UNIVERSITY OF CAPE COAST

# URBAN GROWTH AND ACCESS TO UTILITIES IN SUB-URBAN SETTLEMENTS: A STUDY OF EFFIA-KWESIMINTSIM SUB METROPOLITAN AREA IN WESTERN REGION

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# URBAN GROWTH AND ACCESS TO UTILITIES IN SUB-URBAN SETTLEMENTS: A STUDY OF EFFIA-KWESIMINTSIM SUB METRO, WESTERN REGION

BY

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This thesis is submitted to the Department of Geography and Regional Planning of the Faculty of Social Sciences, College of Humanities and Legal Studies, University of Cape Coast, in partial fulfilment of the requirements for the award of Master of Philosophy degree in Geography and Regional Planning.

MARCH 2019

# DECLARATION

## Candidate's Declaration

I hereby declare that this thesis is the result of my own original research and that no part of it is has been presented for another degree in this university or anywhere.

Candidate's Signature …… Date ……

Name: Martin Maxmillian Acquah

## Supervisors' Declaration

We hereby declare that the preparation and presentation of the thesis were supervised in accordance with the guidelines on supervision of thesis laid down by the University of Cape Coast.

Principal Supervisor's Signature …… Date ……

Name: Dr. Collins Adjei Mensah

Co-Supervisor's Signature …… Date …….

Name: Prof. Kwabena Barima Antwi

## ABSTRACT

There has been an increase in urban population of Sekondi-Takoradi Metropolitan Assembly from 246,169 in the year 2000 to 402,874, 2010. This is supposed to have a corresponding expansion in infrastructure (including utilities and amenities) provision to suit the growing population, however this has not been the case. The study sought to assess urban growth and access to utilities in sub-urban settlement of Effia-Kwesimintsim sub-metro of STMA. A total sample size of 253 respondents comprising 246 household heads, three heads of utility services providers and four assembly members were used for the study. The mixed method approach was employed whilst questionnaire, in-depth interview guide and remote sensing techniques were used to collect data from the field. The main finding of the study is that, there is rapid urban growth at Effia-Kwesimintsim sub-metro. Majority of the residents have access to electricity in their homes than water and also the cost of extending water utility services into homes of residents is higher than that of electricity. The coping strategies adopted to have easy and reliable access to utilities include drilling of boreholes, wells, rain harvesting, generators and installation of solar panels. It is recommended that the Effia-Kwesimintsim sub metro in collaboration with the Town and Country Planning Department and utility service providers should intensify their educational campaigns to sensitise the residents on the accessibility of utilities and the efficient usages of these services in the sub metro.

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## DEDICATION

To my brother, Ernest Walter Acquah

# TABLE OF CONTENTS

# LIST OF TABLES

## LIST OF FIGURES

## LIST OF ACRONYMS

| | |
|---|---|
| CIP | Canadian Institute of Planners |
| ECG | Electricity Company of Ghana |
| EPA | Environmental Protection Agency |
| GIS | Geographic Information System |
| GNPC | Ghana National Petroleum Commission |
| GOG | Government of Ghana |
| GSS | Ghana Statistical Service |
| GWCL | Ghana Water Company Limited |
| IDI | In-depth Interview |
| IRB | Institutional Review Board |
| KMA | Kumasi Metropolitan Assembly |
| LAP | Land Administration Project |
| LULC | Land Use Land Cover |
| MDGS | Millennium Development Goals |
| $MMDA_S$ | Metropolitan, Municipal and District Assemblies |
| MTN | Mobile Telecommunications Network |
| NGOs | Non-Governmental Organizations |
| PWD | Public Works Department |
| SPSS | Statistical Package for Social Sciences |
| STMA | Sekondi-Takoradi Metropolitan Assembly |
| TCPD | Town and Country Planning Department |
| UCC | University of Cape Coast |
| UNEP | United Nations Environment Programme |
| UN-Habitat | United Nations Human Settlements Programme |

| | |
|---|---|
| UNICEF | United Nations Children's Fund |

# CHAPTER ONE

# INTRODUCTION

## Background to the Study

We now live in an urbanized world with more than half of the world's population living in urban areas. Statistics show that the pace of the urban population growth is dependent on the natural increase of the population of the urban areas and the population gained by urban areas through both net rural-urban migration and the reclassification of rural settlements into cities and towns (United Nations Children's Fund, 2012; Cohen, 2006).

Urbanisation has been used by people to mean urban growth but there is a difference that exists between the two though they are interrelated. Urban growth is viewed as taking into consideration the population size while urbanisation is perceived to mean a lot of things such as a characteristic of the population, as a particular kind of land use and land cover, as well as a characteristic of social and economic processes and interactions affecting both population and land depending on it use (Bekele, 2005; McIntyre, Knowles-Yanez & Hope 2000). The development of a sub-urban region is an unavoidable outcome of urbanisation. As cities in developing countries continue to grow, the sub-urban area moves outward waves (Jha, Bloch, & Lamond, 2012; Simon, McGregor & Nsiah-Gyabaah, 2004; Feng, 2013).

Urban growth in sub-urban areas and its effect on outlying settlements has placed more challenges on utility provisions in urban centers in the global south (Kamal-Chaoui, & Sanchez-Reaza, 2012; Kombe, 2005). Public utilities services which are those businesses undertaking to provide the needed services in a society (such as supply of electricity, gas, power, water and transport and

among others) are needed for everyday existence of the general population (Nique & Opala, 2014; Agarwal, 2016). The art and science of land use planning has been with man since ancient civilizations and in consonance with neighborhood principles as envisaged in urban growth theories (Christaller, 1966; Grotewold, 1959). In all urban growth models across the world and its concomitant land use planning models, efforts were made in the USA, Europe and other developed worlds to effectively maximize the utilization of land so as to reduce the effect of access to utilities (Wegener, 2004). This therefore, makes land use planning a complex, multifaceted and usually a highly political process in rural, urban and peripheral communities (Yendaw, 2015).

In 2002, Asia had 340 million sub-urban dwellers (42% of the world's total) without utilities. Similarly, Africa had 188 million of sub-urban dwellers (20% of the world's total) without utilities; while Latin America and the Caribbean had 128 million sub-urban (14% of the world's total). Europe and other developed countries had 54 million urban dwellers without utilities. It is projected that in the next 30 years the number of sub-urban dwellers worldwide will increase to 2 billion without utilities if no firm or concrete action is taken to arrest the situation (United Nations Human Settlements Programme, 2003; Duah, 2014; Cosgrove, & Loucks, 2015).

Though, the share of the urban population living in sub-urban settlements has declined from 39 percent to 33 percent over the last ten years, the absolute number of sub-urban dwellers in the developing world is growing and will continue to increase in the near future (United Nations Human Settlements Programme , 2014). The number of sub- urban residents living in marginal conditions in the developing world is now estimated to be 828 million

compared to 657 million in 1990 and 767 million in 2000. The trend of rapid urbanisation and social services provision in Sub-Saharan Africa has given rise to the emergence of new sub-urban and expansion of existing ones (United Nations Human Settlements Programme , 20014). Sub-urban centres are a physical and spatial manifestation of the intensification of urban poverty. In most developing countries, sub-urban dwellers have little or no access to services such as water, sanitation, and solid waste collection. It is estimated that about 400 million people in the world lacked "improved" sanitation in 2004 (Duah, 2014; Hutton, Haller & Bartram, 2007). Africa was the only region that was found to have the lowest coverage of improved sanitation in urban areas (63%) as at 2004. In Sub-Saharan Africa, the coverage dropped to 55% and the number of people lacking improved sanitation increased from 77 million in 1990 to 160 million in 2005 (United Nations Human Settlements Programme , 2004). Utility provisions in sub-urban settlements in many Sub-Saharan countries have been found not to be adequate and do not comply with local building codes. In addressing this global need, the Millennium Development Goals (MDGs) goal 11, was set to focus on the actions needed to be taken to improve the lives of sub-urban and sub-urban dwellers.

Currently, in Ghana there are about 25 sub-urban settlements in Accra whereas Kumasi has more than ten (Duah, 2014). Sub-urban settlements are growing with acute utility deficit. The trend seems frightening as our housing problem is one of a national development crisis with a current annual need of 70,000 units and an accumulated delivery deficit of 250,000 units needed to provide the necessary housing units for urban dwellers. An average annual delivery of 133,000 units will be needed to provide adequate housing within the

next twenty years as against the current annual delivery of 28,000 units, which yields a performance rate of 21% (Twumasi-Ampofo, Osei-Tutu, Decardi-Nelson, & Ofori, 2014).

The provision of utilities tends to grow at a rate slower than that of the urban population in most developing countries (United Nations Human Settlements Programme , 2000). The resultant effect is a wide margin between the use of land and creation of disparities between demand and supply of urban utility services in affected sub-urban areas (Cobbinah, & Amoako, 2012). Recent literature indicates saliently the transformations that are occurring in human settlements resulting in rapid urbanisation. As such, effective land use planning of this growth in urban areas and its peripheries are critical for individuals, their communities, as well as social activists, planning institutions and government (Fekade, 2000; Cohen, 2004). The reason for this is because it affects the provision of utility service distribution and spatial organisation of peripheral communities. The centripetal nature of the growth of cities creates intense pressure on the local economic and spatial structure of urban and peripheral systems which include service facilities such as housing, hospitals, educational institutions, transport, telecommunication systems and electricity supply (Ahmed, & Dinye, 2011).

According to Owusu and Afutu-Kotey (2010), millions of urbanite Ghanaians currently live in densely populated environments without adequate access to basic services such as water, telecommunication, electricity, sanitation and health care. Therefore, to prepare reasoned and effective utility supply solutions to meet the growing demand and the use of urban lands, new processes and tools are needed to deal with this complexity (Duah 2014). Despite these

recognitions and acknowledgements, the political economy of Ghana and its limited resources do not allow for efficient and effective land use planning in Effia-Kwesimintsim. The rate of urban growth in Sekondi-Takoradi is therefore necessary to be investigated into to know the effect of sub-urban growth dynamics and social services provision in Effia-Kwesimintsim.

**Statement of the Problem**

Ghana has over the years experienced population that has contributed to rapid urbanisation and re-classification of many villages as towns and cities (Ghana Statistical Service [GSS], 2012). Such rate of growth of Ghana's population has resulted particularly in urban areas to have increasing housing deficit of 100,000 units annually (GSS, 2012). The inability of city authorities to plan effectively as well as to enforce urban planning laws and regulations has given rise to haphazard development of settlements and structures which are far away from the domains of utility service capacity to provide adequate services. The number of sub-urban dwellers in Ghana was estimated to be 4, 993,000 with a 1.8 percent growth rate per annum as at 2001 (United Nations Human Settlements Programme, 2010). This figure was predicted to rise to 5.8, 6.5, and 7.1 million by 2010, 2015, and 2020 respectively (Ghana Statistical Service, 2011).

Ghana is making frantic efforts to help solve the utility service disparities that exist between sub-urban and rural areas. Though the persistent deficit in housing delivery and expansion is being addressed through the seeking of private capital to finance sub-urban improvement projects by focusing mainly on providing low cost houses for the low income brackets but there is still housing deficit in the country (Cheru, 2001). The growth and expansion of sub-

urban dwellers are alarming and need more attention. The high rate of population growth as a result of natural increase and rural urban drift coupled with other factors has outstripped the rate of infrastructure development and utility service provision in these areas. Lack of proper land use planning in these areas makes it difficult for residents to enjoy utility services that exist in sub-urban centers provided by utility service providers.

Furthermore, the discovery of oil in the Western Region of Ghana in the year 2007 has contributed to the influx of people, companies and other commercial activities that are economically efficient in attracting people into the Sekondi-Takoradi Metropolis thus leading to the uncontrolled springing up of new settlements and the expansion of already existing sub-urban settlements particularly, Effia-Kwesimintsim in the Western Region of Ghana. Available statistics show that there has been an increase in urban population of Sekonid-Takoradi Metropolis from 246,169 in the year 2000 to 402,874 in the year 2010 (GSS, 2012) with much of such population moving to sub-urban areas. This is supposed to have a corresponding expansion in infrastructure (including utilities and amenities) in sub-urban areas to meet the needs of the growing population but this has not been the case (Attua & Fisher, 2011).

This has led to the rise in problems such as pressure on existing infrastructure and difficulty in accessing social services such as utilities in sub-urban areas of STMA, especially in the Effia-Kwesimintsim Sub Metropolitan area. Studies show that lands in the newly developing suburbs in EffiaKwesimintsim have not been well serviced with utility facilities, hence indirectly poor planned settlements (Smout, Kiunsi, Ngouanet, Oteng-Ababio, Esson, Fisher, & Namangaya, 2015).

Notwithstanding this, review of the available literature indicates that not much studies have been done to investigate the effects of rapid urban growth on access to public utility services in sub-urban areas in Effia-Kwesiminstim Sub-Metropolitan area of Sekondi-Takoradi Metropolitan, thereby creating a knowledge gab in that respect. It is against this backdrop that this study was undertaken to assess urban growth and access to utilities in the Effia-Kwesimintsim Sub-metropolitan which is under the Sekondi-Takoradi Metropolis as a means of contributing to the quest of finding plausible solution to ameliorate the plight of sub-urban dwellers in the study area.

**Objectives of the Study**

The main objective of this research was to assess urban growth and access to utilities in sub-urban settlement of Effia-Kwesimintsim sub-metropolitan area of STMA. Specifically, the study sought to;

i. Describe the effects of urban growth of Sekondi-Takoradi on Effia-Kwesiminitsim sub metro.
ii. Analyse the residents' access to major utility services in Effia-Kwesimintsim sub-metro.
iii. Assess the institutional arrangements for managing utility supply in the Effia-Kwesimintsim sub metro.
iv. Assess the coping strategies adopted by the residents in accessing utility services in the sub metro.

**Research Questions**

The study sought to answer the following questions;

i. How is the urban growth of Sekondi-Takoradi affecting Effia-Kwesiminitsim sub metro?

ii. To what extent do residents get access to major utilities in Effia-Kwesiminitsim?

iii. What are the institutional arrangements for managing the supply of utility services in the Effia-Kwesimintsim sub metro?

iv. What coping strategies have been adopted by the residents to access basic utility services in the sub metro?

**Significance of the Study**

This study is conducted to assess the effects of urban growth on access to utilities in sub-urban settlements. This is important because basic utilities such as water and electricity have become part of infrastructural development of every settlement in Ghana. The provision of these utility services will help in the improvement and upgrading of existing sub-urban settlements in the Effia-Kwesimintsim sub metro to relieve the hardships of inhabitants. The study will provide information on how sub-urban dwellings could be improved to enhance and absorb various individual who come to the cities in search of jobs. This really needs to be done because these migrants contribute to the generation of revenue through payment of taxes which are used in developing the nation.

The findings and recommendations of the study will be beneficial to the Kwesimintsim Sub-Metropolitan Assembly, Town and Country Planning, development practitioners and other stakeholders who are interested in urban planning issues to take informed decisions to improve access to public utilities in the study area. The findings will also help utilities service providers to evaluate their activities in the study area and thus improve upon them to enhance

the provision of utility services in the area. The findings will also add to the body of knowledge which can serve as a basis for further research on access to utility services in sub-urban areas of Ghana.

**Delimitation**

The study was confined in Effia-Kwesimintsim sub metro in the Sekondi-Takoradi Metropolis in the Western Region of Ghana. Selected communities include, Apremdo, Anaji, Whindo and Assakai. These communities were selected as study communities since it was easy getting data on the population sizes and the situation under study was predominant in these areas as compared to other communities within the sub metro. The study outlines the effects of urban growth on access to utility service utilities in Effia-Kwesimintsim sub metro. Specifically, the focus is on Effia-Kwesimintsim as a case study of a rapidly growing urban centre in the Sekondi-Takoradi Metropolis with its attendant development issues coupled with inadequate accessibility to utility services.

**Definition of Terms**

**Urban Growth:** Urban growth is defined as the rate at which the population of an urban area increases. This results from urbanisation which is the movement of people from rural areas to urban areas. Urban growth may lead to a rise in the economic development of a country. Urban growth is also referred to as the expansion of a metropolitan or suburban area into the surrounding environment (Antrop, 2004).

**Sub-urban:** Suburban areas are lower density areas that separate residential and commercial areas from one another. They are either part of a city or urban area,

or exist as a separate residential community within commuting distance of a city. (Taylor & Derudder 2015).

**Utilities:** According to Cambridge dictionary (2013) utility is a service that is used by the public, such as an electricity or gas supply or a train service. Collins English Dictionary (2012) also defines utilities to mean, useful features, or something useful to the home such as electricity, gas, water, cable and telephone.

**Land Use Planning:** Land Use Planning is considered as the scientific and traditional, aesthetics, and orderly use of land, infrastructure and services with the aim of promoting the spatial, economic, cultural and social efficiency in the development of well-being without compromising the quality of the local ecology (Canadian Institute of Planners, 2000).

**Organisation of the Study**

This thesis is made up of five chapters. Chapter one covers the background to the study, statement of the problem, objectives, research questions, significance of the study, the delimitations and limitations of the study, definition of terms and organisation of the study. The second chapter reviews the literature aspect of the study. Within this chapter are the discussions of the theoretical perspectives and paradigms that informed the conceptual framework of the thesis.

The Third Chapter focuses on the method employed for the study. This chapter discusses the research design, the target population, sampling procedure, sample size, the research instruments used, data and sources, data

processing and method of analysis, ethical considerations and the challenges of the study.

Chapter Four deals with the result and presentation of discussion and while Chapter Five provides the summary, conclusions and recommendations based on the findings of the study.

# CHAPTER TWO

# LITERATURE REVIEW

## Introduction

This chapter reviews the various literature that are relevant to the study. The topics reviewed include the concept of urban growth and urbanisation, sub-urban settlement, land use and land cover change, effects of urbanisation on sub-urban areas, how urban growth affect the consumption of utilities (electricity, water and telecommunication), accessibility and awareness to utilities and institutional arrangement for managing utility services. Finally, theoretical perspectives on Concentric Zone model and the nuclei theory were discussed to serve as the basis that informed the conceptual framework adopted for the study.

## Urban Growth

Urban growth is a continuously evolving natural process as stated by Sudhira, Subramanian and Ramachandra (2007), due to population growth rate that is, birth and death. Thus, an increased urban population and growth in urban areas is an unintended process as natural increase and migration are usually unplanned. Urban growth may lead to a rise in the economic development of a country. It is also referred to as the expansion of a metropolitan or suburban area into the surrounding environment. It can be considered as an indicator of the state of a country's economic condition as the effect of urban growth directly impacts the country's economic development. The more the metropolitan area grows, the more employment it generates, and in this way economic growth also takes place.

The emergence of settlements was the result of the first social division of labour, that is the allocation of the first farmers. Later, with the separation of crafts and/from exchange of goods, and their concentration in certain settlements, the first cities started sprouting (the so-called second and third social division of labor).Urban growth leads to urbanisation which in turn leads to some changes such as migration of rural people to urban areas, employment opportunities in urban centres, transport and communication facilities, educational facilities and increase in the standard of living (Planning Tank, 2017). For Planning Tank (2017), urbanisation can yield positive effects if it takes place up to a desirable limit. Extensive urbanisation or indiscriminate growth of cities may result in adverse effects like overpopulation, the growth of sub-urbans, disintegration of the Joint family, cost of living, increase in crime rates problem of pollution and stress.

**Defining Urbanisation**

Different types and forms of definitions exist regarding what urban is. With the United Nations, their statistics on urban and rural populations rely on definitions of rural and urban that varies between countries. About one-quarter of countries rely only on criteria related to population size and these population criteria themselves vary considerably.

It is generally accepted that urbanisation involves the shift in population from rural to urban settlements. From a demographic view, the urbanisation level is best measured by the urban population share with the urbanisation rate being the rate at which the share is growing. It is even more confusing when urbanisation is used to refer to the expansion of urban land cover (Montgomery

& Balk, 2011) and is from this definition that urbanisation is being applied to settlements found within the catchment of the Densu Basin.

It is a difficult task for researchers to arrive on international consensus on how to determine the boundaries of urban areas or determine when a settlement is 'urban'. Some researchers may prefer a simple, standardized definition, based on population size and density criteria, and some countries have adopted such definitions. Notwithstanding, such definition varies between regions and cities (Potts, 2012). As stated Cohen (2004), there exists no universal definition as different countries have adapted their own parameters of defining it.

In many countries of which Ghana is not an exception, settlements designated as urban are expected to run certain administrative responsibilities. Administrative responsibilities are rarely conferred on the basis of physical features alone (Montgomery & Balk 2011). Alternatively, some countries have multiple criteria, perhaps including density, size and administrative level, and sometimes consideration of urban employment.

In most countries with size criteria, the minimum population size ranges from 1,000 to 5,000. Countries with extreme size, however, include Sweden where a built-up area with at least 200 households, with gaps of no more than 200 metres between them, is defined as urban. In Ghana, with regards to demography, an area is termed as urban when the population number is 5000 and over. In Mali, the censuses up to 1987 used a cut-off of 5,000, the 1998 census used a cut-off of 30,000 and the 2009 census used a cut-off of 40,000 (Uchida & Nelson 2010). In Botswana, a population of 5,000 or more and with 75% of the economic activities being non-agricultural is termed as urban. For

some countries, the mere availability of streetlights, sanitation, pipe water, hospitals and schools is enough to entitle and name a locality an urban area (United Nations Human Settlements Programme, 2001).

**Concept of Sub-Urban Settlement**

The meaning of 'suburban' is disputed. Not exclusively is there a wide variety of suburbs, ranging for example from luxury upper-income residential annexes of cities; socially mixed suburbs in which commuters to the donor-city predominate; through to established suburban new town. With mainly lower-middle-class family households. There are also differences between suburbs that are created through their own histories. Some are still rather new and 'pure' residential settlements in which the vast majority of households share similar values and norms with regard to residential life and where the family is still the most typical form of household; in these suburbs, the dependence on the cities where people came from or where they have their work is extremely important.

Other suburban areas, however, are older and have developed towards a more varied stage, moving away from simply being an appendage of the city to being a 'city in their own right' (Omi & Winant, 2014). This reflects a process that is referred to as the 'urbanisation of the suburbs'. Hadden and Masotti (1974), who described that process, argued that suburbs should not be seen as just green ghettos dedicated to the elite, and not even as just a family place.

Suburban areas were built after World War II in the form of large residential districts on the fringes of or close to a larger city. Suburbanisation as a social-spatial process is not a recent trend. In the Netherlands, it has been common among the

higher social classes since the 17th century to have a second home outside the city (Lupi & Musterd 2006).

The attraction of living in a healthy and spacious environment in small, rural and peaceful environments as opposed to living in overcrowded and often unsanitary conditions in modern cities became a popular ideal in the 19th century. Through the Garden City movement this romantic ideal of living in the countryside was transferred to the lower middle and working class (Meacham, 1999). Suburbanisation became a mass movement from the 1950s in America and some 10 years later also in Europe.

From a sociological point of view, the move to the suburbs is described at least partly as the result of the social process of growing domesticity, influenced by a variety of modern developments: the increase in wealth and technology which allowed people to do more things at home, individualization and the growing importance of the nuclear family. As a result of these facts and because society became more and more complex, home developed a new meaning in the postwar period, from just a place to sleep, into a refuge, a place where people can relax, be with their family and have autonomy and control (Clapson, 1998; Morley, 2000).

The new ideas towards housing also brought about a demand for more living space in and around the house, which was provided in the new suburban estates. As a result because of increased mobility opportunities and affluence, suburban living became accessible to broad social categories. As a part of modernisation, the suburb presents an element of the social sphere that Castells called the 'spaces of flows' (Castells, 2011).

From a geographical point of view, residents moved out of the city as a sign of social mobility, searching for detached single-family housing with a

garden. People preferred the suburb for its absence of urban characteristics such as high-density building, small-stacked houses, heavy traffic, air pollution and litter, but also to escape from social attributes such as crime, poverty and ethnic minorities.

Suburbanisation was also primarily considered to be a positive development from a professional point of view. The first American suburbs, built by big private investment companies such as Levitt, were initially seen as social experiments, celebrating the best of the urban and rural way of life. However, they soon began to be perceived as a threatening social process and critics started to contrast negatively the new suburban areas with cities and villages (Jackson, 1985). The way the suburban debate developed from that time onwards resembles in our view what Wellman has called the 'community question'. From the different views on local social life and social ties in suburbs, we see the same 'Lost', 'Saved' and 'Transformed' argument emerging both in academic debate and public opinion (Wellman, 1979).

Tacoli (2004) observed that sub-urban zones are often far more environmentally unstable than either urban or rural settings. From ecosystem's point of view, physical, chemical and biological factors generally interact among themselves, and are interrelated with socio-economic forces. These factors have their own functions, which can be enhanced or reduced depending on the conditions of other factors in the same system (Fang, Gartner, Sum & Anderson 2005).

A place is sub-urban when there is evidence of changing land use, especially in the conversion of agricultural lands to urban use (Houston, 2005; Zasada, 2011). A sub-urban is a zone between rural and urban characterised by

both rural and urban activities. In many cases the sub-urban zone may contain a disorganised cluster of residential, commercial, rural-residential and varied agricultural uses (Irwin & Geoghegan, 2001). These features could also be seen with the Effia-Kwesimintsim sub metro (the study area of this piece of work).

Urban areas contrast village in terms of population size, social and economic development, social mobility, division of labour among other characteristics. Though human settlement has been in existence for the past 13000 years, urban planning is only a recent phenomenon Davis (1955). The concern of the world, particularly sociologist, to urban growth has heightened over the years, because of the effects that urbanisation has had and would continue to have on all aspects of human lives (Kamal-Chaoui, & Sanchez-Reaza, 2012; Kombe, 2005). According to Davis (1955), the main concerns include:

- Urbanism represents a revolutionary change in the whole pattern of social life, affecting almost every aspect of reflection.
- Cities tend to be centres of power and influence throughout the whole societies
- The process of urbanisation is still occurring; many of the problems associated with it are unsolved; and, consequently, its future direction and potentialities are still a matter of uncertainty.

**Effects of Urbanisation on Sub-Urban Areas**

Cities do not exist in vacuum. They are constantly interacting with their adjoining rural areas (Omi & Winant, 2014). The Rural-urban linkages have been extensively explored by researchers and diverse opinions have been

expressed about the nature of interaction that exists between urban and their peripheral villages. The arguments advanced by most researchers are along the lines of Modernisation and Dependency theories on the basis of the conception of cities as growth poles or conception of urban bias in rural development respectively (Satterthwaite & Tacoli, 2003).

These ideologies have prevailed in development thinking since the second half of the twentieth century. The emergence of the growth pole theory in the 1960s and 1970s saw the activation of cities as growth centres with the notion that growth will trickle-down to the adjoining areas (Gantsho, 2008). As a result Modernisation theory was equated with urbanisation due to the emergence of the growth pole theory. However, in the 1970s and 1980s, Populist revision of Modernisation theory and neo-Marxist theory reversed the view that cities are engines of growth and development. Furthermore, they noted that urbanisation in Africa was not necessarily associated with industrialisation, but was an extractive and parasitic process that undermined agriculture and rural development (Baker & Pedersen 1992 cited in Maxwell *et al.*, 2000, Satterthwaite & Tacoli, 2003).

Based on the dichotomous views about the nature of urban function in rural development, a concern has been raised about the need to clearly establish the linkages between rural and urban areas. According to Aberra and King (2005), the linkages between rural and urban areas can be beneficial as well as increasing inequality and vulnerability of those groups with least assets. Lee, (1991) is of the view that depending on the nature and intensity of the relationship between urban and rural areas, the livelihoods of the poor will be negatively or positively affected by a number of processes.

This means that rural-urban linkages are spatially and socially differentiated. Thus, there are marked differences in the effects of urbanisation among different people in different socio-economic groups across different geographical areas. The issue of the quality and quantity of asset base of household members play a critical role in an attempt to either mitigating the negative effects of urbanisation or developing the opportunities that urbanisation presents. Development practitioners argue that urban growth has brought both positive and negative impacts on the developmental, demographic, environmental and social situation in cities and their peripheral villages with differing effects (Edusah, 2008). The effects of urbanisation are discussed in subsequent sections.

Sub-urban areas in the developing world are experiencing the fastest growth of urbanisation (Alperovitz, Howard & Williamson, 2010) and this places a huge demand on urban infrastructure and development. More than half (54 percent) of the world population reside in urban centers, and this is expected to increase to 66 percent by 2050. Much of this urban growth is expected to occur in Africa and other developing countries. This will put a lot of pressure on the already deteriorating infrastructure in these areas and on the pace of its development.

In developing countries, high rate of urban growth poses much challenge to almost every aspect of human welfare. Issues relating to human settlements and housing infrastructure, sanitation, water and energy supply becomes much harder to manage. The development of sub-urbans, the outbreak of diseases and other disasters in many developing countries could be directly attributed to unchecked demographic growth and growth of cities. Unchecked urbanisation

could fiercely promote poverty and land degradation on sub-urban areas (Shem & Shepherd 2009).

That notwithstanding, well planned urban growth could have diverse positive impact on sub-urban settlements. Benefits that could accrue could be seen in high demand on agricultural produces, access to developed extension services, and opportunities to non-farm employment (Satterthwaite & Tacoli, 2003). Being characterised with residential and commercial activities and varied agricultural activities, sub-urban dwellers become exposed to a wide range of livelihood options including agriculture, formal salaried work, construction, trading among others (Narrain & Nishal, 2007). One main feature of urbanisation is the massive conversion of agricultural land to urban land use (Edmond, Kirkwood, Amenga-Etego, Owusu-Agyei, S., & Hurt, 2007).

Population of people in peripheral villages increases with the sprawl of cities as more people cluster in and around sub-urban areas to take advantage of the increasing commercial activities in nearby cities (Deep & Saklani, 2014). Traditional extended family systems also gradually give way to nuclear family systems as people no longer desire to live in family houses but their own. Moreover, Land owners in sub-urban areas, tend to change the use of their land from agriculture to other land uses, as the profitability of using their land for agriculture becomes relatively lower than for other uses; posing a threat to food insecurity in such areas. These processes tend to reduce the amount of arable land in sub-urban areas for agricultural purposes (Amoateng, Cobbinah & Owusu-Adade, 2013).

In a report from the International Institute for Environment and Development, it was observed that growing population pressure and

development of market economies as a cause and consequence of urbanisation in developing countries, are leading to significant changes in land tenure practices and related rights (Moomaw, & Shatter1996; Henderson, 2003).

Sub-urban areas in Ghana are normally beleaguered with development problems such as inadequate water supply. Lack of funds by the government to provide water facilities for the sub-urban communities is the main reason behind the inadequate water supply. The unavailability of public land for sitting of water facilities is also a main contributor to inadequate water supply in sub-urban communities (Akrofi & Whittal, 2011).

Access to energy, especially electricity has become one lingering problem in sub-urban communities in developing countries with issues of illegal connections and increased cost of accessing electricity (cost of electric meters, connection fees and increasing electricity bills). One reason could be associated with the high energy demand and high energy consumption in urban areas, forcing the cost of accessing energy up. The greater impact is felt by the urban poor. The rapid migration rates and population growth are imposing pressures on urban electricity supply. According to United Nations Human Settlements Programme (2003) data, urban areas consume nearly three-quarters of the world's commercial energy.

**Urbanisation and Demand for Energy**

High economic activity creates demand for electricity consumption. Increased Commercial and industrial activities are major parameters in sustaining economic growth. Demand for energy increases as commercial activities increase.

- *Housing and population growth*

Population growth relates directly with housing demands. Increased housing demands mean increased demand for energy. Household energy consumption correlates directly with the number of households and the level of lighting, heating and cooling comfort. One of the main drivers of household electricity demand growth among European countries has primarily been the increased use of electric appliances such as home electronics and kitchen gadgets.

- *Weather*

Higher variations in temperature mean higher electricity consumption. More electricity is needed to heat and cool buildings. As a result, weather plays an important role in electricity demand. Consumers' electricity bills can increase during a year that experiences extreme weather conditions.

- *Income growth*

The most important factor that affects electricity demand is household income. According to the U.S. Energy Information Administration (or EIA), between 1981 and 2001, household real disposable income increased by 49% from $17,217 to $25,698 (Psomopoulos & Themelis, 2009). As income increased, so did the demand for larger homes and new appliances. This increased the demand for electricity. In 2001, an average household with an income of less than $20,000 used -24,000 kWh of electricity compared to 42,000 kWh for households with an income of more than $50,000.

**How Urbanisation Affects Electricity Provision and Consumption**

Being closely related to industrialisation, urbanisation is almost always characterised with increased energy consumption. Jones, (1991observed three ways by which urbanisation increases energy consumption:

a) Energy conversion from one form to another; especially from bioenergy to fossil fuel because of the large scale demand;

b) Indirect energy consumption in goods production and transporting activities; and

c) Direct energy consumption by households. However, the degree of energy use would vary among developed countries and among developing countries; due to improvement in energy conserving technologies in certain countries and the effectiveness of energy conserving state laws and policies, for instance in the use of energy conserving appliances in different countries.

Holtedahl and Joutz (2004) argued that the direct relation between urbanisation and increased energy consumption is because of: easy accessibility of electricity by households and, the high possibility of rural dwellers increasing their energy consumption rate in urban areas because of increased use of their already existing appliances and the new ones they acquire.

Urbanisation affects energy demands through its influence on production, infrastructure, household activities and income levels, large scale production and increased economic activities. Urbanisation brings about Industrialization; and the opposite also holds, ceteris paribus. They both accompany each other during economic development. A major characteristic of

urban areas is increased economic activities such as the growth of small and medium scale enterprises.

Associated with large-scale movements of the people from the countryside into urban areas, urbanisation puts more pressure on the local environment owing to the increased human activities in the area. Pacione (2009) for instance estimates that cities account for 75 percent of the world's consumption of natural resources, yet these cities cover a minimal percentage of the world's surface.

In meeting the economic and social demand of the growing population, large scale production becomes preponderant in cities. With economies of scale in focus, production shifts from less energy intensive agriculture to more energy intensive manufacturing to meet the demand for food and other materials by the increasing population (Sadorsky, 2013). Sodri and Garniwa (2016) found that urbanisation has a positive influence on urban transport and road energy use. In that study, the elasticity of urbanisation to road energy use was estimated to be 0.45.

- *Growth in infrastructure*

In developing countries, infrastructure stands as a pacesetter in economic growth. Growing economic activities tend to be almost always accompanied with the construction of modern buildings which operate on increasing energy consuming facilities such as lifts/elevators, air conditioners and much other sophisticated high energy consuming equipment, in both the public and private sectors of an economy.

- *Household activities and income levels*

In process of urbanisation and increased economic activities, household incomes are sure to increase. In Ghana, the use of traditional means of energy supply such as wood and biomass are only preponderant among the low income group; especially in the rural areas. Modern means of energy supply are in greater demand in the urban sectors, especially among the high income group. This could be associated with increased demand for better housing infrastructure with more electronic fixtures and fittings in the urban areas. Thus, energy usage increases with the increased demand for lighting and electronic home appliances such as refrigerators, washing machines among others.

**Remote Sensing (RS) and Geographic Information System (GIS) For Land Use /Land Cover Maps to Determine Urban Growth**

Land use/ land cover maps are essential tools in natural resource planning and environment management (Bunruamkaew & Murayama, 2012). Human activities have led to fast and large changes in land cover, which in turn have a negative impact on the environment as a whole. As a result, land cover is one of the most important elements for the assessment of the environment. Herold and Clarke (2002) argued that land cover is the basic geographic feature serving as a reference base for other environmental applications.

RS and GIS provide a cost-effective way to assess ecological characteristics and to periodically update baseline data regarding resource distribution and abundance. However, Ridd (1995) indicates that a large number of application shows that remote sensing techniques have a variable degree of success corresponding to the difficulty of interpretation of certain ecosystem features. It is believed by many scientists that terrestrial vegetation has the most

unique spectral reflectance characteristics and its mapping has been among the most persistent and well developed remote sensing applications (Valentine, Knecht & MIller, 1998). Geographical Information Systems (GIS) has been shown to be a powerful and flexible tool for environmental resources inventory particularly when conventional photogrammetric techniques cannot be applied.

The GIS technologies have the potential to playing an important role in all stages of monitoring programmes (Ridd (1995). The GIS multi-criteria functions have been used to weigh and combine various environmental parameters and scientific concerns directing the selection of monitoring sites. GIS data management capabilities are largely used to store, query and visualize monitoring data.

**Utilities (Water and Electricity) and their importance**

Utility is a term used by economists to describe the measure of "useful-ness" that a consumer obtains from any goods or services. Utility is the satisfying power of any commodity or capacity of a commodity to give satisfaction usually over a specific time frame and intensity (Nique & Opala, 2014). The term when given a specified meaning, refers to the set of essential (water and electricity) services provided by various organizations that play a vital role in economic and social development to be consumed by the public. A few examples of public utilities include an electric utility, roads and toll ways, public transportation, telecommunication, heat generation and distribution, natural gas distribution, waste disposal, water purification and distribution, and sewage treatment and disposal. Governments are ultimately responsible for ensuring reliable universal access of utility services under accountable and regulatory frameworks.

Utilities depending on the socio-economic situation of a country may vary in terms of need, supply and importance. The world over, certain public utilities are a necessity as others are viewed as an added luxury. Water, electricity, telecommunications, gas, sewage in this preferred order is mostly the required need and importance of utility to man. In developing nations, the supply and demand for utility is limited to three basic types with importance attached in a preferable order namely water, electricity and telecommunications. It can be seen that they are interconnected such that one cannot be supplied and demanded without the other.

*Water*

Water as a basic human need can never be underestimated. This need and its demand is underscored in its abundance in nature as a raw commodity. Water is actually the second most common molecule in the universe behind hydrogen. Water in various forms and states make up 70% of the total surface of the earth. Life simply cannot exist without water (World Health Organisation, 2004).

*Water in Agriculture*

- Irrigation: It is estimated that 70% of worldwide water is used for irrigation, with 15-35% of irrigation withdrawals being unsustainable. It takes around 2,000 - 3,000 litres of water to produce enough food to satisfy one person's daily dietary need. This is a considerable amount, when compared to that required for drinking, which is between two and five litres. To produce food for the now over 7 billion people who inhabit the planet today requires the water that would fill a canal ten meters deep, 100 meters wide and 2100 kilometers long.

- Cultural practices: Aside irrigation, water is primarily used in agriculture to plant seeds, harvest crops, wash and maintain machinery and all other processes concerned with agriculture.

*Water in Industry*

- It is estimated that 22% of worldwide water is used in industry. Major industrial users include hydroelectric dams, thermoelectric power plants, which use water for cooling, ore and oil refineries, which use water in chemical processes, and manufacturing plants, which use water as a solvent.
- Water is used in renewable power generation. Hydroelectric power derives energy from the force of water flowing downhill, driving a turbine connected to a generator. This hydroelectricity is a low-cost, non-polluting, renewable energy source. Significantly, hydroelectric power can also be used for load following unlike most renewable energy sources which are intermittent. Ultimately, the energy in a hydroelectric power plant is supplied by the sun. Heat from the sun evaporates water, which condenses as rain in higher altitudes and flows downhill. Pumped-storage hydroelectric plants also exist, which use grid electricity to pump water uphill when demand is low, and use the stored water to produce electricity when demand is high.
- Hydroelectric power plants generally require the creation of a large artificial lake. Evaporation from this lake is higher than evaporation from a river due to the larger surface area exposed to the elements, resulting in much higher water consumption. The process of driving water through the turbine and tunnels or pipes also briefly removes this

water from the natural environment, creating water withdrawal. The impact of this withdrawal on wildlife varies greatly depending on the design of the power plant.

- Pressurized water is used in water blasting and water jet cutters. Also, very high pressure water guns are used for precise cutting. It works very well, it is relatively safe, and it is not harmful to the environment. It is also used in the cooling of machinery to prevent overheating, or to prevent saw blades from overheating. This is generally a very small source of water consumption relative to other uses.
- Water is also used in many large scale industrial processes, such as thermoelectric power production, oil refining, and fertilizer production and other chemical plant use, and natural gas extraction from shale rock. Industry requires pure water for many applications and utilises a variety of purification techniques both in water supply and discharge. Most of this pure water is generated on site, either from natural freshwater or from municipal grey water. Industrial consumption of water is generally much lower than withdrawal, due to laws requiring industrial grey water to be treated and returned to the environment. Thermoelectric power plants using cooling towers have high consumption, nearly equal to their withdrawal, as most of the withdrawn water is evaporated as part of the cooling process. The withdrawal, however, is lower than in once-through cooling systems.

*Water in Domestic Use*

It is estimated that 8% of worldwide water use is for domestic purposes. These include drinking water, bathing, cooking, toilet flushing, cleaning, laundry and gardening. Basic domestic water requirements have been estimated at around 50 litres per person per day, excluding water for gardens. Drinking water is water that is of sufficiently high quality so that it can be consumed or used without risk of immediate or long term harm. Such water is commonly called potable water. In most developed countries, the water supplied to domestic, commerce and industry is all of drinking water standard even though only a very small proportion is actually consumed or used in food preparation

*Electricity*

Electricity is perhaps the most highly demanded energy in world today. Renewable resources the sun, wind, water, and biomass were the first to be tapped to provide heat, light, and usable power. However, with the high cost of harnessing these natural resources to produce electricity, coupled with the high demand for energy during the industrial revolution (beginning from the 20th century), attention has swung away from the use of renewable sources to fossil fuel, with its own negativity - increased emission of $CO_2$ in the atmosphere and its impact on nature.

Nuclear power has recently been utilised to generate power for consumption. Increasing attention on the possible effects of carbon dioxide emission on the environment has led to the recent development of more sophisticated technologies to better utilise the natural renewable resources in producing electricity at a lower cost per desired kilowatt, and per kilowatt hour

(kWh). However, the total energy supply in the world today is still deficient of demand.

Electricity is arguably the most important innovation of man. The greatest scientific achievement of the nineteenth century is the discovery of electricity (MacKenzie & Wajcman, 1999; Latour, 2005). The twenty-first century is making use of electricity so extensively that it has almost changed the face of the earth. Electricity carrier of light and power, devourer of time and space, bearer of human speech over land and sea, has become the greatest servant of man. It has become an integral part of modern life and the most important man-made utility or commodity. One cannot think of a world without it.

Look at life today in a modern city. Electricity regulates the fans and air conditioners that helps us stay in bed; boils the water that makes our tea, cooks our food on heat-proof cookers; powers the radio and TV that tell us the news; rings the bell that announces a visitor; carries our telegraphic message to distant places; takes us to our rooms and offices somewhere in some multi-storied building on elevators; electricity lifts; refrigerates the food to keep it completely fresh; lights our rooms when the sun goes down; warms it in winter and cools it in summer; in short, does everything for our comfort and convenience with the utmost efficiency at all hours.

Its use in everyday life is very comprehensive and mostly underestimated. Essential provisions like food production, clothing, papermaking, gas production and telecommunications are all by-products of electricity.

- Engineering: All engineering and technical activities depend on electricity. Building certain materials and welding all depend on

electricity. An engineering establishment needs electricity at every moment for any and every type of work to be done.

- Communication and transport: Today, modern man is enjoying all the facilities of transport and communication and these are possible only through electricity. This is because from the planning stage through to the production and consumer stage all involve different levels of electricity consumption and applications.
- Healthcare: Modern treatment of many diseases is surgical. Hundreds of patients are undergoing surgical operations and these operations are impossible without electricity. The operation theatre will not be opened if there is not electricity. Doctors need a powerful light which hands over the body of the patient upon the operation table. When the patient is being etherized on the table and the electricity fails, it becomes fatal for the patient and there is little hope of his or her survival. Every machinery and equipment found in any health facility worldwide namely X-rays, CT scans, and MRIs etc. are all powered by electricity. Without it, healthcare delivery would be tedious and nearly impossible.
- Entertainment: Today, all our programmes of entertainment depend on electricity. Television, cinema, radio, tape-recorder, V.C.P, computers, mobile phones and V.C.R are the modern devices of entertainment and they cannot run without electricity. Just imagine what happens in a cinema hall when electricity fails in the middle of the show.
- Construction: Modern house-building also needs electricity, especially for getting grills for the windows, gates and other materials of iron and

steel. We also need electricity for polishing mosaic floors and cutting marble pieces.

Electricity is precious and should never be wasted. At the same time, there is need to exercise caution while using electricity. A slight touch of an open electric wire takes away human life within no time. Therefore, we should be careful about that. A broken switch, a damaged plug, a damaged wire should immediately be repaired or replaced. People should use electricity only when they need it. It should never be taken for granted (MacKenzie *et al*, 1999).

**Accessibility to Utilities**

The situation of rapid urbanisation in the world is no different in Ghana. The country has witnessed an increase in its population from 18.9 million to about 24 million between 2000 and 2010 having a growth rate of 2.7percent (GSS, 2012). This increase in population is associated with many side effects and pressure on existing amenities in homes and the supply of water is one such effect. Poor environmental conditions such as inadequate sanitation and inadequate access to clean water which make up the social utility needs of a community among others have remained as a leading challenge facing developing countries more specifically urban areas (Buttenheim, 2008). Reports show that access to safe drinking water is improving in Ghana. Notwithstanding progress, GWCL currently only meets the demands of about 60 percent of urban and sub-urban residents. Some areas are reported to receive water supplies once a week or not at all, while other areas may be serviced as often as seven days a week (Morinville, 2012).

In Ghana, over the years there has been an absence of a clearly defined national housing policy and lack of control and Regulatory Policy framework

for rents and availability of social utilities (Akuffo, 2006; Benjamin, 2007). This has contributed greatly to Ghana's housing deficit and in varying housing-related problems including sub-standard housing conditions (poor toilet facilities, access to drinking water, to mention a few), overcrowding of households, inadequate and unreliable infrastructure and services leading most inhabitants finding it difficult to access these utilities. The rapid growth of urban areas also means that the housing market has not been able to keep up with demands, despite explicit government policies seeking to increase housing for the poor (Grant and Yankson, 2003; Gough & Yankson, 2011). As a result, rent charges are particularly high and cumbersome, and there are few incentives for landlords to improve and maintain their properties. Studies reports that approximately 60% of residents live in "overcrowded, deteriorated and low-income rentals accommodations" lacking proper amenities (good drinking water, toilet facilities, electricity and among others) (Arku, Luginaah & Mkandawire, 2012).

The United Nations Human Settlements Programme (2003) estimates that by 2030, one in every three people who live in an urban area will be characterised by poor public health, inadequate public services, and widespread violence and insecurity. This situation result from the increasing demand on social services outstripping the ability of governments to meet the needs of the urban populace (Bazoglu, 2012) and as such landlords in these settlement have to provide certain social amenities to inhabitants of their homes. People living in urban areas are highly challenged with access to some basic necessities, materials, facilities and infrastructure including access to natural resources, safe drinking water, energy for cooking, heating and lighting, sanitation and washing

facilities, food security, refuse disposal and site drainage (Gulyani, Bassett & Talukdar, 2014). Moreover, the lack of private connections to water and sanitation is closely associated with poverty and the proportion of the population residing in areas as a result of urban growth.

Access to basic social-amenities such as water, electricity, school, proper sanitation facilities, hospitals and others are required to support individuals living in a particular area. In the absence of adequate supply of these services, individuals resort to both legal and illegal methods in obtaining access to the required services (Jimenez-Redal, Parker & Jeffrey, 2014) as such there is the need to provide these amenities by landlords to inhabitants.

**Institutional Arrangements for Managing Utility Services**

An institution is an organisation composed of groups of people with a common objective, on the organisation's, policies and laws to enhance effective execution of duties, and to establish mandates (Wester, Merrey, & De Lange, 2003). An organisation is a formalised official unit such as Government Ministries with operational objectives, its own budget and professional staff. In many institutional arrangements, informal rules have the tendency to override formal rules, making the enforcement of formal rules very difficult (Bandaragoda & Firdousi, 1992). The above definitions cover three important elements in the concept of institutions. These are policies, laws and organisations as reported by Dinar and Saleth (1999). Hence, for the purpose of this section, institutional arrangements for managing utility services will be observed in line with the roles, collaboration, resources and challenges institutions face in the provision of utility services to it consumers.

For institutions to provide proper services for their consumers, there is the need for government to provide them with the needed resources to execute their work. Networks among organisations are organisational linkages whereas networks among institutions are institutional linkages (Cernea, 1987). Organisational linkages, be it vertical or horizontal, are very necessary to enhance effective service delivery (Hayward, 2006). Where there is a consultation-supervision relationship, a vertical linkage is established, whereas cooperation between agencies indicates horizontal or lateral linkages (Cernea, 1987). Horizontal coordination is difficult when organisations are in hierarchies, but it is necessary to integrate ideas from the bottom to the top and vice versa (Datta, R., Joshi, Li & Wang, 2008). The implication of the findings of Datta, R., Joshi, Li & Wang (2008) is that organisations with equal mandate to work should cooperate with another without superimposing authority.

Again, vertical coordination among organisations involves a two-way process of transferring expert experience from the top and submission of ideas from the bottom to higher authorities. Sahrawat, Pathak and Rego (2008) suggests that linkages among policies and societal laws should be defined properly in any legal framework for natural resource management in order to increase mandate and also avoid conflicting views. Thus, watershed management objectives are achievable only when there are policies and laws that allow and encourage agencies at all levels to work together effectively (Ward & Pulido-Velazquez, 2008).

There is the need for all institutions to take critical look at the linkage that exist for proper collaboration in the provision of their services to the public. As urban growth takes place, it is necessary for public utility institutions to put

in adequate measures to meet the growing demands of a growing urban center. Lack of proper collaboration among the institutions will force people to overlook lay down procedures in accessing utility services in their homes.

## Theoretical perspectives on urban land use and growth

This section discusses various theoretical frameworks on urban land use and growth closely related to the topic under study. Among the theories discussed are the Concentric Zone Model by University of North Carolina (2002) and the Multiple Nuclei Theory by Harris, Ullman and Pulido-Velazquez (2016).

### *Concentric Zone model*

The Concentric Zone Model is usually, among other theories, regarded as being among the most basic portrayal of urban land form and its development process (Ruth 2010 & Maxwell 2011). The model was fashioned by Ernest Burgess in the 1920s. The theory describes land uses in the urban area as a set of concentric rings with each ring keen to a special use (See Figure 1). It explains processes of land development resulting in urban growth by a strategic series of concentric circles which is perceived to expand rampantly from the core/centre of the city which also popularly known as the Central Business District (CBD). The centre or core city is characterised by most economic activities mainly because it is the focus of an intra-city facilities and the provision of basic social utilities (Harris & Ullman, cited in Ruth 2010). The model contends that major utility and other socioeconomic services originate from the city's core (CBD). Hence, making the CBD the most developed and accessible location in the setup of the urban community city (Ruth, 2010).

An integral aspect of this model exists in the positive correlation between the physical development of urban lands and distance from the core city. Therefore, most comfortable households with were observed to live at some greater distances from the central city but lacked most socioeconomic utilities or amenities. Burgess considers the evolving spatial patterns of residential areas in the urban community as a process of "invasion" and "succession". As such, the growth or development of the CBD would exert some amount of pressure on the immediate zone surrounding it. Such zone is called the zone of transition. Expansion of the CBD would invade nearby residential neighbourhoods causing them to expand outward. A significant feature of this model is that as the city grew and the CBD expanded outward, the lower status residents gradually moved to adjacent neighbourhoods, and the more well-off residents eventually moved further away from the CBD.

From the foregoing assumption of the concentric zone model, it is relevant for urban growth taking into consideration the land use planning and utility services provision in urban centres mostly in developing countries like Ghana. The accessibility merit of the model makes the demand for land in core areas great and consequently making the supply of land in this area restricted which leads to high land values and quest for utilities as shown in Figure 1

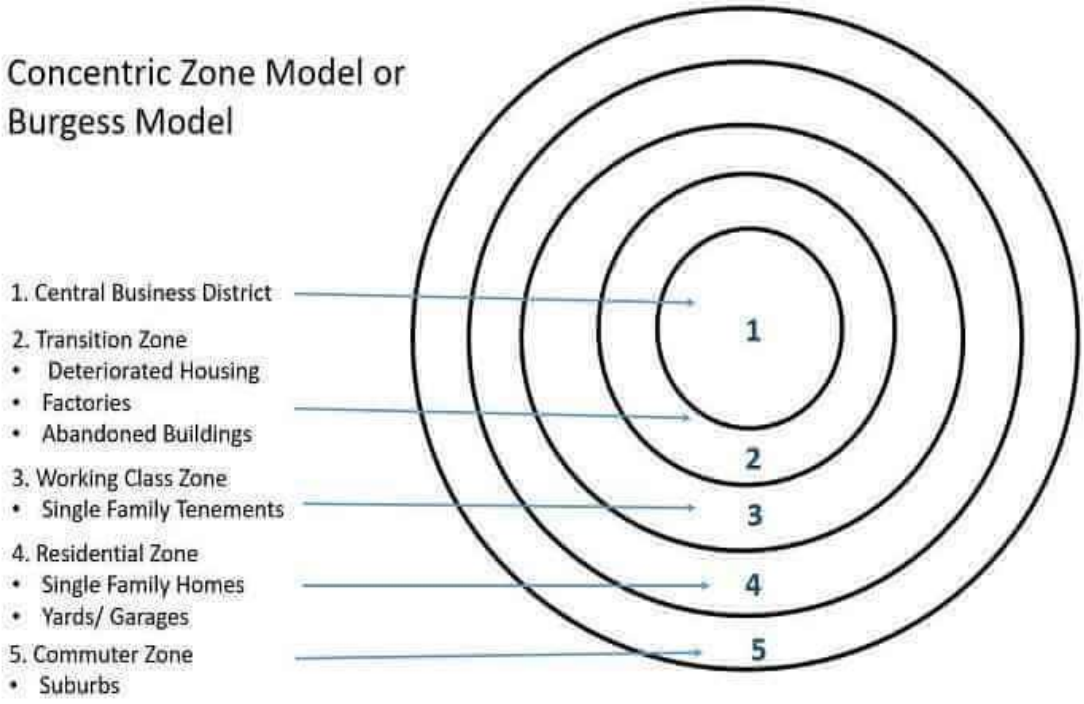


***Figure 1:*** **Concentric Zone Model.**

Source: The University of North Carolina, (2002).

Critics argue that where variations occur in such factors as topography of the physical landscape, the ideal symmetry would be disturbed. Again, residential areas could further be sub-divided on the grounds of race which could affect the model. For most critics, the model fails to judgmentally take a closer look at the growth of corresponding clusters and the possibilities which give rise to prime points other than the well-known Central Business District (CBD). Finally, the theory is highly criticised for asserting that higher income earners are usually located further away from the centre. From a socioeconomic point of view, the theory relates the accessibility of land by preferences for space. Notwithstanding the criticisms leveled against the theory, it is reliable in urban planning and of importance in explaining how land use in an urban area is structured, accessed and developed over time (Asamoah, 2010).

**Multiple Nuclei Theory**

This urban theory is considered closer to reality. The model views a city or urban centre as mostly developing with the assumption that the growth of cities occurs around several places of distinctive nuclei. These nuclei in this model are assumed to include a market, a rural community nearby, a factory, mines or an urban railway terminal. Hence, through agglomeration, most nuclei would combine to form an urban area mainly characterised by residential settlements. These urban communities are easily assessable through the use of intra-city transportation and the existence of varied forms of public utilities. The core part of the model is the called the Central Business District (CBD) with features like manufacturing, major housing developments and wholesaling activities basically located along major transportation routes (Ruth, 2010). The following assumptions were made by Harris, Ullman and Pulido-Velazquez (2016):

- Land is not flat and that it is difficult to find a flat land for big cities and the terrain features for the development and direction of growth of urban area.
- Resources are evenly dispersed within the city; no one enjoys rights or has elite access to these resources.
- There is homogeneous distributed of people and they are not concentrated in a particular geographic location. This is important as unevenly distributed population has direct impact on markets.
- Transportation cost is even in the city and not affected by geographic location of people.

- A particular activity is found at a location where maximum profit can be earned taking into consideration the rent, transportation costs, labor cost and proximity to market to help give the final location for activities.

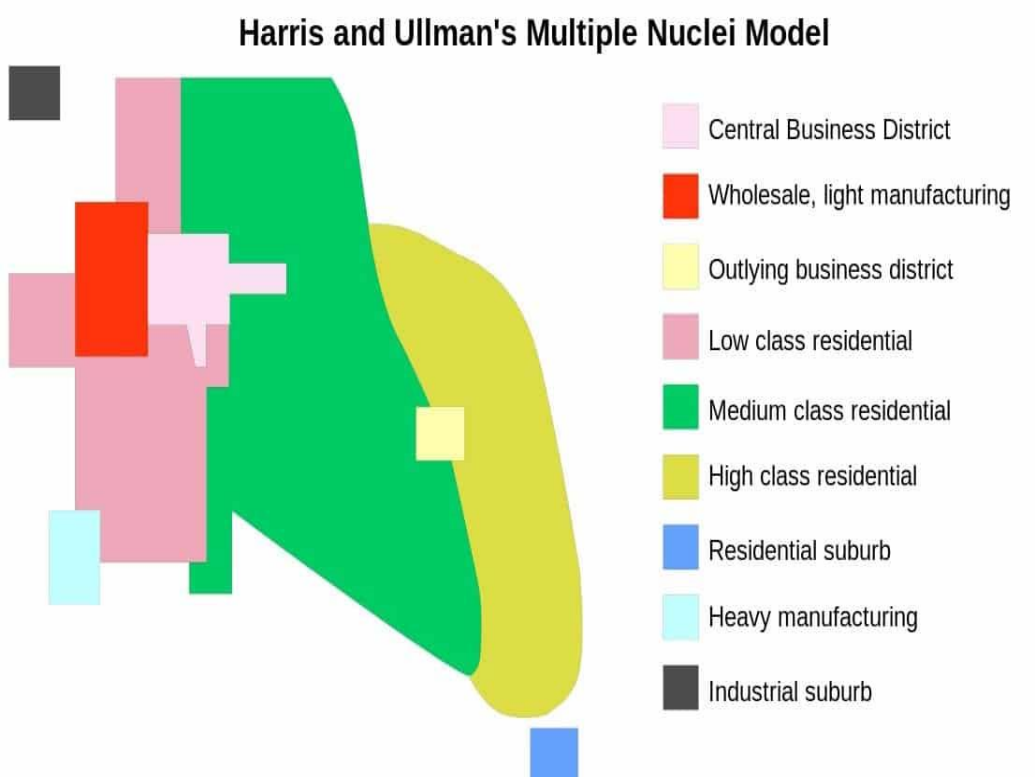


***Figure 2:*** **Multiple Nuclei Model**

Source: The University of North Carolina, (2002).

According to the model, the assumed Smaller Business Districts (SBD) usually act as satellite nodes. Thus, development accrues round these nuclei through land use patterns or forms, making the CBD the center of business. For the model, specialized cells with unique activities would grow with time to a high level area of commerce and cluster together as depicted in figure 2.

*Critics of Multiple Nuclei Theory*

The model neglected the heights of buildings. The heights of buildings play a vital role in the development of cities and this because, for cities to accommodate the growing population, vertical development of buildings must

be encourage rather than horizontal development (spreading out of buildings) since land is limited in supply.

The model did not cater for the unexpected divisions between the zones which may emerge as a result of the display of significant degree of internal heterogeneous characteristics of zones and not homogeneous as assumed by Harris, Ullman and Pulido-Velazquez (2016). There was also no consideration of likely influence from physical relief and government policy in the growth of cities in the model. The concepts may not be totally applicable to oriental cities with different cultural, economic and political backgrounds.

**Access model**

According to Penchansky and Thomas (1981), access is defined as a degree of fit between client and system. It involves the ability (thus monetary cost) and capability (thus distance, time, convenience and energy) of an individual to reach facilities that enhances one's wellbeing. Abane (2005) stated that accessibility involves the facility being located within a safe physical reach with it being affordable and accessible in law. Access also involves the timely use of services according to need.

The concept of access has to be looked at as a set of dimensions that fit into both the consumer and producer system (Dillip *et al*, 2012). According to Clark and Coffee (2011), access may also be considered as the ease of approach to needed facility or services from one location to another. It is measured using the various components of access. Penchansky and Thomas (1981) identified five main components of access. These are availability, accessibility, accommodation, affordability and acceptability.

Access to facilities and services is fundamental for policy formulation and reformation since it has been realized that people deserve similar levels of quality and quantity of resources. It forms a vital issue where the sustainable livelihood of a community is involved because it aids the access to community assets including public facilities such as healthcare centers and water facilities (Obrist, Iteba, Lengeler, Makemba, Mshana, Nathan & Schulze, 2007). Consequently, any constraints to access to facilities will have major effect on the level of its accessibility. Penchansky model on access posits that access can be viewed in five basic concepts such as availability, accessibility, accommodation, affordability and acceptability, but they are not mutually exclusive. Each concept is elaborated subsequently.

**Availability**

It refers to the adequacy of the supply of technicians, engineers and other providers; of facilities such as maintenance and repairs; and of specialised programs and services such as water and sanitation day. This depicts the relationship of the volume and type of existing services (and resources) to the households' volume and types of needs.

**Accessibility**

This shows relationship between the location of supply and the location of households, taking account of households' transportation resources and travel time, distance and cost.

**Affordability**

This shows the relationship of prices of services and deposit requirements to the households ' income, and ability to pay. That is how much a consumer is willing to pay for a service. The clients' perception of worth relative to total cost is a concern here, since it reflects their knowledge of prices, total cost and possible credit arrangements

**Conceptual Framework**

This aspect of the study presents a frame work on urban growth in the development of urban growth and access to utility services in sub-urban. The framework provides relationship and effects of urban growth on sub-urban developments on the availability and accessibility of utility services in Ghanaian urban communities. This is in accordance with United Nations Environmental Programme (UNEP) version on the development of human settlements and also central in the agenda of the Sustainable Development Goals (SDGs) from now till 2030.

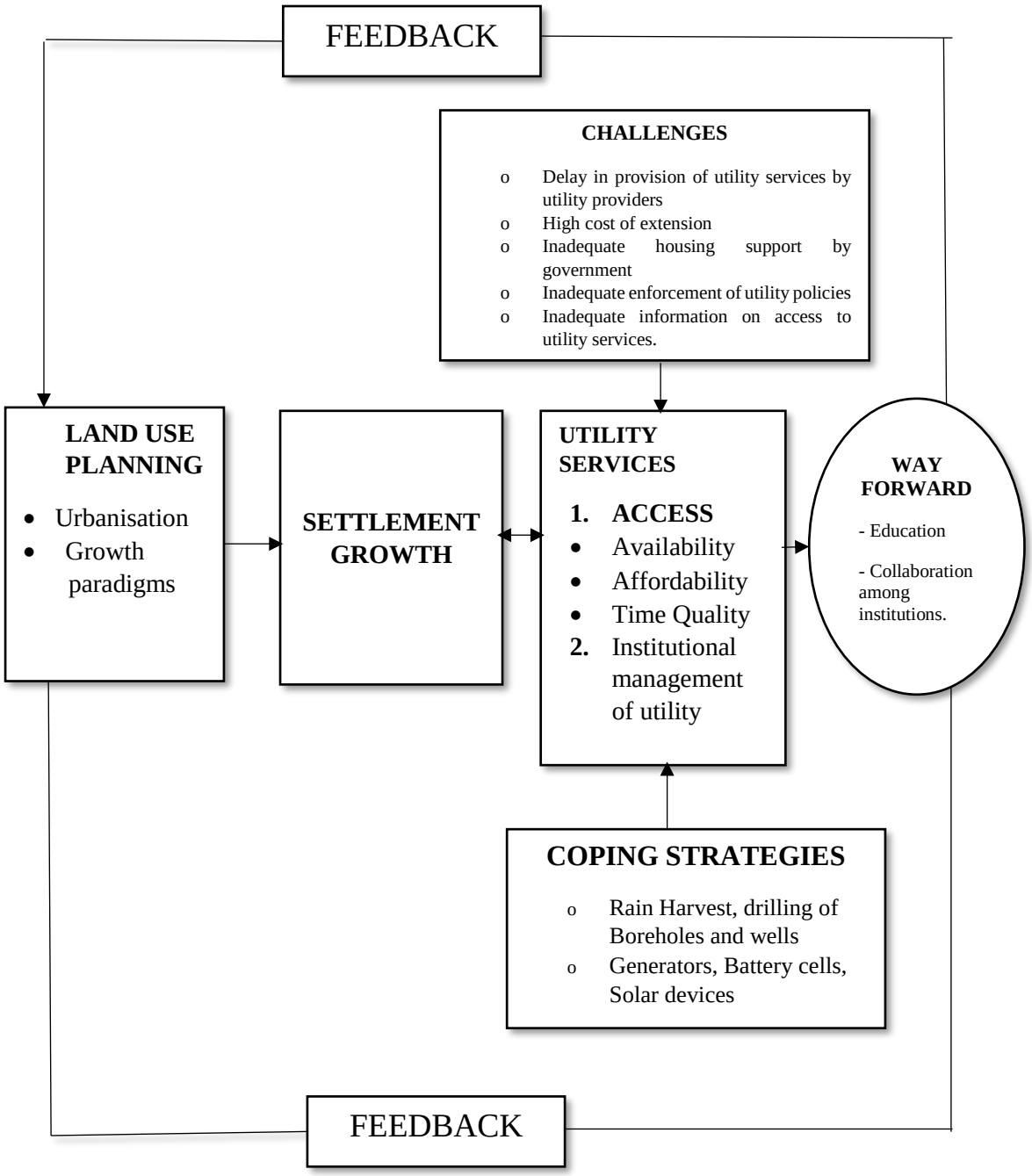


***Figure 3:*** **Urban Growth and Access to Utility Services in Sub-Urban Centers**

Source: Adapted from Department for International Development (1999).

From the Figure 3, human settlements growth result from mainly theories and land use planning activities which are centrally been influenced by urbanisation and the various theories of settlement growth over the years. For example, the Concentric Zone Model explains the processes of land development resulting in urban growth and gives reasons for the emergence of

settlements in urban centres. Also the Multiple Nuclei views urban centre as developing with the assumption that the growth of cities occurs around several places of distinctive nuclei. This theory has help in showing how cities grow taking into consideration all the nuclei of growth. As such, physical growth of most settlements occurs as a result of changes in the use of land that occurs at various spatial levels and with varied time periods (Briassoulis, 2000). Hence, spatial growth of settlements in and around urban cities involves the use of land and its resources as a central aspect of development. Therefore, Briassoulis (2000) asserts the efficient use of land to develop settlements which usually experience influence from urbanisation and pressure from housing, infrastructure and utility delivery against a finite land resource. Consequently, as settlement growth result from land use plans, it leads to the requirement of further utility services to supplement the housing utility deficits occurring in sub-urban communities (Figure 3).

*In accessing utility services,*

The Access Model provides parametres to be considered for measuring accessibility of utilities services. Though these parametres such as availability, affordability and quality of service are met, utility services provision meet lots of challenges. These challenges include lack of sales points (vendor points), non-adherence to existing sustainable land use plans and lack of public awareness in the aspect of seeking for appropriate means of obtaining quality utility services. As a matter of fact residents of these sub-urban communities resorted to several coping strategies well known to them and devised personally or learnt from other areas. Some of the coping strategies is limited to the use of other alternative supply of utility services.

To achieve sustainable development through the availability and accessibility of social utilities in sub-urban areas of the Effia-Kwesimentsim sub-metro, institutions have adopted strategies of ensuring development of sub-urban through various means. They include, collaboration between institutions, following of proper utility plans, government assistance provision and the proper implementation of vertical growth than horizontal growth of settlements in our communities. Hence, according to the framework, the measures taken as the way forward goes on to provide feedback to urban land use planners to become abreast with the current issues and trends in the provision of utility services in sub-urban centres and try to incorporate them in their planning processes.

When this cycle is completed with the necessary feedbacks given by resident and utility providers, it would ensure sustainable LUP in the provision of utility services to sub-urban settlement to make access to major utility services easy. Feedbacks can be in the form of upgrade and modifications in the provision of services. This could help utility providers to always update existing frameworks and blue print for urban growth and utility provision in sub-urban centres.

**Summary**

This chapter reviewed issues which are of interest to the topic under study. Some of the issues reviewed included urban growth, definition of urbanisation, sub-urban settlement, effect of urbanisation, urbanisation and demand for energy, utilities and their importance. Furthermore, the chapter discussed theories that informed the construction of the conceptual framework.

In addition, it discusses the conceptual framework for the study into details. As such, the next chapter discusses the method of the study employed.

# CHAPTER THREE

# RESEARCH METHODOLOGY

## Introduction

This chapter presents the procedures and techniques that were followed to collect and analyse data. It contains a description of the study area, research design, target population, sample and sampling procedures, source of data, research instruments, issues of reliability and validity, data collection procedures, ethical considerations and data analysis.

## Profile of the Study Area

The Effia-Kwesimintsim sub metro is one of the four sub metros found in the Sekondi-Takoradi Metropolitan Assembly. It was inaugurated March 16, 2018 (Gyamfi, 2008). It includes towns such as Anaji, East Tanokrom, Efia, Ntankoful, West Tanokrom, Apremado, Assakae, Whindo, Mpatado, Adientem, Kasawurado, Mampong, Ahanta Abasa, Akromakrom, Effiakuma and Kwesimintsim. It can be located at the south western part of the Sekondi-Takoradi Metropolitan Assembly (STMA). The STMA was originally known as the Takoradi Town Council during the colonial era. As the population and geographical area expanded, there was need to include other villages such as Nkotompo, Effia Nkwanta, Nkroful, Tanokrom and Ketan to the region. The further expansion of the administrative jurisdiction caused the name to change to Shama Ahanta East Metropolitan Area, which later changed to Sekondi-Takoradi Metropolitan. (Sekondi-Takoradi Metropolitan Assembly, 2010).

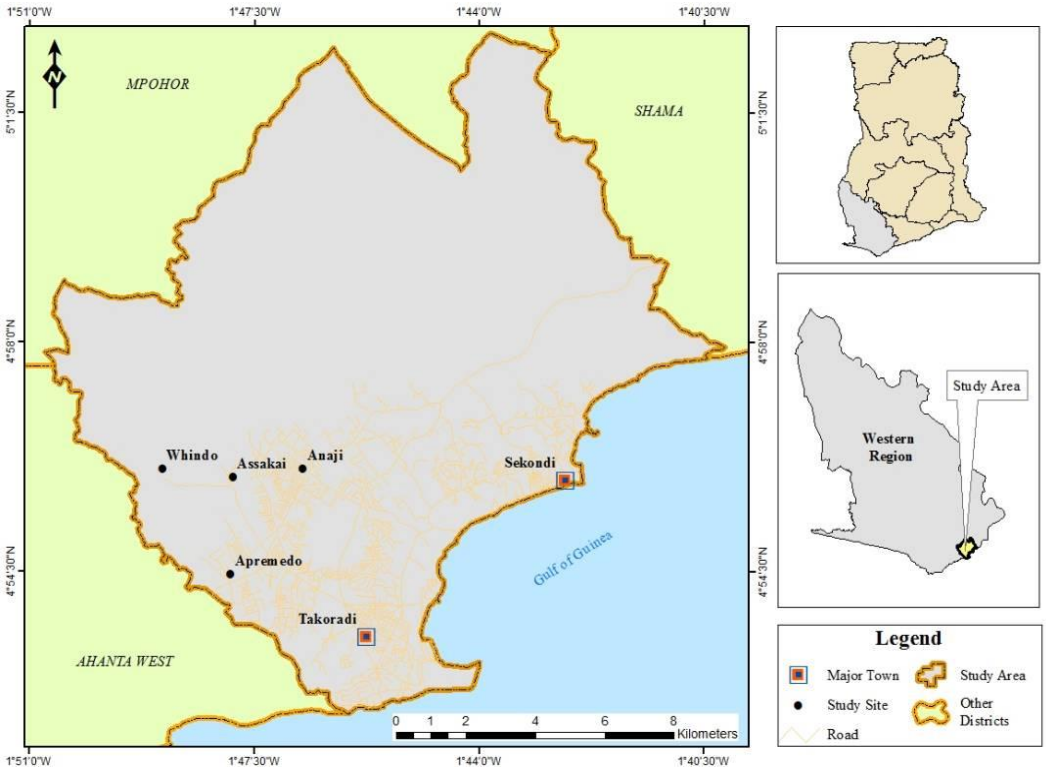


***Figure 4:*** **Map of Sekonid-Takoradi Metropolitan showing the study areas in the metropolitan in regional and national context.**

Source: Geography and Regional Planning Department, UCC (2016).

*Physical characteristics*

The sub-metro is located at the south-Western part of the STMA. It is bordered to the west by Ahanta West District and to the east by Essikado-Ketan sub metro. It has an equatorial type of climate. Vegetation is mainly woodland in the northern and central parts, while thickets are intermingled with tall grass species along the coast, especially in areas where there are no permanent crops. It is also of varied landscapes; the coast line has capes and bays, which have been largely eroded. The central portion of the sub metro is low lying with an altitude of about 6 metres below sea level. Otherwise, the area is undulating with ridges and hills. (Sekondi-Takoradi Metropolitan Assembly, 2010). The

surface of the Effia-Kwesimintsim sub metro is fairly watered, with the drainage pattern being largely trellis in nature with minor dendrite forms. The two main rivers flowing through the Metropolis are the Whin and the Kansawora rivers, while the lagoons are the Essei and the Butre. (Ministry of Food and Agriculture, website: www.mofa. gov.gh).

*Demographic characteristics of Effia-Kwesiminstim Sub-Metropolitan*

According to the 2010 Population and Housing Census, the population of Effia-Kwesimintsim is 232,617 representing 41.6% percent of STMA's total population. Males constitute 48.9 percent and females represent 51.1 percent. Majority of the population in the Sub-metro is concentrated in the young age group 0-24 years (55.2%) with an age-dependency ratio of 58.2 (Ghana Statistical Service, 2012). Fante is widely spoken in the Sub-Metro but the indigenous people are predominately (Ahantas,). The indigenous people exhibit a high degree of cultural homogeneity in areas of lineage organization, inheritance and succession. Matrilineal inheritance system is what they conformed to as found among Akans. The distribution of proportion of ethnic group in the Effia-Kwesimintsim Sub-Metro is as follows Fantes 46.5 percent, Ahantas 12.2 percent, Asantes 12.2 percent, Nzemas 3.8 percent and Wassas 3.0 percent. The proportion of the rest of ethnic groups is below 3 percent.

*Economy*

The economic potential of the Sub-metro lies in the existing infrastructure and human capacity. The economy of the Effia-Kwesimintsim is driven by service and administration with pockets of industrial activities. Aside the regional and Metropolis branches of the public and civil services, private

multinational companies such as Tullow, Vodafone, Ghana National Petroleum Corporation (GNPC) etc. contribute significantly to the economy of the Metropolis (Sekondi-Takoradi Metropolitan Assembly, 2010).

The economic activities in the Sub-metro include manufacturing, Metal Fabrication, Agro/Forest products processing. Examples include West Africa Mills, Cocoa processing companies and Dupaul Wood Treatment Plant to mention among others as well as small scale businesses like sachet water producers to mention a few. Fishing is another key economic activity which is actively undertaken along coastal towns in the Metropolis namely New Takoradi, Sekondi, Essaman, Ngyiresia and Nkotompo (Sekondi-Takoradi Metropolitan Assembly, 2014).

About 63.9 percent of the population aged 15 years and above is economically active while 36.1 per cent is economically not active. Of the economically active population, 89.4 percent are employed while 10.6 percent are unemployed. For those who are economically not active, a larger percentage of them are students (52.0%) and 19.4 % perform household duties.

**Research Design**

The study employed the cross-sectional design in which aggregate data are collected from different respondents at a specific point in time. Cross-sectional design is among the "most widely used type of research design in the study of urban growth" (Zakour & Gillespie, 2013, p. 73). The design has some practical advantages which suited the current study. It helped to capture large factual numeric and descriptive data from a large number of people that represents a wide target population on a one-shot basis. As such, the design was

less costly, more economical and efficient (Cohen, Manion & Morrison, 2011; Bhattacherjee, 2012; Zakour& Gillespie, 2013). It gave the researcher the ability to select settlements with and without land use planning schemes to establish the relationship between land use planning and utilities. According to Levin, (2006) the design supports the use of different methods to collect data from selected respondents in a single study. In view of this, the mixed methods approach which specifically utilises the positivist and interpretive philosophical assumptions as the mode of inquiry was employed.

Relying on the mixed method under the cross-sectional design for methodological triangulation, different methods in the study helped offset the weaknesses that were inherent in using either only quantitative or qualitative technique (Bell, 2010). According to Creswell (2007), a researcher needs to simultaneously blend both quantitative and qualitative information gathering techniques in order to capture the best of the single approaches and present a comprehensive analysis and picture. This provides a better understanding of the problem under investigation. For the set objectives of this study to be accomplished, both quantitative and qualitative information was collected at the same time with the use of key informant interview schedule (quantitative method) and in-depth interview and observation (qualitative methods).

**Study Population**

Four categories of people constituted the target population of the study. They were;

- Residents (household heads)
- Land planning and management institutions

- Utility service providers (electricity and water)
- Opinion leaders (Assembly men and women)

The residents were selected because they occupy the various houses and also serve as the final users of utility services. The sum of the total house from the selected community is 14363 (Ghana Statistical Service, 2012). The Land Planning and Management Institutions as well as utility service providers were involved in the study because of the key roles they play relating to the institutional arrangement for land administration and the provision of utility services in the sub metro. Opinion leaders were not left out of the study since they are highly respected in the society and play major advisory role to enhance the development of the community.

**Sample and Sampling Procedure**

The Fisher, Laing, Stoeckel and Townsend (1998) formula for determining sample size was adopted in selecting the respondents for the study. With a population of 1000, the formul is stated as:

$$n = \frac{z^2 pq}{d^2}$$

Where:

n= the desired sample size (when the population is greater than 10000)

z= the standard normal deviation, usually set at 1.96 which corresponds to 95 percent confidence level;

p= the proportion of the target population have particular characteristics;

q= 1.0-p; and

d= the degree of accuracy desired, this is usually set at 0.05

With (z) statistic being 1.96, degree of accuracy (d) set at 0.05 percent and the proportion of the target or study population with similar characteristic (p) at 80 percent which is equivalent to 0.80, then "n" in this case is:

$$n = \frac{(1.96)^2 (0.80) (0.20)}{0.05^2}$$

$$n = \frac{0.614656}{0.0025}$$

$$n = 245.8624$$

A calculated sample size of approximately 246 respondents was obtained and this was distributed to the communities under the Effia-Kwesimintsim sub metro proportionally (Table 1).

**Table 1: Sampling frame and sample size in study communities**

| COMMUNITIES | HOUSEHOLD POPULATION | SAMPLE SIZE |
|---|---|---|
| APREMDO | 3631 | 63 |
| ANAJI | 7668 | 130 |
| ASSAKAI | 2147 | 36 |
| WHINDO | 917 | 17 |
| TOTAL | 14363 | 246 |

Source: Field Data (2017)

In addition to the 246, seven prospective respondents were purposively included in the study, making the total sample size population to be 253

respondents. Out of the seven prospective respondents, three of them were institutional heads (two utility service providers and one representative from Town and Country Planning Department) and the other four were assembly members from the selected communities. Table 2 shows the distribution of the sample size for the study area.

**Table 2: Total sample population of the study**

| Units | Sample size |
|---|---|
| Household Heads | 246 |
| Town and Country Planning Department (TCPD) | 1 |
| Electricity Company of Ghana (ECG) | 1 |
| Ghana Water Company Limited | 1 |
| Assembly members | 4 |
| Total | 253 |

Source: Field Data (2017)

Both probability and non-probability sampling techniques were used to select the respondent. Below are specific sampling techniques and procedures that were used to select the respondents.

*a) Household-heads*

The systematic sampling technique was employed for the selection of the household heads among the stratus for the study. The reason for this technique is to give each household the equal chance to be selected for the study. A sample fraction was generated by dividing the sample size of each community over the

total number of houses in each community. This is because, households are found in homes. According to Melese (2006), houses are appropriate avenue through which household heads can easily be located. Therefore the houses were used to select household heads. The sample fraction calculated helped in the selection of the households to ensure that every household heads were given equal chance of being selected. Table 3 below shows the household fraction of each community.

**Table 3: Sampling fraction of Study Communities**

| Communities | Total No. of Houses | Sample Size | Sample fraction |
|---|---|---|---|
| APREMDO | 3631 | 63 | 58 |
| ANAJI | 7668 | 130 | 59 |
| ASSAKAI | 2147 | 36 | 60 |
| WHINDO | 917 | 17 | 54 |

Source: Field Data (2017)

From table 3 above, the sample fraction for Apremdo was 58. This means that for every 58$^{th}$ house counted in the community, a household head was selected. The same procedure was employed in Anaji with a sample fraction of 59, Assakai with a sample fraction of 60 and Whindo with a sample fraction of 54. This helped help in the selection of 246 household heads for the study.

*b) Heads of selected land planning institutions, utility providers and opinion leaders.*

The purposive sampling technique was employed to select seven (7) key informants; including one land planning and management institutions, two utility service providers in Sekondi-Takoradi and four assembly members. Their

inclusion in this research was based on the vital roles they play in land management and provision of utility services in the study area. The key informants constituted heads of Town and Country Planning Department (TCPD), Electricity Company of Ghana (ECG), Ghana Water Company Limited (GWCL) and four assembly men. Also, personal observations were made at some areas of the sub metro by the researcher.

**Source of Data**

Primary and secondary sources of data were employed in the analysis of the study. The primary data included cross sectional data collected directly from household heads. Data were also collected from the Ghana Water Company Limited (GWCL) and Electricity Company of Ghana (ECG) as utility service providers, as well as the Municipal Assembly and the Town and Country Planning Department as public facility providers within the study area. Secondary data sources were from District Medium Term Plans as well as Population and Housing Census Report (2010). Information from journals, books and internet is also duded for this study.

**Research Instruments**

In conformance with the mixed method approach (quantitative and qualitative), remote sensing images, interview schedule, interview guide and observation guide were developed to obtain the primary (first-hand) data from the field. These instruments were chosen for the study because they were the most appropriate instruments for achieving the objectives of the research. According to Kumekpor (2002), the interview schedule is known for its advantages of building good rapport, creating a relaxed and healthy atmosphere

in which respondents easily cooperate, answer questions, and clear misapprehension about any aspect of a study.

Interview guide was used to conduct In-depth interview (IDIs) to collect information from the selected seven (7) key informants. Semi-structured interview-guides were used to collect information from the key informants. According to them, semi-structured interview formats are flexible, and they allow for the exploration of emerging themes and ideas. The IDIs provided a scope for asking additional relevant information through asking of more questions in the course of the interview when it became necessary.

The other instrument that was used in the study was ERDAS Imagine 13. Images used for the study were taken over a period of 1991 and 2016 to determine growth pattern of the selected towns. There was an observation guide as well. Non-participant observation was used for the study. For Sarantakos (2012), in this type of observation, the observers are on their own, and observe their participants or the study area from outside the group without fully participating in the activities of the research participants. This helped the study to get first-hand information on issues relating to urban growth and access to basic utility services in the study area.

**Data Processing and Analysis**

The data collected were first cross-checked and then edited to correct mistakes in any form affecting the quality of the work. Aerial photograph data was analysed with the use of GIS tools (ERDAS Image 13) and represented on map to describe the pattern of growth. The interview schedule (questionnaires) were coded and fed into computer software packages for quantitative data

analysis. The Statistical Product for Service Solutions (SPSS version 21) was used to process and analyse the interview schedule (questionnaires) data obtained from the field.

The qualitative data collected from the IDI's were also coded, transcribed manually with the use of Nvivo Software Package (version 10) by categorising them under specific themes and using them for the analysis. Analytical tools such as the central tendencies (specifically, modes and means) were used to determine trends and averages of key variables of the study. The use of tables, graphs, charts and diagrams were to present the data for better understanding of key issues on the topic under study. Inferential statistical technique such as independent t-test and Pearson Correlation Matrix were used to analyse the factors affecting access to utility services in Effia-Kwesimintsim sub metro.

**Ethical Considerations**

The ethical dimensions of the study were taken into consideration. Ethical clearance was sought from the Institutional Review Board (IRB) of the University of Cape Coast (UCC). Permission was also sought from the Department of Geography and Regional Planning of, UCC before visiting the study communities for data collection. Seeking official permission and cover letter facilitated easy entry into the study area.

With the aid of an introductory letter, respondents were pre informed and had the rights to either be part or exempt themselves from the research. The content of the study was thoroughly discussed to help them have a fair idea on

the study. They were assured that the exercise was purely for academic purposes and it may be of advantage to them.

Anonymity of respondents was respected. During the field work all forms of identification including names, addresses and telephone numbers of respondents were avoided. In cases where anonymity could not be fully promised, the respondents were assured of confidentiality. That is, every information given was going to be used for the study only, which was the case.

**Summary**

This chapter focused on the study area, and the procedures that were allowed to collect the field data. The research design, sampling techniques, research instruments, and the data processing and analysis have been described in the chapter. The next chapter presents the results and the discussion of the study.

# CHAPTER FOUR

# RESULTS AND DISCUSSION

## Introduction

This chapter analyses, presents and discusses the findings of data collected from this study. The discussion covers four main themes. These were socio-demographic characteristics, land use/land cover changes in the study area, institutional arrangements for utilities provision and coping strategies adopted by the residents of the study area.

In all, 246 questionnaires were administered to the respondents for this study. Out of the 246 questionnaires administered, 230 were retrieved from the study respondents of the study. In addition, seven in-depth interviews were conducted for heads of institutions and assembly men and women. This represents 94% of the total study population which shows a fair representation of the sample and in addition it also good for analysis.

## Socio-Demographic Characteristics of Respondent

This was done to have much background information about the respondents to inform subsequent analyses of the study. The socio-demographic data collected covered sex, age, religious affiliation, level of education, number of years stayed in the community and household size. Table 4 shows the demographic characteristics of respondents that were involved in the study.

**Table 4: The Socio-Demographic Characteristics of Respondents**

| Characteristics | Frequency | Percentage |
|---|---|---|
| **Sex** | | |
| Male | 122 | 53 |
| Female | 108 | 47 |
| ***Total*** | ***230*** | ***100*** |
| **Age Group** | | |
| 18-27 | 15 | 6.5 |
| 28-37 | 63 | 27.4 |
| 38-47 | 89 | 38.7 |
| 48-57 | 51 | 22.2 |
| 58 and above | 12 | 5.2 |
| ***Total*** | ***230*** | ***100*** |
| **Ethnicity** | | |
| Akan | 198 | 85.9 |
| Ewe | 8 | 3.6 |
| Ga-Adanbge | 14 | 5.9 |
| Mole-Dagbane | 10 | 4.5 |
| ***Total*** | ***230*** | ***100*** |
| **Level of Education** | | |
| No formal education | 39 | 17 |
| Basic | 88 | 38.3 |
| Secondary | 62 | 27 |
| Tertiary | 41 | 17.8 |
| ***Total*** | ***230*** | ***100*** |

Source: Field Data, (2017)

*Sex of respondents*

As indicated in Table 4, the information on the socio-demographic characteristics of the respondents for the study depicts that both males and females were considered in the study. Specifically, there were more males (53%) than females (47%). The dominance of males over females could be explained by the cultural values and norms of the Ghanaian society that generally accepts males as heads of households. This finding conforms to the 2000 Population and Housing Census of the area where males as household heads outnumbered their female counterparts.

*Age Distribution of Respondents*

Age is a vital variable that must be taken into consideration when dealing with urban growth and sub-urban settlements. This is because it helps to have a fair idea about the age structure of the respondents and the dominant age groups contributing to the growth of the area. From the study (Table 4) it was observed that majority of the respondents were between 38 and 47 (38.7%). This was followed by those within the age bracket of 28-37 (27%). This shows that over 50% of the respondents were between 28 and 47 years indicating that the study area has a youthful population with many of them in their active working ages which is a major characteristics of residents of sub-urban area as indicated by United Nations Human Settlements Programme (2000).

*Ethnic Background of Respondents*

Sub-urban settlements are found to be heterogeneous in nature due to the differences in beliefs of individuals. Nawagamuwa and Viking (2003) revealed in their study that people in sub-urban settlement have heterogeneous characteristics in terms of ethnic background dwellers. With regards to ethnicity, Table 4 reveals that 85.9 percent are Akans (Fante, Asante, Ahanta and Sefwi), 5.9 percent are Ga-Adangbes (Ga and Krobo), with 3.6 percent being Ewes. Mole-Dagbane (Dagomba and Dagbane) constitutes 4.5 percent of the respondents, with no Guans recorded. This result conforms to the GSS (2013) report which found the Akans as the dominant ethnic group that indicates that they are in the majority (78.2%) in the Western Region of Ghana.

*Level of Education*

On the issue of educational background, the study results in Table 4 indicated that 38.3 percent of the respondents had attained basic education whilst 17 percent had non-formal education. In addition, the findings point out that 27 percent and 17.8 percent of the participants had attained secondary and tertiary education respectively thus depicting that education is of key importance in the study area.

**The Extent of Urban Growth in STMA**

To describe the extent of urban growth of the STMA, a remote sensing data was collected based on the land use/land cover (LULC) changes that had taken place in the area from 1991 to 2016, In assessing the LULC of the study area, the following analyses were conducted to understand the extent of urban growth and its effects better and draw important inferences accordingly.

*Land Use/Cover (LULC) Classes of Sekondi-Takoradi Metropolitan Assembly*

The LULC mapping was established on the partition of the study area using a managed remotely sensed data of 1991, 2002 and 2016. Six (6) main LULC classes were derived using their spectral and textural characteristics and their feature space. These are given in details in Table 5 below.

**Table 5: Description of Land Use/Land Cover units**

| Land cover/use | General description |
|---|---|
| Water | Water includes all areas within the landmass that persistently are covered by water. These include stream, lakes, reservoirs, bays and estuaries. |
| Barren land | Land areas of dry and exposed soil surface as a result of both human activities and natural causes. |
| Farm land | Farm land broadly covers land used primarily for production of food and fiber. In this category include cropland and pasture, orchards, groves, vineyards, nurseries, and ornamental horticultural areas, confined feeding operations, other agricultural land. |
| Built-up | Built-up comprised of areas of intensive use with structures. This category includes community service areas (parks, playing grounds, lorry parks), residential areas, commercial and industrial areas. It also includes lands cleared in readiness for development. |
| Open forest | Forest lands have a tree-crown aerial density (crown closure percentage) of 5 percent. It includes areas that depict sparsely located trees, shrubs and patches of bare soil. Areas of extensive grass cover and isolated thickets are classified under this category. |
| Closed forest | Forest lands have a tree-crown aerial density (crown closure percentage) of 10 percent or more, regime. Categories include deciduous, evergreen, and mixed. |

Source: USGS Anderson Land Classification Scheme (1976)

*State of Land Use/Land Cover Classes in 1991*

Land use land cover classifications is done by the use of a Remote Sensing tool (ERDAS Imagine13). Images generated using ERDAS was classified base on the Anderson Classification System (1976) in Table 5. The findings of the study revealed that in 1991, the most predominant LULC class in the Sekondi–Takoradi Metropolis was Open forest which covered greater portions of the study area of 4514.9 hectares surface area representing 54.1 %

of the total land area while barren lands had the least surface area of 7.9 hectares representing 0.1% as shown in Table 6 and Figure 5 below.

**Table 6: Surface Area of Land Use/Cover Units of STMA in 1991**

| Land use/cover | Surface Area in 1991 (hectares) | Percentage |
|---|---|---|
| Water | 174.0 | 1.1 |
| Barren land | 7.9 | 0.1 |
| Farm land | 1025.5 | 6.2 |
| Built up | 1923.2 | 11.6 |
| Open forest | 9000.9 | 54.1 |
| Closed forest | 4514.9 | 27.1 |
| **Total** | **16646.4** | **100.0** |

Source: USGS Anderson Land Classification Scheme (1976)

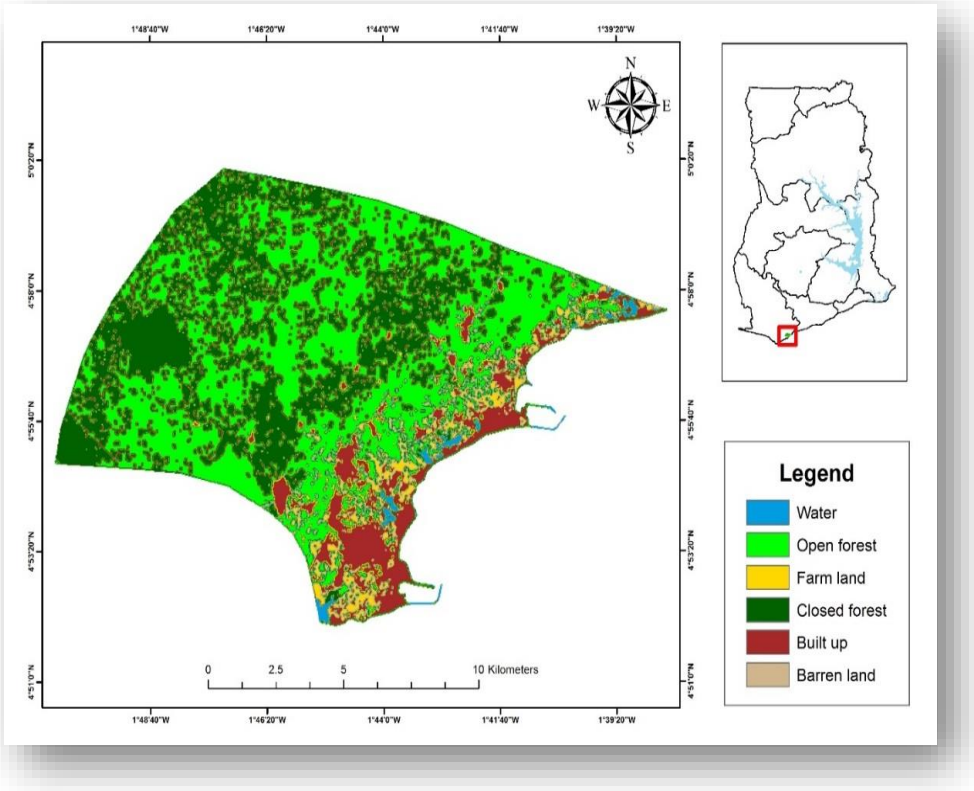


***Figure 5:*** **Land Use/Land Cover Map of STMA in 1991**

The findings in Table 6 depict that water resources in the study area in 1991 was minimal as compared to the rate of built environment (1.1% to 11.6%) respectively. Meanwhile, the 54.1 percent of the land was covered by open forest showing that the study area was very green in 1991.

*State of Land Use/Land Cover in 2002*

Land use/land cover units, surface areas and proportions in the Sekondi – Takoradi Metropolis in the year 2002 are presented in Table 7 and Figure 6. On the whole, open forest was the most predominant land use class. In 1991 it increased to 55.5 % dominating the northern sector of the area. This was followed by Built up which was seen spreading from the south to the north eastern part of the area increasing from 11.6% in 1991 to 17.7% in 2002. Closed forest reduced significantly in area from 27.1% in 1991 to 15.8% in 2002. Built Up increase in the STMA can be attributed to increase in population in the area from 246,169 hectares in the year 2000 to 402877 in the year 2010 (GSS, 2010). The population is close to 100% increase over the 10 years period which has led to the increase rate of land use cover in the sub-urban areas of the STMA.

**Table 7: Surface Area of Land Use/Cover Units of STMA in 2002**

| Land use/cover | Surface Area in 2002 (hectares) | Percentage |
|---|---|---|
| Water | 70.6 | 0.4 |
| Barren land | 311.1 | 1.9 |
| Farm land | 1448.2 | 8.7 |
| Built up | 2940.3 | 17.7 |
| Open forest | 9241.8 | 55.5 |
| Closed forest | 2634.4 | 15.8 |
| **Total** | **16646.4** | **100.0** |

Source: USGS Anderson Land Classification Scheme (1976)

The coverage of water in the land area reduced from 1.1 percent in the 1991 to 0.4 in the 2002 while barren lands increased from 0.1 to 1.9 percent, covering 311.1 hectares of land. Built up areas experienced a massive expansion by attaining 11.6 percent in 2002 as compared to 11.6 percent in 1991 and thus exhibiting a growth in urban quest for housing and other infrastructures making it difficult for utility providers to meet the increasing demands.

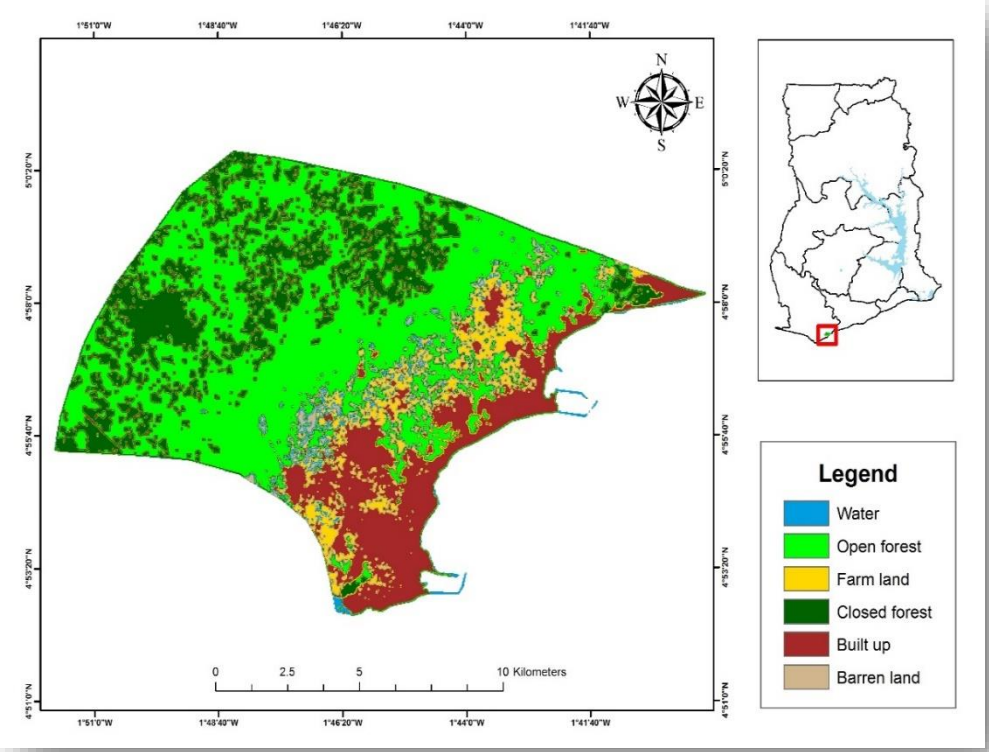


***Figure 6:*** **Land Use/Land Cover map of STMA in 2002**

Source: Erdas Image, 2016

*State of Land Use/Land Cover in 2016*

On the whole, open forest which is the most predominant class, reduced from 55.5% in 2002 to 48.1% in 2016 paving way for built up developments. Consequently, the built up increased very significantly from 17.7% in 2002 to

46.6% in 2016 spreading at a faster rate more precisely to the northern part of this study area.

The significant increase in the percentage of built up is as a result of the remarkable increase in urban population of the STMA from 246,169 hectares in the year 2000 to 402,874 hectares in the year 2010 (Ghana Statistical Service, 2012). The increase in the human population of the STMA consequently might have resulted in corresponding increase in infrastructure and amenities to accommodate the growing population (Agyapong *et al* 2014), thus reflecting a sharp increase in urban/built-up areas between the period of 2002 and 2016.

**Table 8: Surface Area of Land Use/Cover Units of STMA in 2016**

| Land use/cover | Surface Area in 2016 (hectares) | Percentage |
|---|---|---|
| Water | 49.9 | 0.3 |
| Barren land | 455.6 | 2.7 |
| Farm land | 190.9 | 1.2 |
| Built up | 7751.5 | 46.6 |
| Open forest | 8013.5 | 48.1 |
| Closed forest | 185.1 | 1.1 |
| **Total** | **16646.4** | **100.0** |

Source: USGS Anderson Land Classification Scheme (1976)

The reduction in the land area of water as compared to Built-Up areas in the study area represents the development of sub-urban communities into mostly residential areas and business centres characterised with trading communities but had less access to water resources. Furthermore the quest for settlements and other development projects had resulted in the loss of the natural forests. The results include unguided human activities contributing to barren lands over the years (from 1991 to 2016 Erdas Image) as revealed by the study in Table 8.

According to Attua and Fisher (2011), another effect of the increase in population in the metropolis was the lateral expansion of urban infrastructure, especially for office and residential accommodation. They observed that the demand for and access to land for residential purposes was the major drive for spatial expansion in cities. This has led to the emergence of sub-urban settlements expansion in the STMA. The urban expansion can be seen over the study period as shown in Figure 7.

The finding of this study is in line with finding of Agyapong and Stemn, (2014). In their study it was revealed that the Sekondi-Takoradi Zone recorded the least urban expansion because this zone has no land for further expansion as they have expanded fully in the past. The Effia-Kwesimintsim zone experienced the highest urban expansion within the 14-year period. This is because Effia-Kwesimintsim is the closest to Takoradi and in time past had a vast land for further development and urban expansion (Agyapong *et al* 2014). This sugguest that there urban expansion taking place in the sub metro. This is in line with findings of the study as shown in the figure 7 below.

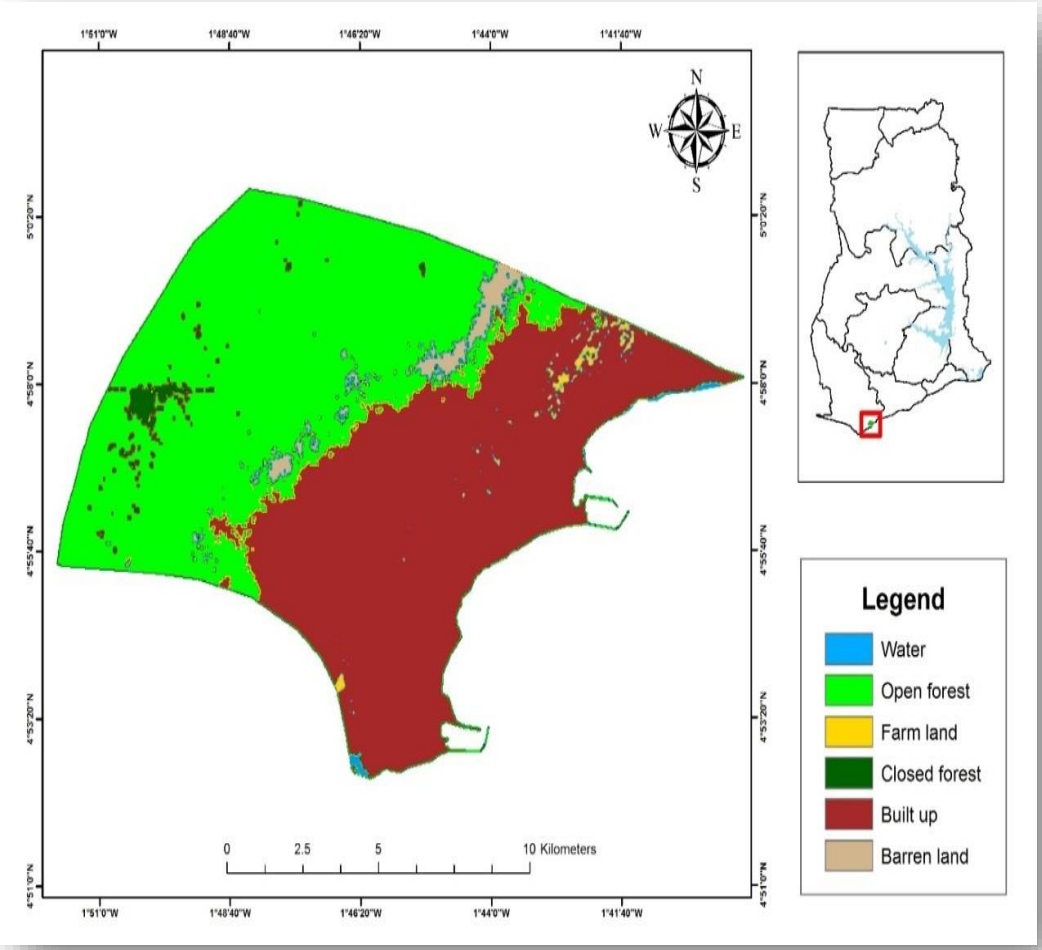


***Figure 7:*** **Land Use/Land Cover map of STMA in 2017**

**Total Changes in Land Use/Cover Classes and Trend between 1991 and 2016**

The statistics, as revealed in Figure 7, indicates a percentage increase of about 3828.6 % hectares in the land area covered by Barren land. Water fell by 59.4% while built up increased significantly at 52.9 %; Farm land increased at 41.2%. However, closed forest reduced at 41.7% and Open forest increased very slightly at 2.7%. As shown in Table 6 and Figure 6, whereas about 577.2 hectares of built up remained unchanged from 1991 to 2002, 25.9 ha of the land

cover transitioned from built up in 1991 to water in 2002, while 36.8 hectares of Built up were also transformed to Farm land in the same period. As approximately 59.5 hectares of Built up were transitioned into open forest, there was no change of Built up area into closed forest. Furthermore, as 838.6 ha of closed forest remained unchanged, 3236.0 hectares of this land cover changed into Open forest while 596.4 hectares was converted to built-up areas.

An estimated 5914.2 hectares of Open forest remained steady, whereas about 1151.5 hectares of the land cover transitioned into closed forest and approximately 1873.2 ha was converted into Built-up areas. However, 890.1 ha of Open forest was converted into Farm land. Hence, there was no transition of barren lands into built-up areas as an estimated 0.0 ha remained unchanged. 1.3 hectares of Water was converted into Built up 2002. Kahn *et al.* (2008) revealed in their study that open forest and farms are of importance to man and hence man should do his best to protect them. In this modern era, not only must man protect the forest and farm lands alone but most significantly, every aspect of man's environment needs absolute care and proper usage or exploitation to reduce waste, and ensure sustainability without compromising the quality of the environment for the future generation.

As shown in Table 8 and Figure 7, whereas about 575.6 hectors of built up remain unchanged, 0.7 hectares (25.9 hectares in 2002) of the land cover transitioned from Built up in 1991 to water in 2016, while 2.5 hectares (36.8 hectares in 2002) of Built up were also transformed to Farm land in the same period. Approximately 0.8 hectares (59.5 hectares in 2002) of Built-Up also transitioned into Open forest. In the same period of time, 0.0 hectares (0.0 hectares in 2002) of Built up transitioned into closed forest. Furthermore, as

20.3 ha of Closed forest remained unchanged, 2691.4 hectares (3236.0 hectares in 2002) of this land cover transitioned into Open forest and 1296.7 ha (596.4 hectares in 2002) was converted to Built-up areas.

An estimated 1959.27 hectares of Open forest remained steady, whereas about 5.0 hectares (1151.5 hectares in 2002) of the land cover transitioned into closed forest and approximately 3898.7 hectares (596.4 hectares in 2002) was converted into Built-up areas. However, 110.7 hectares (890.1 hectares in 2002) of Open forest was converted into Farm land. Hence, 3127.3 ha (0.0 hectares in 2002) of land transited from Barren lands into Built up areas whiles an estimated 10.0 ha remained unchanged. 0.0 hectares (1.3 hectares in 2002) of Water was converted into Built up in 2016.

On the other hand, the statistics as shown in Figure 7, indicates a percentage increase of about 163.6% hectares in the land area covered by Built up. Barren land increased at 46.6%. Water fell considerably at 29.3% while Barren land increased at 46.6%; Farm land reduced noticeably at 86.8%. However, open forest reduced marginally at 13.3% and Closed forest lessen noticeably at 93.0%. The rate change of LULC in the sub metro is very high due to urban growth taking place in the sub metro. This means water, farm lands, open and close forest which constituted 82% of total surface area in 2002 reduced to 53.4% in the year 2016 while surface area for built up increased from 17.7% in 2002 to 46.6% in 2016. According to Seto *et al*, (2002), population and increasing socio-economic necessities creates pressure on land use/land cover and this pressure could result in mismanagement of agricultural, urban settlement and forest lands which lead to severe environmental problems in the sub metro and this supports to Kahn *et al.* (2008) study that opines that man

must do well to protect lands and its resources since they form vital aspects of our lives and affect the outlook of humanity in the long run.

**Effects of urban growth of STMA on Effi-Kwesimintsim**

Urban growth taking place in the STMA is evidential in the LULC changes that has taken place from 1991 to 2016 as shown in the analysis above. This section sort to find out some of the effects of urban growth of STMA on Effia-Kwesimintsim sub metro. The sub metro is now experiencing urban expansion as a result of the urban growth taking place in the STMA. A representative from the TCPD through and interview remarked as follows:

> *Currently there are no lands available for resident for settlement and other economic activities especially in the Sekondi-Takoradi metro. People resort to the surrounding sub metro in quest of looking for lands for both economic purposes and settlement. Most people prefer Effia-Kwesimintsim sub for reasons such as its closeness to Capital City that is Sekondi-Takoradi, the availability of transport services and the affordability and availability of land (Official TCPD 2017, IDI).*

Similar findings came up in a study conducted by Stemn and Agyapong (2014) which found Effia-Kwesimitsim to be experiencing high LULC change in STMA. An urban expansion analysis conducted in the STMA by Stemn and Agyapong (2014) for the four sub-metros showed in terms of percentage that EffiaKwesimintsim sub-metro recorded the greatest urban expansion (47.76%) followed by the Sekondi sub metro (19.85%) whiles the Takoradi sub metro recorded the least expansion of 6.69%. This analysis confirms the remarks made by the TCPD representative.

This urban expansion in the sub metro as a result of urban growth taking place in the STMA has led to a rapid population increase and unplanned growth in the Effia-Kwesimintsim sub metro. The expansion has created sub-urban centres in the sub metro and as a result there has been an increase in demand for utilities in the sub metro. Although there are availability of public utilities such as water and electricity, they are in limited supply. For instance, one key informant had this to say:

> *"Water doesn't flow. The only time you find water flowing is when they are coming to distribute bills. Once the bills have been distributed then the flow ceases until the next month."(Resident 2017, IDI)*

The above findings show that there is some amount of pressure on major public utilities in the area. This is in line with the observation made by Rakodi (2016) that the creation of sub-urban centres often strains the capacity of local and national government to provide urban residents with even the most basic services such as housing, water supply, sewerage and solid waste disposal.

**Access to Major Utility Services**

A major problem that has been found to affect suburban city utility supply is inadequate access to major utilities by residents due to the increasing demand of the urban growth. In view of this, utility service providers find it difficult to respond timely to the demand of new expanded settlements and thereby causing problems to access to major utilities (Pereira, Cordery & Iacovides, 2009). Access to utility services is defined based on parameters or variables such as availability, cost, time and quality of delivery of utility services (Moriarty *et al*, 2011). Using the above parametres or variables as a

guide, the study sought to access resident's access to major utilities in the study area based on availability, time, cost and quality services of utilities enjoyed by residents

*Availability of utility services*

**Table 9: Availability of Utility Services**

| Statements | Yes | % | No | % |
|---|---|---|---|---|
| Do you have electricity in your house? | 201 | 87 | 29 | 13 |
| Do you have pipe-borne water system in your house? | 108 | 47 | 122 | 53 |

Source: Field Data, (2017)

From the table 9 above, utility services such as of electricity and pipe-borne water system were considered for the purpose of the study since these services are considered as the major basic utility services (Bayliss & McKinley, 2007). One issue of concern that needs to be looked at is the low access of water in the homes of the respondents. Out of the 230 respondents sampled for the research, 47 percent noted that they had no access to water in their homes. Access to water system is a major problem in the sub metro as a result of high cost of extension, irregular flow of water as well as delay in supply of utility. According to Pereira *et al* (2009), the major problem of city water supply is inadequate source of water to respond to the increasing demand of the city. The findings of the current study suggest there is a similar problem in the study area. It was observed that, there is much access to electricity in the homes of residents of Effia-Kwesimintsim as compared to water.

*Cost and time for extending electricity and water*

Time and cost of extending utility services is very essential in analysing access to utility services but often times much attention is not paid such variables in developing countries to provide good utility services to urban dwellers (Crittenden, Trussell, Hand, Howe, & Tchobanoglous, 2012). In view of that, the respondents were made to provide some information on their accessibility to utility services in terms of cost and time of extending utility services into their homes as shown in Table 10.

**Table 10: Cost and Time for Extending Electricity and Water**

| Variable | Subscale | Frequency | % |
|---|---|---|---|
| Cost of extending electricity | GHC1-500 | 31 | 5 |
| | GHC501-1000 | 142 | 61 |
| | GHC1001-1500 | 33 | 14 |
| | GHC1501-2000 | 26 | 11 |
| Cost of extending water | GHC1-500 | 22 | 10 |
| | GHC501-1000 | 34 | 15 |
| | GHC1001-1500 | 165 | 71 |
| | GHC1501-2000 | 12 | 5 |
| Time for Extending month | A day | 18 | 8 |
| | A week | 28 | 12 |
| | A month | 172 | 75 |
| Time for Extending electricity | More than a month | 14 | 6 |
| | A day | 16 | 7 |
| | A week | 178 | 77 |
| | A month | 35 | 15 |
| | More than a month | 3 | 1 |

Source: Field Data, (2017)

The results indicate that, the cost of extension, time for extending electricity and water affects access to utility services in the Effia-Kwesimintsim sub metro. From Table 10, 165 out of 230 respondents spent between Gh₵ 1001 to Gh₵1500 in extending water to their homes while 142 out of 230 respondent

spent between Gh₵ 501 to Gh₵ 1000 in extending electricity services to their homes. This implies that, the cost of extending water supply is higher than the cost of extending electricity.

This is because, there are major costs involve in the extension of water such as, the buying of pipes, the digging of holes to lay the pipes and the cost of tapping water supply from the main pipe lines provided by GWCL unlike that of the extension of electricity which involves only the cost of tapping of power from the main lines provided by ECG. In support of the above responses from the respondents on the high cost of extending water into their homes an official from GWCL had this to say:

> *Though it takes 48hours for the company to extend our services to individual on request, water supply is always tapped from the main supply and this calls for the buying of more pipes and that calls for an additional cost in the extension of water supply (ECG Official 2017, IDI).*

The above assertion by the official from the GWCL indicates that in extending water to homes at Effia-Kwesimintsim one must be prepared to bear additional cost before the extension will be possible. This makes the cost of access to water a bit higher.

Respondent also gave their response to how long it takes for utility providers to extend their services to their homes. From Table 10, 172 out of the total of 230 respondents said that it takes a month for water to be extended to their homes or facilities while 178 out of 230 respondents responded that it takes a week for electricity to be extended to their homes or facilities. The delay in the extension of water supply to homes was found to be due to poor land use

planning of the area. Information gathered from the TCPD revealed that most landlords/ladies do not follow land use planning provisions provided by the TCPD t and they build at places demarcated for water pipes to pass. This makes the work of the engineers very difficult in extending water in various houses in the sub metro.

In addition to the cost of accessing water and electricity, the time dimension of getting access to these utilities were assessed. In doing this, it was inquired, from the respondents how long it takes for water and electricity to be extended to their homes. Table 10, depicts that, 75% of 230 respondent responded that it a month for water to be extended to their homes while 77% of 230 respondent responded that it takes a week for electricity to be extended to their home. This implies that, it takes a longer time to for residents in the sub metro to extend water to their homes than extending electricity to their homes. An assemblyman remarked that:

> *The protocols that one has to through before water can be extended to our homes is very long. And the contactors charge huge sums of money which delays the whole process of extension (Assemblyman 2017, IDI).*

This remark is in line with the responses from the residents in the sub metro explaining why it takes a longer time for water to be extended to their homes than that of electricity. Another interview conducted with an official from GWCL in the sub metro revealed that residents do not follow all processes laid down by the company in the extension of water services into their homes. He remarked as follows:

> *Before water can be extended to the homes of individuals, all the laid down process must be followed. Most of the time, residents would want to skip some of the process to enjoy water supply as soon as possible. Our services goes beyond just extending our services to homes but rather follow safety measures, proper installation of pipes and meters as well permit from all institutions involved in the extension water to residence. When all this requirements are met, it delays the time for extension of water (Official GWCL 2017, IDI).*

The above comments from both the assemblyman and the official from GWCL, though it is the responsibility of GWCL to extend utility services to residents, the residents have a role to play by fulfilling every laid down processes in the extension of water to prevent delays in the extension of water in the sub metro.

*Quality of service of major utilities*

Access to facilities and services is fundamental for policy formulation and reformation since it has been realized that people deserve similar levels of quality and quantity of resources (Van der Ree, Van der Grift, Gulle, Holland, Mata, & Suarez, 2007). The quality of utility services in the sub metro was analyse by respondents by rating the services as very poor, poor, good and very good as shown in Table 11.

**Table 11: Quality of Electricity and Water Delivery**

| Variable | Subscale | Frequency | % |
|---|---|---|---|
| Quality of water delivery | Very Poor | 45 | 19 |
| | Poor | 16 | 7 |
| | Good | 167 | 72 |
| | Very Good | 4 | 2 |
| Quality of electricity delivery | Very Poor | 31 | 13 |
| | Poor | 185 | 80 |
| | Good | 12 | 5 |
| | Very Good | 4 | 2 |

Source: Field Data, (2017)

Table 11 indicates that 72% of the respondents out of 230 rated the quality of water services as good while 80% of the respondent rated the quality of electricity poor. This could be as result of inadequate pre-paid vendors in the sub metro as well loading shedding programmes and frequent power cuts popularly known as “Dumso” from ECG.

The finding of the study is not different from what is happening in Nigeria. According Awosope (2014), the power utility company is not prepared to increase the consumption electricity in the country. This has affected the quality of electricity supply in the country. As a result of that there is always a deficit in the consumption of electricity and the only solution to this challenge is the practice of load shedding as known in Ghana as “Dumso”. This finding of the study is also in line with the STMA citizen’s report card that, most households are not satisfied with the quality of services electricity supply in Effia-Kwesimintsim sub metro. They gave reasons such as power interruptions, inadequate pre-paid venders, unstable voltage level and frequent power cuts

which take more than two hours for it to be restored as the major reasons affecting the quality of electricity supply in the STMA (Sekondi-Takoradi Metropolis Citizen's Report, 2012). The above findings of the study suggest that, there is much to be done by ECG to improve the quality of their services to the sub metro.

In furtherance to the above results, the study probed further to find out a descriptive statistic of the pairwise sample t-test for the cost of extending water and electricity. A pairwise t-test is used to compare two population means where there are two samples in which observations in one sample can be paired with observations in the other sample (Shier, 2004). The pairwise t-test was done to compare the cost of extending water and electricity from the same group of respondents to establish whether there is high cost involved in extending water as compared to the cost of electricity. The results are presented in Table 12. The descriptive statistic respondents responded to the cost of extending utility services by respondents.

**Table 12: Means and Standard Deviations for Cost of Extending Electricity and Water**

| | | N=232 | Mean | Std. Deviation |
|---|---|---|---|---|
| Pair 1 | Cost for extending electricity | | 13.5455 | 9.385 |
| | Cost for extending water | | 20.0682 | 6.846 |

Source: Field Data, (2017)

Table 12 above provides the paired sample descriptive statistics of cost involved in extending electricity and water. The Table clearly shows means and standard deviations for cost for extending electricity (M=13.5455, SD=9.385)

and water (M=20.0682, SD=6.846). Table 12 depicts that the mean for water supply extension (M=20.0682) is higher than electricity extension (M=13.5455). This implies that the cost of extending water is higher than the cost extending electricity supply in the sub metro.

To analyse whether there is any significant difference in the cost of extending electricity and water supply, a Paired Sample t-test was conducted to establish the significance difference between water supply extension and electricity supply extension in the sub metro. The results of independent samples t-test are presented in Table 12.

**Table 13: Pairwise Sample T-Test for Cost Involved In Extending Electricity and Water**

| | | Mean difference | Std. Deviation | t | df | Sig (2 tailed) |
|---|---|---|---|---|---|---|
| Pair 1 | Electricity<br><br>Water | 6.5227 | 11.160 | -4.501 | 231 | .000 |

Source: Field Data, (2017)

The result given in Table 13 indicates a statistically significant difference *t (231) =-4.501, Sig. = .000, p. = 0.00* between the cost of extending electricity and water. From the descriptive statistics, it is very clear that the cost for extending water is higher than the (M=20.0682, SD=6.846) cost of extending electricity (M=13.5455, SD=9.385). In accessing utility services among water and electricity, water is more expensive than extending electricity in the sub metro.

In furtherance to the above results, the study probed further to find out from the respondents, the factors that limit their accessibilities to utilities in the

sub metro. The results are presented in Table 13. The respondents responded to the various factors by indicating the extent to which these factors limits their accessibility to utility, 1= Very Low (VL), 2= Low (L), 3= High, 4= Very High (VH),

**Table 14: Means and Standard deviations of factors limiting the accessibility to utilities**

| **Statements** | N= 230 Mean | Std. Deviation | Rankings |
|---|---|---|---|
| Delays in getting utilities in the house by service providers | 2.93 | .90 | 1st |
| High cost of extension | 2.87 | .95 | 2nd |
| Inadequate housing support by government | 2.83 | 1.02 | 3rd |
| Inadequate enforcement of utility polices | | | |
| Low income level | 2.75 | .83 | 4th |
| Low level of education | 2.67 | .87 | 5th |
| Inadequate information on access to utilities by service providers | 2.54 | .91 | 6th |
| Lack of sanctions against culprits/offenders in accessing utility services illigally. | 2.3 | 0.7 | 7th |
| **Means of Means** | **2.70** | | |
| **Mans of Standard deviation** | | **0.90** | |

Source: Field work (2017)

It was found out from Table 14 that in getting utilities into houses by service providers, high cost of extension of utility services and inadequate housing support by government (M=2.9, SD= .9, M= 2.87, SD= .95 and M=2.83, SD= .02) respectively are the major factors that limit residents of Effia-Kwesimintsim in accessing utility services in the sub metro. The results of the above factors were spread closely around the mean. Similar finding came out

with an interview that was conducted for the head of customer care of ECG. He remarked as follows:

> *Electricity Company of Ghana provides 24 hours' service of extending power to homes. The delay in the extension of power to homes cannot be blamed on us because, the power is always available for our client but private individuals are contracted to extend the power into the homes of our client and they delay in discharging their duties". (Head of customer care from ECG, IDI 2017)*

Although the above comments by the head of customer care from ECG supports the claims of the residents of the study area but it also raises concern about private individuals or organisations contracted to extend electivity to the homes of the residents as they were also implicated in the problems. This is because the interviewee expressed worry about the inefficiency or undue delays made by some of the contracted private organisations that the government have contracted to work with them to contribute much to the delays in getting utilities to the homes of residents of Effia-Kwesimintsim.

Another major factor found to limit access to major utilities in the study area was inadequate housing support by government. This was found to worry the residents of the study area very much as an interview conducted with one of the assembly men in the sub metro confirmed it. The Assemblyman had this to say:

> *We expect the government to provide housing projects and give it out to individuals who can afford it. By so doing, the burden of residents extending utilities into their homes will be taken off and the government will take the full*

> *responsibility of extending utility services to the homes of residents in the sub metro. But this is not the case and creating many difficulties for the residents* of *Effia-Kwesimintsim to get access to utilities* (Resident 2017, IDI).

That is not far from for Memon (2002) view; the inefficient supply and availability of water and other utilities in most sub-urban communities in developing countries are primarily as a result of the government inability to provide affordable housing to the citizenry especially the middle- and low-income earners.

Furthermore, it can clearly be seen from Table 14 that low level of education, inadequate information on access to utilities and lack of sanctions against culprits in accessing utility services (M=2.6, SD= .87, M=2.54, SD= .91, M= 2.3 and SD= .7) were not among the major factors that limit access to utilities in Effia-Kwesimintsim. From the demographic data collect for the study, 83.1% of the respondents have received formal education from the basic level up to the tertiary level of education in the country. This suggest that there is of no doubt that low level of education and access to information is a major limiting factor in accessing utility services in the sub metro. This is in line with the finding of the study that shows that low level of education and lack of information could be a major limiting factor in accessing utility services in the sub metro.

**Institutional Arrangements for Managing of Utility Services in the Effia-Kwesimintsim Sub-Metro**

The provision of utilities in most urban areas of developing countries tend to grow at a rate slower than that of the urban population leading to the disparities between the demand and supply of urban utility services (United Nations Human Settlements Programme , 2000: Henderson, Shalizi & Venables 2001). This made it imperative to delve deep into the activities of utility service providers in the study area to find out how they are addressing utility problems and challenges facing them. The following discusses some of the arrangements made by the utility and other planning institutions in the provision of utility services within the Effia-Kwesimintsim Sub-Metro in the Sekondi-Takoradi Metropolis.

1. **Education**

Most institutions in the metropolis have sought to general education of the public on utility provision and requirement processes. The educational campaign by utility providers covers the areas of safety and consumption since they are responsible for the provision of safe and clean energy and water for the public use. These institutions such as ECG in recent times are well resourced to undertake their activities but are usually overwhelmed by the way urban population of STMA is increasing at a faster rate making them incapable of meeting the demands of these g. This therefore makes it necessary to embark on rigorous public education periodically to build capacities of not just their staff but also the general public and other partnered institutions to pave way for proper planning. As such, all members of staff are encouraged to engage in

training services to equip themselves with modern techniques in handling utility projects, develop planning and modern technologies in housing, land planning, information systems, surveying and many more. During the research, it was even evident that some staff members of ECG and GWCL were having field work and seminars as others too had resumed on leave to further their studies for a short period of time. For instance, one manager at the customer service department of ECG added that;

> *There have been a training on proper wiring and the conservation of electricity through the use of energy saving bulbs, efficient energy usage and advocating for the reduction in the usage of old electrical gadgets like fridge, iron, kettles, microwave and so on. Meanwhile, in-service training have been given to our technical men on modern methods of distancing households from the high tension poles, the laying of underground cables in a manner not to be exposed any time soon, safe earthling system and management and maintenance of electrical cables* (Customer Care ECG 2017, IDI).

**Availability and Accessibility of Services**

It is the main motive of all utility service providers in the Sekondi-Takoradi Metropolis to spread their tentacles wide enough for the public to enjoy their services. Thus, the more they make their services available and accessible to all that need their services, the greater their profit. Hence, for availability of services, ECG for instance have created additional service points/stations called the service cells at the various sub-metros within the metropolis and offer 24hrs of extension services (Saturdays and Sundays inclusive) to all households upon meeting all their requirements.

With the issue of the accessibility, measures put in place by these institutions are commendable but face some difficulties because of the inception of some third parties in their activities (middlemen). For example, an ECG official added that, they are faced with the problem of "goro-boys" who in connection with some corrupt officials act as agents in electricity services provision and rather end up duping, cheating or misconducting themselves, distracting the laid down procedures of the company. According to the ECG official this is denting the image of the institution and causing loss of public trust for their services.

Bureaucracy that exists in extending electricity services to households make it difficult for individual to get access to electricity in their homes. This involves the long processes that individuals have to go through before they are served with utility services at their homes or facilities. With ECG for example, there are occasions respondents asserted that at times individuals will have to bear all the cost of the extension of electricity into their homes which should have been the responsibility of the government especially in new residential areas in the sub metro. From the study, it was uncovered that this wasn't only the case of ECG but also with Ghana Water Company Limited. Cases of such incidents according to some officials are worrying and distort their work in several ways. An official from ECG had this to say;

> *ECG provides a 24 hour services of extension of utility service. But the processes at times delay because, resident do not meet all energy regulations for the extension to be done. These regulations are made to ensure the safety of public in accessing utility services. Until all these regulations are met, ECG will not extend utility services. This bring about this bureaucracy in the*

> *discharging of our duties because all appropriate authorities must grant individuals the permit before we can extend our service* (Official ECG 2017, IDI).

The above suggest that, there are laid down rules and regulation for the extension of utility services by the services providers. For an individual to enjoy these services, all rules and regulations regarding the extension of utility must be meet. Aside the bureaucracy that exist in the extension of utility services that affects the access to utility services in the sub metro, the GWCL is facing water pollution challenge which has affected water supply in the sub metro. The pollution of the river Pra up stream as a result of mining activities has polluted the river making and thus making it difficult to treat for human consumption. This has increase the cost of treatment of water as well as affecting quantity of water supply in the sub metro. An official from Ghana Water Company Limited added that:

> *The pollution of the river Pra due to indiscriminate farming activities and the illegal mining activities have affect our services a lot, especially with the cost of production. This is because, the cost of treating the polluted water is very high and this causes a reduction in the quantity and the quality of water supplied to the people of Sekondi-Takoradi and how much more the Effia-Kwesimintsim sub metro* (Official GWC 2017, IDI).

**2. Automated Systems**

Planning and utility service providers within the Sekondi-Takoradi Metropolis have sought to automated systems of handling issues related to housing, planning and utility service provision in the past years. But sometimes

due to the rampant rise in population, their logistics became inadequate rendering them to be incapable of meeting all the utility needs of the general public. For instance, the electricity company of Ghana is trying hard to collaborate with the telecommunication companies so that resident can buy prepaid units with their mobiles without going to look for a vendor to recharge. To add to this, one of the heads from ECG asserted;

> *We wish we could make electricity available and accessible to customers through a scratch card system as it is done by the telecommunication networks in recharging airtime on their phones. But the unfortunate thing is that, because we lack the resources to mount such a splendid idea, it still hangs as an issue for discussion at the detriment of its implementation. As a matter of fact, we also have limited number of vendors in the sub metro despite of prepaid meters have making our work easier* (Costumer Care ECG 2017, IDD).

One assembly member also had his view on the automation system by utility service providers. In his opinion, he believes strongly that the call for automated systems suggest that there is the need to fast track the utility provision services to reduce the stress associated accessing utility services in the sub metro. He had this to say;

> *it is good to automate our systems for quick and easy access sake but if the right logistics and human resources are not available, this fight would always be in vain (Assembly Member 2017, IDI).*

The prime purpose of automated utility services is to easily gain access to utilities, enable utility and utility bills to be paid through the use mobile banking

services provided by telecommunication companies. This will help utility bills to be paid from the comfort of the homes of residents.

### 3. Networking

Networking within the institutions is one of the vital means through which they are able to provide services to the general public with less or reduced stress. There exists a strong cooperation between the institutions handling land use and land planning activities in the metropolis. But as a matter of fact, collaboration sometimes yields laziness within some of the companies since they rely on others. Sometimes, the anomaly lies in the fact that some responsibilities are not clearly stated or spelt out and that interrupt with each other's activities in many ways. Other institutions fail to execute their parts of activities when time is due. For example, one manger indicated that;

> *One of such example of the problem with collaboration was very much experienced with the collaboration between the government and metropolis during the constructing of the 'Nkroful by-pass' road to reduce the traffic congestion at Pipeano and 'Agip' area (Official GWCL; ECG 2017, IDD).*

***Figure 8:*** **Nkroful By-Pass**

Source: Field data (2017)

An assembly member added to this that;

> *since the road was being expanded from a single lane to a double road, it costs the companies extra funds and also denied the residents in these areas the rights to enjoy potable water and other utilities since the activities of the institutions were interlocked and could not run the construction of the road simultaneously as planned initially (Assembly Member 2017, IDI).*

In this regard, networking utility institutions is a very good idea but need to be closely looked at again and clearly regulated with specific and non-ambiguous duties that conflicts with the interest of one another. Consequently when there exist such issues, it could result in the conflict of interest, things delay and the

provision of certain basic amenities to communities outside the main commercial area are mostly disregarded or delay. On the other hand, if these services are not delayed or disregarded, their outcomes are mostly jobs performed shabbily, shoddy, and usually unsafe for public consumption and/or use. In this context, the head of Town and Country Planning Department ascertained that;

> *for the safety of residents in the sub-metro in accessing utility services in their home, there is the need for the planning department to make sure that all land use planning regulations are met before utilities can be extended to their homes. Utility providers on the other hand are to make sure that proper inspection is done on the laying of pipes and cables in the homes of individual before the utility services can be extended to the homes of individuals (Officer TCPD IDI, 2017).*

**Coping strategies adopted by the residents in accessing utility services in the Sub Metro**

Despite the different challenges that residents of the study area encounter in accessing utilities, they were found to still survive in their communities. Hence, this section of the study discusses the coping strategies that have been adopted by the respondents to enjoy utilities in the Effia Kwesimintsim Sub Metro. Below were the coping strategies that the respondents were found to use to enjoy utility services in the area.

*1. Coping strategies for electricity*

To overcome poor access to electricity in the study area, the residents of the Effia Kwesimintsim were found using all sort of alternative sources of power to generate electricity to their homes and business facilities. Predominant of these strategies were the use of dry cell batteries, the use of car batteries for households, small solar devices and backup generators to perform their activities or operations during hours of power outages and load shedding. A resident remarked:

> *We resort to the use of generators, rechargeable lamps and candles during power outage. The cost of fuel is very expensive so we hardly use the generator so we mostly use the rechargeable lambs than the candle since the candle is not safe and can catch fire at any time (Assemblyman IDI, 2017)*

Within the study area, some average and high income household heads in the course of the study purported that they were encouraging themselves to cooperate and purchase solar panels to power the homes. Even though the strategy is an expensive idea but deemed fitting of resolving their issue of having power cuts often due to officials' un-readiness to address their needs. Some households were found to have bought standby generators that they fuel to power their homes anytime there are power outages or unstable electricity supply.

*2. Coping strategy for water*

Purchasing of water is a common strategy in many developing urban communities in developing countries and popularly called water vending.

Water vending is said to be an old phenomenon in this study area. Therefore, households and businesses within the study area were found using different means of water supply as a coping strategy to make sure water sources were available to their homes and other facilities for usage throughout the year. Significant examples of these coping strategies include, the use of tanker trucks, trolleys, tricycles, among others to get water to their homes.

To the respondents, sometimes prices of such water really fluctuates and makes it difficult for them to pay fees for the charges of water supply but since water is vital to one's survival, without it they still purchase it. Even so the respondent commended the efforts of people assisting them with this strategy of water supply since it would have been very unbearable living in the communities without any potable and constant water supply to their homes. Resident respondents commended the effort of water vendors as well for assisting them with this strategy of water supply. This means of released them of the stress of insufficient water supply in the study area even though their activities are considered informal. This conforms to the World Health Organisation, (2000), that the activity of water vending could be considered formal or informal by the context it is being carried out but yet remains one of the oldest outstanding coping strategies in water-scarce developing areas.

*Rainwater harvesting*

According to Geerts and Raes (2009), rainwater harvesting is one of the common means of accessing water by urban and their peripheral residents during rainy seasons or anytime that it rains. This is no different from the experiences from the field data collection for this study in the study area. This

activity however involves the means of accumulating and storing rainwater, before it gets to the earth's aquifers for immediate or later use. The common method in the study area is the collection of rain water from the roofs of houses and tents. Therefore, in the rainy seasons, water is collected with simple method of using barrels, buckets, bowls and sometimes dug pits. This serves as a temporal source of drinking water for some households and the major source of water for some households too.

A female tenant was of the view that:

> *The rainwater is mostly used for bathing, flushing water closets and the washing of utensils in the home. The rain water is hardly used for drinking and cooking unless there is severe water shortage. This is because, the cost of treating is very expensive (Female Tenant IDD, 2017).*

Other uses of this type of water source is meant for washing clothes, utensils, cooking and almost all other activities that water could serve. Respondents attested to the fact that they sometimes even preferred the use of rain water to some other sources since it lathers well with soup and helps in saving money for the purchasing of soup and other materials for washing and cleaning homes and cars, watering grass, gardening to mention a few.

*Drilling of boreholes and wells as coping strategy*

Another coping strategy intensified by the residents of the Effia-Kwesinimtsim sub metro in dealing with water accessibility is the drilling of bore holes (mechanical process) and wells (manual method) for both household use and commercial purposes. Depending on the topography of the area, some wells were dug about 10ft to 35ft and even above. For the mechanical wells also

known as the boreholes, some even exceeded 90ft as it is necessary to touch the water table mainly for constant supply of water. Some residents even claimed that:

> *The well and borehole water was sometimes better than the pipe borne water from the Ghana Water Company Limited. Some rich people even treat it and package it for sale and we enjoy drinking them as well. Some are very clean and feels good when you drink* (Resident IDI, 2017).

Unfortunately, some dug wells or boreholes had stopped the supply of water because they were poorly constructed, thus, the seepage of water had ceased. Notwithstanding, even with some of these challenges, wells and boreholes constitute one of the main sources of water for residents. Since they are very close to them, it is easy to draw water, especially with the use of pumping machines and other flexible means. Hence, residents seen using the water obtained from these sources for almost all their household activities and sometimes use for making sachets water for public consumption.

**Summary**

This chapter has provided information on the socio-demographic characteristics of respondents. It also looked at the description of the extent of urban growth in the sub metro, thus the rate of change in LULC in the sub metro is at an increasing rate. Other sections treated access to utility services, institutional arrangement for handling utility services in the sub metro and the coping strategies adopted by residence in accessing utility services at the sub metro.

The study revealed that utilities are available in the sub metro but there are limiting factors. Factors such as lack of proper collaboration between institution (utility providers and land planning management) and the residence. This is affecting the accessibility of utilities in the sub metro in meeting the growing demand for utility services. Thus, the residents have coping strategies to meet the high demand of utility services in the sub metro. This study has brought to light the similarities and differences of access to utility services in the sub metro in the Metropolis. The next chapter of this thesis focuses on the summary, conclusions and recommendations of the study.

# CHAPTER FIVE

# SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

## Introduction

This chapter provides a summary of the whole work and major findings that came out of this work. The conclusions of the study as well as the study's recommendations are captured under this chapter. The chapter ends with areas suggested for further studies as well as the contribution of the current study to knowledge.

## Summary of the Study

The study sought to assess urban growth and access to utilities in sub-urban settlements. Specifically, the study was undertaken to:

i. Describe the effects of urban growth of Sekondi-Takoradi on Effia-Kwesiminitsim sub metro.
ii. Analyse the residents' access to major utility services in Effia-Kwesimintsim sub-metro.
iii. Assess the institutional arrangements for managing utility supply in the Effia-Kwesimintsim sub metro.
iv. Assess the coping strategies adopted by the residents in accessing utility services in the sub metro.

The instruments employed in the study included interview schedule (questionnaires), in-depth interview guide, remote sensing tool (ERDAS Imagine 13) and observation check list.

In order to achieve the objectives of this study, primary data were collected from households on their awareness and limiting factors affecting their access

to utility services and coping strategies adopted to access utility services. For much in-depth information on the topic under study, data were obtained from institutions concerned with Utility Services (Water and Electricity) and Land Planning and Management in the Effia-Kwesimintsim sub metro. Data collected from the study institutions (TCPD, ECG and GWCL) focused on their activities, services to the public, finances and logistics, co-operation/collaboration with other institutions and their challenges.

Data were also collected from assembly members of the four selected communities Apremedo, Anaji, Assakai and Whindo in the study area since they were in the best position to give accounts on how utility services are accessed in the sub-metro To establish the extent of urban growth that has taken place in the last 15 years between 1991 to 2016 at STMA and its effects on Effia-Kwesimintsim remote sensing techniques were used to describe the LULC changes. The whole data for the study was collected from the 30th March to 4th May, 2017.

The total sample for the study was 253 respondents. In all, 237 respondents were covered due to unavailability of some of the respondents. Out of the total number sampled, 230 were household heads and seven were key informants (one for Land Planning and Management Institution, two were utility service providers and four Assembly Men and Women). Both probability and non-probability sampling technique were used to select the respondents. A systematic sampling technique was used to select household heads to give equal chance of being selected to be part of the study. The assembly members and heads of selected institutions were purposively chosen for scheduled interview.

**Summary of Main Findings**

- The respondents were within ages 38 – 47 representing 38.7% and this formed the majority of respondents at Effia-Kwesimintsim sub metro. Furthermore, 38.3% of the respondents had formal education up to the basic (primary) level of education in the sub metro.
- The rate of change of LULC in the sub metro is very high due to urban growth taking place in the STMA. For instance, water, farm lands, open and close forest in STMA which constituted 82% of the total surface area in 2002 reduced to 53.4% in the year 2016 while surface area for built up increased from 17.7% in 2002 to 46.6% in 2016.
- There is an urban expansion in the sub metro as result of urban growth taking place in the STMA and this has led to a rapid population increase and unplanned growth in the Effia-Kwesimintsim sub metro. This has resulted in an increase in demand for utilities in the sub metro. Although there are availability of public utilities such water and electricity they are in limited supply.
- There are 201 respondents who had access to electricity while 108 respondents had access to water in their homes. In terms of cost, it cost less that is between Gh₵501 to Gh₵1000 to extend electricity to homes than extending water which cost between Gh₵1001 and Gh₵1500 in the homes of the respondents. In terms of time, it takes a month to extend water to the homes of respondents while is takes about a week to extend electricity to the homes of respondents. On the whole, it was found out that quality of services provided by GWCL is better than that of the services provided by ECG.

- Two major factors limit access to utilities in the study area and these were delays in getting utility services in the homes of the residents by service providers and inadequate housing support by government.
- All institutions responsible for the handling of utility services consulted faced the challenge of the role of middle men and the activities of private contractors who are contracted to extend utility services to the homes of residents in the sub metro. They delay and charge huge sums of money from residents which leads to the delay in the extension process and makes it difficult for the residents in accessing utility services. All these are happening as a result of lack of education for the public by utility providers.

  Residents in Effia-Kwesimintsim sub metro resort to alternative sources of utility sources to cope with their inability to access some utility services in their homes. These alternative sources include solar devices, backup generators, rain harvest, dunging of wells and drilling of boreholes.

**Conclusion**

Based on the findings of the study, four broad conclusions can be drawn. There is rapid urban growth taking place in the Effia-Kwesimintsim Sub-metro and this is evident in the LULC.

With respect to utility services, majority of the residents have more access to electricity in their homes than water. The cost of extending water supply into the homes is higher than that of electricity. In terms of quality of

services provided by utility service providers to the public, GWCL was found to provide better services than ECG.

Moreover, there are laid down processes for the provision of utility service but there is poor collaboration among the utility service providers and other key land management institutions. This therefore poses a lot of challenges to residents in the Sub-metro in accessing utilities.

Last but not least, residents of Effia-Kwesimintsim undertake some coping strategies to help them address the problem of limited access to utility services in the sub metro. These strategies include, drilling of boreholes and well, rain harvest, generators, installation of solar panels and among others.

**Recommendations**

To reduce the high rate of change in LULC in Effia-Kwesimintsim, the government should endeavour to help in solving the problem of urban growth by providing affordable housing to residents and also encourage vertical development of lands rather than horizontal development. This will help control LULC in the sub metro.

Also, Effia-Kwesimintsim sub metro in collaboration with the Town and Country Planning Department, Utility Service Providers and any other Related Land Management Institutions should intensify the already existing educational programmes to sensitise the residents on the importance of access to utilities. This could take the form of community-based workshops, television shows and radio programmes through which residents of the study area could be well informed or educated on urban growth and access to utilities.

Furthermore, for urban growth and access to utilities to be sustainable, there should be stakeholder such as chiefs, Member of Parliament of the STMA, Metropolitan chief executive and opinion leaders' involvement in all the urban planning processes. This could be achieved through collaboration at multi-level and multi-stakeholder governance and cross-sectorial cooperation in the study area. Wide and open consultations are critical to the development of the sustainable utility services, provision strategies and projects. This is because there are many public and formal sector players in utility provision.

**Contribution to Knowledge**

This study has contributed to knowledge in the following aspects: first, it has provided a broad-based knowledge on urban growth and access to utilities in sub-urban settlement in the Effia-Kwesimintsim sub- metro which has received less attention in the literature. Secondly, it has contributed to the development of strategies and a conceptual framework that are capable of helping to manage urban growth and access to utilities for residents as well as utility providing authorities to meet the growing needs of sub-urban settlement.

**Areas for Further Research**

This study focused on urban growth and access to utilities in sub-urban settlements in the Effia-Kwesimintsim sub -metro. Future studies can consider the effects of utilities on the livelihood of individuals in sub- urban settlement. Such studies will bring to light the role utilities play in the lives of individuals in sub-urban settlement. More also, further study cancompare study of Effia-Kwesimintsim sub- metro and other sub -metros in the STMA to analyse the similarities and differences of access to utility services in sub-urban areas.

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# APPENDIX A

## QUESTIONNAIRES FOR RESIDENTS

## UNIVERSITY OF CAPE COAST

## DEPARTMENT OF GEOGRAPHY AND REGIONAL PLANNING

TOPIC: URBAN GROWTH AND ACCESS TO UTILITIES ON SUB-URBAN SETTLEMENTS: A STUDY OF KWESIMINTSIM SUB METRO

Access to utility services in sub-urban settlement has been of great challenge for both residence and service providers. The discovery of oil in the region in recent times have accounted for the influx of people, companies and other commercial activities that are economically efficient in attracting people into the area thus leading to uncontrolled springing up of settlements. This raises questions whether the existing utilities will be able to match the population growth. Thus, most of the facilities have exceeded their carrying capacities.

This study seeks to gather basic data on the institutional arrangements for accessing utility services. This document is an instrument for my master thesis on the topic: ***Urban Growth and Access to Utilities in Sub-Urban Settlements: A Study of Effia- Kwesimintsim Sub Metropolitan area in the Western Region.***

This interview will last for approximately 20 minutes and your participation is completely voluntary. Your identity will remain anonymous and all answers are confidential. This research is purely for academic purposes and nothing else and so, feel free to give me credible information to ensure the success of this research. Your contribution is of much relevance for this study and all persons or institutions interested in urban growth and utility services in sub urban

settlements in Ghana. Please respond to the following questions by filling in the blank spaces or ticking **[√]** where appropriate.

**Section A: DEMOGRAPHIC BACKGROUND OF RESPONDENTS**

1. Sex : a. Male [ ] b. Female [ ]
2. How old are you? …….
3. Level of Education:
    a. No formal education [ ] b. Basic [ ] c. Secondary [ ]
    d. Tertiary [ ]
4. Religious affiliation:
    a. Christian [ ] b. Islam/Muslim [ ] c. Traditionalist [ ]
    b. Others: specify……
5. Ethnicity:

    ……
6. What is your main Occupation?

    ……
7. How long have you stayed in this community?

    ……
8. How many people live in the shared house with

    you?……
9. Which basic facility do you lack in your house?
    (a) Bathroom [ ]
    (b) Kitchen [ ]
    (c) Toilet [ ]
    (d) Water (pipe-borne /borehole /well) [ ]

(e) Electricity [ ]

(f) Telecommunication [ ]

(g) All of the above [ ]

(h) None of the above [ ]

10. Which facilities are not adequate in your community?

(a) Educational [ ]

(b) Health [ ]

(c) Water (pipe-borne /borehole /well) [ ]

(d) Electricity [ ]

(e) telecommunication) [ ]

(f) Recreational facilities [ ]

(g) Road [ ]

(h) Sanitation [ ]

(i) None of the above [ ]

(j) Other [ ], Specify ……..

11. Status of Respondent. a. Tenant [ ] b. Landlord/ lady [ ]

**Section B: Awareness on utility accessibility in Effia-Kwesimintsim sub metro.**

Please indicate the extent of your agreement on the scale where 5= Strongly Disagree (SD), 4= Disagree (D), 3 = Agree (A) and 4 = Strongly Agree (SA).

| **Statements** | | **A** | **SA** | **D** | **SD** |
|---|---|---|---|---|---|
| A | There exist a laid down process of accessing utilities | | | | |
| B | All utility regulations by utility providers must be met before utility services can be extended to my home. | | | | |
| C | Planning authorities must be notified before utilities can be extended to houses. | | | | |
| D | I have to complete my house before I can get access to utilities in my house. | | | | |
| E | Full payment needs to be made before utilities services are provided in households. | | | | |

**Section C: factors limiting the accessibility to utility services in Effia-Kwesimintsim sub metro.**

12. Please indicate the extent to which the following factors limits residents in Effia-Kwesimintsim sub metro in accessing utility services. 1=Very low (VL), 2=Low (L), 3=High (H), 5=Very High (VH)

| **Determinants** | | **VH** | **H** | **L** | **VL** |
|---|---|---|---|---|---|
| a | Low level of education | | | | |
| b | Low income level | | | | |
| d | Inadequate housing support by government | | | | |
| e | Inadequate information on access to utilities by service providers | | | | |
| f | Delays in getting utilities in the house by service providers | | | | |
| g | Inadequate enforcement of utility polices | | | | |
| h | Lack of sanctions against culprits/offenders in accessing utility services. | | | | |

**Section D: ACCESS TO ELECTRICITY**

13. Do you have electricity in your house? Yes [ ] No [ ]. If yes, (skip question 14)
14. If No, why?
    a. High cost for extension [ ]
    b. High cost of utility bills [ ]
    c. Yet to extend [ ]
    d. Others (specify) ---------- [ ]
15. What are the sources of electric energy in your house?
    a. Hydro
    b. Solar
    c. Thermal
    d. Biogas
    e. Wind
    f. Others specify ……
16. How long have you been enjoying electricity in your house?
    a. For some months month now
    b. A year
    c. Five years
    d. More five years
17. How much do you spend on electricity services in a month?
    a. GH₵100 and below
    b. GH₵101 - GH₵500
    c. GH₵501 - GH₵1000
    d. GH₵1000 and above

18. How much did it cost you to extend the electricity to your house?

    a. GH¢ 1 – 500 [ ]

    b. GH¢ 501 – 1000 [ ]

    c. GH¢ 1001 – 1500 [ ]

    d. GH¢ 1501 – 2000 [ ]

    e. GH¢ 2000 and Above [ ]

19. What challenge (s) did you encounter in extending electricity to your house?

    a. Purchase of extra poles [ ]

    b. High cost of acquiring meter [ ]

    c. High labour costs [ ]

    d. Cumbersome institutional procedure [ ]

    e. Other (Specify) [ ]……

20. What are the challenges you face in using electricity services in your area.

    a. Low current [ ]

    b. Frequent power outage (dumso) [ ]

    c. Inadequate prepaid vendours [ ]

    d. Others (Specify) ……

21. Rate the quality of service of electricity services

    a. Very Good [ ]

    b. Good [ ]

    c. Indecisive [ ]

    d. Very bad [ ]

    e. Bad [ ]

22. What are the coping strategies adopted in accessing electricity in your household?

.....

.....

.....

.....

.....

**Section D: ACCESS TO WATER**

23. Do you have piped water system in your house? Yes [ ] No [ ]

24. If no, why?

    a. High cost of extension [ ]
    b. Availability of Community water supply [ ]
    c. High cost of utility bills [ ]
    d. Others (specify)……

If yes;

25. What is the source of water in your house?

    a. Borehole
    b. Well
    c. Rainwater
    d. Supply by Ghana water company
    e. Others specify [ ] ……

26. How long have you been enjoying water supply in your house?

    a. For some months now
    b. A year

c. Five years

d. More five years

27. How much do you spend on water in a month?

a. GH₵100 and below

b. GH₵101 - GH₵500

c. GH₵501 - GH₵1000

d. GH₵1000 and above

28. How much did it cost you to extend the electricity?

a. GH¢ 1 – 500 [ ]

b. GH¢ 501 – 1000 [ ]

c. GH¢ 1001 – 1500 [ ]

d. GH¢ 1501 – 2000 [ ]

e. GH¢ 2000 and Above [ ]

29. What challenge (s) did you encounter in extending electricity to your house?

a. High cost of extension [ ]

b. High cost of meter acquisition

c. Cumbersome institutional procedure [ ]

d. Others (specify) …….

30. What are the challenges you face in using water services in your area.

a. Poor quality of water [ ]

b. Not flowing regularly [ ]

c. High cost of water bills [ ]

d. Other Specify [ ]……

31. Rate the quality of service of electricity services

    a. Very Good [ ]

    b. Good [ ]

    c. Indecisive [ ]

    d. Very bad [ ]

    e. Bad [ ]

32. What are the coping strategies adopted in accessing electricity in your household?

    .....

    .....

    .....

## APPENDIX B

## INTERVIEW GUIDE FOR INSTITUTION

**UNIVERSITY OF CAPE COAST**

**DEPARTMENT OF GEOGRAPHY AND REGIONAL PLANNING**

**TOPIC:** URBAN GROWTH AND ACCESS TO UTILITIES ON SUB-URBAN SETTLEMENTS: A STUDY OF KWESIMINTSIM SUB METRO, WESTERN REGION.

**Introduction**

Access to utility services in sub-urban settlement has been of great challenge for both residence and service providers. The discovery of oil in the region in recent times have accounted for the influx of people, companies and other commercial activities that are economically efficient in attracting people into the area thus leading to uncontrolled springing up of settlements. This raises questions of whether the existing utilities will be able to match the population growth. Thus, most of the facilities have exceeded their carrying capacities.

This study seeks to gather basic data on the institutional arrangements for accessing utility services. This document is an instrument for my master thesis on the topic**: *Urban Growth and Access to Utilities on Sub-Urban Settlements: A Study of Effia- Kwesimintsim Sub Metropolitan Area in Western Region.***

This interview will last for approximately 40 minutes. Your identity will remain anonymous and all answers are confidential. This research is purely for academic purposes and nothing else and so, feel free to give me credible information to ensure the success of this research. Your contribution is of much relevance for this study and all persons or institutions interested in urban growth and utility services in sub urban settlements in Ghana.

**Date of interview: ……**

**Time of interview: Starts …… and Ends ……**

**Place of interview:**

**Gender of interviewee:**

**Institution / Organisation:**

**Position / title of interviewee:**

**(a) General Information**

1. Describe the nature of your institution.
2. How many members constitute the total staff strength of the institution?
3. Are you satisfied with the staff strength at your disposal? **Yes/No** Give reasons.
4. Using a rating scale of very high, high, low and to very low; specify the performance of your staff. What are your reasons?
5. What are the functions of your institution in the provision of utility services in the Effia-Kwesimintsim sub metro?

**Finances and logistics**

6. How is your institution financed/funded?
7. Are your funds enough to carrying out your operations? **Yes/No.** Give reason
8. What are some of the logistics that your institution uses in its operations?
9. Are this logistics adequate enough in provide services to the public?
10. What is the current state/condition of these logistics?
11. Does the condition of the logistics affect the quality of your performance? **Yes/No.** Give reasons

**Co-operation/Collaboration with other Institutions**

12. Which other institutions do your outfit co-operate with to ensure the proper delivery of services to the public?
13. What services does your institution offer in such collaboration?
14. What are the challenges associated with such institutional collaboration?

**Services to the Public**

15. What services does your institution provide to the general public?
16. Can you explain the procedure involved in the provisions of institutional services to the public?
17. What is the coverage level (in percentage) of electricity or water or telecommunication in the sub metro?
18. Have you extended power or water or telecommunication services to every house in these areas? Give reasons.
19. To what extent do residents in the sub metro patronise your services? Give account.
20. What are the safety requirements in the provision of utility services? Give reasons.
21. How often does your services involve the public? Give account.
22. Do you encounter cases of bureaucracy, bribery and corruption in your institution in the performance of your functions?

**Challenges faced by Institutions**

23. What are the challenges faced by your institution with respect to the provision of utility services?
24. Among the problems, which one affects your institution most?

25. How do the problems obstruct your operations?
26. Does the planned nature of an area create any advantage/disadvantage for your institution in the provision of services? Give an account.

**Way forward**

27. Suggest ways of improving on the provisions of services offer to the residents in the Kwesimintsim sub metro.

## APPENDIX C

## INTERVIEW GUIDE FOR ASSEMBLYMEN AND WOMEN

**UNIVERSITY OF CAPE COAST**

**DEPARTMENT OF GEOGRAPHY AND REGIONAL PLANNING**

**TOPIC:** URBAN GROWTH AND ACCESS TO UTILITIES ON SUB-URBAN SETTLEMENTS: A STUDY OF KWESIMINTSIM SUB METRO, WESTERN REGION.

**Introduction**

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This interview will last for approximately 40 minutes. Your identity will remain anonymous and all answers are confidential. This research is purely for academic purposes and nothing else. Thus, please feel free to give me credible information to ensure the success of this research. Your contribution is of much relevance for this study and all persons or institutions interested in urban growth and utility services in sub urban settlements in Ghana.

**Date of interview: ……**

**Time of interview: Starts …… and Ends ……**

**Place of interview:**

**Name of interviewer:**

**Gender of interviewee:**

**Institution / Organisation:**

**Position / title of interviewee:**

1. How long have you lived here?
2. Do you have any interactions with utility providers in the metropolis?
3. Are you are aware of any lay down procedure in acquiring utility services?
4. Do you think utility allocations in this area have achieved its intended purposes?
5. What problems do people in your locality face in accessing utilities?
6. Are you happy with the distribution of utilities services in your community? Give reasons
7. What challenges do utilities providers pose to the community in the provision of their services?
8. What sanctions are being given to people who engage in illegal acts in accessing utility services in your locality?
9. Suggest measures to be used in addressing utility accessibility in your locality?

# APPENDIX D

## INTRODUCTORY LETTER

UNIVERSITY OF CAPE COAST
COLLEGE OF HUMANITIES AND LEGAL STUDIES
FACULTY OF SOCIAL SCIENCES
DEPARTMENT OF GEOGRAPHY & REGIONAL PLANNING

Our Ref: GRP/G.4[A]/Vol.2/17/39

Your Ref:

UNIVERSITY POST OFFICE
CAPE COAST, GHANA
WEST AFRICA

2nd May, 2017.

Dear Sir/Madam,

**LETTER OF INTRODUCTION**
**TO WHOM IT MAY CONCERN**

**Mr. Martin Maxmillian Acquah,** is an M.Phil Student at the Department of Geography and Regional Planning, University of Cape Coast. His research focus is on: **Urban Growth and Access to Utilities in Peri-Urban Settlements: a study of Kwesimintsim Sub-Metro, Western Region of Ghana.**

Mr. Martin Maxmillian Acquah is applying for the Association of African Universities (AAU) internship grant to enable him undertake a twenty-four (24) weeks internship programme.

He intends to undertake the internship at the Town and Country Planning Department, Cape Coast, Ghana.
The Department believes that embarking on the internship will offer him the opportunity to gain the necessary practical experience.

We therefore support his application and would be very grateful if he is considered for internship grant.

Thank you.

Yours faithfully,

Dr. Simon Mariwah.
**HEAD**

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Fax: 03321-34072 E-mail: geography@ucc.edu.gh