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URBAN GROWTH AND DISASTER RISK ACCUMULATION NEXUS: THE CASE OF WA MUNICIPAL AREA

BY

ASAFO DIVINE MAWULI

(10254282)

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DECLARATION

I, Asafo Divine Mawuli hereby declare, that this research is my own work and all secondary data employed in composing the thesis are acknowledged accordingly. No part has therefore been presented in any form to any institution for the award of any other degree.

Asafo Divine Mawuli

(10254282)

Signature……...

Date……/……/……

Supervisors

Professor Martin Oteng-Ababio

Signature……

Date……/……/……

Professor George Owusu

Signature……

Date……/……/……

DEDICATION

I dedicate this thesis to my mother, Ms Dzodzomenyo Josephine and brother, Asafo Prince Kafui for their tireless support in making my study a success.

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ABSTRACT

Recent demographic dynamics have revealed a dramatic shift in the world's population, manifesting for the first time ever, more than half of all the world's population living in urban areas, with 2008 being the transition year. Ghana is not an exception, as its urban centres continue to experience unprecedented growth. Although cities are focal points for development, they equally potentiate the accumulation of risks if not managed properly. The objective of the study therefore is to examine the relationship between urban growth of Wa and possible risk accumulation using a mixed method approach. A multi-stage sampling technique was adopted for the study due to the heterogeneous nature of the area.

The finding of the study reveals that Wa has experienced unprecedented population and physical growth since 1980. This has compelled urban stakeholders including the Town and Country Planning Department and National Disaster Management Organization to develop various policy interventions to manage this growth. Nonetheless, residents remain exposed to many unsafe conditions. The findings mirror these assertions as many participants of the study remain saddled with inadequate potable water supply, poor sanitation, indiscriminate dumping and haphazard building. Accordingly, incidences such as frequent diarrhoea, flooding and fire outbreaks have become the bane of most communities in Wa Municipal area.

The study observes that since the city authorities appear to be at their wits end, an all-inclusive governance could be a possible antidote for the current situation. It is also recommended that the implementation of Public-Private Partnership (PPP) can also help bridge the infrastructure gap and raise the needed capital to help abate the numerous vulnerable conditions residents of Wa are currently exposed to.

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LIST OF ACRONYMS AND ABBREVIATIONS

CBO	Community-Based Organization
CHPS	Community Health Post Services
CID	Criminal Investigation Department
CSM	Cerebrospinal Meningitis
DRR	Disaster Risk Reduction
ETM	Enhanced Thematic Mapper
FGD	Focus Group Discussion
FIG	International Federation of Surveyors
GHS	Ghana Health Service
GLSS	Ghana Living Standard Survey
GNA	Ghana News Agency
GNFS	Ghana National Fire Service
GOG	Government of Ghana
GSS	Ghana Statistical Service
GWCL	Ghana Water Company Limited
IFPRI	International Food Policy Research Institute
IFRC/ RCS	International Federation of Red Cross/ Red Crescent Society
ILGS	Institute of Local Government Studies
KLM	Keyhole Map-up Language
KVIP	Kumasi Ventilated Improved Pit
LI	Legislative Instrument
MDG	Millennium Development Goal
MOFA	Ministry of Food and Agriculture
MOFEP	Ministry of Finance and Economic Planning
MTTU	Motor Transport and Traffic Unit

MWRWH	Ministry of Water Resource Works and Housing
NADMO	National Disaster Management Organization
NGO	Non-governmental Organization
NHIS	National Health Insurance Scheme
NPC	National Population Council
NRSC	National Road Safety Commission
PPP	Public Private Partnership
RTA	Road Traffic Accident
SPSS	Statistical Package for Social Science
TCPD	Town and Country Planning Department
UDS	University for Development Studies
UNDP	United Nations Development Programme
UNFPA	United Nations Population Fund
UN-Habitat	United Nations Human Settlement Programme
UNICEF	United Nations Children's Fund
UNNATI	Organization for Development Education
WHO	World Health Organization
WMA	Wa Municipal Assembly
WMHD	Wa Municipal Health Directorate

CHAPTER ONE

GENERAL INTRODUCTION

1.0 Introduction

Prior studies indicate that the human population has lived a rural lifestyle for much of its history (Population Reference Bureau, 2010). According to the UN-Habitat (2005), 5 percent of the world's urban population was living in urban areas in 1800 (cited in Stephenson et al., 2013). Additionally, the world's population of 2,519 million had only 733 million urban inhabitants which represented 29.4 percent in 1950 (Cohen, 2006; UN, 2012). In recent times, urban population has increased. In 2000 for example, the world's urban population was 47 percent (UN-Habitat, 2001). Consequently in 2010, more than half of the world's population, representing 51.6 percent, resided in urban centres (UN, 2012). The shift of population to cities has not only led to a population increase but also to the expansion of its physical areas. As stated by Cohen (2006:71), 'given the increase in total urban population, it is not surprising to discover that the world is experiencing both an increase in the absolute number of large cities and seeing cities reach unprecedented sizes'. Current estimates therefore projects that by 2050, the world's population will rise to 9 billion with urban centres inhabiting two-thirds (6 billion) of the total population (Oteng-Ababio, 2013; UN-Habitat, 2014).

The growth of urban centres have been unevenly experienced across the world. That is, urban population growth has been largely associated with developed countries (UN-Habitat, 2009). For example, in 1970 and 1994, the percentage share of urban population of developed regions was 67.5 percent and 74.7 percent respectively (UN, 1995 cited in Yankson, 2006). Nonetheless, growth of cities in developing countries

within this period was insignificant. As stated by UN-Habitat (2008), most of the developing countries had their population largely living in rural areas. According to United Nations (1995), urban population of less developed regions in 1970 and 1994 was 25.1 percent and 37 percent respectively (as cited in Yankson, 2006). Additionally, in 1950, the total population of people living in urban centres in Africa and Asia was 15 percent and 17 percent respectively (UN-Habitat, 2009).

More recently, trends in urban growth have seen developing countries including Ghana experience rapid population increase in their cities (Pelling and Wisner, 2009). Songsore (2009) indicated that though the rate of urbanization in the developing world is steady, the rates of population growth of cities in these countries are unprecedented. Consequently, Africa is the least urbanized continent in the world yet experiencing the fastest rate of urban population increase (UNFPA, 2007). The UN-Habitat (2006) revealed that there are more people in urban settlements in Africa than in Western Europe. Examining the rate of growth on the continent, it is estimated that Africa's urban population will swell more than twice its size, from 294 million in 2000 to 742 million in 2030 (UNFPA, 2007).

Industrialization and economic development have largely been acknowledged as the primary factors that have driven growth of urban areas in developed cities (Cohen, 2003). Conceivably, the early part of the 20th century saw most developed countries shift from an agrarian economy to an industrialized economy, and this paved way for rapid urbanization (Yankson, 2006: 4). Accordingly, Yankson (2006: 4) further noted that 'the increase in population and industrialization tend to occur together and they have traditionally been considered indicators of national development'. As a matter of fact, economic development and industrialization have created favourable

environments for cities to offer high productivity, economic growth, employment and significant contribution to the GDP. A case in point is China, where the contribution of its industrial cities to the GDP was 68.6 percent in 1996 (Xuemei, 2002, cited in Yankson, 2006). This enables cities to offer greater and wider livelihood opportunities such as employment, quality education and health systems, higher income, security and social amenities for its inhabitants. Sen (1981) cited in Pelling (2007) points out that cities serve as 'a place of refuge from famine where food stores, economic opportunities and political accountability provide a buffer from environmental change'.

However, the processes of growth in cities of developing countries have been seen as largely demographic, more so than driven by economic urbanization (Songsore, 2009). Earlier studies established that rural-urban migration, natural increase in population and reclassification of rural areas as urban centres are the major contributing factors of urbanization in most cities of developing countries (Nsiah-Gyabaah, n.d; Cohen 2003; UNFPA, 2007). According to Pelling and Wisner (2009), urban growth processes in most developing countries are driven by a rapid population increase amid limited economic growth and development.

The confidence that cities offer economic, cultural, social as well as human development through wider livelihood opportunities cannot be underestimated. Nonetheless, cities, if not managed well, generate vulnerable conditions which make urban spaces uninhabitable. The UN-Habitat (2008b: x), noted that 'cities are the materialization of humanity's noblest ideas, ambitions and aspirations, but when not planned or governed properly, can be the repository of society's ills'. As a result, the unpreparedness of city authorities to guide growth in cities through the provision of

infrastructure and services compels inhabitants to engage in vulnerable activities to survive (Pelling and Wisner, 2009). These vulnerabilities include poverty, poor sanitation practices, inadequate potable water supply and crime just to mention few. Much of these challenges, however, have been attributed to developing countries especially, Africa, where governments and other city authorities in their inadequate capacities fail to manage urban growth processes (Pelling and Wisner, 2009).

The features associated with growth of urban centres in developing countries do not differ from the experiences of Ghana. According to the Ghana Statistical Service, 7.8 percent of Ghana's population was in urban centres as at 1921 and this increased to 32 percent in 1984 (Owusu, 2005). In 2000, the urban population further increased to 43.8 percent (Owusu, 2005). In 2010 however, the country saw more than half (50.9%) of its population residing in cities (GSS, 2013b). In most of these cities where growth is rapidly taking place, the failure of city authorities to build, sustain or improve existing infrastructures has resulted in the accumulation of disaster risks such as fire, floods, crime, road traffic accident, and disease epidemics among others (Songsore, 2010). For instance, the first two weeks of the year 2013 recorded a total of 265 fires nationwide with Greater Accra recording a substantial occurrence of 51 fire outbreaks (Osoko, 2013). Additionally, the recent cholera outbreak in most cities in 2014 cannot be overlooked. Out of the cumulative total of 20, 955 cases recorded with 166 deaths (between January 1 and October 5, 2014), 16, 970 cases representing 81 percent were recorded in the Greater Accra region (WHO, 2014). These disaster risks have become inevitable when one examines the rate at which human activities are generating complex and interconnected vulnerable conditions that pose serious threats to urban existence (UN-Habitat, 2014).

1.1 Problem statement

The processes of urbanization in cities of developing countries have been challenged by the inadequate provision of infrastructure and services. UN-Habitat (2014:28) noted 'cities are not fulfilling their development potential which is underscored by evidence of environmental strains and social conflicts in urban areas'. Poorly connected roads, insufficient potable water supply, poor access to health services, inadequate housing and sewerage among others, have been the problems characterizing most of these growing cities (Pelling and Wisner, 2009).

Several policies and intervention programmes including the establishment of satellite cities, development of urban corridors to disperse economic activities, (UN-Habitat, 2014) have been rolled out by various governments and city authorities to manage and sustain infrastructure services amid the rapid population increase in the cities. Additionally, decentralization initiatives have been designed to empower city authorities to sustain their mandate of providing basic services for their growing population (UN-Habitat, 2014). That notwithstanding, financial constraints, political interference and weak governance is obstructing city authorities' ability to meet the infrastructural demands of their population (Cohen, 2006). Besides, 'there are no inevitable consequences of rapid urban population growth; rather, they are a consequence of political and institutional failure that inhibits effective urban planning, investment and regulation' (UN-Habitat, 2014: 28).

The challenge of providing adequate infrastructure to meet the growing population in cities has resulted in the accumulation of various forms of disaster risks. As noted by Pelling and Wisner (2009:3), 'cities are becoming hotspots of disaster risks'. With specific reference to African cities, the overarching problem of widespread poverty is

a factor increasing the impact of these risks on the urban population (UN-Habitat, 2014). Consequently, disaster risks such as fire, floods, crime, road traffic accidents and disease epidemics, among others, are fast accumulating in these cities.

Compared to other cities in Ghana, Wa has the least proportion (16.3%) of urban population (GSS, 2013b). Nevertheless, it is experiencing rapid growth (GSS, 2013a; Ahmed and Dinya, 2011). The genesis of the growth of Wa dates back to 1983 when the Government of Ghana created the Upper West Region, which subsequently elevated Wa to a regional capital status to bridge the development inequalities between the area and other parts of Ghana, (GSS, 2002a; Peprah, 2014). This opened a regional administration with its multi-sectoral agencies and departments for administrative functions. This development necessitated the provision of basic infrastructure such as housing, potable water, roads, health and educational facilities.

More significantly, the establishment of two tertiary institutions: the Wa Polytechnic in 1999 and the Wa campus of the University for Development Studies (UDS) in 2002 in the municipality fuelled the growth of the population (Peprah, 2013). The UDS Wa-campus, being the largest among the UDS campuses, hosted a population of 12, 001 (representing 62.8 percent of the entire UDS population) in 2013 (graphiconline.com, 2013). As affirmed by Ahmed and Dinya (2011), the opening of UDS (Wa campus) has led to the influx of students and workers of various economic activities to Wa and its environs. Between 2000 and 2011, a total number of 7 public and private second-cycle schools have been opened in Wa and its environs (WMA, 2012) while many other basic schools including primary and Junior High Schools have also surfaced (UNDP, 2010).

Also, the construction of major trunk roads linking Wa to other parts of the country such as Kumasi and Tamale has revived accessibility to the municipality (Peprah, 2013). In the past, one could hardly see buses commuting from Wa to other areas like Kumasi, Accra and Tamale. Today, several private and public transport companies such as OA, State Transport Company, Metro Mass Transport and other smaller busses commute to and from the municipality on a daily basis (Nunoo, 2014). The WMA (2012) indicated that the municipality is dominated by over 250 private commercial vehicles with about 150 daily passages. Consequently, economic activities have seen a significant revamping with enormous commerce and retailing activities. The increasing number of hospitality industries such as Upland and Blue Hill hotels is a true reflection of these economic activities as noted by WMA (2013:11), Wa municipality is currently the 'regional commercial and service centre' in the Upper West region.

The aforementioned factors, as causes of growth in the Wa municipality, cannot be underestimated. Consequently, the population of Wa has almost doubled in a spate of 26 years. In 1984, the population was 36,067 and this increased to 66,644 in 2000. In 2010, about 71,053 was recorded as the population of Wa (GSS, 2000; GSS, 2013a). Beyond the episode of population increase, there are conditions of vulnerability generation associated with the city.

Unguided growth in cities has been noted to create intense pressure on infrastructure, basic services and the spatial structure of urban systems (Ahmed and Dinya, 2011; UN-Habitat, 2014). Prior studies have highlighted several disaster risks accumulating in cities which have experienced unguided growth. Significant among them is Songsore et al (2009), who examined environmental and disaster risks in the Greater

Accra Metropolitan Area, while Oteng-Ababio (2013) focused on the relationship between urbanization, health risks and environmental sanitation in Accra.

Though it is clearly established that the unguided development of cities results in accumulated risks, not much attention has been drawn to the processes of growth and how these risks accumulate. Also, the focus of these studies have largely been placed on large cities at the expense of small and medium-size cities. That is, a medium sized city like Wa is currently becoming a 'ridicule of human activities against the backdrop of the inability of the institutional arrangements and planning legislations to work against the deteriorating effects of unauthorized human activities' (Ahmed and Dinya, 2011). It appears many questions remain unanswered with regards to how disaster risks accumulate in small and medium-sized cities. The study therefore tries to pose the following questions with focus on Wa municipality:

1. What has been the physical manifestation of rapid urban growth?
2. How are public and private sector institutions responding to this growth?
3. What vulnerabilities are generating as a result of the growth and how are they being generated?
4. What are the coping strategies adopted by residents to mitigate disaster risks perceived to be accumulating in the municipality?

It is against these background questions that the study examined the growth processes and its associated disaster risks in Wa municipality in other to inform policy.

1.2 Objectives

The general objective of the study is to analyse the socio-political risks emanating from the rapid growth of Wa. The specific objectives are:

1. To examine the processes of rapid growth in Wa Municipality.
2. To examine institutional arrangements established to respond to the growth processes.
3. To identify and analyse the vulnerabilities generated by the growth processes.
4. To assess the perceptions and coping strategies of the stakeholders in managing some of the backlash of the growth processes.

1.3 Hypothesis

Ho: Residents' location does not affect their access to potable water, sanitation and solid waste.

HA: Residents' location affects their access to potable water, sanitation and solid waste.

1.4 Justification

Urban centres have been perceived as the safest and most secure areas of human habitation because they promote quality living conditions and economic development (Cohen, 2003). According to Sen (1981) cited in Pelling (2007:1), 'cities serve as places of refuge from famine where food stores, economic opportunity and political accountability provide a buffer from environmental change'. These perceptions and observations about urban centres have accounted for the rapid increase in the population of urban centres. That notwithstanding, the UN-Habitat (2014:33) indicated that 'urban areas are often the localities most vulnerable to disasters, due to dense populations, accumulation of assets and a variety of activities within comparatively small geographical areas'.

Urban centres in Ghana in recent times are experiencing rapid population growth (GSS, 2012). An observed consequence of this growth is the increasing occurrence of disasters experienced by large cities such as Accra, Kumasi, Tema, Tamale and Sekondi-Takoradi among others. For instance, in 2006, flooding resulted in the death of 23 people (NADMO, 2011 cited in Oteng-Ababio, 2013). Besides, Accra in 2010 recorded 3,286 cholera cases with 54 deaths (GNA, 2011 cited in Oteng-Ababio, 2013). Although NADMO's main aim is to strengthen disaster prevention, manage and establish response mechanisms, inadequate funds and infrastructure are limiting its operations (Oteng-Ababio, 2013). In addition, limited resources and sometimes the subversion of development plans increase these risks, such as floods, fire, accidents and diseases which pose threats to the urban population, especially the poor (Songsore, 2010).

The spate of growth in the Wa municipality cannot be overemphasized. As a growing city, Wa municipality is fast growing due to several factors such as the existence of educational facilities, the upgrading of the administrative status and the completion of roads linking the town to other parts of the country. This growth has been observed to be without a corresponding injection of necessary infrastructure hence, there has been accumulation of disaster risks in the city.

Accordingly, the study reveals the processes of urban growth in the area to inform stakeholders about the trends of development in the municipality. This the study believes, will help facilitate the formulation of policies to manage the growth processes in the municipality. In addition, findings of the study on disaster risks accumulating in the area will provide a direction on coping strategies that ought to be adopted to mitigate the impacts of the risks accumulating in the area.

Also, the study provides pragmatic solutions on the experiences of emerging cities and their processes of growth and disaster risk accumulation in the country. This will present a varied dimension of urban development and risk accumulation in emerging cities. Finally, the findings will offer all-encompassing strategies for building resilience in urban towns of various categories and sizes in Ghana.

1.5 Limitations

The study faced three major challenges as its limitations. The first limitation was inadequate available data from key urban stakeholders (especially government institutions). These were needed to trace the pattern of infrastructural provision and to investigate the trends of disaster risk accumulation in the municipality. That notwithstanding, the available data and other information collected from these institutions were used to complement the primary data collected from the field.

Also, the large number of native people in the municipality who had low proficiency in speaking the English language increased the timeframe of the study. However, experienced interpreters including teachers from Senior High Schools, Assemblymen and students from the UDS, who were natives of the area and understood the local language (*Wale*) constituted the research team and provided quality interpretation to issues raised by the respondents.

Lastly, there was the challenge of the boundaries of the communities and residential categories. This was noticed especially in the low and middle income residential areas where population dynamics and characteristics were high. Nonetheless, the Assemblymen and other local members of the area helped in demarcating the

boundaries (based on historical and past experiences) of the study areas. This guided the study primarily in data collection.

1.6 Definition and operationalization of key concepts

Disaster risk: 'The potential disaster losses, in lives, health status, livelihoods, assets and services, which could occur to a particular community or a society over some specified future time period' (UNISDR, 2009). Examples of such disaster risks include; flood risk, disease epidemics, Road Traffic Accidents (RTAs) and fire risk.

Hazards: 'A dangerous phenomenon, substance, human activity or condition that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage' (UNISDR, 2009). Hazards could be of natural origin or anthropogenic (technological) and these could include floods, RTAs, disease epidemics, earthquakes and fire outbreaks.

Classification of towns: Ghana's official definition of an urban centre is an area with a population of 5000. Using this definition, three main classification of urban hierarchy is made for the purpose of this study: large towns, medium/intermediate and small towns. At the top of the urban hierarchy are large towns with population of 250, 000 and more, a typical example is metropolitan areas. The intermediate or medium-sized towns are areas with population of 50,000 to 250,000, a typical situation of regional capitals and municipal areas and the small towns are areas with population between 5000 and 50,000. District capitals mostly form such small towns. It should therefore be noted that this classification is for the purpose of this study as

there is no classification of urban hierarchy in Ghana except the official definition of urban centres.

Urban growth: 'The increase in the number of people who live in towns and cities, measured either in relative or absolute terms' (UNFPA, 2007).

Vulnerability: 'The characteristics and circumstances of a community, system or asset that make it susceptible to the damaging effects of a hazard' (UNISDR, 2009). Vulnerable conditions could rise from physical, economic, social and environmental conditions such as haphazard and sub-standard building, poor sanitation practices (open defecation), unimproved solid waste management practices (burning, dumping in drains) and use contaminated water sources such as dams.

1.7 Structure of the study

The study has been organised into seven chapters. Chapter One dealt with the introduction, the problem statement, the research questions and the research objectives. In addition, this chapter has the write-up on the hypothesis, the justification of the study, its limitations and the organizational structure of the study.

Chapter Two primarily dealt with the literature review. Major themes examined under the chapter include urban growth in the world context, as well as trends and projections of urban growth in Ghana. Approaches to infrastructure provision in urban centres during the pre-colonial, colonial and post-colonial era were also examined while access to social services was equally assessed. Additionally, theory and conceptual issues guiding the study was also assessed. Chapter Three included the research methodology which considers the study design, its strategy, the sampling techniques, data collection processes and the analysis of the various objectives of the

study. Besides, the study area and its physical, socio-cultural, economic and political characteristics was examined.

Chapters Four, Five and Six presented the findings of the study. Chapter Four examined the growth processes in Wa municipality and the institutional capacities established to manage the processes. Chapter Five and Six presented findings on vulnerabilities generated by the growth processes and the respondents' perceptions on disaster risks in Wa. Chapter Seven which is the final chapter focused on the major findings, summary, conclusion and the recommendations proposed by the study.

CHAPTER TWO

LITERATURE REVIEW, THEORY AND CONCEPTUAL ISSUES

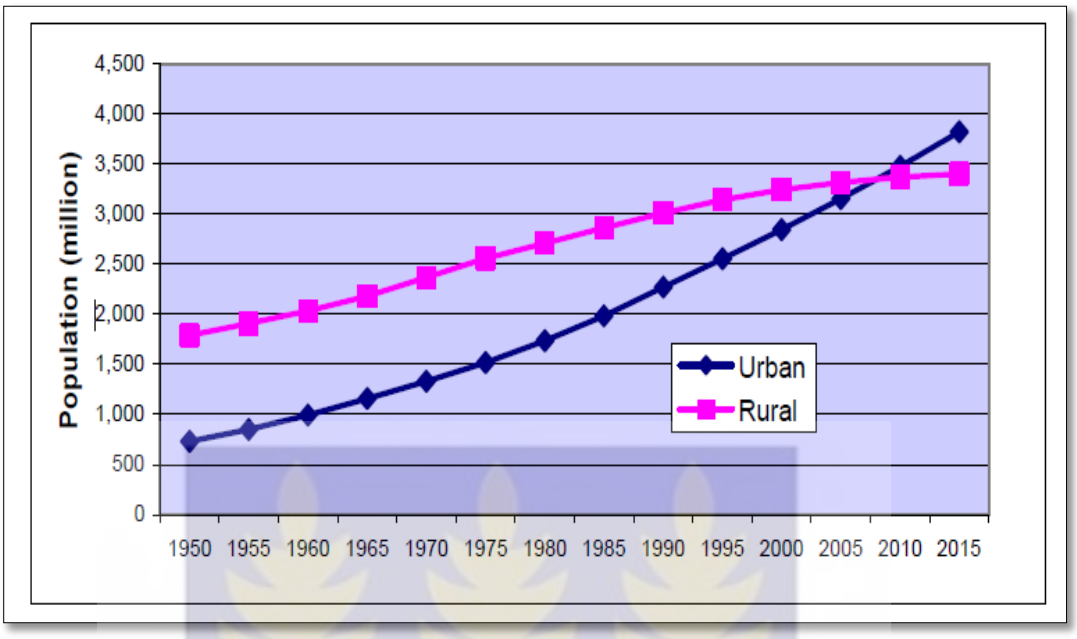
2.0 Introduction

The previous introductory chapter highlighted the research problem and outlined the objectives, hypothesis, its justification and the structure of the study. This chapter explores urban growth processes, dynamics and trends in the global and local context of Ghana. Additionally, the theory and conceptual issues underpinning the study is extensively discussed in this chapter.

2.1 The global urban dynamics

Undoubtedly, the growth of population in cities is assumed to be the most single largest influence on development in the 21st century (UNFPA, 1996 cited in UNFPA, 2007). The world's population was largely rural with 13 percent residing in urban areas as at 1900 (FIG, 2010). However, urban growth became significant during the 1950s with a population growth rate of over 3 percent per year (UN-Habitat, 2010). This growth rate saw the world's urban population increase from 220 million in 1900 to 732million (29%) in 1950. Consequently, periods from 1950 saw the world's population becoming increasingly urban. As Yankson (2006) posited that modern urbanization took place within the last two centuries and large-scale urbanization was a characteristic of the mid-20th century. Davilo and Julio (2002) cited in Satterthwaite (2007) also explains that since 1950, several urban changes have been dramatic, with the urban population of several countries increasing more than ten-fold and many others more than twenty-fold. Figure 2.1 illustrates the level of growth of the urban population as against the rural population of the world from 1950 to 2015.

Figure 2.1 Growth in the world's rural and urban population, 1950 –2015



*2015 is a projected figure based on data available.

Source: Satterthwaite (2007)

Satterthwaite (2007) identifies that these figures and the unprecedented increase in the urban population contrasted with the gradual decrease in the rural population do not only uncover the data of urban population growth, but also, the development and multiplication of the world's economy. He further acknowledges that the phenomena have had a significant influence on a city's economy by transitioning most urban economies from agriculture to industry and service. Coupled with this transition is the influence on the political structure of parts of the world which has seen the apparent disappearance of colonial empires (Satterthwaite, 2007).

Several studies and world reports have indicated that the growth of the urban population coupled with its trend and pattern has not been uniform and as a result, accounts for the uneven distribution of urban populations across continents and countries in the world (Yankson, 2006; FIG, 2010). According to UN-Habitat (2009),

urban growth was largely observed in advanced and develop countries in the 1950s and 1960s. According to Pacioni (2001) cited in Yankson (2006), Britain, North West Europe and USA had more than 25 percent of its population residing in urban centres in 1890. Besides, Yankson (2006) indicated that global figures show more than 75 percent of the population of Europe, North America, Japan and Australia/New Zealand was urban as at 1994 and he therefore projected that by 2025, about 80 percent of the population of these countries will be urban dwellers. The UNFPA (2007) also confirmed that the beginning of the 20th century saw developed regions having more than twice the number of urban inhabitants as compared to less developed countries with urban inhabitants.

Developing continents such as Africa and Asia had much of their population still living in rural areas (Yankson, 2006; UN-Habitat, 2008b). Africa in particular had the least of its population residing in urban areas within this era. Satterthwaite (1996) cited in Songsore (2009) states that until most African countries attained independence in the 1960s, the European colonial period deliberately restricted the population growth of urban centres by imposing restrictions on migrants who wanted to move into the urban areas. These developments according to Songsore (2009) proclaim Africa to be in the early stages of its urban transition. Figure 3.2 shows the distribution of the world's urban population by major regions.

Table 2. 1. Distribution of Urban Population by region (1950-2010)

REGION	1950	1965	1980	1995	2010*
Africa	14.1	20.7	27.3	34.9	43.6
Asia	17.4	22.4	26.7	34.7	43.6
Latin America and the Caribbean	41.4	53.4	64.9	73.4	78.6
Rest of the world**	55.3	64.1	70.5	74.2	78.0

* Projected
** Rest of the World includes all countries in Europe, Northern America and Oceania.

Source: Drawn from figures in United Nations, 1998, World Urbanization Prospects: the 1996 Revision, (Population Division, New York) cited in Songsore, 2009.

Table 2.1 clearly shows that developing countries in Africa and Asia had less than 20 percent of their population urban as of 1950. However, while Latin America and the rest of the world (Europe, North America and Oceania) had more than half (50%) of their population living in urban areas, in 1965, 1980 and 1995, Africa and Asia had their urban population below 50 percent within the same periods.

A more significant accomplishment has been made in urbanisation where the 21st century is observed as the '*century of the city'* (UN-Habitat, 2008b). That is, in 2008 and for the first time in history, half of the world's population (3.3 billion) was absorbed in towns and cities (UN-Habitat, 2008b). With this 'breakthrough' in human existence, it is projected that the population of urban dwellers will continue to increase. According to UNFPA (2007), the urban population will grow to 4.9 billion by 2030, while the world's rural population decreases by some 28 million people between 2005 and 2030.

Several remarkable features have been associated with the current trend of urban growth in the world. One of such features is the fact that most of the growth in urban population will occur in the cities and towns of developing continents (Cohen, 2006; UNFPA, 2007). Martine et al (2008) cited in Songsore (2009) indicated that while Asia's urban population will double from 1.36 billion to 2.64 billion in 2030, Africa's population will also shoot up from 294 million to 742 million, if only the impact of HIV/AIDS is controlled. In sum, the UN-Habitat (2008b) cited in Songsore (2009) estimates that 95 percent of the world's urban population growth over the next four decades will be observed in developing countries. Significantly, Asia and Africa will account for 80 percent of this growth (UNFPA, 2007).

Although Africa's urban population was still largely rural as of 2008, the growth of the urban population in this region, according to UN-Habitat (2008a), will not be accommodated by large or mega cities but rather small and intermediate towns with population of less than 500,000. That notwithstanding, and in contrast to developed countries, urban primacy (a situation where the majority of the urban population of a country is agglomerated in a single town, mostly capital towns) will be a feature associated with urban growth in developing countries. Cohen (2003) recounts that several low and middle-income countries demonstrate a high degree of urban primacy with a large proportion of their national population residing in a single city which in many cases is the national capital.

In the midst of this rapid growth of urban centres in the 21st century, the majority of cities in the developed world is said to have nearly half of their cities growing at a very slow pace of less than 1 per cent annually (UN-Habitat, 2008b; Satterthwaite, 2007). In addition, it is estimated that with an urban population of the developed

world of nearly 900 million as of 2005, it will slightly increase to 1 billion by 2030 and 1.1 billion by 2050. This slow pace of population growth in developed cities will result from in-migration of populations from poorer countries (UN-Habitat, 2008b).

Of further enormous significance of urban growth in the 21st century is the condition under which urban growth is occurring, especially in most developing countries. Unlike the developed world, where urban growth is largely driven by economic growth and industrialization, an observation in most developing countries indicated that most cities in this region are experiencing rapid urban growth in the absence of economic development and industrialization (Cohen 2003; Yankson, 2006). As posited by Songsore (2003) and cited in Songsore (2009), developing countries are experiencing 'demographic urbanization' instead of 'economic urbanization' resulting from low levels of radical transformation in agriculture and industrialization. Against this backdrop, other factors such as the annexation of rural areas as urban areas, reclassification of rural settlements and natural increase have largely been acknowledged as accounting for the rapid growth of urban centres in these developing countries (Cohen, 2003). According to Satterthwaite (2007), studies have revealed that from 1950 to 1980, migration and the natural increase in average terms contributed about 40 percent of urban population growth in low and middle-income nations. However, references were made to the variation of these percentages between nations, ranging from as low as 7 percent to 77 percent.

Unprecedented in the modern growth of urban areas is the rise of mega-cities defined as cities with a population concentration of more than 10 million (FIG, 2010). These mega-cities involve the merging of large cities to create huge urban agglomerations (UN-Habitat, 2010). A case in point is the Tokyo – Nagoya – Osaka – Kyoto – Kobe

mega-region in Japan. This feature associated with modern urban growth has seen the increase of mega-cities increase from 2 in 1950 to 20 in 2005, and examining the trend of growth, it is estimated that over half (17 out of 20) of these mega-cities will be located in Asia (FIG, 2010). With the current rate of urban growth with its associated trends and patterns, it is estimated that the world's urban population will by 2030 reach (60%) or 4.9 billion (FIG, 2010; UN-Habitat, 2008b).

2. 2 Urban trends in Ghana

Ghana is observed to have one of the fastest growing populations in the world (GDHS, 2008 cited in NPC, 2011). According to Owusu (2005), the population of Ghana has seen a much significant increase following the formal introduction of a census in 1920. Beyond the increase in population in the country is the significant rise in urban population, defined as a settlement of 5000 or more people. Empirical data from GSS (2002) cited in Owusu (2005) pointed out that the urban population of Ghana which was 7.8 percent in 1921 increased to 23.1 in 1960, 32 percent in 1984 and 43.8 percent in 2000. According to Songsore (2009), the growth of urban towns in 1948 increased nearly nine fold from 41 in 1948 to 364 in 2000. Table 2.2 shows the number of urban settlements and urban population from 1948 to 2010.

Table 2.2 Growth in Number of Urban Settlements and Urban Population, 1948 to 2000

Year	No.of Settlements	Population	Percentage urban
1948	41	570,597	--
1960	98	1,551,174	23.1
1970	135	2,472,456	28.9
1984	203	3,938,614	32.0
2000	364	8,278,636	43.8
2010	***	12,545,229	50.9

***(not available)

Source: Ghana Statistical Service, April 1995, Vol. 2, 20; 2001; 2002 cited from Songsore (2009); GSS, 2013b

In 2010, the average annual growth rate of 3.1 percent between 2000 and 2010 saw a little over half (50.9%) of the country's population living in urban areas (GSS, 2013b). It is therefore projected that by 2025, urban centres will accommodate 63 percent of the total population of Ghana (GSS, 2005 cited in NPC, 2011). According to Songsore (2009), factors such as rural-urban migration, natural increase and reclassification of rural areas as urban settlements are accounting for the growth of urban centres in Ghana. He further noted that the large growth in the number of urban settlements would suggest that reclassification of rural areas is quite significant although rural-urban migration and natural increase largely account for the driving process of urbanization.

The development of urban centres in Ghana has been uneven following pre-colonial, post-colonial and post-independence policies which influenced growth patterns

(Owusu, 2005; Songsore, 2009). According to Songsore (2009), three major time phases (pre-colonial, colonial and post-colonial periods) influenced the evolution, growth and development of urban centres in Ghana.

2.2.1 Pre-Colonial Phase

According to Songsore (2009), the pre-colonial era was characterized by trade and commerce was the 'bedrock' of state formation and the development of commercial centres. He further points out two trade eras which influenced the development of towns in Ghana in the pre-colonial era. This included the trade with Western Sudan between the 11th and 16th century which saw areas such as Yendi, Gambaga, Nalerigu and Wa, among others, in the North Eastern and Western parts of Ghana becoming commercial towns. Areas that further developed as a result of this trade included Salaga and most importantly Kumasi, which was located at the Southern part of the country (Songsore, 2009). Trade commenced by the Europeans in the 15th century intensified the formation of commercial areas. This new trade focused on coastal areas and those interior parts of the country where there was easy access to resources and to the Atlantic Ocean as their transport routes (Songsore, 2009). As a result, new towns that developed along with the European trade included Elmina, Cape Coast and Accra. Kumasi intensified its commercial activities following the role it played as 'Middletown' for linking resource in northern and coastal towns resulting from the Sudan and the European trade. This phase, according to Songsore (2009), was immediately followed by the colonial era.

2.2.2 Colonial Phase

Strategically, the colonial era evolved with investments in infrastructure by Europeans in areas which were endowed with natural resources such as gold, timber, cocoa, bauxite and manganese (Songore, 2009; Adarkwa; 2012). According to Owusu (2005) cited in Adarkwa (2012), investment policies were informed considering the region with exploitable and exportable resources and this invariably led to the provision of infrastructure in such areas. The concentration of trade, coupled with the provision of infrastructure in these 'resource endowed' areas improved urban concentration, as existing and new towns were created to promote trade (Owusu, 2005). Songsore (2009) noted that coastal port towns such as Sekondi-Takoradi and Accra emerged as the most important centres for export and import activities. These areas, including Kumasi, dominated much of the social infrastructure in the country.

The areas in the northern part of Ghana did not receive such investments from the then flourishing European trade (Owusu, 2005; Songsore 2009; Adarkwa, 2012). It is noted however that the development of the European trade changed the orientation of the trading routes in Ghana which used to be the ones flourishing in the north western and north eastern parts of Ghana (Owusu, 2005). This shift in development became the underlying factor which created a wide disparity in the development of towns between the northern and southern parts of the country (Owusu, 2005; Songsore, 2009; Dickson, 1968 cited in Adarkwa, 2012).

According to Adarkwa (2012:4), this situation accounts for the 'underdevelopment and least urbanized nature of the modern day three administrative regions of northern Ghana; the Upper West, the Upper East and the Northern regions, which have persisted till date'. Adarkwa (2012:4) further observes that in the northern regions, the

'north-south dichotomy was also replicated with the urban nodes of Tamale, Bolgatanga and Wa being more developed than their adjoining rural areas'. Consequently, the implementation of the Infrastructure Development Plan spanning from 1919 to 1926 by the then colonial Governor Guggisberg saw the provision of major infrastructure such as the Kumasi railway lines, Takoradi harbour, Korle-Bu Hospital, inter-urban trunk roads and Achimota School among others and all these resulted in the redistribution of the country's population towards these urban areas (Adarkwa, 2012).

2.2.3 Post-Colonial Phase

According to Songsore (2009), the third phase of urban evolution and growth in Ghana ensued after the achievement of independence from the colonial masters. This era was mainly characterized by an import-substitution strategy of industrialization which focused on developing the 'big three' towns including Accra-Tema, Kumasi and Sekondi-Takoradi into hubs of industrial activities (Songsore, 1989 cited in Songsore 2009). Within this period, Accra-Tema accounted for 59.5 percent of all industrial establishments, Kumasi had 16.5 percent while Sekondi-Takoradi had 10.2 percent. Only 13.8 percent of other industrial activities in the country were situated outside these cities (Songsore 2010 cited in Adarkwa, 2012).

This development saw each of these nodes fast acquiring metropolitan status. The development further led to the increase in the percentage of urban dwellers from 7.8 percent in 1921 to 23.1 percent in 1960 (Owusu, 2005) with Accra accommodating 5.5 percent and Kumasi 3.1 percent of the urban population respectively (Farvacque-Victkovic et al., 2008 cited in Adarkwa, 2012). Again, Tamale in the Northern Region, according to Songsore (2003 cited in Adarkwa, 2012) also sprouted up as an

urban node due to the establishment of a rice industry and a natural increase in 1970s and 1980s.

Coupled with the import substitution policy, the provision of transport infrastructure such as the railway lines which connected the Achiase-Kade line to the Accra-Kumasi line at Kotoku near Nsawam (Adarkwa, 2012) also contributed to a population increase in these urban areas. Accordingly, new urban centres such as Nsawam and Nkawkaw developed. Owusu (2005) cited in Adarkwa (2012) indicated that interventions such as the construction of transportation routes contributed to the development of towns located along arterial roads. Following the attributes of urban evolution which portray the predominance of a few urban centres in the country, development planners, according to Owusu (2005), saw it detrimental to spatial development. This called for the implementation of policies such as the growth pole concept and the Integrated Rural Development Programme geared towards managing rural-urban migration (Owusu, 2005). However, these policies were said to have failed in altering the urbanization and settlement patterns in the country. Owusu (2005) acknowledges that in an attempt to fairly distribute the urban population over the urban centres in the country, the skewed urban development was linked to the policy of Decentralization of 1988 which saw the shedding of political and economic responsibilities as well as allocation of resources to the district authorities. That notwithstanding, the implementation of the policy over the past decade have not made any significant change to the pattern and trend of urban development.

Current trends of urban growth show a replicable pattern and the trends of the past where a few towns accommodated the largest percentage of the total number of urban population in the country. Owusu (2005) indicated that in 2000, two cities (Accra and

Kumasi) accounted for about 34 percent of the total urban population, although about 350 towns existed by then. Consequently, in 2010, the Greater Accra and Ashanti regions which host these two cities, Accra and Kumasi had the largest proportion of urban population of 90.5 percent and 60.6 percent respectively (GSS, 2013b).

Another major feature associated with urban development in Ghana is the urban primacy where there are large urban centres with high population figures followed by other urban towns characterized by few populations (Songsore, 2009). This development is seen to have evolved from the pattern of development where resources and developmental policies are concentrated in a few large urban centres. Besides, the processes involved in the evolution and growth of urban towns in the past, it also reflected the same nature of 'commerce based' urban growth instead of 'industrial based' urban growth as observed by Songsore (2009).

2.3 The challenge of infrastructure provision

The availability of infrastructure and basic services such as water, sanitation and access to health in urban areas is essential in promoting economic development, and more importantly, the wellbeing of inhabitants (Farvacque-Vitkovic et al., 2008). Cities are believed to provide better access to health, education, basic infrastructure, information, knowledge and opportunities (Champion et al., 2004 cited in UNFPA, 2007). It is against this backdrop, among other 'pull factors', that many people are seen moving into urban areas (Bhatta, 2010).

In cities of developed countries, the recounting impact of industrialization as the main catalyst of urban growth has created an environment for development (Yankson, 2006). The UN-Habitat (2008b) indicated that cities drive national economies through

the creation of wealth, enhancing social development and employment. A case in point is the city of Gaziantep in Turkey, (with a growth rate of 2%) where through a good governance structure, has benefitted from infrastructure such as pipe water, sewerage, electricity and social amenities such as schools and health centres (UN-Habitat, 2008b). Nevertheless, amid a rapid population growth, cities in most developing countries face huge deficits of infrastructure provision. Cohen (2006:64) noted that 'rapid growth of urban centres in developing countries has outstripped the capacity of most city authorities in providing basic social services for their citizenry'. Oteng-Ababio (2013) observes that these urban service provisions have not only failed to match the population, but there is the fast depreciation of existing ones which is driving the urban poor to environmentally challenging areas.

In Ghana, populations of most cities face inadequate infrastructure and services provision (Songsore, 2010; Oteng-Ababio, 2013). The unpreparedness of city authorities, poor governance, and unplanned growth has largely accounted for this challenge (Oteng-Ababio, 2013; 2014). According to Songsore (2010), these limited resources and sometimes the subversion of development plans expose urban dwellers to risk factors such as floods, fire and disease epidemics. Although these challenges are experienced across most cities, the inter-regional disparity is significant. As a national capital, Accra hosts over 30 percent of industries in Ghana (UN-Habitat, 2009) and hence has much infrastructural developments.

Comparatively, the Upper West Region with its capital, Wa, does not receive much of any infrastructural development to meet the demands of its high population (WMA, 2012). According to the WMA (2012), the internally generated fund of the Wa Municipal Assembly to total revenue was 9.9 percent in 2011. Accordingly, the

municipality depends extensively on external sources to fund its budget (WMA, 2012). With health infrastructure, Wa continues to house one public hospital which doubles as the regional hospital serving the entire region (WMA, 2012; UNDP, 2010). More significantly, the unavailability of housing facilities has seen many private individuals putting up substandard structures to meet the demands of the increasing population (Ahmed and Dinye, 2011). Most people also rely on several sources of water for drinking, such as pipe water, dug wells, bore holes, dams, and sachet water. The main source of water residents rely on is borehole (GSS, 2013a) due to the fact that the piped water provision is inadequate in the municipality.

2.4 Institutional arrangement for Service Delivery in Ghana

Infrastructure and social service provision in many developing countries, including Ghana, have been observed to be largely dependent on government. In other words, the approach to the provision and delivery of social services in Ghana is a highly centralized activity which is mostly undertaken by central government (Gyogluu 2006). The adoption of the centralized approach to social services and infrastructure provision associated with developing countries, especially so in Ghana, could be traced to the colonial era where services were provided under the authority of the colonial powers. That notwithstanding, the dynamics of the country's population, political influences, economic reforms and investment, among other factors, have resulted in diverse approaches being adopted by Ghana in the provision of social amenities for all her citizens, especially the poor. Gyoluu (2006) therefore identified several approaches to social service provision and these he categorized into time phases from the pre-colonial era to the post independent times.

2.4.1 The Pre-colonial Era

According to Gyoluu (2006), infrastructure and social service provision were based on a participatory and communal approach during the pre-colonial days in Ghana. He observed that although the country did not exist as a centralized governed state, communities under the leadership of tribal or clan leaders and traditional rulers pulled resources together and communally provided the infrastructure for basic services for themselves. This participatory and community based approach was adopted in providing basic services, as there was no formal structure of infrastructure provision (Gyoluu, 2006).

2.4.2 The Colonial Era

This era however saw the adoption of a more centralized approach to infrastructure provision by the colonial administration (Gyoluu, 2006). The provision of infrastructure within this era, which was mostly through roads and railways, was skewed towards areas with exploitable resources (Owusu, 2005 cited in Adarkwa, 2012). Gyoluu (2006: 58) indicated that this infrastructure, as opposed to social services, was to 'facilitate the exploitation of resources, minerals, timber or cash crops and trade for European companies and their countries'. Moreover, Asamoah (1996) cited in Gyoluu (2006) asserts that the provision of this infrastructure was to maintain law and order hence it was an administrative requirement. For this reason, there was no major plan for infrastructure provision for the country (Gyoluu, 2006).

That nowithstanding, the Guggisberg 10 year Plan from 1920-1930 was seen as the first major colonial infrastructure development plan which was initiated in the interest of the country (Gyoluu, 2006). Asamoah (1996) cited in Gyoluu (2006) states that the

total budget for the plan was £12,247,000 of which 81.6 percent was devoted to infrastructure provision across the length and breadth of the country. Among such infrastructure were health and educational facilities, water, roads and other social services. Also, the Town and Country Planning Department was established according to the 10 year plan (Gyoluu, 2006). It was however observed that the communal and participatory approach to infrastructure provision which was practiced during the pre-colonial era was neglected and a more centralized approach adopted, as pointed out by Denkabe and Songsore (1995) and cited in Gyoluu (2006: 59) that 'local contribution was more of forced labour usually organized by the local chiefs to support projects'. Gyoluu (2006: 59) concluded that this 'top-down non-participatory approach' to infrastructure provision stifled 'local initiative and resource mobilization to support the operation and maintenance of infrastructure services'.

2.4.3 Post-Independence Era

The centralized approach to basic services and infrastructure delivery is seen to be largely practiced in the post-independence era. According to Guseh (2001) cited in Gyoluu (2006), most sub Saharan African countries, including Ghana, chose a socialist form of economic system where the state controlled all resources and was the sole provider of social services. Gyoluu (2006) further noted that capitalism was seen to mean colonialism and consequently, the top-down approach was appropriate and this piloted the expansion of the public sector to ensure State dominance in service delivery. Other factors which facilitated the adoption of this approach included the quest for rapid industrialization, political integration and stability and the promotion of social welfare in the country (Gyoluu, 2006).

The continuous application of the top-down (centralized) approach by government in providing infrastructure and social services did not yield much benefit to communities. Many communities in Ghana continued to face the lack of inadequate basic social services such as water, sanitation and basic healthcare delivery. The fast pace of an increasing population coupled with political unrest, weak institutions, economic breakdowns and huge external debts are identified as major factors which account for the demand for social services to be outstripped by supply (Gyoluu, 2006).

In addition to this plight, Ghana in the 1980s was heavily hit by infrastructure deficit stemming from the economic crisis (Boafo-Arthur, 1999). This led to the adoption of several policies most significant of which was the International Monetary Fund and the World Bank inspired policy of the Structural Adjustment Programme (Boafo-Arthur, 1999). According to the programme, Government was advised to disengage from the provision of public services for its citizenry as a result of its low financial capabilities (Boafo-Arthur, 1999). Consequently, this gross failure of the centralized approach resulted in the adoption of new approaches and paradigms of social service provision in Ghana. Of much significance is the decentralization policy which largely influenced the distribution and allocation of political and economic structures as well as the resources of the country.

The Decentralization policy, established in 1988 saw the devolving of 'power, functions and responsibility as well as human and financial resources from the Central Government to the district level' ILSG (2010). Gyoluu (2006) observes that the policy was a donor-funding requirement, nonetheless it's a structure put in place to ensure good governance and provide opportunities for citizen involvement in developments.

In relation to the Decentralization policy and service delivery, Owusu (2005) pointed out that the programme saw District Assemblies (Local governments) being given more political, administrative and development authority in their jurisdiction. That is, these District Assemblies performed 87 functions; including environmental conservation and the provision of social services were part of these functions.

According to Gyoluu (2006), the decentralization programme outlined various approaches to service delivery which is embraced by various jurisdictions. One of such approach is the People's Participation which tries to involve the public in decision making and policy formulation in matters of concern to them such as health, education and social services. Moreover, the Direct-User participation is another approach which seeks to involve communities to engage in self-help opportunities to provide social services for themselves. Gyoluu (2006) noted that this approach was the old method adopted in service provision in Ghana until the arrival of the 'colonial powers'. However, this approach has been neglected over the years. Finally, private sector involvement in service provision was also introduced to close the infrastructure gap created by the public institutions responsible for service provision. This stemmed from the fact that some State-Owned Enterprises could not play their roles effectively as they raised the financial burdens of government (Republic of Ghana, 1994 cited in Gyoluu, 2006). As a result, many private sector entities were encouraged to provide basic services for the citizens in various areas of the country. The operations of the private sector in service delivery, however, have had a negative impact on the poor, as many people cannot afford to pay for the unsubsidized services (Gyoluu, 2006).

Although the decentralized approach to service delivery has been in operation for some time now, urban areas especially the large ones continue to face the challenges

of basic service delivery taking into consideration the rapid population growth in these areas. A new approach which has therefore been established by government to ensure and improve effective collaboration between government and the private entities was to provide adequate social amenities for the citizenry. This new approach, Public Private Partnership (PPP) defined as a 'contractual arrangement between a public entity and a private sector with clear agreement on shared objectives for the provision of public infrastructure and services traditionally provided by the public sector' (MOFEP, 2011:2) was developed in 2011, although the guideline was established in 2004 but had been non-operational. In the quest to provide adequate basic infrastructure and services to the people of Ghana, the PPP outlined several objectives to meet these goals and this included the 'leverage of public assets and funds with private sector resources from local and international markets to accelerate needed investments in infrastructure and services'. Coupled with this is to provide 'increased availability of public infrastructure and services and improve service quality and efficiency of projects' (MOFEP, 2011: 3).

Accordingly, the adoption of the PPP framework as a new approach to basic services and infrastructure provision reveals the enthusiasm with which the government wishes to curb the rising gap of infrastructure deficit in the country. That notwithstanding, MOFEP (2011:1), revealed that the framework is not to be viewed as a 'substitute' but as a 'complement' to the 'continuous commitment to key service market to competition'. A major difference identified in the aforementioned approaches to infrastructure delivery is the fact that until independence, government was not playing active role in basic service provision for communities. However, one major similarity in these approaches is the partial role government plays in providing infrastructure

especially in the PPP approach where government allows private entities to construct and operate basic infrastructure within the communities.

2.5 The question of access to basic services in Ghana

2.5.1 The case of water

Water is identified as an essential resource for healthy living and the promotion of a hygienic environment (WHO/UNICEF, 2010). According to Gleick and IWRA (1996), various sections of society use water for several purposes such as drinking, removing waste, production, cultivation and energy generation. Among the fundamental requirements of water are its uses for basic needs such as drinking, cooking, bathing and sanitation services. Access to safe and clean water is identified as a major solution to solving increasing environmental challenges and disaster risks arising in cities, particularly in developing countries (Songsore, 2008). Globally, an estimation of 884 million people did not have access to an improved source of drinking water in 2010 (WHO/UNICEF, 2010). Significant factors such as poverty, unequal power relationships, climatic changes, depletion of water sources and increasing urbanization have largely been identified as causes of decreasing access to improved water sources (WHO/UNICEF, 2010; Stoler et al., 2013).

To address the water crisis, the international community has progressively declared access to safe drinking water as a human right. Key among these declarations was in 2002, when the UN committee on Economic, Social and Cultural rights adopted its number 15 general comments on 'right to water'. This was defined as the right of everyone 'to sufficient, safe, acceptable, physical accessibility and affordable water for personal and domestic uses' (WHO, 2003:12). This comprised water for drinking, washing clothes, food preparation, personal and household hygiene. Also, this water

supply must be continuous and sufficient to cover personal and domestic uses. However, swimming pools and gardening do not fall within the scope of the right to water (WHO/UNICEF, 2010).

In 2010, a UN resolution, 64/292, adopted by the UN General Assembly identified the human right to water and sanitation and acknowledged that 'clean drinking water and sanitation are essential to the realization of other human rights'. The resolution called upon all states and international organizations to provide financial resources, capacity building and technology transfer to help countries, especially in developing continents, to provide safe, clean, accessible and affordable drinking water and sanitation for their citizens (UN, 2010).

Further attempt to promote and ensure efficient access to safe water saw the WHO outline key aspects and standards for the right to water (WHO/UNICEF, 2010). It was indicated by the WHO/UNICEF (2010), that improved water (a water source that is, by the nature of its construction, adequately protected at its source from outside contamination, particularly from feacal matter) is ideal for meeting basic needs. Based on these conditions, the WHO categorized the sources of water into improved and unimproved sources. Table 2.3 shows the various classification of water into improved and unimproved sources of water identified by the WHO.

Table 2.3 Classification of water by WHO standard

Improved source	Unimproved source
Household connections	Unprotected wells
Public standpipe	Unprotected springs
Boreholes	Rivers/ponds
Protected dug-well	Vendor provided water
Protected spring	Tanker truck water
Rainwater collection	Bottled / sachet water

Source: WHO/UNICEF (2010)

According to the WHO, the right to water, with reference to sufficiency, requires that between 50 and 100 litres of water per person per day is needed to meet the basic needs and to ensure that few health concerns arise (WHO/UNICEF, 2010). Besides, access to a water source has to be within 1000 metres while collection time should not exceed 30 minutes (WHO/UNICEF, 2010). In addition, water services and water facilities must also be affordable for all, as stated by the UNDP, the cost of water should not exceed 3 percent of household incomes (WHO/UNICEF, 2010).

Despite several international attempts to increase access to water for all, access to safe and clean water is increasingly becoming a major challenge to most urban dwellers, especially in developing countries. The most recent JMP report, 2010 stated that 'urban access to piped drinking water is on the decline throughout sub-Saharan Africa, a trend previously observed over three decades in East Africa' (Thompson et al., 2000 cited in Stoler et al., 2013:). According to Stoler et al (2013), sub-Saharan Africa is identified as the region with the 'highest percentage of urban population without piped water access, a figure that continues to grow'. The decline in access to safe and clean water supply in these developing countries have largely been attributed to population growth as posited by Stoler et al (2013:1), 'rapid population growth in

developing cities often outpaces improvements to drinking water supplies'. As a result, sub-Saharan Africa becomes the only region which is not on track to meet the MDG target of halving the proportion of population without sustainable access to safe drinking water (WHO/UNICEF, 2010).

In Ghana, the National Water Policy formulated by the Government of Ghana in 2007 aimed at providing a framework for a sustainable development of Ghana's water resources (MWRWH, 2007). The GWCL is the official utility provider of potable water for urban dwellers (Balaara and Okyere, 2011). According to MWRWH (2010) cited in Buamah and Yakubu (2011), the effective urban water coverage by GWCL is 59 percent. As a result, 49.8 percent of the urban population has no access to pipe water (GSS, 2013b). The limited coverage of this source compel urban residents to access water from other sources such as boreholes, dug wells, sachet or bottled water and tanker services (UN-Habitat, 2011). Nonetheless, there are regional variations in the main source of drinking water. In the Greater Accra region, about 65.8 percent of urban population has access to pipe water, while many others (27.9%) rely on sachet water as their drinking water. Also, in the Brong Ahafo region, 27.5 percent of the urban population has access to water from a pipe (GSS, 2013b.)

In the Wa municipality, however, boreholes are the major source of drinking water (UNDP, 2010). In a related study by the UNDP (2010), it was observed that, 75.6 percent of the population of Wa depended on boreholes as their main source of water. The GWCL operate boreholes which pump water into a central reservoir, where it is treated and distributed as pipe water (Amoah and Yahaya, 2013). According to GSS (2013a), 46.1 percent of Ghanaians access their drinking water from pipe water. The limited coverage of pipe services by the GWCL accounts for this. Many others

(34.5%) depend on boreholes while 12.0 percent rely on protected wells. The inadequate access to potable water in Wa further compels many inhabitants to drink water from dug wells, dams, rivers and sachets, which are considered unsafe sources by the WHO/ UNICEF (2010)

2.5.2 Sanitation and Waste management

Although the sanitation coverage has been observed to be increasing, the pace of achieving this 'breakthrough' has been slow (WHO/UNICEF, 2014). According to the Joint Monitoring Programme (JMP) report of 2010 2.5 billion people do not have access to improved sanitation facilities (WHO/UNICEF, 2014). Also, less than half the populations of 46 countries have access to improved sanitation facilities (WHO/UNICEF, 2014). Examining the rate of sanitation coverage, it is estimated that the world will miss the MDG sanitation target by over half a million people (WHO/UNICEF, 2014).

The JMP has established standards to monitor the progress of sanitation across various countries. As a result, an improved sanitation facility ('one that hygienically separates human excreta from human contact') has been identified as the model with the capacity to ensure safe sanitation practices (WHO/UNICEF, 2014). Unimproved sanitation, including shared facilities and open defecation, were identified as lacking the capability to ensure hygienic separation of human excreta from human contact (WHO/UNICEF, 2014). Based on this condition, sanitation has been categorized into improved and unimproved facilities as indicated in Table 2.4

Table 2.4: Improved and unimproved sanitation facility by JMP

Improved Sanitation	Unimproved Sanitation
Flush/pour toilet to: piped sewer system, septic tank or pit latrine	Open Defecation
Ventilated improved pit latrines	Shared facilities
Pit latrines with slabs	Pit latrines without a slab or platform
Composting toilets	Hanging latrines
	Bucket latrines

Source: (WHO/UNICEF, 2014)

According to the report, open defecation has been reduced from 31 percent in 1990 to 17 percent in 2012 in developing countries (WHO/UNICEF, 2014). Although there has been a tremendous decline in open defecation, these results are unevenly recorded across all regions. A case in point is India, Indonesia and Nigeria which continue to record high figures of open defecation. Nigeria in 2012 recorded an increase in open defecation of 39 million people from 23 million people in 1990 (WHO/UNICEF, 2014).

Access to basic sanitation is a top priority of Ghana's government to ensure good health and to promote adequate living conditions (Ampadu-Boakye et al., 2011). The National Environmental Sanitation Policy, published in 1999 and revised in 2010 is the guiding policy framework established to re-examine the issues leading to the persistent cause of poor environmental sanitation and health related issues (MLGRD, 2010) Many other private institutions working in relation to improving sanitation have equally stepped up their efforts to promote a safe and healthy environment. Notwithstanding the persistent effort and interest to promote good sanitation, Appiah

and Oduro-Kwarteng (2011:31) observed that 'Ghana is not on track in achieving the target of the MDG 7 towards improving sanitation by 2015'.

Solid waste disposal and access to improved sanitation is therefore a major challenge facing most urban and peri-urban areas in Ghana (Bensah et al, 2011; UN-Habitat, 2011). According to the GSS (2013b), four main types of sanitation facilities are used in Ghana; water closet (WC), public toilet, Kumasi Ventilated Improved Pit (KVIP) and pit latrine. Beyond these, others engage in open defecation and utilize pan or bucket latrines. Nationwide, only 24.9 percent of the urban population uses WC. While 12.8 percent and 12.9 percent uses KVIP and pit latrine respectively (GSS, 2013b). The national figures on the types of sanitation facility used in Ghana do not reflect the situation in Wa. Although 44.4 percent of residents in the urban area use public toilet, a large number representing 30.5 percent engage in open defecation (GSS, 2013a). Furthermore, only 11.8 percent of the population uses WC. The high rate of open defecation in the area is attributed to the lack of sanitation facilities in the various houses (GSS, 2013a).

Solid waste disposal is another major challenge facing both urban and rural areas (GSS, 2013b). The GSS (2013b) indicated that two widely practiced solid waste disposal methods are dumping in public containers or on open dumps. Accordingly, 38.7 percent of the urban population dumps their solid waste in public containers, while 22.7 percent dumps in open spaces. Across the urban space of Ghana, only 22.1 percent of residents have their solid wastes collected. Oteng-Ababio (2013) however noted that house-to-house collection of solid waste is mostly associated with high class residents, while the central communal container is mostly found in the low-class densely populated residential areas. The unreliable service of waste management in

low class areas results in people engaging in other forms of waste disposal, such as burning, burying and indiscriminate dumping (UN-Habitat, 2011; GSS, 2013b). The urban population that engages in burning waste therefore represents 10.2 percent of the population.

In Wa, solid waste disposal is a huge challenge facing the city (UNDP, 2010; WMA, 2012). The recent census report indicated that 55.9 percent of residents dump their solid waste in community containers, while 15.7 percent dispose of their refuse in open spaces. Very few residents (4.4%), however, engage in solid waste collection services. These improper solid waste disposal practices account for the poor environmental conditions in the municipality. Significantly, the UNDP (2010) indicated that the increasing malaria in Wa is the result of the poor sanitation, improper solid waste and sewerage disposal practices.

2.5.3. Housing

Adequate housing is one of the basic facilities needed by every person to promote peace, security and a healthy living (Yankson, 2012). According to the UN-Habitat (2014), several international laws including the 1948 Universal Declaration of Human Rights and the 1996 International Covenant on Economic, Social and Cultural Rights have identified adequate housing as part of standards of living by every human (UN-Habitat, 2014). Examining the No. 4 (1991) general comments of the UN Committee on Economic, Social and Cultural Right, adequate housing was distinguished to contain: freedom, entitlement, more than four walls with a roof and a safeguarded against forced evictions. More importantly, adequate housing should have social services such as water and sanitation services to meet the basic needs of its inhabitants.

Despite various recognitions attached to the right to housing, a great number of people still live without adequate housing facilities. It is estimated that billions of people are not housed adequately (UN-Habitat, 2014), while there are about 1 billion (34 percent of world's population) slum dwellers residing in cities of most developing countries (UN-Habitat, 2003). It is estimated that there will be 2 billion slum dwellers in the next 30 years if not more action is taken by municipal governments and city authorities (UN-Habitat, 2003; UN-Habitat, 2014).

Increasing urban population, failure of housing policies and laws, rising cost of urban lands and increasing cost of private houses are factors limiting the progress of housing in cities of most developing countries (UN-Habitat, 2003). As a result, many urban dwellers, especially the poor, convert marginal lands (flood prone, industrial hubs, transportation routes) and create makeshift houses there (WaterAid, 2008). Coupled with this challenge is the lack of social services such as water, sanitation services resulting from the illegal land tenure and the temporary nature of these structures (UN-HABITAT, 2003).

According to the UN-HABITAT (2011), although Ghana has a history of economic planning, housing has not been largely considered hence regarded as a welfare issue. Several "actors" including public, private institutions and individuals are players of housing production in Ghana (UN-HABITAT, 2011). Notwithstanding the role of these entities, housing production is inefficient and insignificant looking at the demand placed forth by migrants who come to the city with the intension to settle and work (UN-HABITAT, 2011).

According to the GSS (2013b), the annual growth in the housing stock between 2000 and 2010 was 4.4 percent, representing the highest growth rate in Ghana since 1960.

Although there is a significant increase in the housing stock of the country, a major characteristic of housing, especially in urban Ghana, is the shortage in supply and the crowding of the facility (UN-HABITAT, 2011). The housing deficit of the country has increased over time. From 1970, housing deficit stood at 736, 657 and this increased to 1,536 275 in 2000. In 2014, however, the housing deficit was reported to be 1.7 million (graphic.com, 2014). This situation has seen 60 percent of urban households occupy one sleeping room (UN-HABITAT, 2011). Observing the regional distribution of housing nationwide, the Greater Accra and the Ashanti Regions accounted for 30.9 percent of the total housing stock (GSS, 2013b).

Although many private developers are constructing housing facilities for sale and rent purposes, the high cost of the facility and the increasing rent in most urban areas do not provide favourable reception for middle class income earners and not at all for mostly the urban poor (UN-HABITAT, 2011). As a result, the increasing urban population (especially the poor) tend to 'fall through the cracks of ineffective urban planning' as a result of weak governance and people consequently convert marginal lands into informal residential enclaves (UNFPA, 2007:6; UN-HABITAT, 2010). A further study conducted by the UN-HABITAT (2011a) on slums in the country's capital, Accra, shows that about 38.4 percent of its population lives in slums.

Housing demand in Wa is fast outstripping supply. According to the WMA (2012), the housing challenge is worsened by the increasing student population, who lack hostel facilities. According to the 2010 census report, the total number of houses in the municipality stands at 9, 592 with 11.2 as the largest number of persons per house (GSS, 2013b). Comparatively, the municipality has such figures because of the migration of people from other neighbouring towns and villages. Similar to the

national trend of room occupancy, the urban population in Wa has 48.5 percent of residents sleeping in single rooms (GSS, 2013a). This is followed by 25.0 percent of people who reside in two rooms (GSS, 2013a). Many individual landlords have taken advantage of the situation and have been putting up haphazard structures to meet the high demand for shelter. These activities are increasingly distorting the planning models of the municipality and exposing the area to floods as people are building in water ways (Ahmed and Dinye, 2011).

2.5.4 Health infrastructure

Healthcare delivery is identified as one of the sectors in the urban setting that has gained much attention (Waelkens and Greindl, 2001). This, according to Waelkens and Greindl, (2001) has largely been attributed to the increasing number of urban dwellers and the intra-urban inequalities existing between urban populations. According to Pehr (2010), rapid growth of urban areas can have a tremendous effect on a population's health.

Significantly, urban areas have more health infrastructures and better services than their rural counterparts (McMichael, 2000; Montgomery, 2009). Nonetheless, populations in the cities are facing burden of diseases resulting from poor environmental conditions (Waelkens and Greindl, 2001). These emerging challenges of urban health is attributed to inadequate housing facilities associated with a lack of basic social services such as water, sanitation services and proper solid waste management. Satterthwaite (2000) cited in McMichael (2000) revealed, that although effective measures have been applied since the 1990s to improve housing conditions, there is a continuous increase in environmental health burdens of people in low income areas; an outcome of increasing urban growth, weak and ineffective

governance and urban poverty. According to the UNEP and UN-HABITAT (2010), some 2.2 million people die annually from diarrhoeal diseases. WHO (2004) further noted that about 88 percent of diarrhoea cases result from the use of polluted water.

Urban centres in developing countries are facing a double disease burden from poor environmental conditions and uncontrollable lifestyles. According to McMichael (2000:1119), large cities in least developed countries combine 'the traditional environmental health problems of poverty, particularly respiratory and enteric infections, with those of poor quality housing and unregulated industrialization'. Beyond the changing trends of the health status of the urban population in most cities, there is the challenge of quality healthcare delivery. According to the WHO, the recommended doctor- patient ratio is 1:600, a figure reviewed from 1:5000 in the past. However, many cities in developing countries are facing a greater challenge of access and quality healthcare provision.

In Ghana, the trend of healthcare challenges associated with urban growth is not far-fetched. According to the WHO (2014) the recent cholera outbreak recorded 20, 955 cases with 166 deaths nationwide. This outbreak reflects the poor environmental practices associated with cities which poses risk to the health of inhabitants. Access to quality healthcare is increasingly becoming a challenge due to inadequate infrastructure and health practitioners. For instance, the sub-metropolitan areas of AMA are supposed to have a polyclinic each, but this has not been the case (Pehr, 2010). The Tema municipality with a population of 500 000 has only one government hospital (Pehr, 2010). That notwithstanding, there are several more private health facilities within these areas compared to other cities. Although there are many other private healthcare providers who supplement government healthcare delivery in urban

areas, Montgomery (2009:8) reveals that 'in the more monetized urban economy, the urban poor without cash on hand can find themselves unable to gain entry to the modern system of hospitals, clinics, and well-trained providers'.

In terms of the doctor-patient ratio, Ghana is far behind achieving the standard set by the WHO. This is confirmed by a recent statement by the Director General of Health Services for Accra who indicated that Ghana's doctor-patient ratio is approximately 1: 15,259 (Ansah, 2014).

Wa is not an exception to the health challenges and health infrastructure deficit experience by cities in Ghana. Accordingly, the poor environmental conditions and unhealthy lifestyles are exposing the population to disease epidemics such as malaria, diarrhoea, typhoid as well as road traffic accidents (UNDP, 2010). A study conducted by the UNDP (2010) reveals, that although there has been a rapid increase in population over the past years, there has not been any significant change in health infrastructure. For example, the municipality continues to host the only one public hospital which serves as a regional hospital for the whole region (WMA, 2012; UNDP, 2010). Aside this, there are other health facilities such as one private hospital, clinics and maternity homes among others.

A further report of the UNDP (2010) reveals, that the majority of the population of Wa does not have access to the public hospital while others visit clinics, pharmacies and private hospitals. The practice of traditional medicine is, however, rife in the municipality. This could result from the inadequate health infrastructure facing the area. Additionally, the doctor-patient ratio of 1: 17, 869 (in crude form) which is woefully above WHO recommendations and this is placing untold pressure on the health facilities and personnel.

2.5.5 Transport Infrastructure

The basis of economic development is dependent on transport infrastructure and accessibility to goods, services, people and information (Rode and Floater, 2014). Adu (2009) reiterated that a catalyst for accelerating socio-economic growth and development is road transport infrastructure. Mckinnon (2006) further asserted that road transport enables the development of other sectors such as health, commerce, agriculture, education and manufacturing industry. Examining the enormous contribution urban centres make to their country's GDP, the development of transport infrastructure cannot be discounted. According to the World Bank (2002), close to one-third of all city infrastructure is invested in the transport sector looking at how vital the sector is to other sectors of the urban economy.

In most developing countries, urban population is said to be expanding at more than 6 percent annually (World Bank, 2002). This implies the expansion of cities and the creation of sprawls as noted by the World Bank (2002) that the growth of cities is occurring outside the range of already existing transport infrastructure. Besides, the non-expansion and the inability of city authorities to construct new transport infrastructure amid urban growth is causing vulnerabilities such as congestion on roads and vehicular traffic (Mustakim et al., 2008). Consequently, Mustakim et al (2008) asserted that these roads which were never designed for the volume of traffic in current times is the cause of increasing Road Traffic Accidents (RTAs) in cities of most developing countries.

In Ghana, the predominant mode of transport is road transport which account for 94 percent of freight and 97 percent of all traffic movement in the country (Farvacque-Vitkovic et al., 2008). The overall institution that oversees policy formulation,

financing and maintenance of road infrastructure is the Ministry of Roads and Highways (MRH, 2012). The Department of Urban Roads is therefore responsible for the development, planning, control and maintenance of roads in urban centres (MRH, 2012) with the primary aim of ensuring effective access and linkages in the city. Ghana's urban road infrastructure network is about 5,500 km (Farvacque-Vitkovic et al., 2008) however the high urban growth rate is outstripping the provision of urban road infrastructure in a generally unplanned urban process (Farvacque-Vitkovic et al., 2008). Consequently, the urban transport system in most cities is therefore characterized by congestion, high vehicular traffic during peak hours and frequent road accidents (Mustakim et al., 2008; Farvacque-Vitkovic et al., 2008). For instance in Accra, only 28 percent of roads was adjudged to be in good condition and 45 percent ranked as poor whiles in Kumasi metropolitan area, only 11.39 percent of roads in the municipality is asphalted with 28.26 percent paved, leaving 60.35 percent of road networks unpaved (Farvacque-Vitkovic et al., 2008). The conditions of these roads are consequently causing uneasy traffic situations in these cities (Farvacque-Vitkovic et al., 2008). A more challenging factor observed to be driving the aforementioned problems is the inability of city authorities to develop other transport modes such as rail transport and water transport among others.

The challenge and problems of inadequate transport infrastructure in Wa municipality cannot be overestimated as the area is experiencing rapid population increase. There are 385.4 km of road network in Wa out of which 135.8 km have been paved (graphiconline, 2015). This indicates that the remaining 249.6 km which represents 65 percent of road network in the municipality remain untarred (graphiconline, 2015a). Noticeably, the non-expansion of existing road networks in the municipality has

resulted to the fight for space by pedestrians, vehicles and shops who arrange their wares on the pavements (Ahmed and Dinye, 2011). Moreover, the increasing use of motorcycle (most commonly used mode of transport) in the municipality is said to be a contributing factor to road traffic accidents in the municipality (Kudebong et al., 2011).

2.6 The link between Urban Growth and Disaster Risk

Studies have shown that cities have much opportunities to offer their population than their rural counterparts in aspects of employment, security, health, education and housing (Cohen, 2006; UNFPA, 2007). As a result, the growth of cities across the world has been phenomenal taking into consideration the increasing population and the rapid expansion of the urban space (Cohen, 2006).

In spite of the gains that cities offer to their population and respective countries, it has equally been identified that there is a huge linkage between the growth of cities and disaster risk. The accumulation of disaster risks have therefore been recognized as resulting from unplanned and unguided urbanization processes such as poor governance, ineffective planning of the urban space, coupled with inadequate provision of social services which includes potable water, adequate housing, proper sewerage systems and proper solid waste disposal methods (Pelling and Wisner, 2009).

Consequently, the inadequate injection of infrastructure by city authorities to meet the increasing demands of urban populations have led most urban dwellers (especially the poor) to wallow in vulnerable conditions such as building on flood prone areas or haphazardly building on waterways; engaging in poor sanitation practices such as

open defecation; dumping of solid waste in drains, slum development and the overcrowding of people in rooms (Songsore et al., 2010). These vulnerable conditions therefore expose residents to several disaster risks such as floods, fire and disease epidemics which includes diarrhoea and cholera. Also, inadequate road infrastructure provision amid increasing automobiles is further resulting to road traffic accidents (Mustakim et al., 2008).

The situation of unplanned and unguided urbanization and its associated disaster risks is not far-fetched in cities of developing countries. A case in point is in urban areas of Kenya where road traffic accidents as an everyday hazard saw an increase from 681 in 2004 to 1,769 in 2006 (Yitambe et al., 2009). Besides, the heavy rains recorded in East Africa in 2002 resulted to floods and mudslides forcing tens of thousands of people to leave their homes in Rwanda, Kenya, Burundi, Tanzania and Uganda (Huq et al., 2007 cited in Pelling and Wisner, 2009)

The case is not different in Ghana as the major cities have experienced recounting disaster risks such as floods, fires, crime and disease epidemics (Oteng-Ababio, 2013). For instance, the two largest cities in Ghana namely, Accra and Kumasi have recorded numerous flood and fire risks in recent times. In 2014, 16, 970 cholera cases representing 81percent of all cholera cases reported in Ghana was recorded in Greater Accra region (WHO, 2014). Also, the 2015 twin disasters (fire and flood) which claimed about 159 lives cannot be overlooked (graphiconline.com, 2015b). Also, in Kumasi, three fire disasters occurred in the early part of 2016 at the Central market, Roman Hill and the Dagomba line slum located around the main Aboabo drain (citifmonline, 2016). Underlying the accumulation of disaster risks in rapidly urbanizing cities of developing countries including Ghana therefore, is the lack of

political will towards prioritizing urban disaster risks mitigation and prevention (Pelling and Wisner, 2009)

2.7 Theoretical Framework

The growth of cities and its associated prospects and challenges involves the interaction and pattern of behaviour of various actors such as: health systems, housing, water, sanitation and transportations (Cheng, 2003). The outcome of interactions among these actors transforms urban spaces into dynamic and complex systems. To empirically examine the nexus between growth of Wa and disaster risk accumulation, a system theory is employed to understand various factors that interrelate to generate vulnerabilities which eventually lead to disaster risks.

2.7.1 Overview of the System Theory

In the quest to find explanations for the complexities existing between phenomena in the world, the German biologist, Ludwig Bertalanffy, propounded the system theory in 1968 (Meredith, 2005). Flood and Jackson (1991) cited in Meredith (2005:10) define the system as an 'interrelated network of parts exhibiting synergistic properties where the whole is greater than the sum of its parts'. In sum, a system is an organized body comprising elements which interact and interrelate with each other.

The primary attribute of the theory is its ability to explain complex relationships existing between phenomena. Also, systems are made up of several sub-systems, with their respective elements, which interrelate to produce an outcome. According to O'Leary (2007), much emphasis is placed on how elements within sub-systems interrelate with each other. The effective interconnection of the sub-systems reveals the effectiveness and efficiency of a system. However, the failure of a sub-system to

function and interrelate effectively renders a system's breakdown. Meredith (2005) revealed that external forces, such as the environment, influence how sub-systems behave within a larger spectrum. That notwithstanding, there are boundaries which separate these sub-systems from the environment and as such, the level of interaction between the external forces determine whether a system is closed or open. Leiper (2003) cited in Meredith (2005) reveals that a system is closed when the interaction between sub-systems are not influenced by external forces, while a system is said to be open when there exists an interaction of sub-systems with external forces.

The relevance of the system theory cannot be overemphasized. The theory ensures a systematic explanation of how diverse phenomena behave in the real world (Laszlo and Kippner, 1998). In addition, systems helps in analyzing the 'cause and effect' relationship between phenomena. Though the theory is versatile and easily adaptable by various disciplines, its application in social science is more complex, due to the multiple interactions of elements that makes a phenomenon more difficult to comprehend. As acknowledged by Laszlo and Krippner (1998), the application of the theory in human and social structures is much difficult to comprehend as most of its elements are difficult to define and without clear-cut aims. Furthermore, the application of this theory is usually difficult, especially when defining boundaries of social elements which have diverse forms of interactions (Laszlo and Krippner, 1998).

Though the theory basically evolved from biology, it has been extensively adopted and applied by various social disciplines such as geography, social work and political science (O'Leary, 2007). For instance, in tourism studies, Leiper (2003) engaged the system theory to study complex tourism services (as cited in Meredith, 2005). In the field of urban studies, Yankson (2012) employed the theory as a conceptual

framework to analyze the production of housing in the Greater Accra Metropolitan Area. The study revealed that, various elements such as access to finance, cost of labour, and availability of construction material and housing demand interrelate with each other to produce housing facilities. Significantly, the system theory ensures a more systematic approach to analyze how phenomena evolve, develop and operate across space.

2.7.2 Exploring risk accumulation processes of Wa through the system theory

Wa as an urban system is experiencing rapid development. Components of this system including: housing, water, sanitation, health facilities and transportation interrelate with each other to ensure the resilience of the population towards hazards. As a system, building resilience in Wa is highly dependent on how effective these aforementioned components are provided and how efficient they function toward meeting the demands of the increasing population. In other words, the effective provision of potable water, of affordable and adequate housing, of good transportation facilities, of proper waste management, of adequate sanitation systems and of effective healthcare facilities to meet the demands of the population will contribute in building a resilient population and community against pending hazards. Additionally, the proper management of these components will reduce the factors that are capable of generating vulnerable conditions.

That notwithstanding, the malfunction of one or any of these components amid the growth of the population will cause the urban system (Wa) to fail. Given that, the inadequate provision of potable water, poor housing facilities, poor transport network, poor health systems, inadequate solid waste disposal methods and sanitation practices will lead to the generation of vulnerabilities. Consequently, inadequate housing will

compel people to dwell in substandard housing facilities characterized by congestion and overcrowding. Also, the inadequate provision of potable water will cause people to use unsafe water sources (dug wells, streams and rivers). Additionally, insufficient sanitation and solid waste containers will further compel people to engage in open defecation and indiscriminate solid waste disposal respectively. More so, poor road systems will lead to traffic congestion on roads.

As an open system, the interference of non-governmental organizations and other agencies, which call for slum upgrading rather than demolitions, for instance, increases the vulnerabilities of people. This allows people to continuously stay on marginal lands with the hope of being furnished with basic services. Also, political influence on spatial planning further manipulates zoning procedures and processes of basic service provision.

These vulnerable conditions continuously accumulate when the provision of these components (basic services) do not meet the demands of the increasing population. As a result, the population becomes susceptible to disaster risks such as disease epidemics, flood, fire outbreaks and road traffic accidents. Of significance to the study, the System's way of thinking facilitates the study of vulnerable conditions generated for emphasis in the urban system of Wa and how it is leading to disaster risks accumulation.

2.8 Conceptual Framework

The occurrence of various disasters across the world is no longer perceived as a natural phenomenon. Conversely, the event of disaster is attributed to the increasing vulnerabilities of populations and their exposure to hazards (Wisner et al., 2003).

Particularly, the adverse impact of disasters in urban areas is largely attributed to the failure of social structures, such as provision of potable water, housing, transportation and sanitation facilities to meet demands of the population. Hence, vulnerable conditions are generated through the use of unsafe water, the engaging in unsafe solid waste disposal practices and the residing in substandard buildings on marginal lands. Subsequently, the population becomes susceptible to disaster risks. As asserted by Cardona et al (2012), the exposure of the urban poor to various types of disaster risks has largely been attributed to vulnerable conditions caused by interactions between social, political and environmental processes.

Conceptualizing disaster risk accumulation in Wa, the study adapts the crunch model developed by Wisner et al (2003). The model explains disaster risk accumulation as an element of the progression of vulnerability conditions. According to the model, disaster risk is the outcome of a progression of vulnerabilities meeting an impending hazard, as affirmed by Wisner et al (2003:49), 'risk of disaster is a compound function of natural hazard and the number of people characterized by their varying degrees of vulnerability to that specific hazard, who occupy the space and time of exposure to the hazard event'. From this core principle, generation and progression of vulnerability evolves from three main interrelated causes: root cause, dynamic pressure and unsafe conditions (Wisner et al., 2003; UNNATI, 2008).

In the root cause phase of the model, demographic factors, economic processes and political foundations are the most important factors laying the foundation of an area (Wisner et al., 2003; Cyr 2005). According to Cyr (2005), these foundations account for the society's social, financial, economic and political systems which influence government administration. Accordingly, root causes determine how resources and

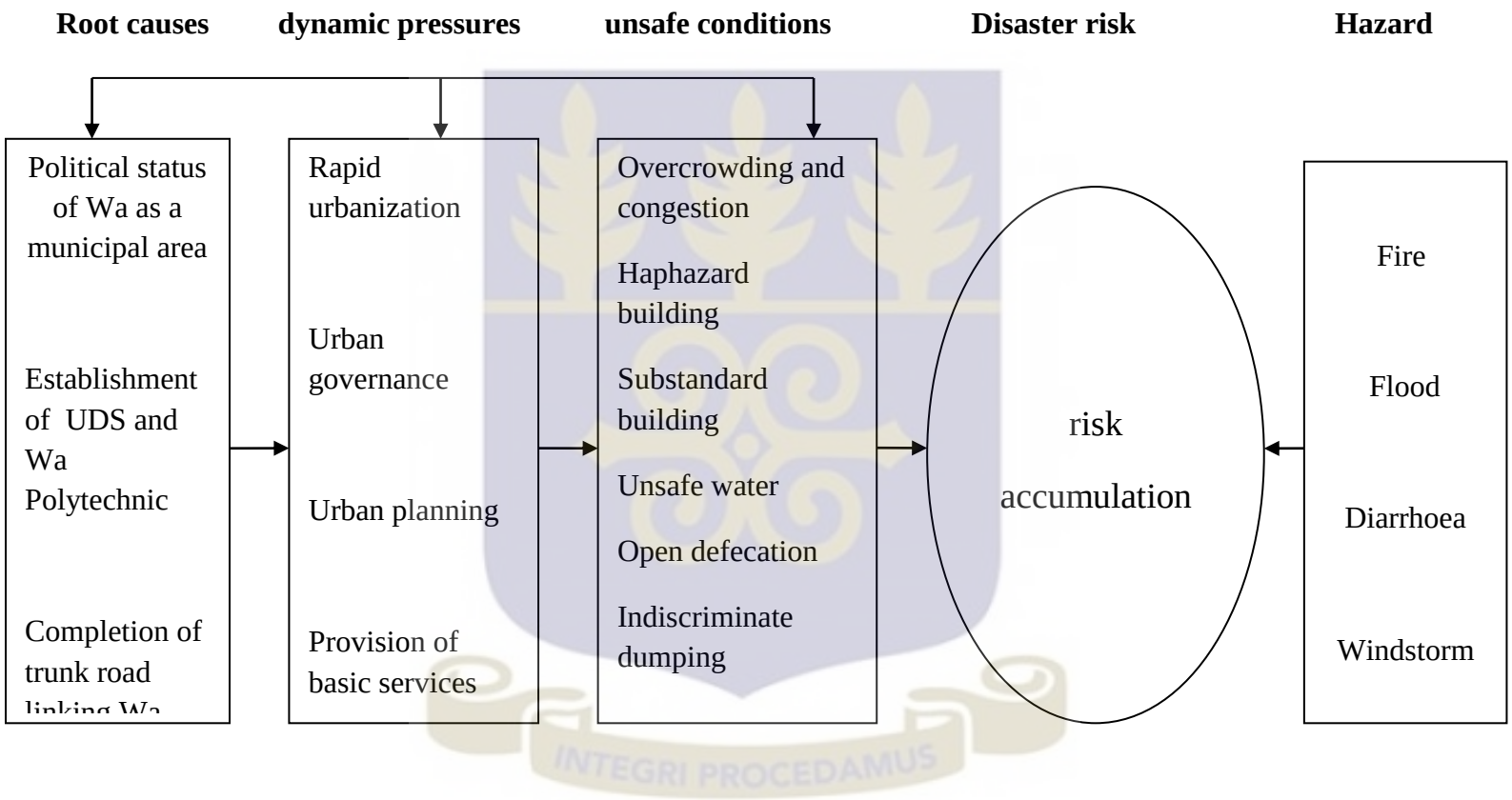
power are disseminated across the social classes of an area (Cyr, 2005). Consequently, people of low economic control tend to have high vulnerabilities as a result of the minimal power they have to control the socio-political and physical environment (Cyr, 2005).

The dynamic pressures are processes and activities which translate and channels root causes into unsafe conditions (Cyr, 2005; Wisner et al., 2003). These include: rapid urbanization, rural- urban migration, epidemics, foreign debts, wars and various structural adjustment policies (Cyr, 2005; Wisner et al., 2003). For instance, a dynamic pressure like export promotion is a risk to food security in an area (Wisner et al., 2003). Unsafe conditions are the specific vulnerable situations which make a population susceptible to pending hazards at a particular point in time (Wisner et al., 2003). Such unsafe conditions may include: people using unsafe water, engaging in poor sanitation practices, residing in substandard housing structures and dwelling in hazardous areas (Wisner et al., 2003). These unsafe conditions make a population susceptible to hazards such as disease epidemics, floods and fire outbreaks.

Though the model acknowledges and explains the sequence of vulnerability progression from root causes to unsafe condition, it fails to define the term and expound the processes and evolution of hazards (Fussel, 2007). Therefore, the study operationalizes the definition of vulnerability as the accumulation of unsafe conditions which characterize a population and makes them susceptible to pending hazards. Accordingly, vulnerability is best understood when associated with a hazard (Fussel, 2007) and even though the concept acknowledges this, it does not state clearly that the progression of vulnerable conditions can equally interact with several hazards to result in the accumulation of multiple disaster risks. Figure 3.1 shows the

framework which establishes the progression of vulnerable conditions among the residents of Wa.

Figure. 3.1: Progression of Vulnerability to disaster risk accumulation



Source: Adapted and modified from Blaikie et al., 1994.

With reference to Figure 3.1, the processes of growth in Wa are the root causes of vulnerable conditions among the population. Historically, the area experienced its associated growth when Wa was politically upgraded from district capital to a regional and municipality capital. Also, the establishment of tertiary institutions, mainly the UDS and Wa Polytechnic, created another platform for the growth of Wa. These factors coupled with the completion of transportation routes such as the Wa-Kumasi trunk road and the agglomeration of small and large businesses has revamped the economy of the municipality. These root causes has ensured the physical development and the increase in the population of Wa.

Consequently, various processes such as rural-urban migration, urban planning, provision of basic services such as water, housing and urban governance has characterized the Wa municipality. These processes and activities are the dynamic pressures which are capable of channelling or transforming the root causes into unsafe conditions. However, the unpreparedness of cities authorities, as a result of weak financial capacity, an inadequate human resource base and logistics, to provide adequate infrastructure such as potable water, housing, roads, health facilities among others to meet the demands of the increasing population in the municipality has resulted in the exertion of untold pressure on available services. For instance, the inadequate provision of potable water by the Ghana Water Company Limited (GWCL) will result in people accessing other sources (dug wells, streams and dams) of water for drinking. Also, the inability of the Town and Country Planning Department (TCPD) to plan the municipality amid increasing population growth will further lead to haphazard building and erection of housing structures on water ways.

Such activities which include: building in low-lying areas, using unsafe water sources, haphazard building, open defecation, overcrowding and congestion in rooms and the indiscriminate disposal of solid waste, create unsafe conditions which render the population of Wa vulnerable to disaster risks such as fire, floods, diarrhoea and windstorm among others.

2. 9. Summary

The main issues discussed in this chapter include urban growth trends and patterns in the global and local perspective. In 2008 and for the first time, half of the world's population (3.3 billion) resided in urban centres. Observably, more of this growth is occurring in the developing countries, mainly Africa and Asia. With respect to urban growth in Ghana, it was revealed that, pre-colonial trade between northern Ghana and the Western Sudan and later the colonial trade between the Gold Coast and Europe played a significant role in the development of urban areas in Ghana. In addition, skewed development practices during and after colonial rule resulted in Ghana having the majority of its urban population residing in few large cities.

Infrastructure provision with focus on the various approaches adopted by subsequent governments in Ghana was also examined. The participatory and communal approach to infrastructure provision was changed to a more centralized approach where colonial governments were solely responsible for the provision of social services. This centralized approach continued until 1988, when a decentralized approach to infrastructure delivery was adopted. Currently, Public Private Partnership is what is being adopted to complement existing approaches to infrastructure delivery.

Following the complexities urban centres exhibit in their growth processes, the study adopted the system theory to examine the interrelationship of factors stimulating

growth in Wa and the cause of their associated risks. It was revealed that the interplay of government institutions, policies (city authorities), infrastructure, population increase and environmental processes were causing the rapid growth of Wa. However, the unpreparedness and lack of capacity to manage the growth processes was identified as reasons for the accumulation of disaster risks in Wa. The system thinking also informed the adoption of the crunch model propounded by Blaikie et al (1994) as the conceptual framework for the study. The crunch model propose that vulnerable conditions which expose a population to disaster risks are generated by three causal factors: root cause, dynamic pressures and unsafe conditions. Due to the unpreparedness and lack of capacity by stakeholders to manage the growth processes, weak governance, poor planning, inadequate infrastructure constitute the dynamic pressures. These dynamic processes translate the growth processes (root causes) into unsafe conditions (Vulnerable conditions) of the population of Wa. Such conditions include, utilizing unsafe water, haphazard building, poor sanitation practices. These conditions expose the population to risks such as diseases, flood, crime and fire outbreaks.

CHAPTER THREE

METHODOLOGY AND STUDY AREA

3.0 Introduction

The previous chapter examined literature, theory and conceptual issues relating to urban growth processes, patterns and currents trends in the world and in the local context. Additionally, the challenges of infrastructural provision and access to basic services in Ghana were assessed. This chapter highlights the research methods adopted by the study and explores the background of Wa as the study area.

3.1 Research Design and Strategy

A case study design was employed for the study. Every town or area has its own processes and dynamics which promote its growth. Moreover, the activities which generate vulnerabilities equally differ from one urban centre to another. Therefore, the focus of the study in Wa municipal area is to have an in-depth analysis of the distinct and the dynamic processes which are resulting in its growth and accumulation of disaster risks.

The study employed both quantitative and qualitative research strategies. The quantitative strategy provided statistical and measurable data on the different dimensions of growth, such as population growth of the Wa and the infrastructural development of the area. Besides, the qualitative strategy presented an in-depth explanation and showed the intensity of cases forming the underlying factors of growth and its associated disaster risks.

For these reasons, a mixed research strategy was adopted for the study. As a result of the complexities exhibited in Wa, applying the mixed research strategy provided a credible and systematic understanding of the trends and patterns of growth, their

causalities and it further provided a comprehensive account of the generation of vulnerable conditions by the inhabitants. As acknowledged by Teye (2012), the use of quantitative and qualitative strategy or method triangulation cross-validates each other around a common reference.

3.2 Data sources and collection process

3.2.1 Primary data

The primary data involved questionnaires consisting of close and open-ended questions, which were administered to head of households in Wa. The questions probed into the types of housing conditions respondents were residing in, the sources of drinking water, sanitation practices and the healthcare facilities respondents use. The perceptions of respondents on the various disaster risks accumulating amidst the growth of Wa was also examined.

The heads of household were chosen for this study because they are responsible for spending their resources to access infrastructure and basic services for their households. Moreover, respondents who had lived in Wa for three years and more were sampled for the study. This was to provide an informed decision about their perceptions of the various disaster risks accumulating in Wa and their causal factors.

Semi-structured interview guides were used to interview key-informants in the study area. Among the category of key-informants interviewed were the Acting Director of the Town and Country Planning of the Assembly, the Municipal Planning Officer, an Information Officer from the Ghana Health Service, the Municipal Coordinator of NADMO and an Operations Officer of Ghana Water Company Limited. Besides, the District Crime Officer and the District Officer of the Motor Traffic and Transport

Unit of the Ghana Police Service and two Assemblymen from the low income and middle income communities were also interviewed. The interview probed into the arrangements and plans put up by these institutions to manage the growth process in the Municipality. In addition, mitigation strategies adopted by these institutions to cope with the disaster risks accumulating in the Municipality were also assessed.

Focus group discussions were also organized to explore the diverse sentiment and meanings of people towards the vulnerabilities generated by the growth process in Wa. Two groups were organized for the study; the first group was made up of tenants and the other group was made up of landlords. These categories of people were used in order to ascertain the diverse views of tenants (who were mostly migrants) and landlords (who were mostly indigenes) on the processes of growth and associated disaster risks. These discussions were fruitful because topical issues concerning the vulnerabilities generated and the perceptions of risks accumulating in the Municipality were debated naturally.

Field observation was also employed at the community level to observe daily activities of the people. These activities included the daily method of solid waste disposal, access to their source of drinking water and the conditions of their dwelling places. Besides, these activities that were leading to the various forms of disaster risks were also observed. The type of observation adopted for the study was a 'non-participant type' which separated the researcher from the study population. This non-participant type of observation was suitable for the study because the variables, population and their activities under study was relatively open and an individual could see everything that happens once the individual visits the community. Accordingly, the study applied a concurrent mixed method of data collection since it permits both

quantitative data and qualitative data to be collected at the same time. A merit derived from this method indicates that it saves time in the data collection process (Teye, 2012).

3.2.2 Secondary data

The nature of the study demanded for the intense use of secondary data to determine and confirm variables collected under the primary data as well as to confirm the findings of other work done in the Municipality. Most importantly, secondary data was acquired from the Ghana Statistical Service which included census data of the area from 1970 to 2010. This was necessary to determine the growth of population of the area. Additionally, information on the various disease burdens of the Municipality was also obtained from the GHS. The available data on disease burden covered a period of 5 years that is from 2008 to 2014. In addition, information concerning the production statistics of water in 2014 by the Ghana Water Company Limited was also obtained. Lastly, data on crime and road traffic accidents were also obtained from the Ghana Police Service. These were the figures of road accidents and crime activities that had occurred in the municipal area from 2008 to 2013. The study used these secondary data to confirm the perceptions of people on various disasters accumulating in the area.

3.3 Sampling Techniques for questionnaire administration

The complexity and heterogeneity of the urban population of Wa demanded the use of a multi-stage sampling technique to obtain respondents for the study. Four stages were therefore adopted to obtain the respondents for the study. The first stage involved the proportional stratification of the study areas based on income, housing characteristics and the availability of social services. These criteria stratified the

municipality into high class residential areas, middle class residential areas, low class residential areas and newly developed residential areas. The stratification criterion was based on data available at the TCPD of the Wa Municipal Assembly.

As a result of many communities falling under each of these residential strata, the next stage employed simple random sampling technique to select one community from each stratum. In justifying the sampling method adopted at this stage, it was observed that all communities within each strata possess the same qualities and characteristics hence the simple random technique. These communities were Mangu (Low income, Kpaguri (Middle income), SSNIT residence (High income) and Kumbiehe (Newly developed area, characterized by mixed-income status but dominated by middle income population). The third stage involved the use of systematic sampling to select the household structures. Apart from the high income residential area which had well planned settlement structures, all the other three communities had clustered settlements. In view of this, the first house was selected and every third house was subsequently selected for the survey in the high income area.

However, each of the other three communities was clustered into four blocks. This was necessitated by the clustered nature of settlements in these communities. Respondents were then randomly sampled from each of the blocks. Even though a multi-stage sampling technique is complex because of the listing and sampling at various stages of a strata (Black, 1999), it has been distinguished as the most suitable technique for selecting a sample from a heterogeneous population such as the population of Wa (Barreiro and Albandoz, 2001).

3.3.1 Sample size

The sample size for the quantitative method was 200. However, the uneven distribution of the population within these selected communities informed the use of a proportional allocation (proportional to the total population of the study communities) mechanism to arrive at a sample size for each community. This method gave a fair representation of the population in the study areas. The sample size for the qualitative method of data collection was 9 key informants from institutions managing the urban space. In addition, 2 focus group discussions were organized for tenants and landlord in one of the stratum (low income residents) of the settlement categories. There were 9 participants each in the focus groups. This focus group discussion could not be done in the high-income areas due to the unavailability and busy nature of residents within the area. Table 3.1 shows the selected communities and their respective sample sizes.

Table 3.1 Selected Communities and their sample sizes

Residential Classification	**Community selected**	**Total Population**	**Sample Size**
Low income	Mangu	3,461	84
Middle income	Kpaguri	3,014	73
High income	SSNIT residential	1,128	27
Newly Developed Area	Kumbiehe	627	16
		Total=8,230	**Total=200**

Source: (GSS, 2013a; TCPD, 2014)

3.4 Techniques of Data Analysis

The data collected from the field was analysed qualitatively and quantitatively. The variables which were analysed included housing characteristics, source of drinking water, sanitation, solid waste practices and heath seeking behaviours. To meet the objectives of the study, these variables were analysed quantitatively using the Statistical Package for Social Sciences (SPSS) software version 16.1 to generate bar graphs, frequency tables, cross tabulation and line graphs to represent trends, patterns and levels of growth, vulnerabilities generated and the perceptions of the population about disaster risks associated with the people of Wa. In addition, images obtained from LANDSAT 4, 5 AND 7 were analysed using ENVI version 5.0 and GIS to reveal the level and pattern of physical expansion of the Wa municipal area.

In view of the fact that descriptive statistics was limited to analysing trends and patterns, qualitative data (derived from key informant interviews and focus group discussions) were also collected through audio recording and analysed through transcription of interviews and coding of results into relevant themes. These themes provided in-depth explanation to the trends and patterns of the growth processes and vulnerabilities generated by the population of Wa.

3.5. Background of the study area

The nature of the physical and cultural landscape of geographical spaces plays a very significant and influential role in determining their processes, trends of growth and development. The Wa Municipality is no exception, as the agglomeration of business activities, the concentration of population and housing structures as well as the provision of public infrastructure play a significant role in its physical growth. Moreover, to comprehensively understand the interactions between urban growth and

disaster risk accumulation processes, it is necessary to examine the historical background, the political and administrative setup, the demographic characteristics and the economic activities of the Wa Municipal Area.

3.5.1 Historical Background of the Wa Municipal Area

The Wa municipal area started as a kingdom in the 16th and early 17th century originating from the movement of various kinship groups at different times (Salih, 2008). Oral tradition affirms, that the movement of these people into Wa resulted from chieftaincy disputes among kinships and the trans- Saharan gold trade at the Lobi or Black Volta goldfields (Salih, 2008). More significantly, the arrival of three major estates, *Nabiili, Tagrahi* and *Limanhi* together with the *Tengdaamba* set up a nucleus which laid the foundation of the Wa kingdom with Wa town serving as the centre (Salih, 2008). According to Salih (2008), these kinship groups within the kingdom created a central traditional political authority and an 'ethno-cultural' group known as the *Waala* people with the *Waali* language. Consequently, the Wa province was distinguished from the town in that, the Wa town served as the metropolis of the kingdom and stood as a strong commercial centre *(*Salih, 2008*).* Conversely, the provincial Wa included the kingdom of Wa and its peripheries such as Wechiau, Dorimon, Manwe and Chakalli among others (Salih, 2008).

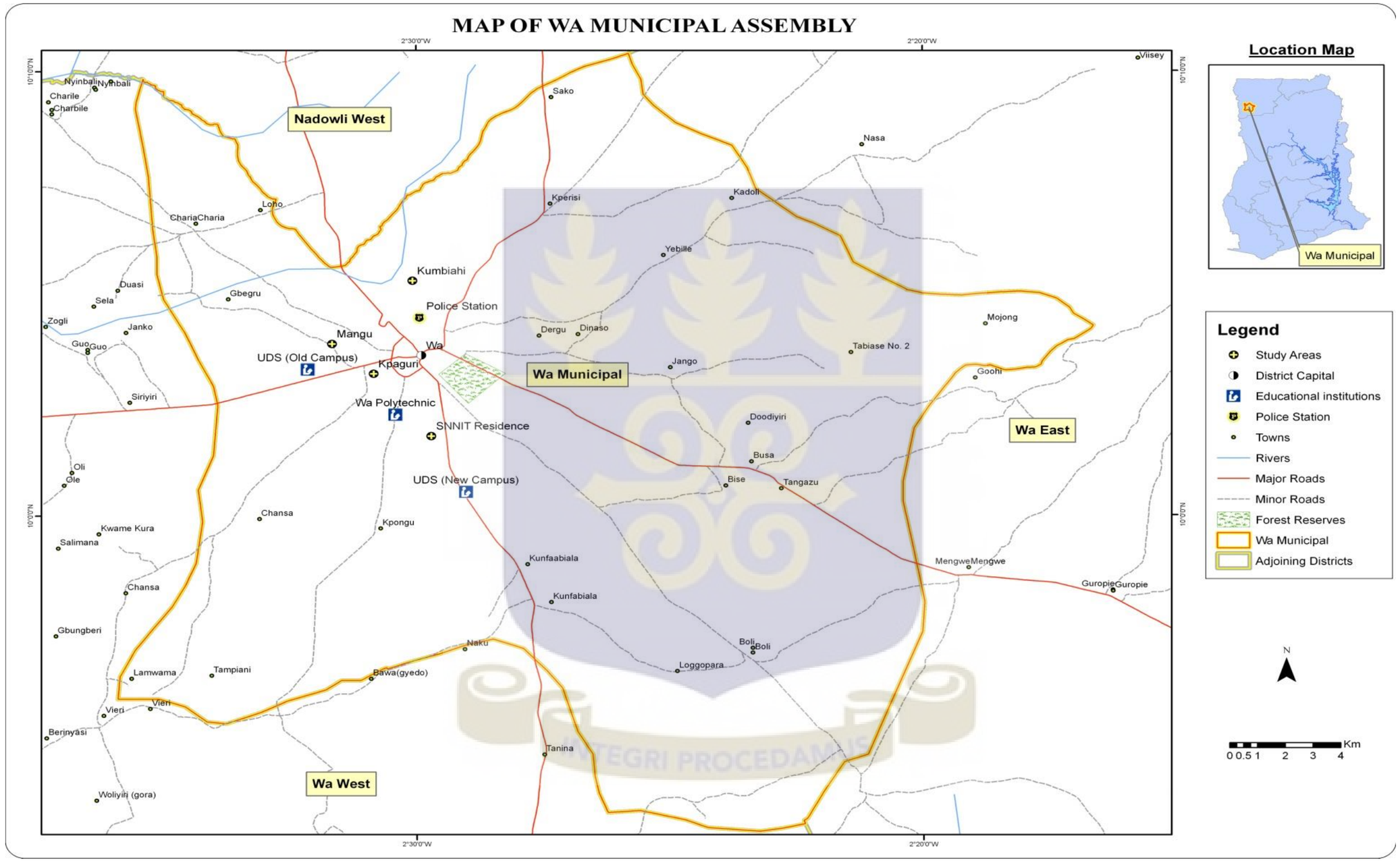
The kingdom saw an accelerated development and growth with the Wa town serving as a commercial centre and transit points for merchants travelling between Mali and other Northern states across the country (Salih, 2008). Coupled with this was the centralized traditional political system of the kingdom located in the Wa town which made the area a stronger metropolitan area. These factors led to the immigration of

various populations with different nationalities and religious orientations into the Wa town *(*Salih, 2008*)*.

Based on the administrative demarcation of the country in the colonial and post-independence era, Wa was originally part of the then Northern Region until 1960 when it was carved out as part of the newly created Upper Region. This elevated Wa to a new political status of district capital of the then Wa district within the Upper Region. Although part of the then Upper Region, and functioning as a district capital, there existed huge inequality in development and growth between the area and the rest of the country. As a result, the Upper West Region was created on 14th January 1983 by the then government with the aim of closing the development gap existing between the area and other parts of the country (GSS, 2002a).

In pursuance of the decentralization policy introduced in 1988, a Legislative Instrument (LI) 1800 created the Wa Municipal Assembly from the then Wa district in 2004 (Amoah and Yahaya, 2013). Lying within latitude 1º40' and 2º45'N and longitude 9º32' to 10º20'W (Amoah and Yahaya, 2013) and with a land size of 234.74 square kilometres (occupying 6.4 percent of the total land coverage of the region), the area currently serves as a Municipal and Regional capital for the Upper West Region (WMA, 2013). It is bordered by Nadowli District Assembly in the North, the Wa East District Assembly in the East, Wa West District Assembly to the West and South (WMA, 2013). Figure 3.2 shows the map of the study area.

Figure 3.2. Map of Wa Municipal Area



Source: Author's own construct, 2014

3.5.2 Physical Features

According to the GSS (2013a), Wa Municipal Assembly lies within the Savanna high plain which is undulating with an average height between 160m and 300m above sea level. Besides, the gentle nature of the landscape shows that the topography does not pose any hindrance to physical development and agricultural activities (UNDP, 2010). The Municipal area is drained by two main rivers, Sing-Bakpong with tributaries to the south and the Billi with its tributaries to the North (GSS, 2013a; UNDP, 2010). However, the available streams are seasonal and mostly dry up during the dry season and hence do not support agricultural activities, domestic activities and construction works during these seasons (WMA, 2012 cited in GSS, 2013a; UNDP, 2010).

3.5.3. Climate

The Wa Municipal area falls within the general climatic patterns of the Upper West region with two main climatic conditions, the dry season and the wet season (GSS, 2002a). The dry season, the Harmattan, spans from November to April and is characterized by long windy, cold and hazy conditions and intense hot weather conditions (GSS, 2013a). These conditions are as a result of the north-eastern trade winds which blow over the area. The dry season often records high temperatures between 40ºC and 45ºC which may result in the risk of Cerebrospinal Meningitis (CSM) and dehydration (MOFA, 2014). The area, however, has only one rainy season (GSS, 2013a) spanning between April and October and characterized by short and stormy rainfalls. The annual rainfall volume recorded in the area is between 840mm and 1400mm, which is sparsely distributed over the months (MOFA, 2014).

3.5.4 Vegetation

Additionally, the area lies within the guinea savanna vegetation belt containing grass with drought resistant trees such as shea, baobab, dawadawa and nim (GSS, 2002a). Several economic benefits are derived from the trees and the grasses found in the area. For example, the trees felled are used as fuel woods and in building kraals for cattle and for fencing gardens (GSS, 2002a). Besides, the shea fruits are harvested to produce shea oil and shea butter. More significantly, the dawadawa fruits are used to prepare food in most homes. The climatic conditions further favour the raising of livestock such as guinea fowls, sheep, goats and cattle (GSS, 2002a). The soil type within this area such as the savannah ochrosols, the tropical brown yeast, terrace soils also support the cultivation of cotton and variety of grains, such as millet, maize, rice, sorghum, and tubers, such as yams (GSS, 2013a).

3.5.5 Economic activities

Although the Wa Municipal Area is the most urbanized in the region, agricultural activities, contributing about (70%), dominate the economy (WMA, 2013). This is followed by commerce 9 percent and 3 percent industry (WMA, 2013). According to recent census report of 2010, the service sector however employs majority (51.3%) of the population followed by the agricultural sector which also employs 30.2 percent of the population while the industry also employ 18.4 percent (WMA, 2013; UNDP, 2010). The pattern of the economy therefore depicts a typical characteristic of most municipal economies in Ghana (UNDP, 2010). Other economically vibrant activities which employ the population and contribute to the economy include; pito brewing, agro industry, edible oil extraction, processing and packaging and tourism (WMA, 2013).

The major means of transport in the Municipality is motorcycles, followed by a vehicle population of over 300 commercial and private cars. It is acknowledged, that the use of the motorcycle reduces traffic congestion, however, it causes increasing road traffic accidents in the town (WMA, 2013). Although the Tourism and Transport sectors of the economy are not well developed, it is noticed to have a potential for growth and development (UNDP, 2010; WMA, 2013).

According to the UNDP-Ghana (2010), the trend of the economic activities has not changed much since 2000. That notwithstanding, a major development and dynamic growth potential of the city in future has been attributed to its unique location which can be developed as the North Western corridor gate-way to landlocked countries such as Burkina Faso, Mali, Niger and Chad.

3.5.6 Demographic characteristics

The Wa Municipality, although situated in the least urbanized area in the country, is rapidly experiencing an increasing population growth. According to the 2010 Population and Housing Census, the Wa Municipal Area has a population of 107, 214 (2013) representing 15.3 percent of the total population in the Upper West Region. Although the Wa Municipality is considered an urban area, it also has a rural population of 36,163 representing 33.7 percent of the total population in Wa (GSS, 2013a). A comparison of the 2000 and the 2010 population censuses revealed that the population of Wa Municipal Area has also increased from 98,675 to 107, 214 (GSS, 2013a). Following the trend of the national population, the Wa Municipal area also has a dominant female population of 54, 218 as compared to the male population of 52, 996 representing 50.6 percent and 49.4 percent respectively (GSS, 2012). According to the UNDP-Ghana (2010), the longer life expectancy of females

compared to that of males and the higher out-migration of the male population outside the region in search of 'greener pastures' could play a significant role in such trends.

The sex ratio of the population further shows that the youth between the ages of 20-24 representing 14.7 percent dominate the population (GSS,2013a). This is explained by the operation of the tertiary institutions: the University for Development Studies, the Wa Polytechnic and the College of Education in the Municipality (GSS, 2013a). Besides, the rapid influx of migrants from near and far towns into the Municipality in search of jobs also account for the youthful nature of the population (GSS, 2013a). In addition, the predominance of the youth in the area as noted by UNDP (2010) could be attributed to the cultural values of the people that include large families, polygamy, the absence of family planning and early marriages.

3.6 Summary

The study adopted a case study approach, as the research design, and a mixed method strategy in its data collection processes. The chapter finally examined the historical background, the physical, economic and demographic characteristics of the study area. The study asserted, that the growth of Wa was informed by factors including increasing economic (trade and commerce) activities, political factors which upgraded the area from a district capital to a regional capital and finally to a municipality. Also, the establishment of the UDS and the Wa Polytechnic was also identified as a major force contributing to the growth of the area in recent times.

CHAPTER FOUR

THE GROWTH AND MANAGEMENT OF WA

4.0. Introduction

The previous chapter analyzed the system theory as the theoretical foundation for understanding the urban growth and disaster risk accumulation nexus in Wa. Additionally, the research design, strategy and sampling techniques employed to accomplish the study's objectives were also highlighted. This chapter is dedicated to assessing the spatial expansion and population growth of Wa using demographic data and aerial photography. The arrangements put in place by the city authorities to manage the growth process in Wa are also discussed.

4.1 The Growth of Wa

Urban growth has been measured in several dimensions using demographic figures, aerial photographs, social factors and economic indicators. Demographic figures and aerial photographs (through the use of remote sensing and GIS techniques) are therefore identified as approaches that actually measure population growth and expansion in urban areas (Yeboah, 2000; Otoo et al., 2006). These methods have been extensively acknowledged to provide a better approach to the monitoring of spatial changes in urban areas and of solving spatial challenges such as planning and land use (Otoo et al., 2006).

Historically, urbanism in Wa, according to Songsore (1985:3), 'had its roots through revolutionary innovation in the form of more-or-less strict political over-lordship imposed from without'. That is, the invasion of northern Ghana by 'warriors of fortune' in the 15th century led to the formation of the Dagomba, the Mamprusi and

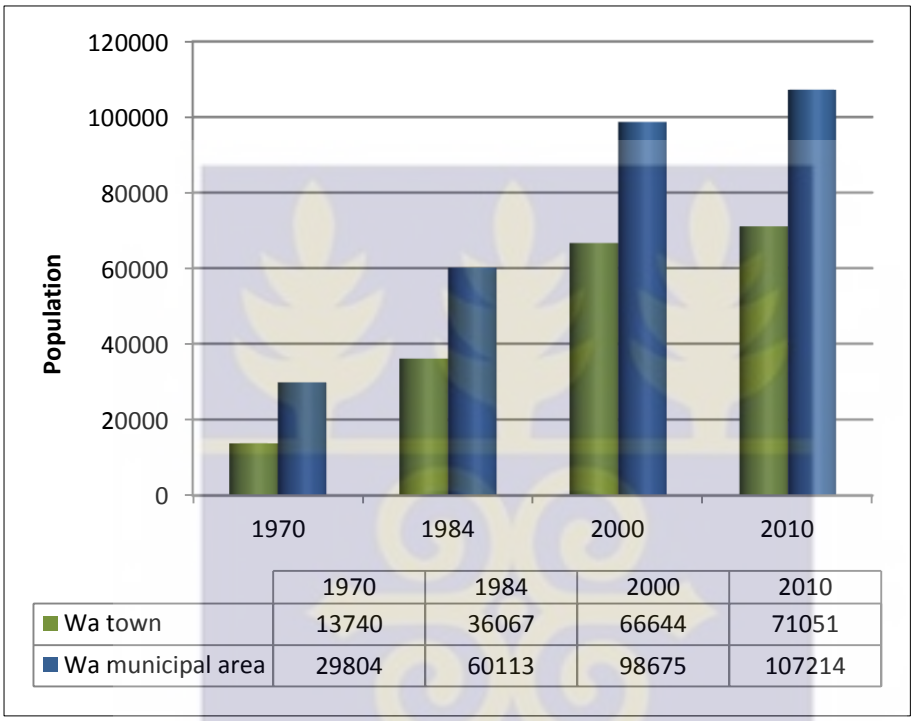
the Mossi States (Dickson, 1969-1970 cited in Songsore, 1985:3). Wa became the headquarters of the Wala State, established on the Dagomba pattern, mainly set up by immigrants (Goody nd. cited from Songsore, 1985). The continuous development of Wa as an emerging urban centre was further witnessed from major trade and religious activities with the Islamic Mande and Hausa traders in the past. Accordingly, trade was conducted at two levels; local trade involving villages within a 10km radius and inter-regional trade with the kola market in Mossi, markets in the north (Binger, 1892 cited in Songsore, 1985:8). These activities were said to have accounted for the rapid agglomeration of economic activities in Wa.

Further development of Wa was witnessed following political factors which elevated the town to a district capital in the then Upper Region in 1960 (GSS, 2002a). However, due to the continuous disparity in development of the district and the rest of the country, the Upper West Region was carved out of Upper Region in 1983 with Wa as the regional capital (GSS, 2002a). This is confirmed by 1970 and 1984 census data which indicated that the then Wa district had an increase in population from 29,804 to 60,113 respectively (GSS, 2002b). Subsequently, in 2004, the decentralization policy of 1988 adopted by the country further upgraded Wa to a municipal status through a Legislative Instrument, 1800 (WMA, 2013). These political factors have partly accounted for more people (civil and public servants) moving into Wa to work in various government institutions.

Serving as an economic growth pole, the rapid development of trade and the agglomeration of businesses triggered migrants to move into the municipality to engage in diverse business activities. As a result, the 2010 census figure showed a steady increase in population from 98, 675 in 2000 to 107,214 (GSS, 2013a). Besides,

the Wa town also witnessed a steady increase in population from 66,644 to 71,051 in 2000 and 2010 respectively. Figure 4.1 shows the trend of population growth in the municipality and the Wa town from the four inter-censal years, 1970-2010.

Figure 4.1 Population of Wa town and Wa municipality in 1970, 1984, 2000 and 2010



	1970	1984	2000	2010
Wa town	13740	36067	66644	71051
Wa municipal area	29804	60113	98675	107214

Source: GSS, 2002b; GeoHive, 2014

*1970 and 1984 municipal population stands for the then Wa district. However in 2004, Wa municipal was carved out of the Wa district. Therefore, 2000 and 2010 figures represent the population of the Wa municipal area

Of much significance to the factors accounting for the rapid growth in the municipality in recent times is the establishment of tertiary institutions, including the UDS, Wa-campus in 2002 and the Wa Polytechnic in 1999 (Peprah, 2013). Commenting on the contribution of the tertiary institutions to the recent growth of the area, the acting regional director of the Town and Country Planning Department remarked:

> *...basically if you look at the period before the start of UDS, Wa was more of a rural set up. But the period after the commencement of UDS, Wa has experienced some substantial growth and places like "Bamahu" which is housing the University has now virtually merged up with Wa itself. So the University is one of the pull factors. We can also talk about the polytechnic which is equally a pull factor'* (Acting Director-TCPD, 2014).

Another significant factor is the completion of road networks linking various towns and other regions to the municipality. For instance, the Wa-Kumasi trunk road, the Wa-Tamale trunk road, (though not fully completed) has also created a gateway for people to access the area at any time. In an interview with the Planner of the Municipal Assembly, he noted:

> *...the construction of the Tamale road though not completed has seen a lot of people moving into Wa. In the past, getting a bus to Tamale used to be difficult. But these days, you can travel at any time. Also, only one bus goes to Kumasi. But in recent times, there are about 5-6 buses from OA station alone going to Kumasi. Metro Mass transport also has about 3 buses that leave Wa for Kumasi. As for the vehicles that move from the main GPRTU station to these areas, you cannot count. This shows that the upgrading of road network is increasingly accounting for the influx of people into Wa and also opening up a lot of business* (Municipal planner-Wa, 2014)

The two processes highlighted above form a large part of the factors contributing to the immigration of people to Wa in recent times. That notwithstanding, one cannot isolate the contribution of natural increase in population as another major factor causing population growth in the area. This is evident in the recent 2010 Population

and Housing census which indicated that the total number of migrants in the municipality constituted 22.6 percent, hence natural increase (with total fertility rate of 3.3) may partly account for 77.4 percent of the total population of Wa (GSS, 2013a), not withholding other factors such as the annexation of other communities as part of the municipality.

4.2 Examining the growth processes of Wa using GIS

According to Singh (1989), determining change detection involves the use of 'multi-date images' to evaluate differences in land cover resulting from environmental conditions and human actions (as cited in Yang and Lo, 2002). Yang and Lo (2002) further noted that the heterogeneous nature of an urban landscape demands the use of finer geometric resolution images for analysing urban land use and land cover change. Consequently, Barnsley et al, (2001) posited that 'Landsat TM and ETM images with a 30m spatial pixel resolution is potentially useful for classifying urban land cover on a generalized level, provided that the classification methods adopted are targeted towards urban areas' (as cited in Møller-Jensen et al., 2005:40).

As a result, several studies on urban land use and land cover change have been conducted with Landsat images. A case in point is Yang and Lo (2002) who used Landsat MSS and TM images to extract land use and land cover data of the Atlanta and Georgia Metropolitan region of the United States. Møller-Jensen et al (2005) also employed Landsat ETM images to produce a land cover map showing the extension of new residential areas on the fringes of Accra. It is against this background, that Landsat images were acquired to analyze the physical extent of growth in Wa municipal area. As posited by Møller-Jensen et al (2005), Landsat images provide the

platform for analyzing a larger urban area using a single image and a 'well-proven' classification method.

4.2.1 Delineating the spatial expansion of Wa

To delineate the spatial growth of Wa, Landsat 4, 7 and 5 images acquired in 1991, 2001 and 2011 respectively were used. The images were captured in the dry season (mainly between January and February) to minimize the influence of cloud cover. Table 4.1 shows the characteristics of images used from Landsat 4, 7 and 5.

Table 4.1 Characteristics of Landsat images used for the classification

Satellite	Image reference	Acquisition date	Path/Row
Landsat 4	L41XXX1091008090100	January 08, 1991	195/ 053
Landsat 7	L72EDC1801051160100	February 20, 2001	195/ 053
Landsat 5	L51MPS1011023100100	January 23, 2011	195/ 053

Source: Author's own construct, 2014

Processing the images, band 3, 2, 1 in the images were calibrated to reflectance and stacked to create a composite image. This was necessary, because urban areas in an image with band combination 3, 2, 1 show a coloration of white to light blue which makes the features of the study distinct for easy analysis. The images were then sub-set with the Region of Interest (ROI), Wa municipal area. Figure 4.2 shows the composite image of bands 3, 2 and 1 while Table 4.2 shows the band combinations and their respective colours.

Figure 4.2 Composite image of bands 3, 2 and 1

Source: Landsat Imagery, 2011

Table 4.2 Band combinations and respective colours

Ground cover type	Natural colour (3, 2, 1) appear	False colour (4,3,2) appears	Pseudo Natural colour (7,4,2) appears
Trees and bushes	Olive oil	Red	Shades of green
Crops	Medium to light green	Pink to red	Shades of green
Wetland vegetation	Dark green to black	Dark red	Shades of green
Water	Shades of blue and green	Shades of blue	Black to dark blue
Urban areas	White to light blue	Blue to gray	Lavender
Bare soil	White to light gray	Blue to gray	Magenta, Lavender or pale pink

Source: Author's own construct, 2014

Using ArcGis software version 10.1, sixteen points were created on the images and converted to Keyhole Map-up Language (KML). Truthing was then undertaken in Google Earth where existing ground features in the imagery were used to update the attributes of the 16 points. An error was identified after the truthing was accomplished. Accordingly, two of the 16 points which were supposed to be lying in built-up areas were however lying in bare land areas. Percentage accuracy was therefore calculated to determine the extent of accuracy of the colour combination used.

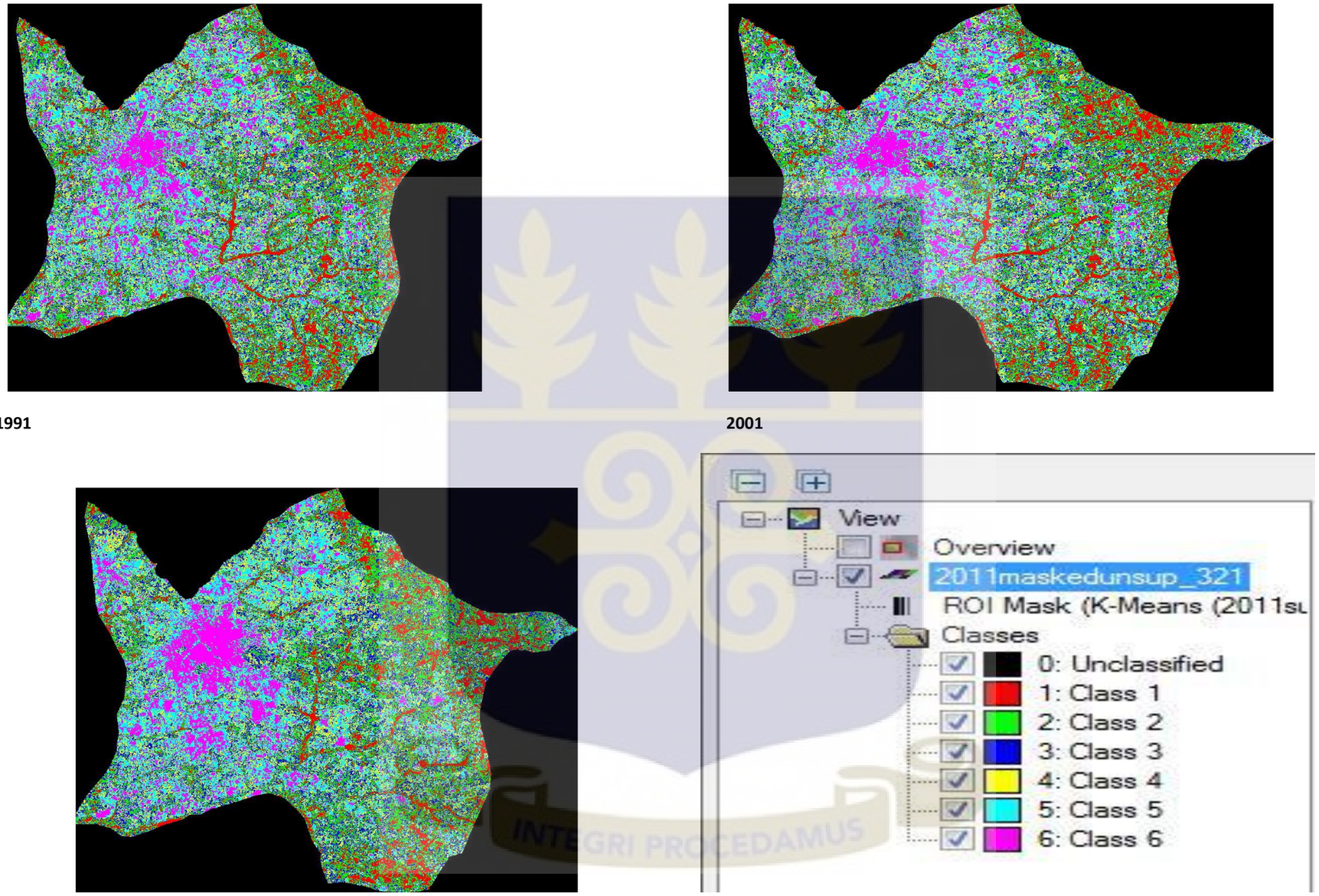
$$\frac{Tp - Ep}{Tp} * 100\%$$

Tp= Total number of truthing points, Ep= Total number of error points.

$$\frac{16 - 2}{16} * 100\% = 87.5\%$$

Consequently, the percentage accuracy of the truthing was 87.5 percent, which shows a high level of accuracy in the colour combination. The images were taken through a K-means unsupervised classification out of which six classes were created. The unsupervised classified image of 2011 was saved as a GeoTiff file and converted to KML through ArcGis. The KML image was then superimposed on aerial imagery in Google Earth. It was found that the areas in class six consisted mainly of built-up whereas the areas in class one consisted of mainly bare land. The remaining classes consisted of vegetative areas such as reverine vegetation, shrubs and scattered trees. The 2011 image was used for this exercise to verify what the respective classes represented on the ground. Figure 4.3 shows the unsupervised classified images of the 1991, 2001 and 2011 respectively.

Figure 4.3 Unsupervised classified images of 1991; 2001 and 2011

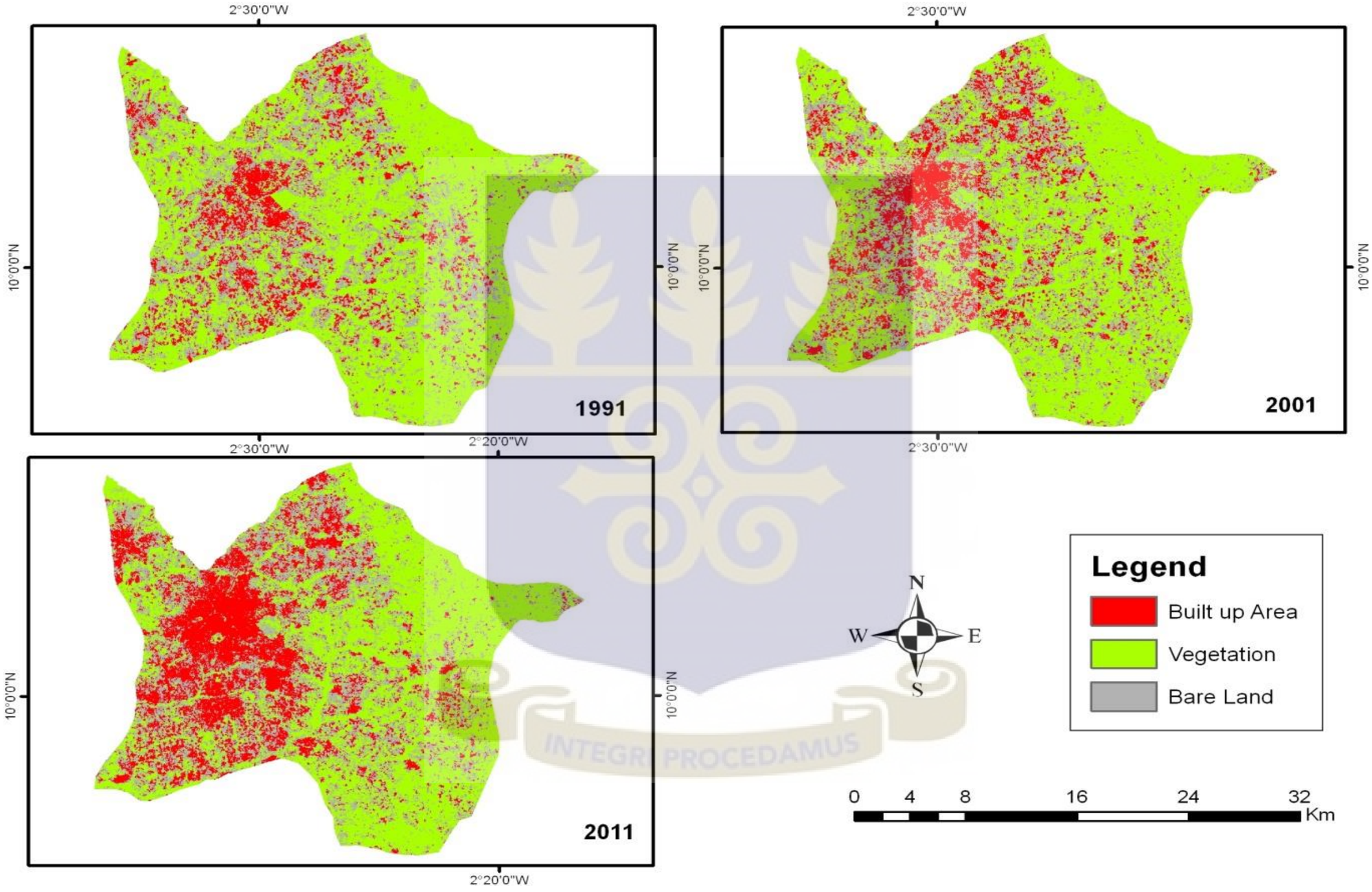


Source: Author's own construct, 2014

The 16 points were then used to create a maximum likelihood supervised classification in Erdas Imagine where three classes were obtained as built-up areas, bare lands and vegetative areas. After the three images were taken through the supervised classification, the ROI (Wa municipal area) was masked out. Using the calculate statistics tool in Erdas Imagine, the changes in the images between respective years were computed.

The final output of the images reveals the significant changes in the three classifications (built-up areas, bare lands and vegetation cover) over the periods of 1991, 2001 and 2011. Figure 4.4 shows the satellite-based land cover map of Wa municipal area while Table 4.3 shows the land cover changes in figures (Kilometer square and percentages).

Figure 4. 4 Land Cover Change of Wa Municipal Assembly



Source: Author's Own Construct, 2014

Table 4.3 Land cover change of Wa municipal area from 1991 to 2011

Year	Built-up area		Bare land		Vegetation	
	Area(km^2)	%	Area (km^2)	%	Area (km^2)	%
1991	73.99	12	207.38	32	360.55	56
2001	95.92	15	203.92	32	342.03	53
2011	144.88	23	205.94	32	291.12	45

Source: Author's own construct, 2014

According to Table 4.3, the urbanized area (built-up) of Wa in 1991 covered an area of 73.99 km^2 representing 12 percent of the total land mass. This increased in 2001 to 95.92 km^2 representing 15 percent of the total land mass. In 2011, Wa witnessed a significant physical expansion of its built-up area by 144.88 km^2. This represented 23 percent of the total landmass of the municipal area. Observably, the study reveals that, between 1991 and 2011, the built-up area of Wa has almost doubled within a spate of two decade.

This development shows that there has been spread of development to the fringes of the municipality. However, the study identified in Figure 4.3 a high concentration of the built-up area reflecting in the core of the municipality. That is, most people are preferably situating their structures close to the central part of the municipality to enjoy social services such as water, electricity, educational facilities and other services. Besides, most landlords are expanding their existing structures to meet the high demand for shelter by migrants, especially tertiary students.

This pattern and trend of development is exerting untold pressure on existing social amenities. As a result, most people are characterised with unsafe conditions such as haphazard building, overcrowding and drinking unsafe water hence become vulnerable to flood, diarrhoea and CSM risks. Several determinants and risk factors of meningitis is observed to include socio-economic conditions such as poor living conditions and overcrowded houses and climatic conditions including temperature, drought and dust (www.cdc.gov cited in Apwah, 2013). Songsore (2010) noted that limited urban resources and non-adherence to development regulations increases risks of flood, disease, accidents and fire.

Table 4.3 further reveals that the changes experienced by bare lands in Wa was steady. Although, there have been fluctuations in the coverage of bare lands between 1991 and 2011, the percentage coverage of 32 percent remains unchanged. The study however detected a decreasing trend of vegetation in the municipality. Table 4.3 shows that Wa had a vegetation coverage of 360.55 km² representing 56 percent of the total land area in 1991. This decreased to 342.03 km² (53%) and 291.12 km² (45%) in 2001 and 2011 respectively.

The study infers, that Wa is fast losing its vegetation cover. This situation poses a series of environmental challenges to the population of Wa. Firstly, there is loss of agriculture lands which is a major source of livelihood to the majority of the population (Aduah and Aabeyir, 2012). This situation could decrease people's adaptive and coping capacities to disasters because of poverty resulting from the loss of their livelihood. Additionally, the loss of vegetation also exposes water sources such as dams, streams and rivers to the sun and could eventually dry up (Aduah and

Aabeyir, 2012). This could reduce residents' access to safe water hence makes them susceptible to disease epidemics.

4.3 Responding to the rapid growth of Wa – Institutional perspective

In view of the rapid physical expansion and population growth in Wa, city authorities have adopted several interventions and strategies to manage the process. Though not explicitly targeting disaster risk reduction, these interventions are geared towards meeting the basic needs of people. Additionally, people's vulnerability to disaster risks will eventually reduce and a resilient city can be built. Accordingly, the study's assessment of urban planning practices, provision of social services and disaster reduction strategies in Wa will help ascertain the city's preparedness in building a 'disaster risk-free' municipality.

4.3.1 The current urban planning modalities

Spatial planning is a major tool for effective land use and disaster risk reduction in cities. The Ministry of Local Government and Rural Development (MLGRD) is the highest state institution overseeing planning of towns in Ghana (Yeboah and Obeng-Odoom, 2010). The ministry regards planning as a process of implementing decisions and actions at various administrative levels of government with the aim of transforming the living conditions of people in a geographical area such that their socio-economic conditions and their physical environment can be improved. (Adams and Anum, 2005 cited in Yeboah and Obeng-Odoom, 2010).

Two major legislative instruments outline planning modalities in Ghana. The Local Government Act, 1993 (Act 462) and the Town and Country Planning Act, 1945 (CAP 84). According to section 12 (1) of the Local Government Act (462), local

governments (district assemblies) are responsible for the planning of towns and cities. This is done in collaboration with other stakeholders such as the Survey department (Yeboah and Obeng-Odoom, 2010). That notwithstanding, the overall development of towns is undertaken by the TCPD.

The current planning model used by TCPD in planning towns is a three-tier spatial planning model which seeks to establish a direct link between national development and spatial planning strategies at the local level. It also seeks to involve a greater participation of stakeholders including landowners (individual and community), traditional rulers, real estate developers and other institutions to ensure an all-encompassing planning of towns (MEST-TCPD, 2011a). The model includes the Spatial Development Framework (SDF), Structure Plan (SP) and the Local Plan (LP).

The SDF/SP and LP are strategic issues for spatial development at the national, regional and district levels over a period of 20 years (MEST-TCPD, 2011a). It functions alongside with broad national level policies which seek to ensure effective socio-economic and environmental development of towns (MEST-TCPD, 2011a). The SP on the other hand comprises accurate spatial plans which are basically used in guiding development and redevelopment of new areas in towns (MEST-TCPD, 2011a). Major characteristics of the SP include the provision of a coordinated approach to infrastructure and service delivery in large and growing areas; to identify areas in towns which needs redevelopment and to ensure effective re-use (MEST-TCDP, 2011a). The LP is the basic level of planning in Ghana. It consists of a digitized, dimensionally accurate layout plan of an area which is being developed, showing detailed activities on individual plots of land, open spaces, transportation systems, energy and drainage systems (MEST-TCDP, 2011a). A significant feature of

a three-tire planning model is its hierarchical nature and the relationship with national, regional and district policies aim at ensuring consistency in spatial development nationwide (MEST-TCPD, 2011a).

According to the current model, new zoning procedures have also been outlined to ensure orderly and effective spatial developments (MEST-TCPD, 2011b). These guidelines provide a clear description of land use activities indicating permitted areas for development and prohibited areas. Therefore, in order to guarantee effective land use activities suitable in newly developing areas, all areas within a planning scheme are zoned to outline various activities (permissible and prohibited) on the land. This is aimed at mitigating vulnerabilities or adverse impact resulting from the activities on the land.

The development of structures on any part of a land ought to conform to zoning procedures hence, requires a building permit from respective district assemblies. This aims at ensuring adherence to planning scheme and zoning guidelines to promote effective spatial planning and quality standards of building. As a result, the national building regulation LI 1630 (1996) guides the development of these structures (CASA, 2012). Consequently, Section 5 (3) of the national building regulations outlines the requirement for acquiring building permits. This include;

1. Clearly and accurately delineated plan in ink or otherwise to the scale of 1:100

2. A detailed description of the building showing clearly the purpose of each room

3. Indicate the stages and methods by which the developer intends to construct the building

4. Indicate the materials of which the building will be constructed and show clearly and accurately the position and dimensions of the foundations

5. Indicate the method of disposal of storm water, domestic waste water and sewage, in a block plan to the scale of 1:1250

6. Clearly indicate the method of water supply

7. Include the plan and section of every floor and roof

8. A site plan to the scale of 1:1250 showing adjoining streets

9. A site plan which shows the height of adjoining properties.

Given that land plays an integral role in spatial planning, the processes of land acquisition for planning purposes and overall development of towns cannot be underestimated (Yeboah and Obeng-Oddom, 2010). Land acquisition and land use for planning at the district level is defined and guided by section 20 (1) of CAP 84 which gives authority to the District Assembly to acquire land for carrying out the provisions of planning schemes. That notwithstanding, the existing land tenure systems in Ghana have a great influence on the planning processes and outcomes. Land tenure in Ghana is basically owned and managed by two institutions; a customary and a statutory tenure system (Thurman, 2010; Dzokoto and Opoku, 2010). These two major land tenures co-exist and highly influence planning and development in various towns (Dzokoto and Opoku (2010). The customary lands are associated with traditional rulers, earth priests, council of elders or family lineage (Agbosu, 2007 cited in Thurman, 2010). According to Fiadzigbey (2006), about 80 percent of lands in Ghana are under the customary tenure system. The statutory land tenure is a system where land is managed by the government.

4.3.1.1 Planning in Wa

The agglomerations of businesses and population increase have required the rapid use of urban spaces in Wa. In the quest to guide development, the Acting Director of the TCPD stated that planning in Wa is in accordance with national planning policies identified in Local Government Act 462 and CAP 84. The ineffective planning of Wa has therefore been a challenge due to the increasing rush for land for settlement purposes (basically for migrants and tertiary students) and for economic activities. This situation has generated spontaneous development of the urban space with traffic congestion, uncontrolled building and inadequate provision of social amenities such as water, health and shelter. In an interview with the Acting Director of TCPD on the preparedness of the institution amid growth in Wa, he opined,

> *... growth has outstripped the infrastructure provision in the municipality. The system did not prepare itself adequately for the massive expansion it is experiencing within this short period. We knew the university was coming up but we did not plan ahead to realize that it will go with some infrastructural facilities; many people with diverse background and agenda have moved into this town. We have not adequately prepared for these people as well. So to the best of my understanding and facing the reality, urban growth has outstripped our preparedness in planning the Wa* (Acting Director-TCPD, Wa, 2014).

He further indicated that the unpreparedness of the institution has led to some communities experiencing haphazard development. For instance, Bamahu (the community hosting UDS) was never prepared to accommodate such a huge number of people, and is hence experiencing unguided development such as building in areas designated for public utilities, indiscriminate dumping of solid waste and haphazard

building. This practice is increasingly exposing residents to flood risks. This confirms the situation experienced in many cities of developing countries where planning is undertaken as a 'reactive' strategy to development. (Larbi (1996) cited in Yeboah and Obeng-Odoom, 2010). Furthermore, most District Assemblies rarely undertake forward planning and even the few existing plans also face ill implementation (Yeboah and Obeng-Odoom, 2010). As a result, such areas, including Wa, lack social services and infrastructure such as water, paved roads and health facilities (Antwi and Deankin, 1996 cited in Yeboah and Obeng-Odoom, 2010).

Although outstripped by the growth process, the Acting Director of the TCPD indicted that new areas such as *Kolutsuni and Mogulu* had been planned before they become fully built-up. Besides, the SP modalities have been adopted to re-zone already built-up areas which are exhibiting chaotic developments. This strategy includes close collaboration with the survey department to map all chaotic areas for the TCPD to develop a planning scheme. The intervention is also supposed to guide other urban stakeholders to easily extend their services to these areas.

Beside the unpreparedness of the TCPD, several other factors have also hindered effective planning in Wa. Significant among these factors is the land tenure system practiced in Wa. As revealed by several studies, about 80 percent of land in Ghana is vested in the customary land tenure (Fiadzigbey, 2006). The situation is not different in Wa, as larger parcels of land is vested in families and the traditional authority. As an acephalous society, Wa does not have a central leader, hence land is sold to individuals through the '*tendamba*' land tenure system where the "*tendamba"* and elders sit together to witness the sale of lands (Dogbevi, 2014). This mode of land

acquisition leads to litigation, since many individuals within a family could sell a parcel of land at any time. The Acting Director of TCPD posited that;

> *... land ownership is one of the biggest challenges we have with respect to planning. In Wa, we have what we call 'fragmentation of land ownership'. Unlike Kumasi where all lands are under the Ashanti stool, in Wa, you have 4 acre parcel of land belonging to three landlords. Sometimes, you go in to plan and there is so much conflict around it to an extent that, even within the same family, there is a problem so you cannot plan* (Acting Director-TCPD, 2014).

There is also a difficulty in enforcing planning regulations in Wa, because most lands acquired under the customary land tenure is not developed to conform to the planning schemes of the areas. Yeboah and Obeng-Odoom (2010) affirmed that, 'customary landholders sell land for purposes which are different from the uses for which planners zone them'. This development has seen people building in water ways, open spaces and prohibited areas. Though in principle, a permit is needed from the District Assembly before land is acquired, most lands in Wa (in practice) are acquired without sufficient reference to planning requirements (Yeboah and Obeng-Odoom, 2010). Additionally, many planning schemes could not be enforced due to poor registration of land and land titles. This development (litigation) according to Biitir (2014) is 'leading to stalemate in development in Wa' (as cited in Dogbevi, 2014).

The partial decentralization of TCPD at the municipal level as Physical Planning Unit of the assembly is not promoting effective planning. The inability of the Assembly to fund the TCPD in preparing planning schemes is also hindering the work of the TCPD in Wa. The Acting Director of TCPD noted that;

> *…Government of Ghana does not resource us to prepare planning schemes. Not at all! The government only provides funding for administrative purposes and even that one, for the whole year it came in September, and this is a peanuts.* (Acting Director-TCPD, Wa, 2014).

With regards to the Assembly funding the TCPD, the Acting-Director further revealed that

> *…the assembly does not resource us. Maybe they are yet to. They have not given anyone money, although they ought to resource us. Not in Wa Municipal Assembly!* (Acting Director-TCPD, Wa, 2014).

This result is in tandem with other studies which reveal inadequate funding of planning institutions. As highlighted by Yeboah and Obeng-Odoom (2010), inadequate funding of planning department by MMDAs stems from three critical issues; article 88 of the constitution of Ghana which limits assemblies to seek financial assistance up to $2000; existing arrangements of funding from MLGRD and MEST (which does not come in time and its always small) and inability to control funds generated from planning schemes and building permits.

Though very little revenue is generated from developing planning schemes, these funds are woefully inadequate. As stated by the Acting Director of TCPD that,

> *…if a landlord engages you to plan his or her area, definitely, he will pay you something. That in a way brings some kind of funding to the institution. But the challenge we have and I don't know whether it's peculiar to Wa, is that most of the landlords don't have physical cash so there are times you work virtually for free* (Acting Director-TCPD, Wa, 2014).

As a result, '*planning is done on a piece-meal approach'*. In other words, inadequate funds result in the TCPD engaging in a gradual preparation of schemes which does not cover all new and emerging areas, rather pockets of lands are planned as and when the need arises. Another major challenge hindering effective planning in Wa is the procedure involved in obtaining building permits. Due to the bureaucracies involved in obtaining building permits, many landlords and individuals in Wa ignore this procedure and develop their land. A discussion with the Wa municipal NADMO coordinator revealed that

> *...the requirements and process of acquiring building permits in Wa is very cumbersome with associated bureaucracies. The delay in granting permits by the assembly is too much and most at times, the people cannot wait for it so they erect all kinds of structures on the land which are usually below standard* (NADMO Coordinator-Wa, 2014)

This development has seen many substandard structures sprouting up in Wa. As a prerequisite for disaster, many people face the risk of building collapse. For instance, a recent report of the collapse of a two storey building (belonging to Yorke properties) under construction in Wa killing one person and injuring two others is a case in point of such vulnerabilities accumulating in Wa (Dogbevi, 2014). Yeboah and Obeng-Odoom (2010) revealed, that building requirements in addition to land title certificates, detailed engineering, architectural and structural drawings as a prerequisite for obtaining permits are mostly difficult to meet and moreover, architectural and geological experts to produce these drawings are few in the country. Subsequently, the inability of developers to produce good land titles accounted for over 90 percent of permit applications rejected (TCPD, 2009 cited in Yeboah and

Obeng-Odoom, 2010). The UN-HABITAT (2009) also revealed that about 45 percent of structures in cities do not meet planning standards. The GSS (2010) revealed that, 'only 44 percent of dwelling units in Ghana are fit to be called "houses" (as cited in Yeboah and Obeng-Odoom, 2010).

Lastly, political influence is also contributing to the ineffective planning in the municipality. The Acting Director of TCPD indicated,

> ...*Politicians and other technocrats have a problem of going by our blueprints as a planning authority. As a result, we are not moving forward because they always satisfy their constituencies and party people and this is affecting planning. Politicians who are supposed to help the system work are rather weakening it and have become obstacles to the efficient planning system in Wa. These politicians have equally put up structures in areas which are not designated for residential facilities.* (Acting Director-TCPD, Wa, 2014).

These challenges reveal the shortfalls in the urban planning strategies adopted in the country as a whole. According to the UN-HABITAT (2013), most of the British colonies including Ghana have retained Town and Country Ordinance (with amendments) within which is embedded primary land use and control frameworks. This continuous adoption of the ordinance does not meet the reality of emerging complexities of rapid urban growth experienced in developing countries such as Ghana (UN-HABITAT, 2013). Also, the large percentage of land spaces vested in traditional authority, families and communities dating back from the pre-colonial days until present times (UN-HABITAT, 2013) continues to pose a great threat to urban planning as reflected in the case of Wa.

4.3.2 Provision of urban services – overview of Water and Sanitation

4.3.2.1 Water

Water as an essential resource forms a vital component in the health of people. Potable water can mitigate the occurrence of diseases and reduce costs on global health, increase productivity and ensure political stability. In Ghana, urban water supply lies with the Ghana Water Company Limited (GWCL) which is under the Ministry of Water Resources, Works and Housing (Adank et al., 2011). Established by Act 461 of 1993 (amended in LI 1648), the GWCL has as its main objective the provision, the distribution and the conservation of water for domestic, public and industrial purposes (Adank et al., 2011). Within the operational system of the GWCL, people are only considered as customers when they are formally connected to the utility (Adank et al., 2011).

The water system available for access by the population in Wa include pipe borne water, dams, dug wells, streams and boreholes among others. Nonetheless, the main water supply in Wa is largely obtained from boreholes. The GWCL in Wa obtain water from boreholes which are treated, managed and distributed as potable water for residents. The treatment and management of this source of water by the GWCL is as a result of the inadequate surface water found in Wa. Presently, the GWCL operates and manages 16 boreholes from which 1, 200 m^3 per day of water is yielded into a 7,000 m^3 capacity reservoir for treatment and distribution. According to the operations manager of GWCL, the demand for potable water by the population of Wa is 10,000 m^3 per day. Consequently, examining this high demand for potable water and the low supply from the GWCL, one can observe that the potable water supply is woefully

inadequate to meet the demands of the population. This was revealed in a discussion with the operations manager of GWCL who stated that,

> *… in Wa at the moment, the demand for water is 10,000 m³ per day but due to our limited resources and sources of water, we are making an average of 1, 200 m³ a day. We operate 16 bore-holes and the yields of these bore-holes are not all that good. This is the cause of our inability to meet the demands of the people.* (Operations manager-GWCL, Wa, 2014)

The inadequate supply of potable water is further attributed to the growth of Wa as pointed out by the operations manager of GWCL, '*the rapid expansion of the town cannot match our production level of water supply for the population'.* Coupled with the low production of potable water, there is also the spatial limitation of the utility in that, the catchment area for the distribution of potable water by the GWCL covers only the central part of Wa. The municipal planner of WMA acknowledged that,

> *...access to potable water is a very hectic situation in Wa. If you look at the Ghana urban water delivery within the municipality, it is only centred within the central town. If you go to areas that are fast experiencing population growth like Bamahu, Kpaguri and Sombo among others, they don't have access to water from GWCL.* (Municipal Planner, Wa, 2014)

This limited supply of potable water has compelled most residents to use other alternative sources of water, including dug wells, sachet water, streams (mostly shared with domestic animals), and community boreholes. Also, an emerging trend of water supply in the municipality involves rich individuals who drill boreholes for private

use and commercial purposes. This recent development in water supply is highly patronized and seen as a supplement to the diminutive supply of potable water by the GWCL. Though this source is available, many people consider the price (20 pesewas per basin) as expensive hence they rely on other sources of water such as dug wells, streams and dams. These sources are categorized by WHO/UNICEF (2010) as unimproved sources under the recommended standards of potable water This is as a result of the inability of the sources to undergo treatment before use. Consequently, access to unsafe water becomes an unsafe condition which could increase residents' vulnerability to health risks such as diarrhoea, typhoid and dysentery. For instance, cross-contamination of water (shared with animals) from source, mode of transport (tanker services, buckets, basins and *yellow gallons*) and storage facilities (in yellow gallons and basins without tight lids) further increase people's vulnerability to health risks.

In the bid to expand the potable water supply in the area, two major projects have been initiated by the MWRWH in conjunction with the GWCL and the Assembly. The interaction with the operations manager of GWCL revealed that these two projects include a Chinese project (funded by World Bank) and a Korean Water expansion project. The first project, undertaken by the Chinese started in 2011 with the aim of drilling 16 boreholes. However, due to technical and financial difficulties, only 8 of the boreholes have been drilled and mechanized. This is expected to add 1,000 m^3 of water to the daily productions of GWCL. The operations manager however declared that this was still inadequate considering the speedy rate at which Wa is expanding.

The Korean project (surface water project), started in 2012 and scheduled to take 36 months, has also been initiated to further expand the water system in Wa. This involves the pumping of water from the Black Volta River to the municipality due to the fact that the boreholes do not yield much water. As opined by the operations manager of GWCL,

> *…the bore-holes in Wa do not have better yields. We have about three of them which are somehow good with their yields. All the others have their production range between 2-7 m³ an hour instead of about 10 m³ or more an hour. So with these low aquifers in town, it is not advisable to sink more bore-holes. That is why we have decided this time around to go into surface water from the Black Volta River (*Operations Manager-GWCL, Wa, 2014).

In addition, the project involves the construction of a 1000 m³ water storage facility and the construction of a treatment plant in a village 40km away from the municipality. Also, provisions have been made for 500 household connections including 250 standpipes in the communities. It is estimated that by the end of these projects, more than half of the population will have access to potable water. As mentioned by the Operations Manager of GWCL,

> *...the two projects will actually reduce the water stress because demand of 11,000m³ water a day will be satisfied by 15,000 m³ production of water a day. (*Operations Manager-GWCL, Wa, 2014).

Although adequate potable water is expected in Wa after the completion of these projects, it is anticipated that the cost of the resource may hinder many households to patronize the resource. According to the operations manager of GWCL,

> *...the cost of pumping and mechanizing bore-holes are very expensive. However, under the surface water project, the cost is more expensive and the problem will be people's ability to pay for the water. This is because the water will be transported (pumped with electricity) over a 40km distance to the municipality and the use of chemicals to treat it will inflate the cost of production. The flows of the water through different terrain will be heavily contaminated hence needs effective and efficient treatment and management (*Operations Manager- GWCL, Wa, 2014).

Consequently, this anticipated increase in cost of production (which will eventually increase the cost of potable water) can hinder many people, especially the poor, from accessing this source of water. Hence, continuous reliance on other alternative sources will expose the population to diseases. More so, the ineffective management of the water resource by GWCL coupled with inefficient distribution after the completion of the water expansion projects could further lead to illegal connections to potable water in the municipality.

4.3.2.2. Sanitation and solid waste management

The Environmental Health and Sanitation unit of the Assembly is the institution responsible for managing urban environment and sanitation in Wa. As a result of the rapid increase in population, sanitation and solid waste management has become a major challenge confronting Wa. In the quest to ensure good sanitation practices and solid waste disposal practices, the environmental health and sanitation unit of the assembly in partnership with Zoomlion (a private waste management company) has initiated several strategies to manage sanitation and solid waste disposal in Wa. One

of such measures is the provision of community containers in every community for disposal of solid waste.

An interaction with the chief environmental health officer of WMA revealed that 49 community containers are currently available and placed at designated places for residents to dump their solid wastes. Besides, the partnership between the two institutions has seen the delivery of dustbins at a cost of Ghc 30 (as registration fee and subsequent gh¢10 for monthly service) to residents for disposing off their solid waste.

Also, the Unit has 17 environmental health workers who engage in routine inspections of people's residents and their environment. A major approach adopted towards protecting the environment from solid waste indiscriminate disposal is the mandatory clean-up exercise which has been instituted by the government of Ghana. This clean-up exercise requires that every first Saturday of each month be set aside for cleaning individual homes and their surroundings. This exercise is equally observed in Wa to ensure environmental sustainability.

Notwithstanding these measures geared towards managing solid waste in Wa, several challenges facing the environmental health unit, including inadequate staff (17 environmental health officers serving a population of 107,214), logistics and unavailability of funds, continue to exacerbate environmental conditions. The inability of most residents to patronize dustbins (due to the cost) coupled with the uneven distributions of community containers cause residents to feel reluctant to walk long distances to utilize them. These challenges have resulted in the majority of residents adopting alternative methods of disposing solid waste. These include

burning, burying, indiscriminate dumping and dumping in open spaces. The chief environmental health officer noted that;

> *...unlike some bigger towns where one could walk miles to dump refuse at public dumps, the people in Wa want containers to be placed every 2 metres to dump their solid wastes. This attitude has led to many people dumping their refuse anywhere* (Chief Environmental Health Officer-Wa, 2014).

According to the 2000 population and housing report, about 2.4 percent of residents in Wa had their solid waste collected, while 55.9 percent and 30.2 percent, dumped their waste indiscriminately and in public containers respectively (GSS, 2002a). Also, 5.7 percent and 5.5 perecnt burn and bury their solid waste respectively. In 2010, the most recent census report showed that 4.3 percent and 44.6 percent have their solid waste collected and dumped in a public dump (container) respectively. Though there is a slight increase in the use of dustbins from 2000 to 2010, majority of people continues to engage in unimproved solid waste disposal methods such as burning, indiscriminate dumping, burying and open dumping (open spaces). For instance, 23.6 percent and 17.6 percent of people dispose their refuse in open spaces and indiscriminately respectively (GSS, 2013a). While 7.9 percent and 1.6 percent of the population burn and bury their solid wastes respectively (GSS, 2013a).

With respect to sanitation practices, the adoption of a Community-Led Total Sanitation which is aimed at integrating approaches to improved sanitation and good hygiene practices (Quansah, 2011), is one major strategy set up by the WMA to ensure good sanitation. This strategy further sensitizes landlords about the need to build toilets in their houses. As a significant need by the assembly, there are collaborative measures with private individuals who build and operate private toilet

facilities within the communities under the PPP system. Currently 46 public toilets have been built across the various communities to serve the population. Although public toilets are originally built to serve visitors (Appiah and Oduro-Kwarteng, 2011), the facility has become an 'obligatory infrastructure' which is constructed by Wa to serve permanent residents.

In spite of these strategies, people continue to engage in poor sanitation practices such as open defecation. A major challenge facing the environmental health unit is access to land for building additional public toilet facilities. The study observed, that the majority of houses in Wa did not have any toilet facility, hence the increasing reliance on public toilets. This has placed huge pressure on the existing facilities. According to the chief environmental health officer, many plans have been tabled for increasing the number of public toilets in Wa. However, he lamented,

> '*...every land is occupied and landlords are not ready to release any part of their land for toilet infrastructure. Most of them see it as an unfruitful investment* (Chief Environmental Health Officer-Wa, 2014).

He further noted that most landlords indicate in their building plans, designated areas for toilets when obtaining building permits. However, on the ground, these areas are converted into bed rooms. As a matter of fact, the absence of toilet facilities in most houses have compelled many people to engage in the use of poor toilet facilities such as pan latrines and open defecation, which are considered as unimproved sanitation by the WHO/UNICEF (2010). For instance, in 2000 and 2010, 63.8 percent and 41.8 percent of people respectively had no toilet facility hence engaged in open defecation (GSS, 2002a; GSS, 2013a). This practice serves as a prerequisite for health related risks such as cholera and diarrhoea. To conclude the increasing engagement of the

population in unimproved solid waste disposal and poor sanitation practices (especially open defecation) is exposing most residences to susceptible conditions such as respiratory infections resulting from air pollution (from burnt refuse), lung infections, cholera, diarrhoea and floods risk accumulation. In addition, open defecation and unimproved sanitation practices exposes residents to food contamination from flies.

4.3.2.3 Health Care facilities

Access to healthcare facilities in urban areas is a vital component of reducing vulnerabilities among population. However, unplanned development of urban centres is most often associated with health related issues stemming from increasing disease, epidemics and the challenge of accessing and utilizing healthcare facilities. In Ghana, two main institutions oversee healthcare delivery. They are the Ministry of Health (MOH) and the Ghana Health Service (GHS). A structural re-organization of the health sector led to the establishment of the GHS under the Ghana Health Service and Teaching Hospital Act 525, 1996 (Agyei, 2003). This became operational in 2001 to facilitate decentralized planning and management of healthcare and to provide a more functional authority to the GHS at the regional and district levels (Agyei, 2003).

Functions of the MOH include acting as the central governing body for coordinating all health issues in the country and for overseeing the general performance of the GHS. On the other hand, the GHS' core objectives include the implementation of approved policies of national health delivery; to increase access to quality health services and the management of health service resources in Ghana (GHS, 2014).

The rapid growth of Wa has seen a remarkable change in the access and utilization of healthcare delivery. Consequently, meeting the health demands of the population has seen some institutional transformations and strategies in the health sector in Wa. According to the health information officer of the Wa Municipal Health Directorate,

> …*the rapid growth of Wa has resulted in several changes in the health status, healthcare access and disease epidemics in the municipality* (Information Officer, WMHD, 2014)

That is, there is changing trends of epidemics, where aside poor environment-related diseases (cholera, diarrhoea, typhoid), there is the accumulation of non-communicable diseases such as motor accidents, diabetes and cardiovascular diseases, among others. This is increasing the rate /use of access and utilization of healthcare services in Wa. As a result, the municipal health directorate in collaboration with the Assembly has instituted a Regenerative Task Force to educate people on lifestyles and the prevention of non-communicable diseases. Besides, the task force visits educational facilities to sensitize students on ensuring environmental sustainability through effective sanitation and waste disposal practices. In the area of infrastructure, Wa continues to house the only public hospital which serves as a municipal and regional hospital for the entire Upper West Region. Additionally, there are 2 private hospitals, 5 clinics and 7 Health Centres. To further expand the number of health facilities and increase people's access, the municipal health directorate, in conjunction with the Assembly, has since 2005 instituted 20 Community-based Health Planning and Services (CHPS). Table 4.4 shows the health infrastructure status of Wa

Table 4.4 Healthcare facilities in the Wa Municipal Assembly

Type	Ownership		Total
	Government	Private	
Hospital	1	2	3
Clinic	5	-	5
Health Centre	7	-	7
CHPS Zone	20	-	20
Total	**34**	**2**	**36**

Source: Wa Municipal Health Directorate, 2014

Besides, the construction of a new hospital with a bed capacity of 180 earmarked to serve as a regional hospital is near completion and is aimed at further increasing access to healthcare services. This is expected to reduce the pressure on the main health facility (Wa regional hospital) in the municipality. As the only public hospital, it is the most patronized in Wa. It also serves as a referral hospital to other peripheral health facilities within and outside Wa. The facility has a capacity of 200 beds. The staff strength of the facility from 2012 to 2014 is shown in table 4.5.

Table 4.5 Human Resource situation in upper west regional hospital

Categories	2012	2013	2014
Nurses	**153**	**196**	**210**
Midwives	35	32	33
Paramedics	132	140	126
Ghanaian doctors	**4**	**5**	**6**
Cuban medical brigade	6	6	0
Medical house officers	1	3	3
Support services	79	98	97
Houseman administrators	2	2	2
Casuals	60	60	75

Source: Wa Municipal Health Directorate, 2014

According to Table 4.4, the number of nurses in the facility increased from 153 in 2012 to 196 and 210 in 2013 and 2014 respectively. Also, the number of Ghanaian doctors had an insignificant increase from 4 in 2012 to 5 and 6 in 2013 and 2014 respectively. Examining the health infrastructure and staff status of the hospital, the study inferred that there is an untold pressure on the facility causing grave congestion and a fast deterioration of the facilities. As acknowledged by the health information officer that,

> *...because health facilities of yesterday were meant to meet yesterday's needs, the increase in population currently without increasing health infrastructure is having an effect on the existing facilities especially the upper west regional hospital* (Information Officer, WMHD, 2014).

Using the population of the municipality and the number of doctors available, the doctor-patient ratio (in crude form) in Wa can be said to be 1:17,869. This is awfully below WHO recommended standard of doctor-patient ratio of 1:600. This situation can result in health officers compromising the quality of healthcare delivery to the population of Wa.

Moreover, the high cost of service charged by private healthcare facilities further prevents people from accessing it. This results in the congestion of the only public hospital in Wa and compels many people to resort to unsafe health systems such as self-medication, visiting traditional and untrained herbalists for remedies to their ailments.

4.3.2.4 Disaster Risks management preparedness

As a rapidly developing area, Wa is exhibiting a high level of complexities resulting from the agglomerations of economic and human activities. These complexities as asserted by Cardona et al (2012) have the potency of exposing the urban population to vulnerable conditions which can possibly result to the accumulation of various forms of disaster risks.

The National Disaster Management Organization (NADMO) is the main institution mandated by the law (Act 517) of 1996 to manage disasters and help victims recover from their effects (Oteng-Ababio, 2013). In addition, the institution seeks to further create awareness on disaster reduction through intensive public education, to enforce disaster prevention and to mitigation laws and set up monitoring and early warning systems to aid the identification of disasters in their formative stages (NADMO, 2014). Administratively, the institution's task is decentralized across its offices located in the various MMDAs and in the Wa municipal area.

The aforementioned objectives are the broad functions under which NADMO in Wa municipality operates. Consequently, the complexities associated with the development of Wa has given rise to the accumulation of various disaster risks such as fire, floods, collapse of building, disease epidemics, crime and motor accidents. This development has informed the institution to outline coping strategies, preventive and mitigating measures to control disaster risks accumulating in the area. Among these strategies included public education aimed at awareness creation and mitigation strategies in preventing disaster risks. Mostly, the use of electronic media (for instance, Radio Upper West) is employed to disseminate information on disaster risks

and how to mitigate and prevent them. The beneficiaries of this public awareness include market women, educational institutions, private and public institutions.

There is also the collaboration between other stakeholders of the municipality such as the GHS, the GNFS, the GP and the traditional authority in ensuring resilience and promoting rapid response to disasters whenever they occur. According to the NADMO coordinator, the coordination is geared towards enforcing preventive approaches rather than reactive approaches to managing disasters. Furthermore, the institution has established a Disaster Control Group (DCG) at the community level with the fundamental aim of managing disasters before the arrival of other stakeholders. This group is basically made up of individuals who live in the communities. However, lack of funds to motivate their contributions to building resilience in the communities is reducing their commitments to the work. This in effect is influencing NADMO's effectiveness to disaster management at the local level.

Notwithstanding the efforts to mitigate the occurrence of disasters in the municipality, the NADMO office in Wa is facing a myriad of challenges which is weakening their operations. The institution is handicapped in effective handling of disaster risks such as fire outbreaks, disease epidemics, floods and crime among others. The NADMO coordinator acknowledged that the incidence of floods, for instance, is increasing in the municipality, because people are fast occupying every underdeveloped land with haphazard settlements. He noted that;

> *…even areas earmarked for public places including open dump sites, school parks and play grounds are all experiencing haphazard construction of structures* (NADMO Coordinator-Wa, 2014).

These structures are technically weak and do not have building permits. This development, by implication, has the potency of causing collapse of buildings in the area. As posited by Dimuna (2010), the collapse of a building can largely be attributed to the use of substandard building materials and of incompetent contractors who engage in building activities.

Among the challenges faced by NADMO in Wa are inadequate logistics (including infrastructure, relief items and staff) coupled with financial constraints. The coordinator remarked that:

> *...the central government does not give us cash! It's usually in the form of relief items. And even this is not regular. Impress is also inadequate and does not come regularly. If you are to educate people on disaster reduction now, there is no money. Office equipment, especially transport facilities, raincoats, life jackets are not enough. We only have one motorbike. As at now we rely on the Assembly for a vehicle if we are to go on an operation such as distributing relief items* (NADMO Coordinator-Wa, 2014).

The study observed that the NADMO office in Wa has a single-room office structure with an extension made from wooden materials. The extension of the structure with a wooden material is no defence against windstorms and rainstorms which is associated with the area. Also, the wooden structure, which is susceptible to fire outbreaks, can halt the operations of the institution in a fire disaster.

The office has one motor bike (Yamaha 100 brand) and no other vehicle. This motor bike is used by the municipal coordinator for the operations of the institution. This means of transport, however, is woefully inadequate to manage disasters in the

municipality. By inference, embarking on public education and awareness on disaster prevention by staff cannot be effectively carried out. Hence, many people will continue to be susceptible to disasters as information on risk reduction will still be inaccessible. With regard to communication gadgets, the institution has only one '*gota'* phone which is not functioning. Therefore, rapid dissemination of information concerning people at risk at any point in time cannot be achieved.

In addition, the NADMO coordinator lamented that the unavailability of a disaster response team in the municipality distracts and delays recovery processes of disaster risks. Moreover, with the extent of operations required by the institution, a staff strength of 25 (12 males and 13 females) expected to manage various forms of disaster risks in a municipality with 702,214 population can be seen as a challenge. These challenges coupled with many others account for the ineffective and inefficient management of disasters in the municipality. As posited by Oteng-Ababio (2013), staff strength, infrastructure and transport facilities are inadequate in district and municipal offices of NADMO and this is exhibited in the ineffective building of towns and cities. Also, current operation of NADMO which is preoccupied with a top-down approach does not ensure effective risk reduction (Oteng-Ababio, 2013). Therefore, a rapidly developing area such as Wa with a huge deficiency in its disaster management institution is only a precondition for continuous vulnerability generation and disaster risk accumulation. As remarked by IFRC AND RCS (2010), 'governments fail to stop urban disasters when they fail to help local government structures in cities and metropolitan areas to provide the web of institutions, infrastructure and services'.

4.4 Summary

This chapter set out to interrogate the urban growth processes in Wa and examined the preparedness of stakeholders in managing this growth. To achieve this objective, census data from 1970, 1984, 2000 and 2010 were used to examine population trends. According to the findings, Wa municipality in general experienced a steady growth in population from 29,804 in 1970 to 107, 214 in 2010. The township witnessed an increase from 13,740 to 71, 051 in 1970 and 2010 respectively. Using satellite imagery, the physical extent of growth was also analysed. The results revealed that the built-up area of the municipality which was 73.99 km², representing 12 percent of the total land cover, has almost doubled in 2011 to 144. 88 km² representing 23 percent of the total land cover.

Among the factors identified for these growth processes is a political one, specifically the government's decentralization policy which elevated Wa to a municipal status. Additionally, the increasing trade between the town and other parts of the country and the establishment of tertiary institutions (University for Development Studies, Wa Polytechnic among others) equally served as a catalyst for the process.

Unfortunately, the rapid growth has not witnessed a commensurate provision of social and infrastructural services, thus compelling many residents to adopt alternative options which in turn generate disaster risks.

CHAPTER FIVE

VULNERABILITIES GENERATED BY URBAN GROWTH PROCESS IN WA

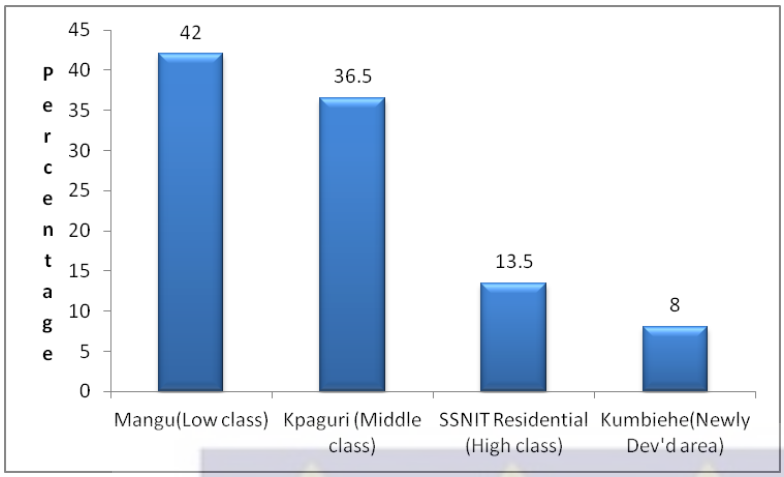
5.0 Introduction

The previous chapter examined the physical and demographic extent to which Wa has developed. Various institutional capacities were also assessed to ascertain their preparedness towards the growth of the municipality. This chapter examines the relationship between demographic characteristics of residents and their susceptibility to disaster risks. Furthermore, the chapter analyses the interconnection between household vulnerabilities and disaster risk accumulation.

5.1 Demographic Characteristics of respondents

The complex nature of the population in Wa guided the study to collate data from four different communities in order to capture the heterogeneity of the area. Figure 5.1 shows that 42 percent of the respondents were from Mangu (low-income residential area) and 36.5 percent from Kpaguri (middle-income residential areas). Additionally, 13.5 percent and 8 percent of the respondents were from SSNIT residence (high-income area) and Kumbiehe (newly developed residential areas) respectively.

Figure 5.1: Location of respondents



Source: Fieldwork, 2014

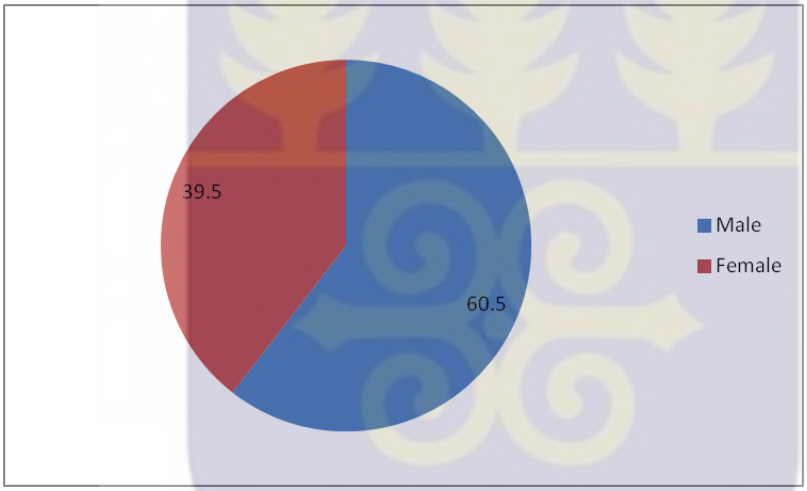
The selected communities depict a typical population characteristic of towns in developing countries including Ghana, where there is a segregation of population basically into high and low income residential areas. These categories are usually based on population density and availability of infrastructure. Mangu has a high population density with underserved infrastructure as compared to the SSNIT residential area. As acknowledged by Pelling and Wisner (2009), most urban centres in developing countries are composed of 'at least two cities'; the elites (wealthy) who occupy gated communities with all urban services at their disposal, whereas the poor reside in impoverish peripheries underserved with minimal or no social services.

Examining the implication of this residential structure in Wa on disaster risk, the study inferred that communities including Mangu, Kumbiehe and some parts of Kpaguri are more susceptible to disaster risks due to their location on low lying areas and flood prone areas. Inadequate social services and the high levels of poverty associated with these areas further account for the high vulnerabilities of their population to flood and disease risks. Several other studies have revealed that urban residents, mostly the poor, are increasingly exposed to floods, fire outbreaks, spread

of disease as a result of poor planning, daily challenges of access to proper sanitation facilities, to safe drinking water, to inadequate housing and to poor health among others (World Bank, 2011; IFRC and RCS, 2010; Dodman et al., 2013).

With regards to household composition, the study revealed that 60.5 percent of head of households were males, while 39.5 percent were female. This signifies that male household heads continue to dominate most families in Wa (GSS, 2013a. Figure 5.2 shows the composition of household heads by sex.

Figure 5.2: Heads of Households



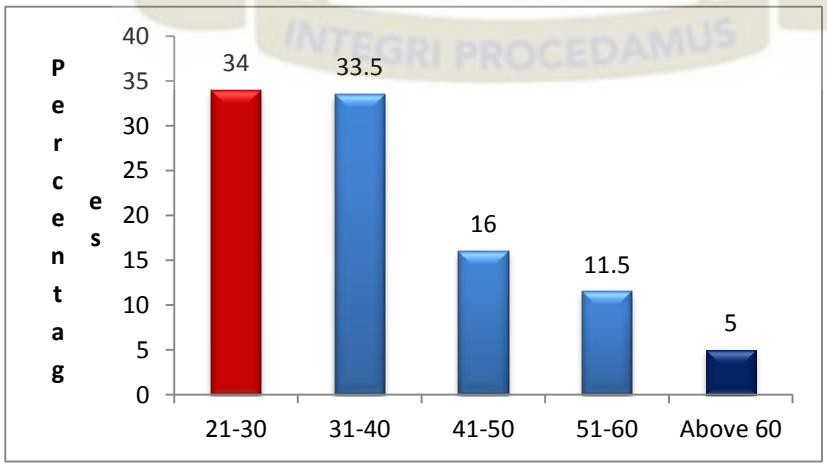
Source: Fieldwork, 2014

Heads of households play significant roles as '*bread winners*' coupled with ensuring the welfare of the entire family. The ability of a household head to provide basic needs (water, sanitation, adequate housing and health services) serves as a prerequisite for preparedness and for mitigating disaster risks. Disaster risks have a negative impact on both men and women (Bradshaw and Fordham, 2013). The dominance of men as household headship in Wa could make them more susceptible to disaster risks due to their risk-taking behaviours such as open defecation, buying food

from vendors and saving children, wife and properties during disasters such as floods and fire outbreaks (Bradshaw and Fordham, 2013). Though there are a few women as household heads, they are equally more vulnerable to disaster risks than men as a result of the socio-cultural status of women in traditional families in Wa. For instance, women, whether household heads or not, do not have control over assets such as land, decision-making processes and information, hence, mobilizing such resources to manage risk factors become a challenge for such households. Bradshaw and Fordham (2013) noted that women are more likely to die than men during disasters due to socio-cultural reasons and gender norms such as less control over assets and resources needed to manage risk factors.

The age distribution of respondents reveals the preponderance of youthful population in the municipality. According to Figure 5.3, most respondents fall between the ages of 21-30 representing 34 percent. More so, 33.5 percent represented respondents within the ages of 31-40. Respondents between the ages of 41-50 and 51-60 represented 16 percent and 11.5 percent respectively. The aged, 60 and above formed the least (5%) of the age distribution among the respondents.

Figure 5.3: Age of respondents



Source: Fieldwork, 2014

The significant percentage of respondents between the ages of 21 and 30 is fairly attributed to the presence of tertiary students in the municipality (GSS, 2013a). Increasing immigrants seeking 'greener pastures' and the love for large families, polygamy, and absence of family planning in the municipality also account for the youthful population in Wa (GSS, 2013a; UNDP, 2010).

Consequently, the youthful nature of the population reveals an active population in managing disaster risks. Their physical strength and abilities enable them to access social services as forms of coping strategies during disasters. The aged, although forming the least of the population are considered as vulnerable in society due to their physical, social and economic weakness which makes them more susceptible to the impacts of hazardous events. Hoffman (2009: 1501) points out that elderly people are part of the most vulnerable people during disasters because of their 'cognitive, sensory, mobility, social and economic limitations that can impede their adaptability and ability to function in disasters.

Expenditure of households play a significant role in determining the wellbeing of individuals and to a larger extent show their levels of income. Table 5.1 shows the monthly expenditure of respondents. The study revealed that, 34 percent of respondents spend less than Gh¢ 200 as their average monthly expenditure, while 36 percent spend between Gh¢ 201-500 as their average monthly expenditure. Furthermore, 18.5 percent spend between Gh¢ 501-1000 whereas 10 percent spend between Gh¢1001-1500. Very few of the respondents (1.5%) however spend above Gh¢1501.

Table 5.1: Monthly expenditure of respondents

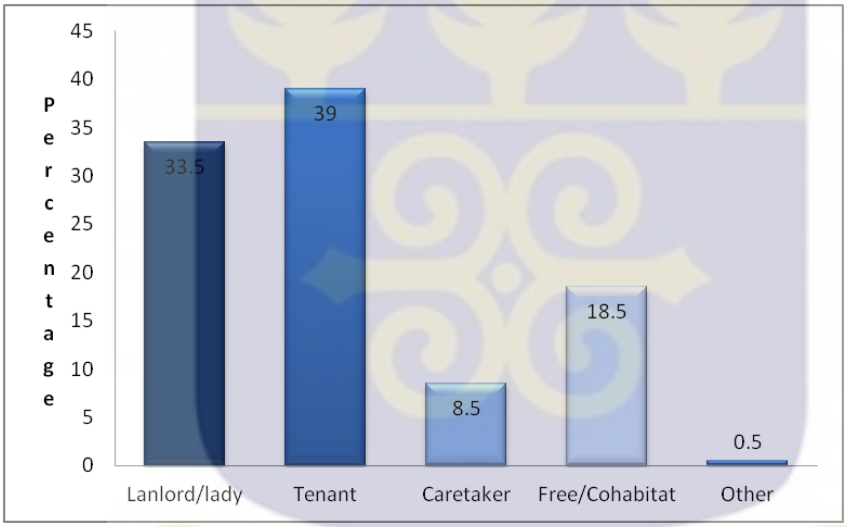
Location of Respondents	Monthly Expenditure				
	Below Ghc 200	Ghc 201 – 500	Ghc501 - 1000	Ghc 1001 – 1500	Ghc above 1501
Kpaguri	35.6	43.8	16.4	4.1	0
Mangu	46.4	38.1	10.7	4.8	0
Kumbiehe	18.8	50.0	12.5	12.5	6.2
SSNIT	0	0	51.9	40.7	7.4
Total	**34.0**	**36.0**	**18.5**	**10.0**	**1.5**

Source: Fieldwork, 2014

The expenditure distribution reveals that 70 percent of respondents spend below Gh₵ 500 as their monthly expenditure. Aside this general picture, the disparity at the community level is wide, since apart from SSNIT residence, where all respondents spend more than Gh¢500, all other communities including Kpaguri, Mangu and Kumbiehe have more than 50 percent of their population spending less than Gh¢500. With such amounts, one cannot doubt the fact that accessing potable water, quality healthcare, proper sanitation and adequate housing can be challenging. This is reflected in various behavioural actions of many households in Wa who resort to improper solid waste practices such as burning, dumping in drains, the use of unsafe water from dug wells, streams, dams and poor housing structures. These practices generate vulnerable conditions making the population susceptible to disease risks such as respiratory infestions and diarrhoea.

The survey revealed, that there are many more people who are tenants than landlords in Wa. According to Figure 5.4, tenants represented 39 percent while landlords represented 33.5 percent of respondents. In addition, 18.5 percent of respondents were freely cohabiting with their families while 8.5 percent were caretakers of various housing units. The large number of respondents as tenants can partially be attributed to the inadequate hostel facilities for tertiary students resulting in the majority of them residing in rented houses in the municipality. Also, the immigration of public and private workers into the town can also account for the high number of tenants.

Figure 5.4: Tenancy Arrangement of respondents



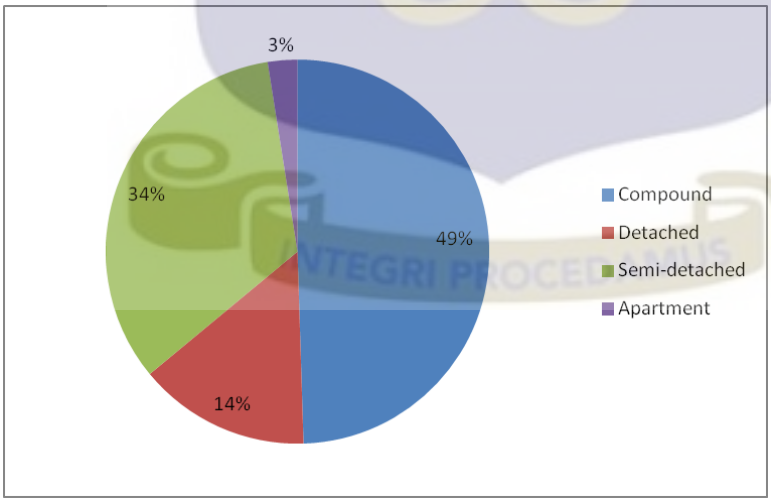
Source: Fieldwork, 2014

The high number of tenants in Wa is a prerequisite for high impact of disaster risks especially on tenants. Most housing structures in Wa are not insured and often lack building permits. The majority of these structures are also built with substandard materials and are located in unplanned areas. These risk factors of housing units in Wa cannot guarantee resilience to most disaster risks such as floods and building collapses. More significantly, eviction procedures by landlords amid risk factors are

potential threats in reducing the tenant's capacity to cope with and recover from disaster risks. According to the World Bank (2011), weak tenure rights is the most critical dimension of vulnerability in that, 'owner occupiers tend to invest in more resources in adaptation measures than tenants, especially in reinforcing the house structure before heavy rains'. That notwithstanding, uninsured and haphazard housing structures equally makes landlords susceptible to hazards, because their source of livelihood can be curtailed whenever such unauthorized structures are demolished.

The most dominant housing facility occupied by people in Wa are compound houses (GSS, 2013a). This is reflected in the study, as Figure 5.5 shows in percentages the type of housing facilities occupied by respondents. Accordingly, 49 percent of respondents live in compound houses followed by semi-detached structures occupied by 34 percent of respondents. Additionally, 14 percent reside in detached facilities while 3 percent occupy apartments.

Figure 5.5: Type of Housing facility



Source; Fieldwork, 2014

The findings reveal the trend at the national level which identifies urban centres as having more compound houses (55%) than their rural counterparts which is 35 percent (GSS, 2008). The large number of people dwelling in semi-detached facilities can be explained by the changing trend of housing structures put up by landlords to meet the demands of migrants (students and workers) in the municipality.

Inherent characteristics of most compound housing units in Wa include: high population densities, the use of shared facilities such as toilets, bathrooms, solid waste bins and kitchen spaces. This compels most residents to engage in open defecation and the indiscriminate disposal of solid waste materials. Most households share a single kitchen space and this causes congestions and indoor and outdoor air pollution from the use of fuel wood during cooking. These conditions of most compound houses expose inhabitants to air-borne diseases, vector-borne diseases and fire outbreaks. WHO/UNICEF (2010) indicated that shared sanitation facilities are not safe for people as they serve as a medium for transmitting diseases. The large household sizes associated with compound houses also cause congestion which serves as prerequisite for outbreak and spread of CSM.

5.2 Vulnerabilities generated by urban growth processes in Wa.

5.2.1 Housing Characteristics and effects on households

Adequate housing promotes the welfare of residents, serves as a haven against harsh climatic conditions and determines a person's health, wellbeing and prospects in life (GSS, 2013b). Nevertheless, inadequate housing facilities in urban centres are risk factors increasing the people's vulnerabilities. The lack of affordable housing from government and other private stakeholders in Wa has resulted in a huge housing deficit affecting the population of Wa. Consequently, the study examined the number

of rooms (adequacy of housing structure) occupied by households and how this is creating vulnerable conditions among the population.

The study considered bedrooms and living rooms due to the fact that people in Wa use these rooms as sleeping places. As a result, bathrooms, toilets, kitchen, store and dining rooms were excluded. Table 5.2 reveal that, most respondents (34.5%) sleep in two rooms while 23 percent use single rooms. This housing occupancy situation contrasts the state of housing occupancy at the national level where 49.9 percent households occupy a single for living (GSS, 2014). Accordingly, in urban areas, more than half (53.5%) of the proportion of households occupy one room (GSS, 2014). Moreover, about 19.5 percent of respondents sleep in 3 rooms and 10.5 percent also sleep in four rooms. Other respondents composing 12.5 percent sleep in structures with five rooms and more.

Table 5.2 Household size and number of sleeping rooms (%)

Size of Household	Single Room	Two Rooms	Three Rooms	Four Rooms	Five Rooms	Above Five Rooms
1-3	62.5	27.1	6.3	2.1	2.1	.0
4-6	14.6	46.1	27.0	6.7	1.1	4.5
7-10	6.8	29.5	18.2	20.5	13.6	11.4
Above 10	0	10.5	21.1	26.3	21.1	21.4
Total	**23.0**	**34.5**	**19.5**	**10.5**	**6.0**	**6.5**

Source: Fieldwork, 2014

Adequate housing in Wa as a basic necessity of life reveals the mitigation, and coping capacities of households in managing disaster risks such as disease epidemics.

Observably, the number of rooms used by people in Wa suggest some level of congestion and overcrowding. Table 5.2 reveals that, 62.5 percent of respondents with household size between 1 and 3 occupy single rooms while many others (46.1%) with household size between 4 and 6 occupy two rooms. The study found that the average number of rooms per household was 2.7, which exceeded the national figure of 1.8 (GSS, 2008). Most of these rooms also accommodate personal belongings which share room space with the inhabitants. In additions, some structures have small windows to their rooms. The absence of kitchen spaces in most structures further results in people cooking indoors. The use of charcoal by many households emits smoke into these rooms causing indoor air pollution which can cause respiratory infections. In addition, residents become susceptible to fire outbreaks. The congestion and overcrowding generate vulnerable conditions such as high temperatures and poor ventilation in the rooms. As a result, inhabitants become vulnerable to disease risks such as cerebrospinal meningitis (CSM) since Wa lies within the hot climatic zones characterized by intense hot weather conditions and high temperatures between 40°C and 45°C (GSS, 2013a).

The high demand for housing units has led to the increasing cost of rent in Wa, and this is also translating into vulnerable conditions. Two major reasons were identified as contributing to high cost of rent. These include a high student population amid a low supply of housing units and the increasing cost of building materials. As a result, landlords have used this opportunity to increase their income by 'inflating' rent charges. A discussion with the Assemblyman for Mangu revealed that,

> *...before UDS was established, the number of houses rented in Wa were only few. But after the opening of the school, renting of houses have shot up. The*

> *cost of rent has also moved from hundreds to millions of cedis. Now in Wa, unless you have between ₵400 and ₵600 to pay for a year, you can't have an accommodation. Even with this amount, you may not have toilet, water and kitchen in the house* (Assemblyman-Mangu, 2014).

In a separate discussion on increasing rent charges in Wa, a tenant disclosed that,

> *…rent in Wa is a big problem. It is very very expensive! This is because the UDS students don't have a hostel, so many of them come to town to rent. And because of that, landlords are continuously increasing the rent anyhow knowing students and strangers will patronize it* (Tenant-Mangu, FGD, 2014).

Apart from the influx of tertiary students and other migrants into Wa, the cost of building materials was equally identified as the cause of increasing rent charges. A discussion with landlords revealed;

> '*…cost of rent has increased because of the persistent increment of the price of building materials. The rise in the price of cement, cost of hiring a mason and even the water to build have all increased that is why cost of rent have also increased* (Landlord-Mangu, FGD, 2014).

Consequently, the high cost of rent is generating two vulnerable conditions. Firstly, it is compelling many individuals, especially the poor, who cannot afford adequate housing facilities to opt for substandard houses where the cost of rent is very low. Such substandard shelters lack potable drinking water, toilets and a proper sewage system. This coerces inhabitants to adopt alternative means of sewage disposal which is mostly discharged in the compound or backyard. Open defecation and the use of unsafe water become alternative means of survival. These practices cause insanitary

conditions in the environment, such as the breeding of mosquitoes and the accumulation of filth. Residents become susceptible to malaria parasites, diarrhoea and cholera epidemics.

Also, households with large family sizes are unable to afford the cost of rent, hence, the result is overcrowding. This has the likelihood of exposing inhabitants to all types of contagion as well as skin diseases such as yaws, measles, and chicken pox. GSS (2013) noted that crowded rooms have health implications such as disturbed sleep and the spread of infectious diseases.

Secondly, the high demand for shelter which translates into high rent charges is further compelling landlords to expand their existing structures and build new houses for renting in order to generate more income. This development is fast leading to haphazard building and to the increasing use of substandard materials for building. Plate 5.1 shows an uncompleted structure that is already at the verge of collapse in one of the communities. This is typical of the numerous structures hastily erected to meet people's demands in Wa.

Plate 5.1 An uncompleted structure built with substandard materials in Mangu

Source: Fieldwork, 2014

The haphazard building is further leading to limited space for the provision of utility services such as electricity lines, water pipes and access roads. A looming disaster risk that is envisaged with this trend of development is the collapse of weak structures and increasing floods which can cause deaths and loss of property. A similar study in Algiers, the capital of Algeria, revealed that the increasing demand on housing coupled with a lack of 'regulatory oversight' is increasing unguided urbanization and increasing people's vulnerabilities to flood. As a result, Bab El Oued (a populous district in Algiers) was hit by a flash flood in November 2001 which affected many people (Benouar and Meziane, 2009).

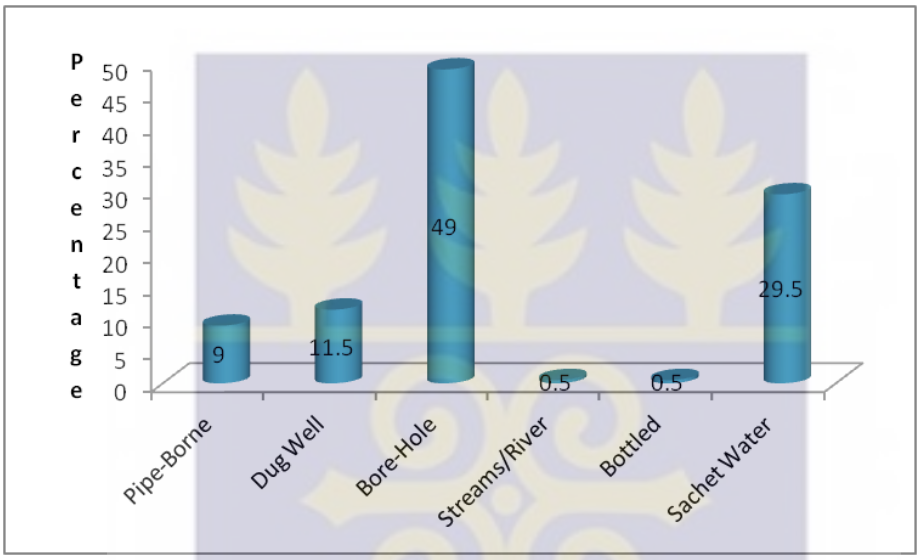
5.2.2 Water Supply and Access to Drinking Water

The availability and access to potable water is key to ensuring healthy living devoid of diseases. Songsore et al (2014:23) posited that 'human progress is very much dependent on access to clean water and on the ability of societies to harness the potential of water as a productive resource'. Though the GWCL is the official institution mandated to provide potable water in Wa, water infrastructure (pipelines) which was built several years ago for the then small population has not been expanded to meet the current increasing population. Hence, there is a high dependence of residents on other alternative sources of drinking water. The study revealed, as seen in in Figure 5.6 that many people, representing 49 percent rely on boreholes as their main source of drinking water. This finding reflects the result of the 2010 Population and Housing census which revealed that 36.1 percent of residents (forming the majority of the population in Wa) access boreholes/pumps and tube wells as their source of drinking water (GSS, 2013b). This situations contradicts the GLSS 6 report which reveals that sachet water is the major source of drinking water for most urban population in Ghana (GSS, 2014). For instance, in Greater Accra Metropolitan Area (GAMA), 70.9 percent of households depend on sachet water for drinking (GSS, 2014). In Wa however, about 29.5 percent of residents forming the second largest proportion of household depend on sachet water. In addition, 11.5 percent and 9 percent of people access water from dug wells and pipe-borne water respectively. Very few (1%) people rely on other sources including streams, rivers and bottled water as their source of drinking water.

Consequently, the inadequate pipe water supply in the municipality is generating vulnerabilities such as people drinking water from dug well, which are mostly

polluted during flush floods. Some of these dug wells do not have proper covers, hence exposing the water to flying debris. Other people who rely on streams and rivers tend to share this source with domestic animals such as cows, goats and sheep. These activities create vulnerable conditions for residents and expose them to water-related diseases such as cholera, dysentery and diarrhoea.

Figure 5.6: Sources of water used for drinking



Source: Fieldwork, 2014

As a result of the inadequate pipe water supply in the municipality, there is currently an emerging trend of water provision in Wa involving individuals (mostly affluent) who drill and mechanize boreholes for commercial purposes. The high cost of water from this source (20 pesewas and 10 pesewas per bucket from private people and public vendors respectively) is compelling people, mostly the poor, to use less water as there is little income to patronize enough of the resource. This condition could lead to dehydration and possibly render people vulnerable to a CSM outbreak. In a FGD, a respondent noted;

> *...It's all about money, if you don't have money to buy water for drinking and cooking, you resort to the wells, and secondly, if you want to enjoy your bath properly you have to fetch water from the wells. We do not have money that is why we go for cheap things. It's good for us to drink pipe and for our wives to use it to prepare food for us but once you can't afford to buy the water you go for wells* (Tenant-Mangu, FGD, 2014).

An interview with one of the Assembly members in the municipality revealed that;

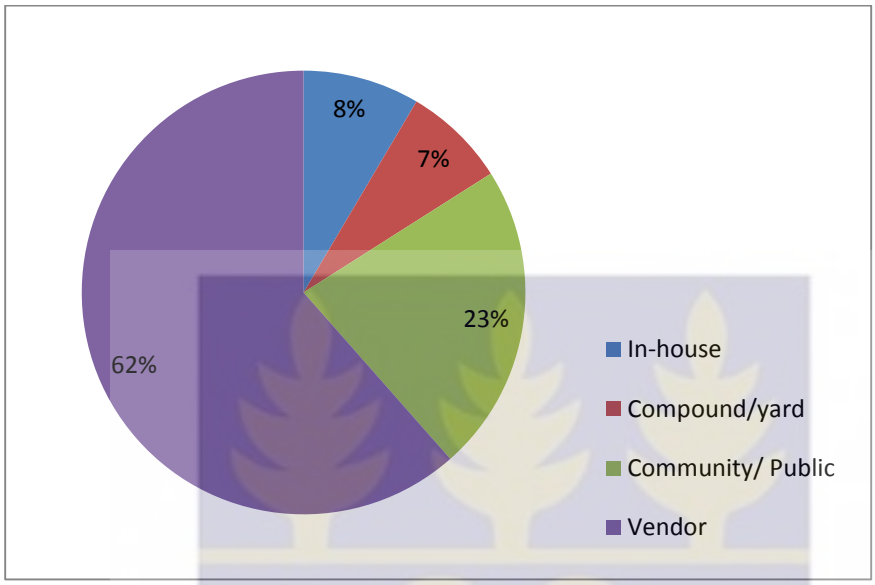
> *…the pressure on water is so huge and that has caused many private people to drill and mechanize boreholes making a lot of money from it* (Assemblyman-Mangu, 2014).

Coupled with the increasing drilling of boreholes is the proliferation of many sachet water producing companies, and if these companies fail to meet the required standard of safe water but engaging in production secretly, their activities could pose vulnerable conditions that can lead to health risks. Several studies have shown that an unreliable and inadequate supply of potable water is the leading cause of increasing water-related diseases especially in urban areas (MacGranaham (1993) cited in Oteng-Ababio (2013).

Another major factor that determines the safety of drinking water is its proximity and accessibility to the population. In Figure 5.7, the study revealed that, 61.5 percent of respondents access their source of drinking water from vendors (sachet water and borehole). This is followed by 22.5 percent whose source of water is located within the community. Also, 9 percent of respondents engage the services of both private and public (GWCL) tankers for their drinking water. Lastly, 8.5 percent and 7.5 percent of

respondents have their drinking water located in-house and in their compounds respectively.

Figure 5.7: Location of drinking water



Source: Fieldwork, 2014

According to WHO/UNICEF (2010), the minimum distance a person should cover to access water should be within 100 metres. However, in Wa, most households do not have direct pipe water connections in their houses. Observably, most people walk long distances to access this drinking water from communal standpipes, boreholes and private water operators. This results in cross-contamination of water, especially between the access point and the processes of transporting the water home. Basins, gallons and buckets (mostly without proper covers) are some of the containers used in fetching the water. The transportation of water over long distances in these basins usually exposes it to falling debris which pollutes the water. The storage of water in gallons and other containers without proper covers easily causes contamination. These practices create health concerns for households and make them vulnerable to water related diseases. Songsore (2008:8) noted that 'given the widespread practice of

unhygienic water handling and storage in deprived low-income areas, it is not enough to focus on bringing "water to the tap"; what is happening "between the tap and the mouth" is also critical in determining health concerns'.

The study further revealed that the location of respondents influences their source of drinking water. Testing the relationship between location of respondents and their source of drinking water, the study (from Table 5.3) performed a chi-square test and a p value less than 0.05 was computed, implying the rejection of the null hypothesis. Hence, the study concludes that there is a significant relationship between the location of respondents and their sources of drinking water.

Table 5.3: Source of drinking water accessed by various communities

Location of Respondents	**Source of drinking water (%)**					
	Pipe borne	Dug well	Bore-hole	Streams and rivers	Bottled water	Sachet water
Kpaguri	16.4	1.4	50.7	0	0	31.5
Mangu	1.2	25.0	51.2	1.2	0	21.4
Kumbiehe	18.8	6.2	43.8	0	0	31.2
SSNIT	7.4	0	40.7	0	3.7	48.1
Total	**9.0**	**11.5**	**49.0**	**5**	**5**	**29.5**

$X^{2=}$ 115.745 df: 15 P value<0.05

Source: Fieldwork, 2014

The implication of the computed chi-square test indicates that though Mangu relies primarily on bore-holes (51.2%) and sachet water (21.4%), many other people also rely on dug wells (25.0%) and streams (1.2%). While very few people drink pipe

water (1.2%). In the SNNIT residential area, people rely primarily on boreholes (40.7%), sachet water (48.1%) and pipe water (7.4%). None of the people use dug wells and streams as their source of drinking water. This trend is reflected in Kpaguri and Kumbiehe where people rely primarily on boreholes, sachet and pipe water. The result resonates with other studies which theorize that low-income residential areas in most developing cities are underserved with social services such as water, proper solid waste and sanitation services (UN-HABITAT, 2006; Oteng-Ababio, 2013). This statement confirms the account given by the Assemblyman for Mangu who revealed;

> *...in Mangu, we do not have a single pipeline that runs through the community. It's the bore-holes that we have, few public ones and others by individuals who are capitalizing on the lack of such an invaluable resource and are charging any amount but still, we have to go for them* (Assemblyman-Mangu, 2014).

Also, the assertion that many urban poor cannot afford to pay for this service was refuted in the aforementioned statement of the Assemblyman. This is so because the poor even pay more for water than the affluent do in cities (Oteng-Ababio, 2013; World Bank, 2011).

The SSNIT residential area which used to have pipe connection to their various dwellings do not have this service anymore. The malfunctioning of the water pump, which pumps water from the reservoir to residents, has denied residence from having access to pipe water. That notwithstanding, the availability of a private borehole operator in the area has made it possible for residents to connect the water into their homes. As a result, there is availability of water in the community at every point in time, confirming other studies that high- income areas have a 24/7 availability of

water in their homes (Oteng-Ababio, 2013). The health implications associated with the disparity in access to potable water can affect residents in Mangu due to their high dependence on unsafe water sources such as dug wells. As posited by Songsore et al., (2014) that the challenges of inadequate water supply mostly affect the poor.

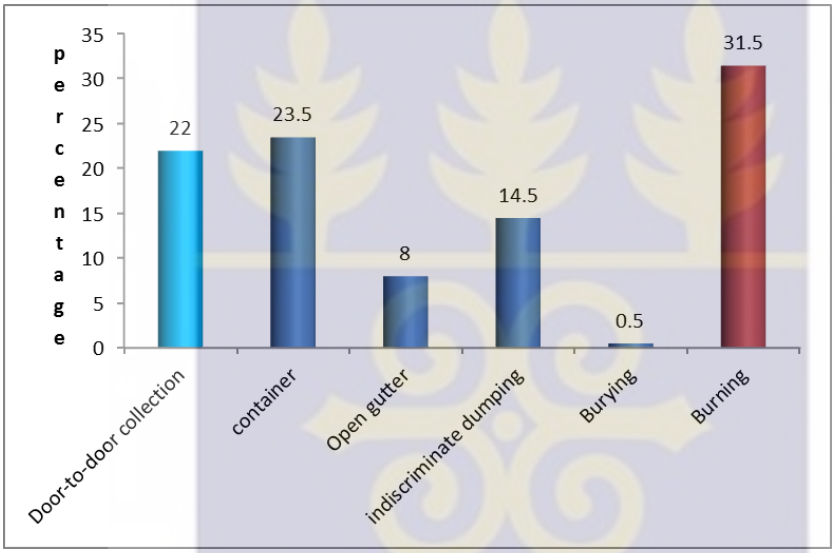
5.2.3 Solid Waste Disposal and Sanitation Practices in Wa

5.2.3.1 Solid Waste Disposal

According to earlier studies, poor sanitation, improper solid waste disposal methods and sullage management are major challenges facing most cities in Ghana (Oteng-Ababio, 2013). The official institutional arrangement for solid waste collection in Wa is by two major approaches: the house-to-house collection and the use of 'central community containers'. It is evident that the WMA is not able to collect all the solid wastes generated daily by households in Wa. Additionally, many households are unable to patronize waste bins for the house-to-house collection of solid waste. Besides, the inadequate and uneven distribution of central community containers in the municipality is causing much filth to engulf the community. These challenges have compelled most residents to engage in improper solid waste disposal practices such as burning, burying and indiscriminate dumping. Figure 5.8 reveals that, only 22 percent of respondents manage their solid waste through the door-to-door collection, while 23.5 percent of other respondents dump their solid waste materials in public dumps (central community container). Apart from these approved practices, majority of residents in Wa representing 31.5 percent burn their solid waste material, while 8 percent dispose of it in open public dumps. Comparing the solid waste situation to the national data, the GLSS 6 revealed that, 29.8 percent and 52.3 percent of people have their solid waste collected and dumped in public dump sites respectively (GSS, 2014).

Data on intra-regional level further reveals that 67.7 percent of households have their solid waste collected in GAMA while in other urban areas, about 69.3 percent use the public dump for their waste management (GSS, 2014). This means that Wa is lagging behind other municipalities and metropolis in terms of solid waste management. As a result, 14.5 percent of other respondents engage in indiscriminate dumping while 0.5 percent of the population bury their solid waste.

Figure 5.8: method of solid waste disposal in Ma Municipal Assembly



Source: Fieldwork; 2014

The burning of these solid waste materials emits smoke into the atmosphere. This causes outdoor pollution and exposes residents to diseases such as upper respiratory tract infections. The emission of these gases further has the potency to deplete the ozone layer thereby exposing the population to intense ultra-violet rays which is capable of increasing the risk of CSM outbreaks. It was observed that most communities, such as Mangu, Kpaguri and Kumbiehe, were seen with plastic sachet, paper and other plastic materials littered around in the environment.

The existence of open drains in some communities has further resulted in the accumulation of refuse. This has choked the drainage system preventing the free flow

of sewerage and run-off from heavy rains. These activities are increasing the residents' vulnerability to flood risks during heavy downpours. Stagnant water in these choked drains generate into breeding grounds for mosquitoes thereby making inhabitants susceptible to diseases such as malaria and other vector-borne diseases. More significantly, pockets of illegitimate open dump sites were spotted in most of the communities. These practices degrade the land, cause outdoor air pollution (stench from dumpsite) and water pollution (leachate sipping into dug wells). The environment therefore becomes a harbour for vector-borne diseases such as cholera, diarrhoea and typhoid fever. Plate 5.2 shows an illegitimate open dumpsite in Kpaguri (a middle-class area).

Plate 5.2: An illegal open dump site in Kpaguri, Wa

Source: Fieldwork, 2014

Several households dump solid waste in this open space because the central community containers are some distance away from their houses. Many of these households are unable to acquire the dustbins, hence they engage in this practice. According to the Assemblyman for the area, dumping in this area is usually done at night or at dawn when people are asleep. Children and other solid waste scavengers face a high risk of disease infections as they are often spotted playing on the dumpsites and scavenging for materials for recycle. The stench emanating from these dumpsites makes the area uncomfortable to inhabit.

The burden of improper solid waste disposal methods is spatially uneven in the municipality. In the SSNIT residential area, households use only two disposal methods: door-to door collection (77.8%), while the rest of the population (22.2%) use central communal containers. This is possible because most residents are able to afford the cost of the door-to-door method (Gh¢ 30 for enrolment unto the service and Gh¢ 10 monthly for the service). Though there is only one central community container, the use of the dustbins in most homes makes it sufficient for the community. In Kpaguri, more than half of the households (50.7%) depend on central community containers, while 17.8 percent rely on door-to-door collection. The rest of the population engage in burning, burying and indiscriminate dumping practices.

However in Mangu, more than half (51%) of the respondents burn their solid waste. This emits carbon monoxide into the atmosphere causing outdoor pollution. Also, 23.8 percent and 14.3 percent engage in indiscriminate dumping and open dumping respectively. This practice is reflected in Kumbiehe, where the majority (43.8%) of the households burn their rubbish. Mangu and Kumbiehe face a serious challenge of

solid waste practices, as there is not a single central community container in these areas. In a focus group discussion, a respondent noted;

> *...some of us, our landlords have dug holes in their backyard garden so we dump the rubbish there and when it's full, we either burry or burn it* (Tenant-FGD, 2014).

Commenting on the sanitation challenges in Mangu, the Assemblyman noted;

> *…solid waste has affected Mangu a lot! An area (electoral area) with an estimated population around 7000, has no single community container!, no single community container!. And this has been a worry to me. I complain a lot to the Assembly but yet still, you don't know what they are doing'* (Assemblyman -Mangu, 2014).

This situation has left drains, uncompleted houses and open spaces littered with all kinds of solid waste. Most environmentally related diseases such as cholera, diarrhoea, malaria and typhoid fever associated with cities in developing countries, including Ghana, are mainly as a result of improper solid waste management (Songsore et al., 2014). More so, the open dumps very often have small fires which tend to increase the residents' susceptibility to fire outbreaks. Table 5.4 shows the method of solid waste disposal by various communities.

Table 5.4 Cross tabulation of location of respondents and method of solid waste disposal

	(Improved)			(Unimproved)		
Location	**Door-to-Door collection**	**Public Dump (Container)**	**Public Dump (Open)**	**Indiscriminate Dumping**	**Burying**	**Burning**
Kpaguri	17.8	50.7	2.7	9.6	1.4	17.8
Mangu	6.0	4.8	14.3	23.8	.0	51.2
Kumbiehe	31.2	6.2	6.2	12.5	.0	43.8
SSNIT	77.8	22.2	.0	.0	.0	.0
Total	22.0	24.0	7.5	14.5	.5	31.5

X^2 = 134.817 df: 15 P value<0.05

Source: Fieldwork, 2014

Confirming the discussion above, the study computed a chi-square test from Table 5.4 which revealed a p-value less than 0.05 implying the rejection of the null hypothesis. Hence, the study concludes that there is a significant relationship between the location of respondents and their methods of solid waste disposal. This confirms the assertion that low-income areas which are associated with dense population often lack adequate infrastructure to manage solid waste, therefore revealing huge accumulation of filth in the community (Songsore, 2009; World Bank, 2011).

5.2.3.2 Sewerage Disposal

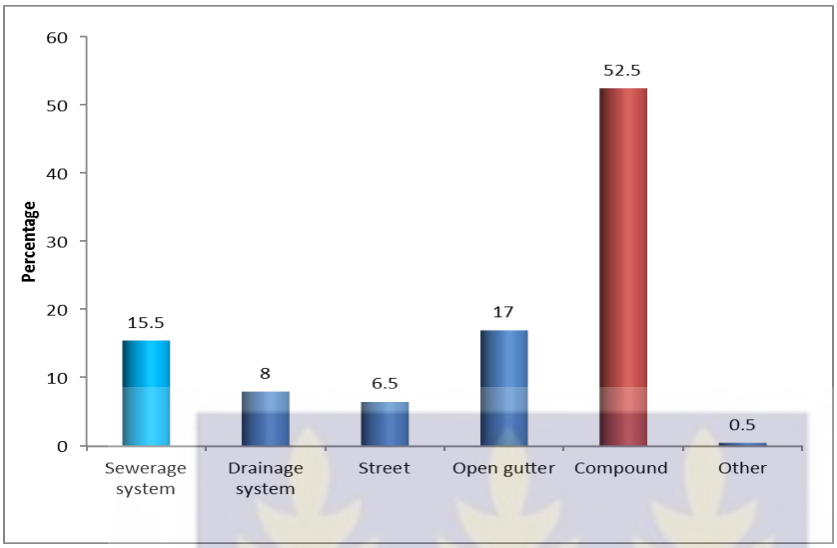
The Environmental Health and Sanitation unit of the WMA is the institution responsible for managing wastewater and the sewerage systems in Wa. However, the lack of sewerage systems in the municipality coupled with poor planning and layout of the communities have resulted in residents managing their own wastewater. Much

of the wastewater generated in the area is domestic, which includes bath water, water from the kitchen and wastewater from the laundry.

Results of the study indicated that only 15.5 percent of respondents have a sewerage system in their houses. This system is associated with the SSNIT residential area, which has a well-planned layout and a well-connected sewerage system. However, the majority of the respondents (52.5%) dispose of their wastewater in their yards or compounds. This wastewater collects in ditches and provides ideal conditions for the breeding of mosquitoes and flies. These flies find their way and settle on uncovered food contaminating it with the disease vector they carry. This exposes residents to disease epidemics such as cholera and diarrhoea. This finding is in tandem with the national situation of sewerage management where majority of households in Ghana (35.2%) throw their sewerage in their compounds with only 3.4 percent of households have well-connected central sewerage system (GSS, 2013).

Also, storm and other open drains has become receptacle for wastewater generated from households. As indicated in Figure 5. 9, about 8 percent and 17 percent of respondents dispose their wastewater in drainage systems and open gutters respectively. While 6.5 percent of the others also dispose of their wastewater onto the streets. Consequently, the accumulation of solid waste materials in most of these drains prevents the flow of wastewater thus choking the drains. This causes floods risks during heavy rains. Besides, the disposal of wastewater on streets further deteriorates the roads making them impassable during heavy rains.

Figure 5. 9: Method of wastewater disposal in Wa



Source: Fieldwork, 2014

It was observed that apart from the SSNIT residential area that has a well-connected sewerage system, all other communities including Mangu, Kumbiehe and Kpaguri lack a well-connected sewerage facility. The poorly planned nature of these areas contributes to the non-existence of such facility. As a matter of fact, these areas are characterized with most residents disposing their wastewater in their compounds, streets and open drains. Plate 5.3 shows the accumulation of wastewater in a ditch in front of a house in the municipality.

Plate 5.3: Sewerage disposal in a compound house in Wa

Source: Fieldwork, 2014

The above picture shows wastewater generated by residents from their bathhouse. Due to the absence of a sewerage facility, wastewater from the bathhouse accumulates in a ditch creating a suitable environment for the breeding of mosquitoes and flies. Children are the most vulnerable in this condition as they are mostly found playing around such area.

The lack of sewerage systems in most households reflects the general picture in the country where very few people have access to the facility. According to the Environmental Health and Sanitation Directorate of the Ministry of Rural Development and Environment, about 4.5 percent of Ghanaians have access to these systems (WSMP, 2008 cited in Arthur and Antwi, 2011). The lack of an adequate

infrastructure for wastewater collection and treatment is the cause of the bulk of domestic and industrial wastewater discharged without any treatment in open drains and compounds in most cities of developing countries including Ghana (Nikiema et al., 2013). Accordingly, these practices deteriorate the health of people and damage the natural ecosystem (Nikiema et al., 2013)

5.2.3.3 Sanitation practices in Wa

Adequate sanitation promotes health and ensures dignity to users. However, in the Wa municipality, access to adequate sanitation is a major challenge facing the majority of the population. It was observed that many households do not have sanitation facilities in their houses. Although there are private sanitation facilities operating in some communities (particularly Kpaguri), residents consider the cost (50 pesewas per usage) as high and not affordable. Compounding the problem, the inadequacy of public toilets coupled with the deplorable state of some facilities has compelled many people to engage in unapproved sanitation practices such as use of pan latrines, pit latrines and open defecation.

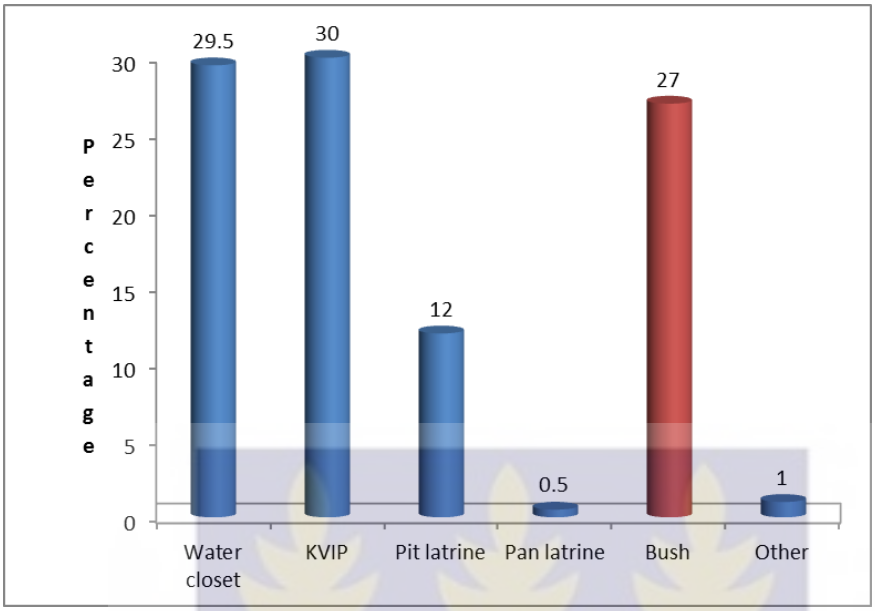
The study found that less than 1/3 of respondents (29.5%) use water closets. Also, 30 percent of respondents use KVIP (public toilets). This reflects the general situation of sanitation systems in most communities where about 35.7 percent of Ghana's population depend on public toilets (GSS, 2014). Among urban households in Ghana, the situation reveals the same picture as the use of public toilet is more prevalent among majority (42.1%) of urban dwellers (GSS, 2014). Primarily, public toilets were meant for visitors (Appiah and Oduro-Kwarteng, 2011) nonetheless, it has become a community asset and a necessity hence the high dependence on the facility. Also, 12 percent use pit latrines while less than 2 percent use pan latrines and other facilities. A

significant number of respondents representing 27 percent therefore defecate in the open (*free range*) in areas such as in bushes, in parks and in uncompleted buildings. In contrast to two national data; 2010 census data and GLSS 6 report, about 18.8 percent and 19. 3 percent of Ghana's population had no toilet at home hence engage in open defecation (GSS, 2013; GSS, 2014). This shows that open defecation is dominant in the Wa municipality, a situation which depicts the region's challenge of battling with 72.9 percent of the population of Upper West engaging in open defecation (GSS, 2013). Figure 5.10 shows the sanitation facilities used respondents.

Open defecation is identified as a practice that generates vulnerabilities for residents and further exposes them to high health risks (Songsore et al., 2014). The practice in Wa is causing contamination of surface water bodies. That is, during heavy rains, faecal matter is washed into rivers and streams that serve as drinking water for some inhabitants. Dug wells also get contaminated due to run-off that carry faecal matter which seeps into them.

Open defecation also increases the breeding of houseflies, which carry pathogens from the human waste and deposit them on uncovered or cold foods. This makes residents susceptible to disease burdens, especially cholera which is one of the outcomes of insanitary conditions (Songsore et al., 2014). Moreover, the sight and stench emanating from these places which experience open defecation is also causing nuisance as well as both land and outdoor air pollution. Figure 5.17 shows respondents use of various sanitation facilities in Wa.

Figure 5.10: Type of Toilet facility used by respondents



Source: Fieldwork, 2014

The spatial distribution of insanitary sanitation practises is uneven in the municipality as shown in Table 5.5. Accordingly, the SSNIT residential area is the only community with a significant number of respondents (100%) using water closets. All other communities depend on KVIP, pit latrine, pan latrine and open defecation. A daunting observation made in Mangu was that the majority of the residents (47.6%) engage in open defecation. Factors accounting for this menace were revealed in a focus group discussion among landords and tenants. In the discussion, a respondent noted that;

> *...people in Wa have a problem with building latrines in their houses. They don't even provide the bathrooms. They get their tenants before they put up all these things. They claim the toilet is expensive but I think they just don't want it. Even those with toilet at home, when it's full, they don't drain it. They leave it like that and it overflows. This is the reason why we engage in 'free range'* (Tenant-Mangu, FGD, 2014).

Confirming the assertion made by the tenants, a Landlord affirmed that

> ...*'we do not have enough money to build toilets. We normally concentrate on where to sleep before thinking of where to defecate'* (Landlord-Mangu, FGD, 2014)

This assertion reveals the attitudinal challenge of most property owners to see the need for toilet facilities in their structures. This situation, coupled with other factors, is increasing the exposure of the population to health burdens due to these vulnerable conditions, significant among them is the open defecation.

Table 5.5: Type of sanitation used by communities

Location of Respondents	**Type of toilet facility (%)**					
	Water closet	KVIP	Pit-latrine	Pan-latrine	bush	Other
Kpaguri	16.4	47.9	19.2	0	16.4	0
Mangu	16.7	26.2	8.3	1.2	47.6	0
Kumbiehe	37.5	18.8	18.8	0	12.5	12.5
SSNIT	100	0	0	0	0	0
Total	**29.5**	**30**	**12.0**	**5**	**27**	**1.0**

X^2=115.745 df: 15 Pvalue<0.05

Source: Fieldwork, 2014

From Table 5.5, a p value less than 0.05 was computed implying the rejection of the null hypothesis. Hence, the study concludes that there is a significant relationship between the location of respondents and the types of toilet facilities they use. Most housing facilities in high-income areas are mostly furnished with the adequate

infrastructure such as a kitchen, a bathhouse and toilet facilities. Nevertheless, in most low-income areas in urban Ghana, the structures lack toilet facilities and hence rely on public toilets and open defecation. Others who have water closets cannot afford the cost of water for this service. As posited by Boadi (2004:3), 'access to sanitary facilities is wealth dependent'. The impacts of health risks such as cholera, diarrhoea and typhoid are usually very high on low-income residents in cities due to their poor and insanitary practices.

5.3 Summary

The chapter examined the demographic characteristics of respondents and the interconnection between household access to basic services and vulnerabilities generated. Accordingly, the study selected four communities; Mangu, Kpaguri, Kumhiehe and SSNIT. The study observed that most households had men as heads, while the youth formed the majority of the population. Also, a compound housing structure was the most common housing structure to be occupied by households. The expenditure of most respondents was less than Gh¢ 500, which implies that most households might not be spending much to patronize basic services such as potable water, adequate housing and proper solid waste disposal and sanitation services. Hence, the reliance on alternative basic services such as unsafe drinking water, improper solid waste disposal and poor sanitation. These vulnerable conditions are making residents susceptible floods, fires and disease epidemics.

The inability of the respective public institutions to provide adequate basic services for the increasing population is equally generating vulnerable conditions. Inadequate housing facilities have placed a huge demand on accommodation in Wa. This has led to escalating rent charges, compelling households with large families to dwell in

insufficient rooms. This is causing congestion and overcrowding. Besides, the high demand for shelter is resulting to the erection of substandard structures and haphazard building practices. An impending disaster risk associated with this development is the collapse of buildings and increasing flood risks.

Compounding the problem is the unavailability of potable water, solid waste disposal practices and proper sanitation services, and these have led many residents to access unsafe water from dug wells, streams, boreholes. Besides, there is the burning and indiscriminate dumping of solid waste in drains and open spaces. The inability of landlords to build toilet facilities in their structure has resulted in open defecation. All these activities are generating vulnerable conditions making residents susceptible to disease risks such as cholera, diarrhoea, typhoid. In addition, there is also an increasing indoor and outdoor pollution of air and flood risk

CHAPTER SIX

RESPONDENT'S PERCEPTION OF DISASTER RISK ACCUMULATION IN WA

6.0 Introduction

The previous chapter analysed the interconnection between household access to basic services and the various risk factors generated from vulnerable conditions accumulating in Wa. Although there is the lack of a common definition on the concept of vulnerability, several disaster experts have conceptualized the term to suit their approaches to comprehend disaster risks (Adger 2006; Fussel, 2007; Heijman, 2011). However, these concepts fall short of community perceptions and local experience in identifying disaster risks (Heijman, 2011).

According to Songsore et al., (2014), a participatory approach to risk perception is increasingly gaining attention as an important source of information useful in improving and planning community health, housing, water and sanitation among others. They further noted that a community perception does not only serve as complementary information on human settlement existence, but also becomes a vital source of information for understanding human conditions and to create interventions to improve their wellbeing. The term *risk perception* according to the Royal Society refers to 'people's beliefs, attitudes, judgments and feelings, as well as the wider cultural and social dispositions they adopt towards hazards and their benefits' (Pidgeon et al., 1992:89 cited in Bickerstaff, 2004). Heijman (2011) argues that perceptions of people's risk behaviour are not irrational, as affirmed by sociologists, but rather should be seen as the individual's 'judgement of uncertainty'. Hilhorst and Bankkoff (2008) cited in Oteng-Ababio (2014: 22) further acknowledged that perceived risks in relation to disasters constitute the 'sextant and compass' with which

vulnerability is measured. More so, perception is vital in understanding why people exhibit certain behaviours. It is against this backdrop that this chapter examines respondents' perception of disaster risks associated with the growth of Wa and the various coping strategies adopted to manage these risks.

6.1 Disaster Risks in Wa

Most of the respondents outlined a number of disaster risks confronting them in the municipality. These risks include: crime, disease epidemics, floods, CSM, fire and road traffic accidents. Other risks identified were food insecurity, wind and windstorm. Residents in Wa perceive these risks as threats to their livelihood, personal safety and the urban environment as a whole. The individual's daily way of life is shaped by various forms of coping strategies and adaptations to safeguard their very existence and to mitigate the impact of these disaster risks.

Various forms of collaborative efforts have also been instituted by city authorities, other stakeholders of the municipality and community members to ensure risk reduction interventions. Though these interventions are on-going, there are increasing concerns about these risks and the danger residents are exposed to, resulting from the vulnerabilities generated by the rapid growth of the town.

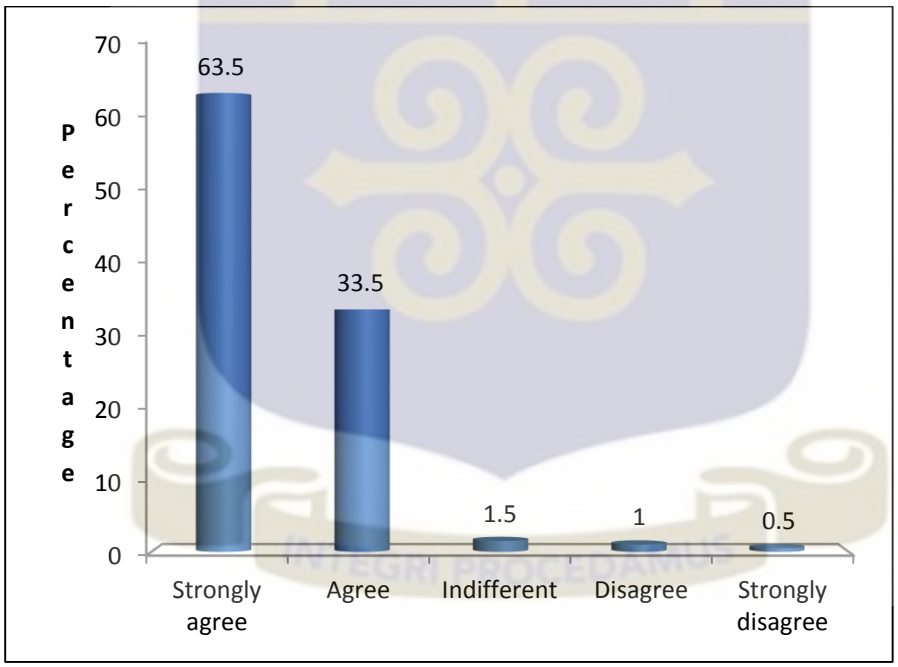
6.1.1 Perception of Crime risk

The most perceived disaster risk in the Wa municipality is Crime. The study found that this is a common and most frequent risk affecting all communities, irrespective of the residential category or the location of an individual. In other words, residents in poor communities, newly developed, or high-income residential areas were all at risk to crime (criminal activities). In an FGD, a respondent indicated that;

> *… the disaster risks accumulating in the municipality are becoming numerous. The most serious ones are flood, crime and motor accidents. However, crime is the major threat to the community followed by road traffic accidents. As for floods, they happen during the raining season, but crime and motor accidents happen every day* (Landlord, FGD, 2014).

Observation from Figure 6.1 reveal that more than half of respondents (63.5%) in the community strongly agreed with the fact that crime is a pervasive act threatening the livelihoods and wellbeing of residents in Wa. This is followed by 33.5 percent of respondents who also agreed that, Wa is experiencing criminal activities.

Figure 6.1. Respondents' views on the crime activities in Wa



Source: Fieldwork, 2014

Information gathered from the Criminal Investigations Department of the District Police Station of Wa revealed that various criminal activities committed in the municipality included theft (stealing), defrauding, robbery, causing damage to property and trespassing. The most occurring among them is theft (stealing). Items

normally stolen include motorbikes, livestock, household wares such as televisions, laptops, phones and kitchen items. The study however identified, that in all communities the most frequently stolen item is motorbike. Confirming this assertion, the CID revealed that,

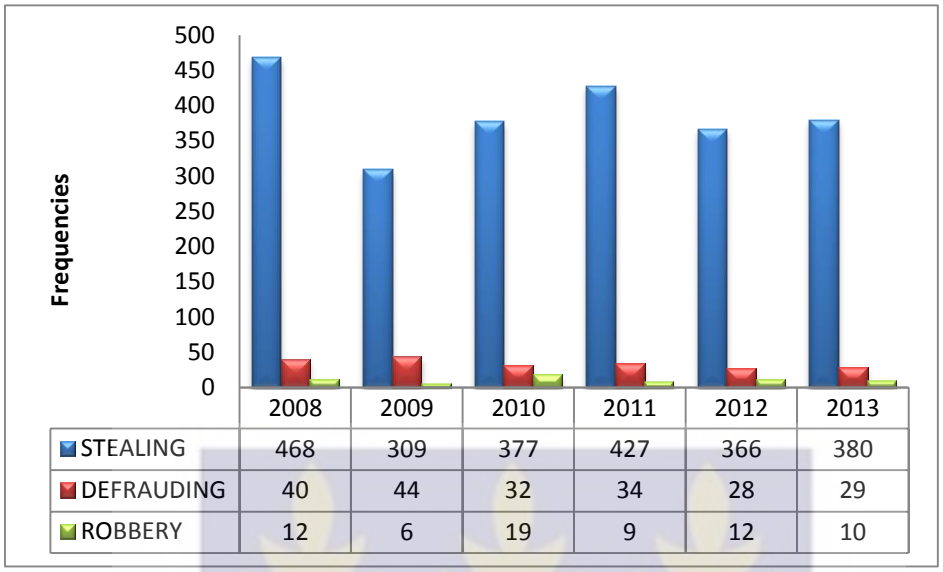
> *…the most common items stolen in Wa are motorbikes. Motorbikes are common in the town and almost every household owns one. So these criminals have taken that as an opportunity to earn a living from it* (District Crime Officer-Wa, 2014).

A landlord further reiterated that;

> *...stealing of motorbikes is a challenge we have. Unlike those days, we can park our motorbikes somewhere for a long time but nowadays, even in your room, the thieves are attempting to steal them. Last time, a neighbour parked his motor outside one evening just to go and bath and when he returned, it was a disaster. The motor had vanished* (Landlord, FGD, 2014)

Figure 6.2 reveals and confirm the perception of crime risks in the municipality. Accordingly, stealing has been extensive in the town. In 2008, 468 cases were recorded. Though this was reduced to 377 in 2010, it further increased to 427 in 2011. The year 2013 further saw an increase to 380 from 366 in 2012.

Figure 6.2 Criminal activities in the Wa Municipality from 2008 to 2013



	2008	2009	2010	2011	2012	2013
STEALING	468	309	377	427	366	380
DEFRAUDING	40	44	32	34	28	29
ROBBERY	12	6	19	9	12	10

Source: District CID, Wa District Police Station, 2014

Two major factors were said to be the cause of the high crime wave in the municipality. Rapid population growth amid inadequate jobs and the socio-cultural characteristics of indigenes who see themselves as one people. These were supported by some key personalities in the community. The statement below encapsulates the views of the Assemblyman for Kumbiehe on the cause of high crime wave in the area:

> *...crime is the major disaster risk in Wa resulting mainly from population growth. Until recently, things of this nature were not happening. I have been here 19 years now and in the past, the place was calm and safe. But as the population keeps increasing, crime is also coming up in the municipality. Personally, I feel the cause of crime in Wa is unemployment. I don't see any normal human being commit a crime by nature. People steal to make their lives better. You may call it crime but they call it a job. Also, most of the youth engage in drug peddling and these are the thieves* (Assemblyman-Kubiehe, 2014).

Supporting this assertion, a landlord noted;

> *...the increase in the population of the municipality and the lack of job opportunities for the youth has resulted in many young people indulging in stealing and other criminal activities. Last time, by the time we slept at night and woke up the following morning, all my goats were gone* (Landlord-Mangu, FGD, 2014).

The statement asserts to the fact that the rapid growth of cities and the 'lagging response by government' to provide infrastructure and social services such as job opportunities create poverty and declining urban livelihood options, frequent civil unrest and crime (UN-HABITAT, 2008a). In addition, a strong tribal affiliation exhibited by the indigenous people is identified as a cause of reduction in reported crime cases in the area. This socio-cultural characteristic of the indigenous population reveals their togetherness as a result, leading to the diminishing confidence residents have in the Ghana Police Service. In an FGD discussion, a respondent point out;

> *…although we believe in 'tija buyeni' (a term used by indigenous people of Wa to identify themselves as one people from one background with one aim), this seems to be killing us. Nowadays, most of us don't report cases to the Police because they don't do anything to the criminals. We don't even trust them again. When you even arrest a thief and drag him to the Police Station, you will see the thief parading on the streets. So I will not even go and waste my time there that I am going to report a theft case to the police* (Landlord-Mangu, FGD, 2014).

This indigenous term *'tija buyeni'* particularly prevents indigenous people from reporting offenders (who are indigenous) to the police, they rather prefer to solve such cases at the clan and family level. So anytime a theft case involving an indigenous person is reported, clan heads and family heads intervene to withdraw the case from the Police station to be settled among themselves (arbitration). This in effect has drastically reduced the reporting of theft cases in the area whilst in reality cases of theft is said to be on the increase.

As a way of reducing vulnerability to crime risks, residents noted that they always commit their households into God's protection. Also, coming home early from work or any other place was one of the coping strategies adopted to avoid being attacked. One of the respondents stated;

> ...*we only pray to God for protection and there is also a self-imposed curfew which allows us to come home early and protect our properties and lives. So before 9:00 pm, I am back from wherever I go. Else, when thieves get you, they will hurt you* (Tenant-Mangu, FGD, 2014).

A major trend developing in Wa as a coping strategy adopted by most landlords is the fixing of burglar proofs on their structures to protect their properties from thieves. Plate 6.1 shows a respondent's shelter with burglar proofs to prevent thieves from breaking into the house.

Plate 6.1 A respondent's house protected with burglar proof to prevent thieves from entering

Source: Fieldwork, 2014

It can be observed that almost every new house that is constructed has burglar proofing installed. Some house owners of old structures are also fixing burglar proofing. Respondents indicated that this new development is helping to safeguard their properties, especially their motorbikes, which they can comfortably park on their porch without any interference from thieves.

6.1.2 Respondent's perception of Road Traffic Accidents

Road Traffic Accident (RTA) is another major disaster risk perceived to be on the increase in Wa. This was pointed out by all the four communities as a hazard threatening the existence and movement of residents in the municipality. Both the

discussions and the in-depth interviews did confirm this assertion. Several forms of RTAs occur in Wa, involving private and commercial cars as well as motorbikes. Among these, motorbikes caused the most frequent RTAs in the municipality. The dominant use of motorbikes as the major means and most preferred mode of transport is attributed to the increasing involvement of motorbikes in accidents.

The study found that RTAs has a direct relationship between urbanization of Wa and the increasing rate of accidents. The population of Wa has increased tremendously over time. Besides, the spatial dimensions of the town have widened leading to the creation of fringes and peri-urban areas. Many people are moving into these areas and therefore see it as a necessity to have a motorbike to ease their movements in the town. However, there are no adequate road systems to accommodate the increasing motorbikes, hence the clustering and overcrowding of these motorbikes on the existing roads. This challenge is one of the major factors increasing the rate of RTAs in Wa. A discussion with the Motor Transport and Traffic Unit (MTTU) of the Wa Police revealed;

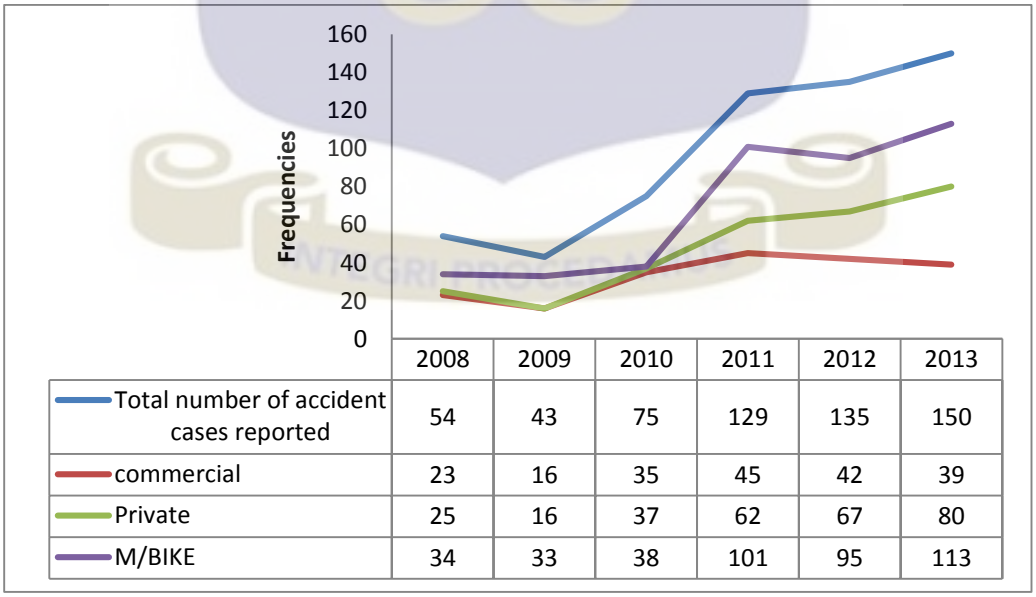
> *…the growth of Wa has led to the increase in the volume of traffic. Every household owns a motorbike and with the nature of roads in the towns, it was originally built for a small population. And mind you, the major means of transport here is motor bike so almost everyone who has come to stay for a long time tries to get one. The town is growing and expanding and this has caused congestion on the roads because the roads are just the same as it was several years ago* (MTTU-Wa, District Officer, 2014).

A respondent supported the above statement by noting;

> *...accident is also rampant that is why we have speed ramps, yet people do not obey them. Because we are many, we are always crowded on the street so any wrong overtaking causes accident. Moreover, careless driving and riding by motorist is a major cause of accident in the Municipality* (Landlord-Mangu, FGD, 2014).

The perception of respondents on motorbike accidents rapidly increasing RTAs is confirmed by data from the Police MTTU. The available data in Figure 6.3 shows that total RTAs have increased progressively over the past 6 years. In 2008, 54 reported cases of RTAs were recorded. This increased to 150 reported cases of RTAs. An interesting observation made by the study was that motorbike accidents were more rampant in the area than other forms of RTAs involving private and commercial cars. For instance, motorbike accidents reported in 2013 were 133, an increase from 34 reported cases in 2008.

Figure 6.3 Trends of Reported Road Traffic Accidents in WMA



	2008	2009	2010	2011	2012	2013
Total number of accident cases reported	54	43	75	129	135	150
commercial	23	16	35	45	42	39
Private	25	16	37	62	67	80
M/BIKE	34	33	38	101	95	113

Source: Wa District MTTU, 2014

Coupled with the large number of motorbikes in the municipality, other factors such as careless driving, speeding, non-adherence to road traffic regulations and an increasing number of inexperience riders, especially tertiary students in the town, were risk factors exposing residents to RTAs. A respondent revealed that,

> *…motor accident is on the increase in the municipality and it is killing people. The people ride carelessly in this area and they don't wear helmet and on top of that, they don't obey road traffic regulations. And most of them ride without mirrors so they use gestures to signal which directions they want to turn* (Tenant-Mangu, FGD, 2014).

On the issue of inexperience riders, the study found that, the woefully inadequate hostel facilities available to UDS students compelled most of them to seek shelter in town. Unfortunately, there is inadequate public transport that ply the UDS campus and the town which is about 8km long. Although most of these students do not know how to ride the motorbikes, it has become a necessity for them to make their movements flexible. Supporting the assertion, another discussant disclosed that;

> *...UDS students are the major cause of accident in the town. Why am I saying that, we in Wa here, our major means of transport is motorbikes and naturally, we all know how to ride before we grow. But many students who come to UDS do not know how to ride. They come here before they learn it. Even they take hours to learn it so at the end of the day, they show their inexperience on the road leading to many of them being killed'* (Landlord, FGD, 2014).

Furthermore, the attitudinal challenge of some residents also compounds the risk factors leading to motor riders being vulnerable to accidents. The District Superintendent of the MTTU indicated that the major challenges faced in mitigating RTAs accumulating in the municipality include; residents having wrong perceptions of the MTTU by considering Police enforcement of road traffic regulations as a form of 'harassment'. Moreover, a popular saying by the indigenous (Waala) people; *'Waala head is not a Police head'* coupled with *'Tija buyeni'* has been the other challenge distracting the arrest and prosecution of traffic offenders.

That notwithstanding, a range of coping strategies adopted by residents to mitigate and prevent RTAs include; the regular use of helmets, careful riding and adherence to road traffic regulations. As noted in a Focus group discussion by one respondent;

> *...with motorbikes, I wear helmet to protect myself and this is the surest way I can prepare myself against accidents.* (Tenant-Mangu, FGD, 2014).

Also, forms of adaptive strategies by key stakeholders in mitigating and reducing the impact of RTAs include enforcement of road traffic regulations, awareness creation in educational institution such as the UDS and the Wa Polytechnic among others. There is also periodic sensitization programmes through the media to control and manage the menace of RTAs in the municipality.

6.1.3 Perception of Fire Risks in Wa

Although discussant did not provide much detail about fire risks, it was perceived as an emerging disaster risk in the municipality. There are pockets of wild fires which occur mostly during the dry season however, domestic fires were identified as the most frequently occurring fires in the municipality. The rapid growth and increasing

population of Wa is largely noted by discussants as the main underlying factor fuelling people's vulnerability to fire risks. In that, urbanization has increased the demand for accommodation in the municipality. Consequently, many landlords have taken advantage of this development and are rapidly building new structures and expanding existing ones to meet the rising demands. This has led to the increasing use of substandard materials for the structures. Most of these structures have inferior wiring coupled with inhabitants also using inferior electric gadgets.

Compounding the problem, the majority of these rapidly built structures do not have kitchen spaces and this has compelled residents to cook in their rooms. Besides, the haphazard building of structures usually impede the movement of fire tenders during outbreaks, hence people become more vulnerable when faced with this risk. A respondent disclosed that;

> *…domestic fires are also on the increase. This is because, landlords do not build kitchens hence most people are forced to cook in their rooms. They use rice cookers and they have bad wiring. And even if there is an outbreak, how the fire tender will get into a house is a challenge and this is as a result of poor way of building. Even last time, some students got burnt to death because a gas bottle exploded in their room* (Tenant-Mangu, FGD, 2014).

Recognizing the vulnerable conditions residents were facing and their subsequent exposure to fire risks, several coping and mitigate strategies has been adopted to reduce their vulnerability to this risk. Among these include: avoiding the use of candles when the lights go off at night, cooking in the open and the use of quality electrical gadgets. In addition, other respondents also advocated for the strict implementation of building codes which they believe is the surest way of ensuring

that landlords build their houses with a kitchen and leave enough space for emergency services such as fire service operations and the ambulance services.

6.1.4 Perception of Disease Epidemic and CSM Risk in Wa Municipality

Discussions and answers from respondents indicated a good awareness about disease epidemics as perceived risk accumulating in the municipality. The effect of population growth in Wa can largely be seen on its environment. In that, the existing basic amenities (potable water, sanitation facilities and proper solid waste disposal practices) serving the then population of Wa are no longer sufficient for the rate of growth. Hence, most inhabitants are engaging in unsafe environmental practices which are fast undermining the environment. This is posing several health burdens on the population. Among these practices include, the indiscriminate dumping of solid waste, open defecation, the use of unsafe water and the disposal of wastewater inside compounds. As acknowledged by Pelling and Wisner (2009) the increasing population in cities devoid of adequate infrastructure and service provision is creating various forms of disaster risks including disease epidemics.

Most of these epidemics were associated with insanitary environmental conditions. That notwithstanding, respondents indicated that these epidemics resulting from poor environmental conditions are not widespread in the municipality, rather, they are prevalent in communities associated with insanitary conditions. Observably, within the study communities, Mangu, Kpaguri and Kumbiehe are the areas experiencing these conditions. However, Mangu is the community facing the most challenges of poor environmental conditions. Poor sanitation, inaccessibility of safe water, improper solid waste disposal methods such as indiscriminate dumping, burning and dumping

in open areas are some of the practices associated with the community. Commenting on these unsafe practices, a respondent indicated that;

> *...for all of us staying at Mangu here, we don't have a particular place to dispose our solid waste. We normally pour it on people's plot and sometimes they chase us to come for our rubbish, so because of this, people normally hide and pour it behind their houses. But anywhere you want to drop waste, it's someone's plot* (Landlord-Mangu, FGD, 2014).

In addition to the above statement as a cause of insanitary conditions in Mangu, a respondent further disclosed that,

> *…there is no community container in Mangu. And we cannot afford the waste bins distributed by Zoomlion Company in collaboration with the Assembly. So we throw our rubbish anywhere. Even toilet facilities are not adequate here, yet we have to defecate, so you see children and grown-ups defecating at odd place (*Tenant-Mangu, FGD, 2014*)*

These conditions are said to be accounting for the prevalence of cholera, diarrhoea, malaria and typhoid epidemics in the municipality. A respondent remarked;

> *…because of the indiscriminate dumping of refuse everywhere, our children mostly suffer from diseases such as malaria and diarrhoea in the rainy season because the environment becomes unsafe and dirty* (Landlord-Mangu, FGD, 2014).

The results from the study are not farfetched as they confirm the outcomes of other related studies. High incidence levels of diseases such as malaria, cholera, diarrhoea

and typhoid are associated with environmental conditions which can be considered as hazards contributing to disease risks (Songsore et al, 2009).

Also, the sanity of SSNIT residential area is attributed to the 'affluent' characteristics of residents and the fact that they can afford basic services such as proper solid waste disposal practices, potable water and good sanitation. This assertion confirms several studies which reveal that high-income residences enjoy a sanitary environment due to their availability of basic services and their ability to patronize them (Oteng-Ababio, 2013; Pelling and Wisner, 2009).

In addition, Cerebrospinal Meningitis (CSM) was also perceived as another disease epidemic accumulating in the municipality. The municipality lies within the meningitis belt of Ghana, therefore, almost every year, there is an outbreak. Again, population growth and inadequate housing is a causal factor to CSM risks. Respondents mentioned overcrowding and poor ventilations in rooms as factors stimulating CSM risks.

The study attributes this overcrowding and poor ventilation to the high cost of rent which is compelling large households to cluster in small rooms and the haphazard building of housing facilities with small windows as underlying factors making residents vulnerable to CSM. Also, the increasing cases of crime have coerced people to keep their windows shut for fear of burglary, hence causing rooms to heat up. A mitigation measure adopted by most households to reduce the impact of CSM is partaking in the periodic vaccination organized by the Ghana Health Service.

Other coping strategies adopted to mitigate the outbreak of disease epidemics include drinking clean water from boreholes, ensuring personal hygiene by washing hands

with soap after visiting the public toilets and also eating foods prepared under hygienic conditions. In addition, some respondents noted that instead of engaging in the indiscriminate disposal of solid waste and open defecation, they prefer to either burn or bury solid waste and also to utilize the public toilet. A respondent noted that;

> *...some of us, our landlords have dug holes in their backyard garden so we dump it there and when it's full, we either bury it or burn it* (Tenant-Mangu, FGD, 2014).

6.1.5 Perception of Flood risks in Wa

Predictably, the risk of floods seems pervasive in Wa, observed from the responses accrued during the study. According to respondents, floods are perennial risks occurring in Wa after every heavy rainfall. The pattern of flood risks in the municipality is also uneven. That is, flood risks occur in communities where there is evidence of poor planning and layout, inadequate drains, haphazard building and choked drains. The study revealed, that three of the residential areas, including Mangu, Kpaguri and Kumbiehe always experience floods after a downpour. The SSNIT areas however do not experience this risk as a result of the well-planned nature of the area coupled with well-connected and free from filth.

Perceptibly, respondents attributed haphazard building as a major cause of flooding in these communities. This is because many people build on lowlands, along banks of rivers and dams. In a FGD, a respondent revealed that,

> *...every year, whenever the rains come, there is serious flooding which sack people from their homes and sometimes break their buildings. People have built everywhere, even in waterways. There is a valley down there (Mangu)*

where all running water from town flow into but people are extending their houses there because it is their land and they have to build on it. So these houses get flooded anytime the rain comes. But people don't listen, in the dry season, you see people continuing to build again' (Tenant-Mangu, FGD, 2014**)**

Significantly, about 82.5 percent of respondents noted that the flood risk is as a result of haphazard building in the municipality. Table 6.1 shows the answers of the respondents.

Table 6.1: Haphazard building is the cause of flood risk in Wa (%)

Strongly Agree	Agree	Indifferent	Disagree	Strongly Disagree
36.5	46	7	9.5	1

Source: Fieldwork, 2014

The increasing haphazard building associated with the area is as a result of the high demand of shelter by the increasing population moving to Wa. As a result, landowners are converting every open space into residential enclaves. Landlords who do not have additional lands at their disposal extend their structures to create more rooms to accommodate people. These structures occupy marginal lands, streets and waterways creating a vulnerable condition for inhabitants during the rainy season. As posited by a respondent;

...our housing structures are not planned at all! Some people build on roads and others build so close to each other such that there is no path to walk. Even the ten feet which is supposed to be the space between buildings is not adhered to hence even a 'motorking' cannot pass through. Everybody is just building

> *haphazardly because renting is now a business as many people are moving into the town* (Landlord-Mangu, FGD, 2014)

Another discussant supported the statement above and affirmed,

> *...I must also say that people are building anywhere. You wonder whether they take permits before building and during the raining season, you see the whole place flooded with water. And in the dry season, you see them increase the number of structures again. Although they write 'stop work', the people are very stubborn and they continue to build. Some also negotiate with them (officials) and paint the 'stop work' writing and continue with the building. They are my people, they build anywhere, anytime and for money without thinking of its implications* (Tenant-Mangu, FGD, 2014).

Coupled with poor planning and haphazard building are the inadequate drains in the communities which are unable to allow flash floods to flow into bigger drains. The choking of the few available drains in the community with solid waste further blocks the flow of water, thereby allowing water to overflow and flood people's homes. Mangu is the community that suffers most from the effects of these floods in that it has a low elevation, characterized by overpopulation and mostly inhabited by the poor. Most people prefer to live in this area because of the low cost of land and rent. As a result, landlords have taken advantage of the situation and are building indiscriminately.

These findings resonate with results of other studies (Songsore et al., 2010) which point out that poor planning, haphazard building and choked gutters are the major causes of floods in cities of developing countries, including Ghana.

On measures put in place to mitigate the flood disasters, initiatives at the household and community level to mitigate flood risks were adopted. At the community level, respondents revealed that they avoid residing in areas where the floods are very intense. A common strategy adopted by some residents is to check erosions with sacks filled with sand and dumped in gullies close to their dwelling. Many others vacate and abandon their homes during the rains. Also, at the community level, some people are advocating for more drains to be constructed in the area to receive all the surface water running through the community during the rainy seasons. Other respondents also posited that intensive education and awareness of the dangers of floods to lives and property should be intensified to reduce the impact of floods in the municipality.

6.1.6 Respondent's perception of other risks in the Wa Municipality

Comparatively with other risks, perceptions about food insecurity and windstorm had limited details provided about them. Although food insecurity is not a major disaster risks in the municipality, respondents noted that their major source of livelihood which is agricultural related activities was being affected by the recent change in climatic conditions. It was perceived that the prolonged dry seasons currently experienced in the area are affecting agricultural activities, especially food production in the area. Hence, unlike in the past, the municipality in recent times is experiencing food shortage.

The rapid growth and expansion of the area has resulted in the conversion of vegetation cover to built-up areas. The trees used to serve as windbreaks during windstorms but these houses in the town are unable to stand the North East Trade Winds from the Saharan desert, hence periodic windstorms pull down and rip off people's roof. Coping with this development, many people have engaged in

retrofitting of their houses by placing huge stones of their roofs to prevent them from being ripped off during windstorms.

Although these are perceived disaster risks identified by respondents as accumulating in Wa, the findings are in tandem with other studies which identify cities as hazardous places or *'crucible of hazards'* (Bull-Kamanga,2003). Besides, anecdotal views have always ranked crime, fire risk, disease epidemics and floods as major disaster risks occurring in urban centres of developing countries.

6.2 Summary

This chapter primarily examined the disaster risks perceived to be accumulating in the Wa municipality. The interest in local knowledge in the study was necessitated by the fact that it serves as a vital source of information that facilitates and appreciates the various socio-cultural, environmental, political and psychological influences that shape local perceptions towards hazards.

Several disaster risks such as crime, RTAs, fire risks, floods and disease epidemics among others were perceived as major disaster risks accumulating in Wa. Perceptibly, increasing urbanization with limited infrastructure and a poor layout of the urban space coupled with other factors were identified as major 'drivers' of these risks. Crime is perceived to be increasing, because there are inadequate job opportunities amid an increasing population. This is fuelling most of the youth to engage in stealing and robbery activities. Motorcycles were the most stolen item due to its widespread use in the town. Also, increasing RTAs were attributed to the non-existence of adequate streets to accommodate the increasing motorbikes and vehicles

in the town. Besides, inexperience of most UDS students to ride motor is a major contributory factor to RTAs.

The high demand for shelter leading to haphazard building, building on unsafe lands and the use of substandard materials for building, are perceived to be the cause of flood risks in the town. In addition, poor wiring and the use of inferior electrical gadgets were also identified as factors causing fire risks. Furthermore, the improper disposal of solid waste, poor sanitation practices, inaccessible safe water were among the factors considered as causing disease epidemics such as cholera, diarrhoea and typhoid. Other risks perceived to be accumulating in the municipality included food security and windstorm. Generally, almost all the perceived risks were most associated with Mangu due to its high levels of poor layouts, inadequate infrastructure and haphazard building that are characteristics of the area.

CHAPTER SEVEN

SUMMARY, CONCLUSION AND RECOMMENDATION

7.0 Introduction

The previous chapter discussed the perceptions of respondents on the various disaster risks accumulating in the Wa municipality. It further examined the respective coping and mitigation strategies adopted to prevent and reduce the impact of these risks. This chapter highlights the major findings of the study and establishes the conclusion. It further highlighted the recommendations proposed by the study.

7.1 Major Findings of the Study

In the quest to achieve the general objective of examining the urban growth and disaster risk accumulation nexus in the Wa municipality, four objectives were outlined under the following thematic areas; urban growth processes in Wa, institutional arrangements set up to manage the process, vulnerabilities generated by the growth of the area and perceived disaster risks accumulating in the area and the coping strategies adopted by residents to mitigate their impacts.

7.1.1 Urban Growth process in Wa

The study highlighted the growth of Wa as largely driven by the interplay of political, social and economic factors. Of much significance is the upgrading of the area from a district capital to a regional capital and finally to a municipality in 2004 following LI (1800) under the Decentralization Policy (WMA, 2013). This has seen many public officials, civil servants and private entities moving into the municipality. Besides, the completion of major road networks linking Wa to other parts of the country has opened the area up for the agglomeration of businesses and other economic activities.

More recently, the establishment of tertiary institutions including the UDS, the Wa Polytechnic and other educational institutions has caused a remarkable growth through the influx of students into the municipality. Consequently, the population of Wa has almost doubled in a spate of 26 years. That is, from 36, 067 in 1984 to 71, 053 in 2010. Undoubtedly, the growth process exhibited itself in the physical expansion of the area where the built-up area of Wa increased from 73.99 km² in 1991 to 144. 88 km² in 2011. Significantly, the built-up area which covered 12 percent of the total land space of the municipality has increased to cover 23 percent of the total area of the municipality.

7.1.2 Institutional arrangement for managing growth process

Several urban management interventions have been implemented by key stakeholders to guide the rapid growth of Wa. An institution such as the TCPD has rolled out programmes to plan all emerging areas in the municipality before they become fully built-up. Existing areas which have not been planned but has seen development are also being re-zoned to ensure effective development. In addition, the GWCL is undertaking two major water expansion projects (drilling boreholes and connecting water from the Black Volta River) to increase access to potable water. It is expected that 80 percent of the population will have access to potable water by the end of 2015. With respect to sanitation and solid waste management, the Environmental Unit of the Assembly in collaboration with Zoomlion (a private waste management institution) has initiated a programme geared to distribute waste bins for all residents at affordable prices. However, this initiative has not been fully embraced by residents because they consider the service as too expensive to patronize. Following the National Sanitation Day instituted by the government of Ghana, the Assembly in

collaboration with other key stakeholders have made it a necessity for every resident to partake in the exercise to reduce the effect of solid waste effluence in the municipality. With respect to meeting the health needs of the population, the GHS has also instituted 20 CHPS zones to provide basic healthcare services for the people in the communities. Although these comprehensive strategies have been rolled out, inadequate funds on the part of the public institutions has curtailed the effective implementation of these initiatives. The fragmentation of land ownership (land tenure) and non-adherence to building regulations has also affected effective planning and guidance of developmental activities in Wa.

7.1.3 Vulnerabilities generated by urban process

In effect, the unplanned and unguided growth processes in Wa have resulted in the generation of vulnerable conditions which is making residents susceptible to disaster risks such as disease epidemics, flood risks, fire and the collapse of buildings. Findings of the study revealed that most respondents reside in two rooms which is causing congestion and overcrowding. The lack of a kitchen in most buildings compels people to cook in their rooms making them susceptible to fire risks and in-door air pollution. In addition, the congestion and overcrowding in these rooms are making respondents vulnerable to the risk of CSM which is prevalent in the municipality. The high demand for shelter in the community has attracted haphazard building and the use of substandard materials for building. A pending and looming disaster risk accumulating with this development is the collapse of buildings and increasing flood risks.

Potable water in the municipality is found only in the central part of the town. Consequently, a significant number of residents depend on boreholes and sachet

water. Furthermore, other residents also depend on dug wells, streams and dams. Most of these sources face contamination from animals sharing the water source and runoff from floods. The use of these water sources makes residents vulnerable to disease epidemics such as diarrhoea, typhoid and cholera. Also, there is the proliferation of private boreholes and sachet water production companies.

The study further revealed that most respondents do not have sanitation facilities in their houses. As a result, many people access public toilet facilities while others use pan and pit latrines. Also, many inhabitants engage in open defecation which pollutes the environment and expose residents to disease burdens. Solid waste disposal practices have left communities in the municipality in a very filthy condition. Due to inadequate community containers and inability of most residents to patronize waste bins, there is the evidence of indiscriminate dumping, burning and choking of drains with solid wastes. The lack of proper sewerage system in communities has coerced many people to dispose their wastewater in their compounds and drains. As a result, most of these drains are choked with solid waste materials hence, wastewater becomes stagnant in them. All these practices have cause outdoor pollution and breeding of mosquitoes. Most inhabitants are therefore susceptible to flood risks and diseases such as malaria. An interesting development identified by the study was that, inadequate infrastructure and services was mostly associated with Mangu (low-class areas).

7.1.4 Perceptions of respondents on disaster risks and their coping strategies

In the quest to assess the perceptions of respondents on the disaster risks accumulating in Wa, it was identified that crime, RTAs, fire, disease epidemics including CSM were the major disaster risks perceived by residents to be associated

with the area. Also, windstorms and food insecurity were identified as other risks perceived to be accumulating in Wa. The accumulation of these risks was largely attributed to the rapid and unguided development of the municipality with its associated population increase. Significantly, the unpreparedness of city authorities in providing infrastructure and services were factors accounting for the risks associated with the area.

The cause of crime was attributed to the rapid growth of the area fuelled by population increase and inadequate job opportunities in the municipality. Motorbikes are the most stolen item due to its extensive use in the area. Motorbike accidents were therefore the most rampant RTA occurring in Wa. This was attributed to the inadequate road networks connecting the communities. Also, the use of motorbikes by most tertiary students who are inexperienced coupled with reckless riding were the major factors perceived to be causing RTAs. Inadequate shelter, haphazard building, use of inferior building materials (electric cables), lack of proper sanitation, sewerage and solid waste disposal system were factors perceived by respondents as the primary cause of increasing floods, fire and health burdens such as malaria, cholera and typhoid in Wa.

7.2 Conclusion

Cities in Ghana continue to experience tremendous growth in their physical, economic and social facets resulting from agglomeration of human activities. The Wa municipality as a rapidly growing urban centre has equally exhibited this phenomenon and has provided economic and social opportunities for its population. As posited by Oteng-Ababio (2013), the growth of cities has great prospects in terms of where people can live healthy, productive and sound lives. Akin to this development, Wa

exhibits some of the major urban development similarities experience by cities of developing countries including Ghana.

Significant among them is the pattern and processes of growth. Primarily, the growth of Wa is driven by much of political and social factors devoid of extensive economic factors such as industrialization. This confirms Songsore's (2009:4) assertion that, most cities in the developing world experience "demographic urbanization" instead of "economic urbanization" or one driven by "radical transformations in agricultural productivity and industrialization" experienced by the developed world. This different trajectory of urban development exhibited by developing countries reflects the challenges most cities and their population experience with respect to urban development.

Examining the demographic characteristics, Wa further exhibits what Pelling and Wisner (2009) term '*tales of two cities'* where urban spaces are inhibited by the affluent who reside on 'safe grounds' and are served with adequate social amenities while the urban poor on the other side inhibit marginal lands devoid of standard urban services such as potable water, quality housing and improved sanitation and solid waste services (Songsore et al., 2009; Oteng-Ababio, 2013). This development replicates the situation in large municipal and metropolitan areas in Ghana. Substantiating the point that the growth of small and intermediate or medium towns if not guided and managed well will exhibit the same spatial and demographic features and challenges exhibited in large cities such as Accra and Kumasi. Various initiatives geared towards building urban resilience will be defeated as there will be cumulative growth of disparities of urban population in both large, medium or intermediate and small towns.

More so, the ineffectiveness of city authorities and the weak implementation of urban development initiatives of large and small urban centres in Ghana highlights the increasing vulnerable conditions urbanites find themselves. This is not far-fetched in the case of Wa municipality as growth has extensively outwit stakeholders preparedness towards building resilient city through the provision of infrastructure and services. Hence, urban population in a medium or intermediate towns such as Wa is also becoming vulnerable to hazards such as fire, flood, crime and disease epidemics. As revealed by several studies, unguided urban growth is the primary cause of cities in most developing countries becoming vulnerable to accumulated disaster risks (Pelling and Wisner, 2009; Cohen, 2006; UNFPA, 2007; Oteng-Ababio, 2013). The UN-HABITAT (2014) further affirm that ''inevitable consequences of rapid urban population growth are a consequence of political and institutional failure that inhibits effective urban planning, policymaking, investment and regulation''. Besides, the decentralization initiatives which are supposed to sustain local governments in planning and developing the urban spaces (building resilience cities) have also been interrupted by central government's reluctance to 'cede power to the lower ties of government' (UN-HABITAT, 2014:30). This generally affects how cities are managed.

7.3 Recommendation

The study has generally revealed the interplay of several factors that form the basis of growth in the Wa Municipal Area. In addition, vulnerable conditions generated by the growth process leading to associated disaster risks such as disease epidemics, floods and crime among others has been highlighted. Therefore, to facilitate resilience in Wa

and among the population, the following recommendations are proposed to address the key issues raised by the study;

1. An all-inclusive collaboration between city authorities and the private sector in providing infrastructure and services for the municipality should be intensified. Pragmatic steps such as harmonizing expertise and effective implementations of policies should be encouraged by all key stakeholders of the municipality including GNFS, GHS, NADMO, and TCPD to ensure effective risk reduction strategies. Specifically, Public Private Partnership (PPP) strategies should be extensively implemented to engage private entities to support the provision of specific services such as potable water, sanitation, housing and proper solid waste disposal practices. Most importantly, the low-class areas should be targeted to relieve the population of infrastructure deficiency. This, the study believe will relieve the burden on government as the 'sole-provider' of social services and infrastructure in the municipality.

2. The study calls for the establishment of proactive local groups and civil societies with explicit aim of building resilience through disaster risk reduction strategies. This can be achieved through the establishment of local resilience groups. In addition, existing groups with such aim should also be empowered to continue their activities aim at reducing risk. This will support in creating awareness about activities that are generating vulnerabilities in the municipality. Also, disaster risks accumulating in the area can be identified through these platforms and more effective coping strategies adopted to mitigate their impacts.

3. Disaster risk reduction should be mainstream in various institutions and population setups in Wa. Students, markets women, drivers, butchers and individuals should be involved in the sensitization, education, policy formulation and implementation of disaster risk reduction strategies in the municipality. This will encourage an all-inclusive approach towards building resilience in the community. More importantly, local knowledge of people in the municipality should also be integrated in risk reduction strategies given that, locally-based experience and knowledge plays an effective role in risk identification and further promotes local participation in mitigation strategies.

4. Also, the study calls for an extensive education on the need for spatial planning for landlords and land developers to appreciate planning processes as a relevant tool for building resilient cities. The zoning and spatial planning procedures which seem to be a new phenomenon in the municipality is creating divergent approaches to acquisition and development of land between the TCPD and individual landowners. Therefore, extensive education and integrated approach to the processes of land acquisition, land distribution and spatial planning between landowners and TCPD will encourage effective and orderly development of the urban space.

5. The partial decentralization of some institutions in the municipality is not promoting effective delivery and efficient execution of responsibilities. In that, many government institutions are not well established at the municipal levels. For instance, the National Population Council only has a Committee (District Population Advisory Committee) that represents it at the municipal assembly. This committee which is supposed to guide and help integrate population

characteristics in planning and development issues in the municipality has no office space and infrastructure. Besides, the unwillingness of central government to cede power to these local government institutions and financially support them has rendered most of them incapable in their functions. Consequently, the study calls for a comprehensive and full decentralization of such institutions in the municipality to ensure effective management of the rapid growth in Wa.

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APPENDIX

DEPARTMENT OF GEOGRAPHY AND RESOURCE DEVELOPMENT

UNIVERSITY OF GHANA, LEGON

This study is being carried out by a post- graduate student from the Department of Geography and Resource Development, University of Ghana, Legon. As a partial fulfillment of the degree of Master of Philosophy in Geography and Resource Development, the study seeks to examine the **urban growth and disaster risk accumulation nexus in the Wa Municipal Assembly**. The success of the study depends on the willingness of individuals like you to share your view on the topic. I wish to state that views expressed on this document will strictly be used for academic purposes only.

Date of interview……/……../2014 **Location…….**

SECTION I – Respondent's Social and Demographic Background

1. Sex 1. Male [ ] 2. Female [ ]
2. Age ……..
3. What is your highest level of education? 1. No education [ ] 2. Primary [ ] 3. JHS /Middle [ ] 4. SHS /O' Level [ ] 5.Vocational/Technical [ ] 6. Post Sec./Nursing/Polytechnic [ ] 7. University [ ] 8. Other
4. What is your religious affiliation? 1. Christian [ ] 2. Moslem [ ] 3. Traditional [ ] 4. Other (please specify)
5. What is your ethnic background? 1. Akan [ ] 2. Ga-Adangbe [ ] 3. Ewe [ ] 4. Mole Dagbani [ ] 5. Guan [ ] 6.Other (please specify)……
6. What is your marital status? 1. Never married/Single [ ] 2. Currently married [ ] 3. Living together [ ] 4. Separated [ ] 5. Divorced [ ] 6. Widowed [ ]

7. What is your occupation? 1. Professional/technical [ ] 2. Administrative/ managerial [ ] 3. Agriculture/animal/forestry [ ] 4. Sales [ ]……. 5. Student [ ] 6. production/transport [ ] 7. Other ……
8. How much do you spend as your monthly expenditure? 1. < Gh¢ 200 [ ]2. Gh¢ 201 – 500 [ ] 3. Gh¢ 501 – 1000 [ ] 4. Gh¢ 1001 – 1500 [ ] 5. > Gh¢ 1500 [ ]
9. Where were you born? Town ..... Region……
10. Where did you live before moving into this community? Town..... Region.....
11. How long have you lived in this community? .....

SECTION II – Vulnerabilities Generated by Urban Growth Process

A. Housing Characteristics

12. What is the nature of your tenancy arrangement? 1. Landlord/lady [ ] 2. Tenant [ ] 3. Caretaker [ ] 4. Free/cohabitation [ ] 5. Other
13. Which type of housing facility do you live in? 1. Compound [ ] 2. Detached [ ] 3. Semi-detached [ ] 4. Apartment [ ] 5. Other……..
14. What type of building material is used for the housing structure?

    1. Roof 1. Thatch [ ] 2. Iron sheet [ ] 3. Mixed [ ]

    2. Walls 1. Mud [ ] 2. Wood [ ] 3. Concrete [ ] 4. Mixed [ ]

    3. Floor 1. Wood [ ] 2. Concrete [ ] 3. Mud [ ]
15. How many rooms are there in your housing unit? 1. Single room [ ] 2. Two rooms [ ] 3. Three rooms [ ] 4. Four rooms [ ] 5. Five rooms [ ] 6. Above six rooms [ ]
16. What is the size of your household? ……

17. How many extended family relations live with you? .....
18. Would you say your housing structure is in good condition? 1.Yes [ ]2.No [ ] 3. Don't know [ ] **(Skip to Q 20)**
19. Please explain your……
20. Would you say housing is affordable in this community? 1. Yes [ ]2. No [ ] 3. Don't know [ ] **(Skip to Q22)**
21. Please explain……
22. Does level of income of an individual influence where one will stay in the community? 1. Yes [ ] 2 No [ ] 3. Don't know [ ] **(skip to Q24)**
23. Please explain your answer……
24. In the past decade, what has been the trend of the cost of rent in the community?
    1. Increased [ ]2. Decreased [ ] 3. Remained unchanged [ ] **(Skip to Q 27)**
    4. Don't know [ ] **(Skip to Q27)**
25. Please explain your answer ……
26. If your answer in **Q 24 is option 1**, what effect has the increased in rent had on you and your household?…… ……
27. Do you have electricity in your house? 1. Yes [ ] **(skip to Q29)** 2. No [ ]
28. If no, what source of energy do you use?.....

<u>Access to Infrastructure and Social Services</u>

B. WATER

29. Which of the following sources do you get your drinking water from? (**Tick all that applies)**

1. Pipe-borne [ ] 2. Dug well [ ] 3. Bore-hole [ ] 4. Streams/River [ ] 5. Bottled [ ] 6. Sachet water [ ] 7. Others

30. Among the listed sources above, which of them is your **primary source** of drinking water? …….

31. Where is this primary source of drinking water located? 1. In-house [ ] 2. compound/yard [ ] 3. In the community (public) [ ] 4. Vendor [ ] 5. Other ..……..

32. Are you able to access water from this source always? 1. Yes [ ] **(skip to Q34)** 2. No [ ]

33. **If no,** please explain……

34. Which **alternative source** of drinking water do you use when you are not able to access water from your primary source? ……

35. Which of the following is your primary source of water for **other domestic uses**?

1. Pipe-borne [ ] 2. Dug well [ ] 3. Bore-hole [ ] 4. Streams/River [ ] 5. Tanker [ ] 6. Others ……..

36. Where is this source of water for **domestic use** located? 1. In-house [ ] 2 Compound/yard [ ] 3. Community (public) [ ] 4. Others

37. Do you buy water? 1. Yes [ ] 2. No [ ] **(skip to Q39)**

38. How often would you say your household buys water from a vendor? 1. Every day [ ] 2. At least once a week [ ] 3. At least once a month [ ] 4. Very occasionally [ ] 5. Others……..

39. In the past decade, has the sources of water changed in the community? 1. Yes [ ] 2. No [ ] **(Skip to Q41)** 3. Don't know [ ] **(Skip to Q41)**

40. **If yes,** what do you think accounts for such changes? .....

C. Sanitation

41. How do you dispose of your solid waste? 1. Door to Door collection [ ] 2. Public dump **(container)** [ ] 3. Public dump **(open)** [ ] 4. Indiscriminate dumping [ ] 5. Burying [ ] 6. Burning [ ] 7. Others
42. If your answer in **Q41 is option 1 and 2,** how much do you pay per dump?.....
43. If your answer in **Q41 is option 3, 4, 5 and 6,** please explain your answer…….
44. How far is the **public dump site (container)** from your house? 1. Less than 1km [ ] 2. Between 1 – 3km [ ] 3. Between 3 – 5km [ ] 4. Above 5 km [ ]
45. Where do you dispose of your liquid waste 1. Sewerage system [ ] 2. Drainage system [ ] 3. Street [ ] 4. Open gutter [ ] 5. Compound [ ] 6. Other……
46. What type of toilet facility do you use? 1. Flush toilet [ ] 2. KVIP [ ] 3. Pit latrine [ ] 4. Pan latrine [ ] 5. Bush [ ] **(Skip to 48)** 6. Other…….
47. Where is it located? 1. In the house [ ] 2. In the compound [ ] 3. Outside the compound(communal) [ ]
48. If answer in **Q46 is option 5,** please explain your answer……
49. How far is the nearest **public toilet** from your house? 1. Less than 1km [ ] 2. Between 1 – 3km [ ] 3. Between 3 – 5km [ ] 4. Above 5 km [ ]

D. Healthcare Facilities

50. Which illness do you mostly report to a healthcare facility? ……

51. Which healthcare facility do you visit when you fall sick? 1. Government hospital [ ] 2. Private Hospital [ ] 3.Quasi-governmnet [ ] 4. Clinic [ ] 5.Traditional/herbalist [ ] 5. Pharmacy [ ] 6. Others ……
52. Why do you access the choice of facility stated in **Q 51?** 1. Better quality of service offered [ ] 2. Proximity [ ] 3. Good physical conditions [ ] 4. Moderate charges [ ] 5. Others (please specify)……
53. What is the quality of service provided by the healthcare facility? 1. Good [ ] 2. Average [[3. Poor [ ]
54. Please explain your answer……
55. Are you enrolled onto the National Health Insurance Scheme? 1. Yes [ ] **(skip to Q57)** 2. No [ ]
56. **If your answer in Q54 is no**, please explain …….
57. How far is the nearest healthcare facility from your house? 1. Less than 1km [ ] 2. Between 1 – 3km [ ] 3. Between 3 – 5km [ ] 4. Above five km [ ]
58. What is your usual mode of transport to the healthcare centre? 1. Foot [ ] 2. Motorcycle [ ] 3. Private car [ ] 4. Communal transport [ ] 5. Bicycle [ ] 6. Other ……

SECTION IV – Respondent's Perceptions on Vulnerability To Disaster Risks

59. Is your community exposed to any of the following disaster risks?

Please rank in order of occurrence (1 being the highest and 8 being the least)

Disaster risk	Rank
1. Fire	
2. Flood	
3. CSM	
4. Road Traffic Accidents	
5. Cholera	
6. Windstorm	
7. Food insecurity	
8.Crime	
9. other	

60. Which of the above mentioned disaster risk is the community **mostly exposed** to? .....

61. Why do you think your community is exposed to this **disaster risk stated in Q 60**? .....

62. What visible factors are contributing to the **increase** of this **common disaster risk** in the community? 1…… 2……3……

63. Are you vulnerable to the **disaster risk mentioned in Q 60?** 1. Yes [ ] 2. No [ ]

64. Please explain your answer……

65. Do you think population increase is a major cause for the increasing **disaster risk stated in Q 60**? 1. Yes [ ] 2. No [ ] 3. Don't know **(skip to Q67)**

66. Please explain your answer……

67. Which group of people do you think are most vulnerable to the various disaster risks in the community? 1. Poor [ ] 2. Children [ ] 3. Sick [ ] 4. Aged [ ] 5.physically challenged [ ] 6 Others...…….

68. What makes them vulnerable to these disasters risks? ……

ON V – URBAN GROWTH AND DISASTER RISK ACCUMULATION NEXUS

Please indicate on the Likert scale your view about urban growth and the accumulation of disaster risks in the municipality.

Urban growth and Vulnerability	**Strongly agree**	**Agree**	**Indifferent**	**Disagree**	**Strongly agree**
69. Houses built in this community lack basic services?					
70. People are building haphazardly in the community?					
71. Houses built in the community are not in good condition					
72. Cost of rent in the community is increasing					
73. The loss of farmlands are increasing in the community					
74. Haphazard building is exposing community to flood risk					
75. Most houses are not connected to pipe-borne water					
76. Solid Waste containers provided by the Assembly are not adequate					
77. The number of public toilets have not increased in the community					
78. The number of healthcare facilities have not increased in the community					
79. Crime is increasing in the community					

SECTION VI – Coping Strategies And Capacity Of Households

80. Do you save part of your income? 1. Yes [ ] 2. No [ ] **(skip to 82)**
81. Where do you keep your savings? …….
82. Why do you save? 1. Leisure [ ] 2. To buy asset [ ] 3. To cope with emergencies during disasters [ ] 4. For business [ ] 5. Other ……
83. **If no,** why don't you save……
84. Are you covered by any form of insurance? 1. Yes [ ] 2. No [ ] **(Skip to Q85)**
85. If yes, what type of insurance? **(tick all that applies)** 1. Health [ ] 2. House [ ] 3. Car [ ] 4. Business [ ] 5. Accident [ ] 6. Other……
86. What strategies have you **personally** put in place to protect your household/resident from experiencing the **commonest** disaster risk in the community? ……
87. Have you had any education or awareness on any disaster risks reduction by any government institution in the Municipality? 1. Yes [ ] 2. No [ ] **(Skip to Q88)**
88. **If yes**, please describe……
89. Do you know of any **association/NGO** that provides support in any disaster risk reduction in the municipality? 1. Yes [ ] 2. No [ ] **(Skip to Q 91)**
90. **If yes**, what is the name ……
91. What role have they played in reducing disaster risks in the community?.....

92. Are you part of any group/ association that deals with disaster risk reduction in the municipality? 1. Yes [ ] 2. No [ ] **(Skip to Q93)**

93. **If yes**, what role does the group play in ensuring a resilient municipality? .....……

94. Whose responsibility is it to manage disaster risks in the Municipality? 1. NADMO [ ] 2. WMA [ ] 3. Traditional Authority [ ] 4. Individuals [ ] 5. Communal [ ] 6. Others ……

95. What do you think are the three (3) major challenges facing the community in dealing with disaster risks accumulation?

1. ……..

2……

3……

What do you think should be done to reduce the accumulation of disaster risks in the municipality?.....

Thank you for your time and cooperation.

FOCUS GROUP DISCUSSION

Vulnerabilities Generated by the Urban Growth Process

1. How is urban growth affecting people's access to
   1. Water
   4. Housing
   3. Healthcare delivery
2. What are the disaster risks associated with the community and which of them is the common in the community?
3. Do you think about people's awareness of the accumulation of this disaster risks in the community?

Coping Strategies and Capacities of Managing Disaster Risk Resulting from Urban Growth

4. What are residents doing to prevent and mitigate the accumulation of this disaster risk in their community?
5. What difficulties are people facing in trying to prevent and mitigate the accumulation of disaster risks in the community?
6. Whose responsibility is it to ensure that Disaster risks are managed in the Municipality?
7. What can residents do to mitigate and prevent the accumulation of disaster risks in the community?

KEY INFORMANT INTERVIEWS

Vulnerabilities Generated by the Urban Growth Process

1. What role is your outfit playing to manage the urban growth process in the municipality?
2. What are the effects of urban growth on
   1. Urban planning
   2. Service delivery (water, healthcare)
   3. Infrastructure provision (affordable housing)
3. What are the disaster risks associated with the community and which of them is the common in the community?
4. Which Urban stakeholders do you collaborate with in managing the urban growth process and disaster risk accumulation?

Coping Strategies and Capacities of Managing Disaster Risk Resulting from Urban Growth

5. What challenges are you facing your outfit in managing urban growth process and risk accumulation in the community?
6. What do you think is needed to be done to manage urban growth and disaster risk accumulation in the Municipality?

IN-DEPTH INTERVIEW FOR WA MUNICIPAL ASSEMBLY (TOWN AND COUNTRY PLANNING OFFICE/ MUNICIPAL PLANNING OFFICE)

SECTION I –management of urban growth in the Wa municipal assembly

1. What are the various policies and factors driving urban growth in the Wa Municipal Assembly?
2. What policies and programmes are available to manage the urban growth process in the Wa Municipal Assembly?
3. What role does your institution play in urban growth processes in the Municipality?
4. What are the effects of the urban growth process in the Municipality on
   1. Urban planning
   2. Service delivery
   3. Infrastructure provision
5. What are your sources of funds for planning the urban space?
6. Which Urban stakeholders do you collaborate with in managing the urban growth process and disaster risk accumulation?

SECTION II – Challenges and Solutions in Managing the Urban Growth Process

7. What are some of the challenges limiting the institution's capacity to manage the urban growth process?
8. What do you think is needed to be protected or targeted to manage urban growth and disaster risk accumulation in the Municipality?

IN-DEPTH INTERVIEW FOR NATIONAL DISASTER MANAGEMENT ORGANIZATION (NADMO)

SECTION I –Management of Urban Growth in the Wa Municipal Assembly

1. Do you have a national policy that guides your operations in areas of urban growth in the Municipality?
2. What role does your institution play in urban growth processes in the Municipality?
3. What are your sources of funds allocated for Disaster Risk Reduction in the municipality?
4. Do you see a connection between;
    1. Increasing population density and vulnerability of residents?
    2. Housing type and vulnerability of residents?
    3. Access to water and sanitation and vulnerability of residents?
    4. Municipal services and vulnerability of residents?
5. Which Urban stakeholders do you collaborate with in managing the urban growth process and disaster risk accumulation?

SECTION II – Challenges and Solutions of Urban Growth Management

6. What are some of the challenges limiting the institution's capacity to manage the urban growth process?
7. What do you think is needed to be protected or targeted to reduce manage urban growth and disaster risk accumulation in the Municipality?