LAND USE PLANNING AND ITS IMPACT ON THE PHYSICAL DEVELOPMENT OF TARKWA NSUAEM MUNICIPALITY

By

MALCOLM D. A. YENDAW

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DECLARATION

I hereby declare that this submission is my own work toward the MSc. and that, to the best of my knowledge, it contains neither materials previously published by another person or materials which have been accepted for the award of any other degree by this or any other university except where due acknowledgement has been made in the text.

Yendaw Malcolm D. A (PG7191712) ---------- ----------

(Name of Student and ID) Signature Date

Certified By:

Prof. Kwasi Kwafo Adarkwa ---------- ----------

(Name of Supervisor) Signature Date

Certified By:

Dr. Daniel K. B. Inkoom ---------- ----------

(Head of Department) Signature Date

ABSTRACT

Land use planning has been recognised as being crucial in promoting a country's physical and socio-economic development. A number of commentators have suggested that the process is essential in ensuring that land related activities are developed and organised with due consideration for land use principles which include safety, convenience, efficiency, energy conservation, environmental quality, social equity, social choice and amenity. However, despite such importance, the specific impact of land use planning on the development of human settlements has rarely been explored. The objective of this study was to contribute to the discourse towards unveiling the impact of land use planning on physical development of towns in Ghana.

To reach this objective, a cross sectional research design was adopted to inform the selection of the study areas and the generalisation of the study findings. The assessment of the impact of land use planning on physical development of towns was done using a comparison of two communities; New Atuabo and Abonteakoon in the Tarkwa Nsuaem Municipality. Two groups of respondents were used for the study; heads of four institutions and residents of New Atuabo (81) and Abonteakoon (79). A descriptive statistical tool was used in analysing the field data collected through the administration of questionnaire.

The study revealed that there is a significant level of difference in the physical development between the planned and unplanned communities. It further demonstrated that, statistically, land use planning has an impact on the development of settlements. Optimising space for housing development and improving households' access to utilities and socio economic facilities; among others are such impacts of land use planning on the development settlements.

The study therefore recommends that, government and other stakeholders should pursue proper land use planning through the preparation and implementation of district spatial development framework, structural plans and local plans for communities without such plans, while people are made to comply with such regulations. Necessary infrastructure should also be provided to make conducive living, in the unplanned neighbourhoods possible.

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LIST OF ACRONYMS

AUMA	-	Alberta Urban Municipalities Association
AVS	-	Abontiakoon Vertical Shaft
CBD	-	Central Business District
ECG	-	Electricity Company of Ghana
FAO	-	Food and Agriculture Organisation
GFG	-	Goldfields Ghana Limited
GTZ	-	German Technical Cooperation
GWCL	-	Ghana Water Company Limited
LOGODEP	-	Local Government Development Programme
MEST	-	Ministry of Environmental Science and Technology
MHPP	-	South Sudanese Ministry of Housing and Physical Planning
MMDAs	-	Metropolitan Municipal and District Assemblies
NORCAP	-	Norwegian Capacity
PHC	-	Population and Housing Census
POS	-	Public Open Spaces
TCPD	-	Town and Country Planning Department
TNMA	-	Tarkwa Nsuaem Municipal Assembly
UN	-	United Nation
UNCHS	-	United Nations Centre for Human Settlements
UNECE	-	United Nations Economic Commission for Europe
UNEP	-	United Nations Environmental Programme

CHAPTER ONE
OVERVIEW OF THE STUDY

1.1 Introduction

Physical development of towns is the growth and change in population as well as the consumption of land and land resources for the distribution and expansion of physical activities (Kim, 2010). These physical activities may range from provision of shelter and social services, food production, recreation, extraction and processing of materials; among others. Hence, physical development is shaped under the influence of two broad sets of forces – population and the consumption of land.

The consumption of land occurring at various spatial levels is the expressions of space and human dynamics as well as their interactions which are mediated by land, which when not intervened could be detrimental. Land use planning therefore, becomes crucial in ensuring effective and sustainable physical development through the achievement of land use planning principles. These principles which include safety, convenience, efficiency, energy conservation, environmental quality, social equity, social choice and amenity are the main drivers underpinning this research as these are the variables against which data gathered would be compared with, in order to draw inferences upon which policies can be formulated.

The essence of land use planning is said to be based on the notion that proper land use planning actually enhances public interest, by (i) eliminating negative externalities among conflicting land uses (Bailey, 1959; Lafferty & Frech, 1978); (ii) protecting natural environments and consequently promoting the location-specific distribution of public facilities (Correll, Lillydahl, & Singell, 1978; Randolph, 2004); (iii) providing adequate amount of public goods and services more efficiently (Muro & Puentes, 2004); and (iv) reducing uncertainty and transaction costs involved in the land development processes (Alexander, 1992; Alexander, 1994; Dawkins, 2000).

Some studies have also demonstrated that there are undesirable consequences for the failure to plan and intervene in land use activities, such as the enhancement of uncontrolled development power of land owners (Thorson, 1997), the rapid increases in land value due to limited supply and the spread of haphazard development problems (Quigley & Raphael, 2004); areas without planning schemes are likely to

heighten sprawling development, causing a myriad of undesirable environmental consequences (Razin & Rosentraub, 2000; Carruthers & Ulfarsson, 2002).

There are suggestions in recent times that, unplanned land uses hinder economic growth by excessively constraining land supply for urban uses, increasing the demand and price of land significantly, and limiting not only land but also labour supply for business activities (Glaeser, Gyourko, & Saks, 2006). In other words, absence of land use planning may have negative effects, not only on the spatial aspects of development but also the performance of economies which offset the benefits stemming from developmental efforts in a particular spatial setup.

1.2 Problem Statement

In the Tarkwa Nsuaem Municipality, large tracts of land are cleared on daily basis – particularly in the urban areas – for physical development purposes. These purposes are residential, commercial, educational, industrial and recreational; among others. Some settlements where these development activities are taking place have no planning schemes and others have, but are not being adhered to by developers.

Settlements of the Municipality therefore depict two spatial forms: the planned settlements and the unplanned "but developing" settlements. The planned areas (Layout, Cyanide, Tamso, Nsuta, and New Atuabo among others) are at the core of the urban boundaries. These areas consist of both old and modern housing units, well served with water and sanitation facilities and characterized by easy and patterned accessibility.

In contrast to the above, the areas without planning schemes are mainly the areas outside the urban boundaries of the Municipality. They are also characterized by mostly fairly served with sanitation facilities such as refuse bays and collection points, poor access to residential area and other facilities and haphazard siting of building. Examples of such areas include Essamang Kakraba, Ahwitieso, Abonteakoon and Bogrekrom; among others.

The above presents a mix of settlement orientation, accessibility pattern and infrastructure distribution issues and manifests the spatial inequality in the Municipality. Planned areas with orderly development, served with public and other facilities contrast sharply with areas without land use plans or schemes.

Considering the current physical development in the Tarkwa Nsuaem which is characterized by an increase in residential, commercial and industrial land use and the reduction in open spaces and vegetation cover; one cannot deny the possible chaotic scenario in future in the absence of land use planning. It is therefore not only necessary to examine the process of land use planning, but also, an understanding of how the impact of land use planning for physical development can facilitate future development decisions in the Municipality since currently, this phenomenon is only partially understood.

1.3 Research Questions

The major research question of the study is: what is the impact of land use planning on physical development in the Tarkwa Nsuaem Municipality? The following specific questions were investigated during the research:

i. How does land use planning influence residential development in the Municipality;
ii. How does land use planning influence the provision of public utilities in the Municipality; and
iii. How does land use planning influence public facility distribution and accessibility?

The null hypothesis (h0) to be tested in the study is; land use planning has no impact on physical development. The alternative hypothesis (h1) is land use planning impacts on physical development.

1.4 Research Objectives

The broad objective is to study the impact of land use planning on physical development in the Tarkwa Nsuaem Municipality. The specific objectives of the study are:

i. To assess the relationship between land use planning and housing development;
ii. To assess the relationship between land use planning and the provision of public utilities;
iii. To assess the relationship between land use planning and the distribution and accessibility of public facilities; and

iv. To make recommendations for enhancing land use planning in relation to physical development in the study area;

1.5 Methodology of Study

To achieve the stated objectives, the study adopted a cross sectional research design in undertaking the research. The design informed generalisation of the study findings. The findings were based on quantitative surveys conducted among households, government institutions and utility service providers in the Municipality. The study relied on quantitative analysis of data collected from the study communities which were selected based on their planning status. The analysis drew on a set of field surveys in which questionnaires were administered to cover the different actors involved in land use planning and physical development of towns: household surveys in which house owners and tenants were interviewed and institutional surveys in which utility services providers and local political authorities specifically the Municipal Planning Unit and Town and Country Planning Department of the Assembly were interviewed. Literature was also reviewed to further explore the research questions at a smaller scale than the field surveys.

1.6 Scope of Study

The geographic scope of the study is the Tarkwa Nsuaem Municipality in the Western Region of Ghana. The location has been considered and selected because it presents visible cases of areas “with” and “without” land use plans. It is also one of the densely and rapidly populated areas of land use change in the region.

The study seeks to assess the relationship between land use planning and the housing development in the study areas. It also seeks to assess the relationship between land use planning and provision of public utilities as well as the distribution and accessibility to public facilities. Emphasis was placed on tenants, landlords, utility providers and the local government authorities directly involved in land use planning and the provision of public utilities and facilities.

1.7 Justification of Study

Land use planning and its impact on the various dimensions of development have generated a lot of research interest (see, for example, Chapin and Kaiser, 1979 for the case of urban land use planning; Meyer and Turner 1994 for regional and higher level studies). This study is expected to contribute to building knowledge base in the growth and development of settlements within rapidly growing municipalities.

The recommendations of the study are expected to guide policy-makers in the formulation of policies directed at management of land resources and physical development in the study area. This is also expected to help address some of the negative consequences resulting from the absence of land use planning in areas or settlements in the Municipality.

Finally, the study is expected to make some recommendation that would help to check haphazard and uncontrolled physical development thereby achieving the goal of planned development in terms of aesthetics, safety and compatibility of land use. Also, information gathered from this study is expected to serve as a database that would enhance the performance of institutions involved in land use planning and management.

1.8 Limitations of the Study

The first limitation of the study was the change of ownership of houses and improper records keeping behaviour of the house owners. This constrained the study's attempt at evidently determining the exact date and cost of extension of utilities to the houses. In view of the limited data on the actual cost and date of extension of the utilities, the study discussed the cost of extension of utilities from the perspective of the current house owners of the visited houses without any other source of data to triangulate it.

Secondly, most of the tenants and house owners were oblivious of the distances of the selected public facilities to their houses. The Municipal Assembly and the Town and Country Planning Department of the Assembly could not also provide information on the average distance of the facilities to most houses in the study areas. This constrained the study in the analysis of location and distance of public facilities to houses. However, the study relied on the perceived walking distances (in minutes) of the respondents to the facilities in the analysis.

1.9 Organization of the Study

This study has been structured into five chapters. Chapter One deals with the introduction, statement of the problem and research questions. Also included in this chapter are the objectives of the study, research scope, limitations and organization of the study.

Chapter Two, the literature review, is a desk study of relevant data in relation to the study. Issues considered include definition of key terms and concepts of land use planning. Previous literature reviewed includes drivers of land use change and the impact of land use planning. It also includes land use administration's response to ineffective land use planning.

Chapter Three presents the research methodology. It includes the study design, data requirement and sources and data collection as well as analysis methods.

Chapter Four focuses on presentation of findings using tables, pictures and charts where necessary. Chapter Five provides the summary of findings, recommendations and conclusion.

CHAPTER TWO
THE CONCEPT OF LAND USE PLANNING AND HUMAN SETTLEMENT DEVELOPMENT

2.1 Introduction

Although there are few studies that explicitly relate land use planning and land use interventions to the physical development of towns, a number of studies have examined the effects of land use planning on other dimensions of human settlement development and suggested that land use planning may have significant implications for the development of human settlements (Egbu, Olomolaiye, & Gameson, 2008; Ihlanfeldt, 2007). This chapter reviews the literature on studies in land use planning and physical development of human settlements. It identifies theories that inform land use planning and elucidates the application and impact of land use planning in selected countries. The selected cases present lessons to enhance an understanding of the situation in the study area.

In order to appreciate the linkage between land use planning and human settlement development, an overview of studies related to the concept of human settlement development precedes the review. This is followed by the role of land use planning in the development of settlements. Consequently, this chapter is divided into four sections. The first section presents the overview of the concept of human settlement development and the second section presents the role of land use planning. The third section presents the impact of land use with identified cases in literature and the fourth section, the concluding section, presents a summary of the review and a conceptual framework on the linkage between land use planning and human settlement development.

2.2 The Concept of Human Settlement Development

Studies on the concept of human settlement development do not always employ similar definition of the term human settlement. Definitions and descriptions of the concept vary with the priority given to the attributes of the term and the context within which it is used. The examination of the concept was therefore done by defining the term human settlement. This is necessary to uncover the alternative definitions and descriptions that is more frequently used in the studies of human settlements especially those offered by official sources of the concept.

2.2.1 Definition of Human Settlement

Sassen (2002) argues that because human settlement brings together the economic, social, political, cultural, and practices of humans, it is not easy to have a unified definition of the term. She further noted that the definition of the term has been subject to multiple forms of knowledge and mix of disciplines. Thus the definition of human settlement differ with the context within which it is used. This has challenged attempts to derive a unified definition of the term. Despite this challenge, attempts have been made to provide the meaning of human settlement.

Newman et al., (1996) define human settlement as encompassing all places where people live and the activities carried in these places provide the population with goods, services and quality of life. Similarly, Noor and Fatima (2011) define human settlement as not only a place where people live but also a place where people work including all population centres ranging from small rural communities to densely populated and developed metropolitan areas. These definitions suggest that human settlement is nothing more than the physical and organised groupings of human habitations which include remote communities, rural centres, towns and cities; among others. They relate the concept to housing which influences various aspects of the human life (Sarkar, 2010).

However, Rai (1997) disputes this notion and states that human settlement is not synonymous with housing but rather it is a physical articulation of the social, political and economic activities of people. In other words, human settlement goes beyond housing to include services and infrastructure (Rai, 1997). The UN-HABITAT (1986 cited in Ministy of Lands and Human Settlement Development, 2000:1) support this assertion by noting that human settlements are not simply housing or for that matter, merely the physical structure of a city, town or village but an integrated combination of all human activity process – residence, work, education, health, culture and recreation among others and the physical structures that support them. In other words, human settlements consist of the built environment, the physical infrastructure and amenities as well as liveability of the environment to the population (Newton, 2006).

Due to these differences in definition, the United Nations Conference on Human Settlements attempted to provide a more refined and holistic definition which stated that, "Human settlements mean the totality of the human community – whether city,

town or village – with all the social, material, organisational, spiritual and cultural elements that sustain it. The fabric of human settlements consists of physical elements and services to which these elements provide the material support". (UNCHS, 1976 cited in Sarkar, 2010, p. 3). According to the UN-HABITAT (1976), human settlements have three physical components which comprise of; Shelter, i.e. the superstructures of different shapes, sizes, types and materials erected by mankind for security, privacy and protection from the elements and for his singularity within a community; Infrastructure, i.e. the complex networks designed to deliver to or remove from the shelter people, goods, energy or information; and services which cover elements that are required by a community for the fulfilment of its functions as a social body, such as education, health, culture, welfare, recreation and nutrition. Sarkar (2010) argues that this definition indeed led to establishment of the concept of human settlement. He indicates that this was formed at the United Nations Conference on Human Settlements (UNCHS) in an attempt to address issues of the growing physical and spatial organisation of human life on the planet. The definition consists of several elements that had previously been considered separately such as housing, transportation, planning and the relationship of these and such other activities as environmental change and national development (Rai, 1997; Sarkar, 2010).

Based on this, UN-HABITAT notes that human settlements function as a system at various levels of human habitation; that is, the global, regional, national, sub-national scale and the local level. The UN-HABITAT therefore defines human settlements as "places where organised human activities take place" (UN-HABITAT, 1986 cited in Ministry of Lands and Human Settlement Development, 2000). The definition implies that the concept is broad, encompassing all facets of human habitation.

The study therefore adopts the definition of the United Nations Conference on Human Settlement as the working defintion of human settlement. It also notes that different criteria are used for describing the concept and its development.

2.2.2 The Concept of Human Settlement Development

Human settlement development is relatively a recent concept which has gained an increasing attention in the last decade both through international community and through grassroots movements (Liangyong, 2000). The attention on this concept has been aimed at sustainable development of human settlement and the urge to address

global issues. The concept of human settlement development has different advocates that follow a more or less streamlined perception. Rai (1997) argues that the concept of human settlement development connects seemingly disconnected related concepts such as housing, transportation, recreation and green environment into a broad framework that can be applied by governments to integrate sustainable solutions. The above thus presents a challenge for a unified description of the concept.

Literature has demonstrated that there is no single accepted definition of human settlement development. This is said to be the intention of human settlement movements and advocates to allow governments and decision makers to define the concept from their own conditions and available means (Devuyst, 1996). However, this also complicates the study of human settlement development, although there have been some scholarly attempts to define the concept. UNEP (1996) defines it as the improvement of the social, economic and environmental quality of human settlements and the living and working environments of all people, in particular the urban and rural poor. Another definition of human settlement development is presented by Devuyst as "the sustainable provision of basic human needs, such as decent housing, water supply, education, sanitation systems and health care services. It is the stimulation of inhabitants to lead a more sustainable lifestyle" (Devuyst, 1996). The above definitions offer a broad perspective of the concept. However, the problem with these broad definitions is the fact that, they often undermine the meaning of the concept and how it can be measured. Lundqvist (2007) therefore believes that human settlement development should be viewed as a broad framework rather than a concept that can be defined.

In order to measure development of human settlements, UN-HABITAT II Conference held in Istanbul, Turkey in 1996, suggested that the definition and promotion of human settlements development should address certain aspects of development which have been summarised in UN-HABITAT II Agenda 21. These aspects of human settlement development include, adequate shelter for all, improved settlement management, sustained land use planning and management, integrated provision of environmental infrastructure (such as water, sanitation, drainage and solid waste management among others), sustained energy and transport systems, sustainable construction industry activities, and human resource development and capacity building for human settlement development (UNEP, 1996). The attainment of these

aspects of human settlement development thus help to distinguish the developed settlements from undeveloped ones.

Based on this, Devuyst argues that development of human settlement is not defined merely on the basis of size, but also on the basis of the diversity of its inhabitants, and the complexity of their activities. He further indicates the developed settlement can be distinguished from an undeveloped by their dependence on the formal provision of services (Devuyst, 1996). In his view, developed settlements tend to rely on established providers of goods and services in the public and private sector to meet their daily needs. The undeveloped settlements seem less reliant on the institutional or corporate provision of goods and services.

This study, thus, defines human settlement development with cognition given to the Agenda 21 indicators of human settlement development above. Human settlement development is defined to mean an improvement in a settlement which is characterised by expansion in housing, improved access to environment infrastructure and services and sustainable human and industrial activities. Due to the physical nature of the parameters used, change can be detected and development can easily be measured. The next subsection therefore focuses on the challenges of the development process of human settlements.

2.2.3 The Challenges of Human Settlement Development

The development of human settlements presents both opportunities and challenges. On the one hand, it accounts for and is expected to deliver both sustainable development and liveable communities. On the other hand, it presents serious challenges for economic, socio-economic and environmental conditions of settlements particularly land utilisation which calls for visionary ideas of land use planning. The successful development of human settlement thus depends on how these challenges are resolved to create communities that are liveable and sustainable. For the purpose of the study, challenges of human settlement development that are directly related or affect land utilisation are examined.

Sudhira (2007) argue that the foremost of all the land related challenges of settlement development is sprawling development. They define sprawl development as the outgrowth along the periphery of cities and along highways. They further assert that the phenomenon is characterized by an unplanned and uneven pattern of growth,

driven by a multitude of processes; leading to inefficient resource utilization. Similarly, Galster (2001) are also of the view that sprawl development is a problem for settlement development. They describe it as a pattern of land use that exhibits low levels of some combination of eight distinct dimensions: density, continuity, concentration, clustering, centrality, nuclearity, mixed uses and proximity. Sprawling settlement is generally caused by rapid urbanization, high rent in city centres and the availability of cheaper accommodation and transportation at peri-urban areas. Such unplanned outgrowths thus, present issues of aesthetic and hygiene in human settlements.

Tangential to the issues of sprawl is the adequacies of the provision of infrastructural facilities and services. Cohen (2005) indicates that city authorities are unable to provide adequate basic services and infrastructure for their citizens due to unplanned, uncoordinated and rapid growth of cities (settlements). Their capacities are often outstripped by the rapid growth coupled with inadequate and inaccurate data on population. Eminsang (2011) also argues that human settlement development expand the number of squatter communities and shanty towns which exacerbate the problems of congestion and sprawl, hampering land management authorities' attempt to improve basic infrastructure and delivery of essential services. The situation is rather worse in developing countries where the financial resources and expertise are lacking (Eminsang, 2011). This is also aggravated by the fact that land tenure and development within the region are also a challenge in itself.

Slum development is also viewed as a challenge of human settlement development. The UN-HABITAT (2003) in their publication "*The Challenges of Slums"* relate the development of slums to the development of the "formal" human settlement. They indicate that the development of the formal human settlement leads to the contiguous development of slums. UN-HABITAT (2010) defines slum as a run-down area of a city characterised by substandard housing and squalor that lack tenure security. The Britannica Encyclopaedia also describes the phenomenon as densely populated area of substandard housing, usually in a city, characterised by unsanitary conditions and social disorganisation. In effect, slums are identified by the quality of housing infrastructure, level and quality of social and economic infrastructural services and facilities provided and the available tenure system.

Cohen (2005) also argues that inadequacies of infrastructural facilities and services to serve the need of people is an issue that emanates from the development of settlements. He indicates that city authorities are unable to provide adequate basic services and infrastructure for their citizens due to rapid growth in settlements. The capacity of these development authorities are often surpassed by the rapid nature of the population growth coupled with inadequate and inaccurate data on inhabitants (Cohen, 2005). Stren (1991) argues that, not only is infrastructure succinctly provided by development authorities, but even the existing ones are poorly maintained by them. He describes the problem of poor and inadequate infrastructure which stems from the development of human settlements by indicating that as the population grows, and as available resources decline, public infrastructure is degraded to a point where settlements are seriously losing their capacity to operate as productive entities (Stren, 1991). Songsore (2009) believes that problems that emanate from the lack of infrastructural facilities are more perilous in the developed settlements than in the developing or undeveloped ones due to such rate of growth in settlement. He cites health problems which result from the lack of sanitation facilities as being great in the urbanised settlements than rural setup.

In the final analysis, it is imperative that the outlined challenges are fully resolved or curtailed in order to harness the benefits of developing a human settlement. Land use planning thus becomes pivotal in resolving such challenges. The next section presents a review of the role of land use planning in human settlement development.

2.3 The Role of Land Use Planning

Authors and researchers of land use planning have diverse perspectives on the concept. The review and definition of the concept vary with the context and purpose of its application. Very often, “town and country planning”, “spatial planning” and physical planning; among other terminologies are used to represent the role and activities of this concept. It becomes clear that different definitions of "land use planning" are employed at various levels of analysis and, most of the time, by different disciplines. This however inhibits more holistic and integrated approaches to the analysis of land use planning and its application in general (Amponsah, 2011). Researchers who have worked on this concept recognize the fact that the process has unique experience and history and thus it is difficult to box it into a unified concept with wide appeal. It is, however, an undeniable fact that theorizing and defining land

use planning greatly helps in simplifying the complex concept for easy understanding, interpretation and management. This section therefore highlights the various meanings of the concept of land use planning as a background against which to explore the linkage between land use planning and human settlement development.

2.3.1 Overview of Land Use Planning

Cullingworth and Nadin (2006, p. 91) in their publication on *"Town and Country Planning in the UK"* noted that, land use planning is concerned with "the problem of coordination or integration of the land use dimension of sectoral policies through a territorial-based strategy". It is argued that the concept is more complex than simple land-use regulation, addressing the tensions and contradictions among sectoral policies such as conflicts between economic development, environmental and social cohesion policies (UNECE, 2008). Thus land use planning plays a major role of promoting a rational arrangement of physical activities on land and reconciling their competing goals.

Various studies have defined the land use planning differently. For instance, Petersen (2002) defines land use planning as a process of balancing the competing demands of the urban functions (i.e. housing, employment, social interaction, leisure and mobility of persons and goods) on the limited urban space. This implies that land use planning denotes the "ordering of the use of land" (Turner II & Meyer, 1994).

Pace (2008) defines land use planning as the way community's physical layout and land uses are planned. Mitchell et al. (2004, p. 1) expand the concept further and state that, "statutory land use planning provides a means of legal control over changes in land use and provides an opportunity to allocate land use to areas best suited to that activity". They further indicate that the practise of land use planning involves the achievement of a balance between a spatial unit's environmental, social and economic needs and demands. Thus balancing the competing demands for the use of land is at the core of land use planning process (Mitchell et al., 2004; Peterson, 2002).

In the publication of Ghana's Town and Country Planning Department (2011) *"The New Spatial Planning Model Guidelines"*, land use planning is viewed as the process of streamlining the use and management of land in a sustainable manner. This definition limits the process to the utilisation of land. Jha et al. (2010), also define land use planning as a "public policy exercise that designates and regulates the use of

land in order to improve a community's physical, economic, and social efficiency and well-being". According to them, it is the responsibility of the public authorities to guide and monitor the use of land for development by preparing land use plans and implementing development control measures effectively.

In a broader perspective, land use planning is defined in the 2002 Spatial Planning Act of Slovenian as an interdisciplinary activity involving planning land use, determining the conditions for the development and location of activities, identifying measures for improving the existing physical structures and determining the conditions for the location and execution of planned physical structures (Slovenian MESPE, 2002 cited in UNECE, 2008). This implies that land use planning helps in the identification of preferred land uses that support local development goals by considering physical and geographical features of the lands and the trends of socioeconomic activities.

In the light of the above definitions, land use planning may be summed up as a statutory government intervention instrument or mechanism for the management of the use of land in the process of urban development to achieve goals and objectives in promoting a more convenient, accessible, attractive and equitable pattern of development for public interest. This definition is in line with the principles of land use planning; that is, "to achieve convenience and harmony in the use of space for all land uses; economy and efficiency in the use of resources and space; enhanced safety and adequate health standards in the space economy; and enhanced aesthetics and serenity in the built environment" (Afrane, 2006, cited in Amponsah 2011).

2.3.2 Principles of Land Use Planning

Jha et al., (2010) argue that regardless of the level of planning, land use planning has principles that guide the process. These principles tend to describe what an ideal planning of the use of land should achieve. This section therefore reviews some principles that guide the process of land use planning.

Land use planning is applied in diverse disciplines and the principles that guide the process are not a "one stop shop" but changes over time. The process also differ with spatial units and the levels at which it is applied. This suggests that the principles and what the process seeks to achieve are not the same everywhere.

Verheye (2009) records that land use planning of the past decades mainly focused on agricultural development. Therefore, land use planning at the time was referred to as a tool for sustainable rural development. Thus the main principle that informed the process was sustainability. Currently, there are myriad of land uses that range from agricultural to residential uses (Verheye, 2009). The planning of these uses thus make land use planning complex and multifaceted in nature (AUMA, 2007). In the same way, the different uses and diverse process of planning the uses of land suggest that, several principles informed the process which are often linked to existing concepts of efficiency, equity and sustainability.

Evidently, the Food and Agriculture Organisation's (FAO) (1993) "*Guidelines for Land Use Planning"* points out that land use, in the long run, must be economically viable and socially acceptable and that the long term aim of its planning should lead to the efficient and productive use of the land. Thus, it describes the principles of land use planning as efficiency and productive use of land. The Town and Country Planning Department of Ghana (2011) also indicates that the overarching goal of planning the use of land is the achievement of integration and sustainability. The principles for guiding the achievement of these goals of integration and sustainability are outlined as: accessibility, densification, reducing urban sprawl, corridor development, protection of the environment (covering physical, social and economic) and mixed use development.

German Technical Cooperation (GTZ) believes that land use planning should create the preconditions required to achieve a type of land use that is environmentally sustainable, socially just and desirable and economically sound. Based on this, the institution recommends that land use planning should be based on the principles of: efficiency, sustainability, future oriented, spatial orientation, and economy, promote dialogue, inclusiveness, sensitivity and accessibility.

Amponsah (2011) also cites Afrane (2006) who indicates that the basic rationale for planning the use of land is the achievement of: convenience and harmony in the use of space for all land uses; economy and efficiency in the use of resources and space; enhanced safety and adequate health standards in the space economy; and enhanced aesthetics and serenity in the built environment. Thus, the principles that drive land

use planning are safety, aesthetics, harmony, convenience and economy. The study therefore adopts the principles of land use planning outlined by Afrane for it analysis.

2.3.3 The Role of Land Use Planning in Settlement Development

Land use planning is deeply rooted in the increasing scarcity of land, the competition for such lands by the growing number of uses and the anticipated risk that these situations might lead to conflicts. The concept is also equally associated with the increasing concern for the protection of the environment and a more sustainable use of space. The concept, which includes the division of land into zones and areas in which certain uses or development is not permitted, dates back to Ancient Roman Era (Raff, 1996 cited in Mitchell et al., 2004:3). The Ancient Romans at the time, used land use planning to improve the compatibility of the use of land for industry and residential purposes. This role of land use planning has been broadened in recent times with application of scientific and multifaceted principles. This section therefore reviews some roles of land use planning.

Peterson (2002) indicates that land use planning plays important and diverse roles in the physical development of nations and often the description of the concept is done by specifying the roles it plays. Similarly, UNECE (2008) points out that land use planning is critical for delivering economic, social and environmental development benefits by creating more predictable conditions of development and by promoting an efficient use of land and natural resources for development. Kim (2010) however indicates that there is a considerable evidence to suggest that land use planning does not promote development of nations but rather dampen the pace of regional economic growth and tend to generate disproportionate impact of the various sector of the economy.

Stead (2001) strongly disagrees with the assertion that land planning plays a marginal role in the development of nations. He points out that land use planning explains up to 55% of the variations in the density of settlements and transport accessibility and movement in the United Kingdom. Hickman (2007) and Hickman and Banister (2007) aligned to the transport accessibility assertion of Stead, indicate that land use and planning explained up to 60% of the change in the travel patterns of households in Surrey in 1998. Thus, land use planning plays a more significant role in transportation and movement patterns of nations.

Land use planning plays various roles in transportation and movement with spatial setups. In Hong Kong for instance, the role of land use planning in transportation is clearly seen in the modal choices of the city. This is said to be due to the densely built environment of the city. The roles of land use planning are confirmed to be independent of the travel time and cost associated with transportation (Banister, 2007). However, Zhang (2004) cited in Banister (2007) believes that the role of land use planning in transportation can be effectively measured when complemented by the cost component of transportation.

The point that land use planning influences the housing density and development for quality national life advanced by several authors, is also reaffirmed by Schill (2004) who indicates that land use planning has the tendency to control the amount of land available for development and the intensity of use of land. Peters (2010) cites the release or zoning policy under land use planning regulation in Australia as a classical instance of land use planning controlling the movement of agricultural land into other urban uses predominating residential land uses. Thus, land use planning regulates the availability of land for housing development and influence housing density in the country.

Mutiara et al. (2008) argue that planned space tends to accommodate intensive housing developoment than unplanned. Thus, planned use of land promotes smart and compact housing development in space than adhoc development. The more effective land use planning that a country has, the smarter and compact its physical development is.

In its contribution to the role of land use planning in the physical development of settlements, the UN-Habitat emphasises that land use planning is an effective tool in the development of infrastructure as well as the provision and distribution of public utilities. This argument was enspoused based on the anticipated benefits of planned settlements to the development of Sudan. These benefits are indicated in the Manual captioned “planning urban settlements in South Sudan” prepared by the South Sudanese Ministry of Housing and Physical Planning (MHPP) in collaboration with UN-Habitat and Norwegian Capacity (NORCAP).

Adam et al. (2005) define public utilities as engineering services including water, sanitation, roads, storm water drainage, energy supply, solid-waste removal and

communications in the form of telephones and postal collection and delivery. Schools, hospitals, public buildings including administration buildings, community facilities including recreation facilities, green areas, temples, playgrounds and solid waste management services and telecommunication services, are also considered to be public facilities and should be available for everybody living in an urban area. Land use planning as a primary tool in settlement planning creates the favourable spatial conditions for locating public utilities to maximise their access to users. It invariably determines how collective utility points can be located to support and enhance recreation, education, safety and other needs in a settlement.

Contrary to the notion that land use planning plays a marginal role in development of settlements, Cullingworth & Nadin (2006) cites Gordon Brown who aligns with the above roles of land use planning in settlement development. He actually points out that, land use planning plays a crucial role in helping everyone to have the opportunity of a decent home and in achieving a truly balanced and sustainable development and growth in regions and nations.

2.4 Impact of Land Use Planning

Land use planning system and activities have implications for development. The impact which emanates from the important roles it plays is enormous and affect the various forms of development that are experienced by settlements across the globe. With respect to spatial or physical development, there are many instances where urban land planning has impacted the spatial structure of settlements. Some of such impacts are still evident in recent times for the attention and appreciation of contemporary planners (Cullingworth & Nadin, 2006).

For instance, land use planning has been significant in controlling growth of cities around the world. Large towns and cities have explosive forces which are often generated by the desire of inhabitants for better living and working conditions. Such forces often lead to sprawling development over green areas and rural settlements which share boundaries with these cities. Land use planning measures such as development right; which advocates that no development takes place without the permission of the local planning authorities; have helped to control growth in large British towns and cities such as London, Lancashire and Wales among others (Cullingworth & Nadin, 2006). In effect, large cities were no longer allowed to

continue their unchecked sprawl over the rural settlements. Thus land use planning is very instrumental in reducing sporadic development .

Another substantial impact of land use planning is its effect on land values. Cullingworth and Caves (2007) argue that land use planning has a marked effect on land values in the sense that planning permission has become an important factor in the determinaton of land values. They explain that values of land in some parts of England have increased not only by the development permitted on that site, but also by the development not permitted on other sites. The authors cite the instance where the value of land in some parts of London for which planning permission for housing development was given increased by virtue of the fact that such development was not permitted in other parts of the same town.

Land use planning has also made it possible for existing towns to expand within the framework of planned and restricted development (Hall, 2005). London, for instance, is able to boast of effective greenbelt which is able to halt sporadic urban land development. Hall (2005) has argued that most of these lands would have been developed into residential or perhaps industrial land uses but for the effectiveness of the land use planning system. Similarly, Hall has indicated that national parks, green belts and other related land uses which are designated through planning have excluded more than 40 percent of Britian's land area from the prospect of large – scale urban development of any kind. Little of these areas had any protection before era of land use planning (Hall, 2005). In Kampala – Uganda, open spaces with varying sizes and functions which were developed out of various planning schemes are still in existence in present times and protected by the strict land use planning laws of the country (Omolo-Okalebo, 2011). This implies that, land use planning is capable of protecting greeen fields and areas of natural vegetation.

Urban land use planning has also contributed to improved accessibility in parts of the world. Accessibility within areas are improved as proposed road networks and other forms of transportation system outlined in land use plans are successfully implemented. In Kamapla, the roads and movement networks in the entire town centre are said to have developed along the broad lines of land use planning implementation. Again the development of railways and siting of the industries in the same city has been credited to the implementation of effective land use planning

(Omolo-Okalebo, 2011). It can be inferred that, without land use planning, efforts at achieving improved accessibility would be unsuccessful.

The control of housing and population densities, improvement of neighbourliness and the experience of total makeover in residential land use of urbanised towns and cities are the prinicipal impact of land use planning. London's East End also celebrates the impact of land use planning after experiencing a total makeover in its residential land use. Formerly a scene of some of London's worst slums, the East End was reconstructed after the site was zoned for high rise buildings. The old terrace houses were replaced by mixed development including tall blocks of flats (Hall, 2005). In Uganda, the spatial form and function of Kobolo as an "European" residential neighbour is credited to the implementation of the effective land use planning of the mid 1940s (Omolo-Okalebo, 2011). The surburb depicts a residential neighbourhood with housing units (usually one storey houses) built on large and spacious plots and well served with water, electricity, sewerage systems and open spaces among others. The surburb has density of less that 15 person per acre (Omolo-Okalebo, 2011). the influence of land use planning on housing density and the provision of utilities as well as the promotion of served communities can never be greater.

Similarly, land use planning coupled with the increased population led to the establishment of new towns in the United Kingdom (Hall, 2005; Cullingworth & Nadin, 2006). A notable characteristic of these new towns was their huge size with each town accommodating over 50,000 housing units (Cullingworth & Nadin, 2006). Other striking feature of these new towns was their spatial design and the fact that four of them were based on substantial existing towns – Northampton, Peterborough, Warrington and Central Lancashire (Cullingworth & Nadin, 2006).

From the above discussions, it can be inferred that, land use planning practise and its application are not only appropriate for addressing new, complex and rapidly changing factors affecting urban areas, but many circumstances directly contribute to reducing urban sprawl, poverty and spatial marginalisation as well as cost of infrastructure provision. Measures are therefore needed for the re-examination of the land use planning contributions to development and subsequent incorporation into economic and social development of towns and communities.

2.5 Land Use Planning in Ghana

Studies on the impact of land use planning in Ghana have mostly focused on the effects of non-conformity of town development with planning schemes or recommendations. Evidently, Forkour's (2010) study discusses the impact of land use planning by focusing on the effects of the non-conformity of the development of three settlements in the Kumasi Metropolis to spatial planning. The settlements are Bomso (first class community), Apatrapa/ Nyankyereniase (second class community) and Ayigya (third class community). The study assessed the relationship between the absence of some infrastructural facilities and the effectiveness of land use planning that existed in these communities to establish the impact of land use planning. The infrastructural facilities or services considered were supply of pipe borne water; site for refuse disposal or sanitary areas, access roads and the availability of public open spaces (POS).

The study found out that, out of the 301 houses visited in three residential areas – first class, second class and third class - as many as 42.2 percent had no supply of pipe borne water from the Ghana Water Company Limited (GWCL). Residents interviewed attributed the situation to the fact that service lines for the pipe borne water were far away from their houses and therefore would cost more in connecting to the service. However, the expert view (the Regional Engineer of GWCL) suggested that the poor supply of pipe borne water in the identified residential areas was due to increase in the demand for residential plots above the planned projected number of houses. This could suggest a possible encroachment of areas that may have been proposed for utility lines by the areas' land use plans.

Evidence from the study also indicates that a typical land use plan for the metropolis has a number of sanitary areas where residents could dispose of their refuse for subsequent collection and disposal. However, data collected indicated that many of such sanitary areas had been re-allocated by land owners for other uses – mostly residential uses. This situation depicts the flouting of planning recommendations in cases where there are land use plans. This also gives an indication of what would have been the situation if there were no land use plans. Similarly, the disposal of waste water was identified as a problem in most of the study areas. The study showed that gutters and drains were constructed along the main roads with no links to the interior. This forced high income earners to construct septic tanks while the less affluent ones

disposed off their waste water in the open or channelled through gullies created by erosion. Though sordid, the situation suggests that poor land use planning and development provide the most probable reason for the absence of such facilities in communities in the metropolis.

According to the study, access roads in the study communities were found to be well demarcated with few or no encumbrances particularly in the Bomso community. Those who did not have access to their houses mentioned factors such as poor roads, marshy conditions and building structures as posing obstacles for easy access to their homes. Based on findings of the study, it can be inferred that access roads in communities in Kumasi have not been seriously encroached upon. Generally, it was observed that first and second class communities had well demarcated and wider roads. The only exception was Apatrapa where road reservations were not clearly demarcated and narrow; similar to that which pertains in third class communities. This was attributed to the fact that road reservations were clearly mapped out in land use plans of these areas and permit would not be given to any development to take place in such reservations.

The study also found out that, public open spaces were greatly abused or encroached upon in all the study communities. In some cases land owners had re – allocated public open spaces to other uses and in other cases the community had forcefully turned undeveloped plots to community parks contrary to the provisions in a planning scheme in situations where there is one. This does not only have implications for aesthetics but also for land use conflicts and land litigations in extreme cases.

The above findings of the study reiterate the importance of land use planning to development of human settlements; particularly its effective implementation and enforcement to derive the needed benefits. The next section presents the conceptualised importance of land use planning to the development of human settlements.

2.6 Theories that Influence Land Use Planning

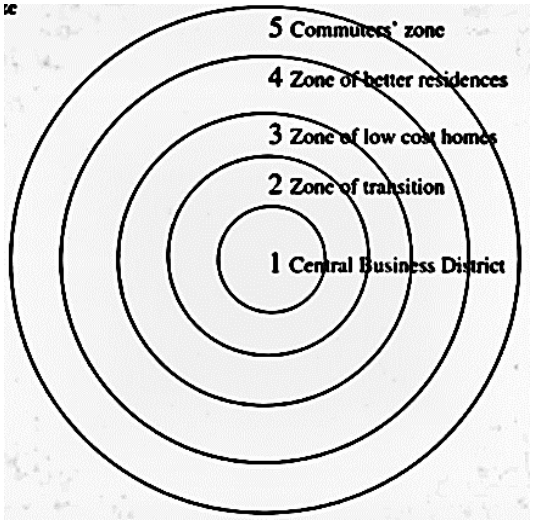
The theories underpinning land use planning generally draw on three descriptive models. These models were developed to generalize the rationale for land use planning in the early industrial cities of the developed countries. Due to changes in the spatial structure of cities over time, new models of land use planning were

developed to inform the development of land uses that were becoming increasingly complex and differentiated. Furthermore, it must be stated that these are general models devised to understand the overall rationale for land use planning. Hence, none of them can accurately describe patterns of urban land use in all cities, especially those in developing countries.

In fact, all of these models have been criticized for being more applicable to cities in the United States of America than to cities elsewhere (Graham, 1993). Other criticisms have focused on the static nature of the models. Critics argue that the models describe the rationale underpinning land use planning in a generic city, but does not describe the process by which land use planning is done. Despite the criticisms, these models continue to be useful generalizations about the way in which land is devoted to different uses within the city. Described in the next section is the Concentric Zone Model, Sector Model and Multiple Nuclei Model.

2.6.1 Concentric Zone model

The Concentric Zone Model is considered as being among the earliest descriptions of urban land form and development process (Asamoah, 2010; Nakatudde 2010 and Amponsah 2011). The model which was originated by Ernest Burgess in the 1920s, describes land uses in the urban area as a set of concentric rings with each ring devoted to a different use (See Figure 2.1). It also explains the process of land development and urban growth by a series of concentric circles which expand radically from the core of the city or the Central Business District (CBD). The CBD has most economic activities because it is the focus of an intra-city transport (Chauncy and Ullman, cited in Nakatudde 2010: p28). The model argues that major transportation emanates from the city's core, making the CBD the most accessible location in the city setup (Nakatudde, 2010).



1. Central Business District
2. Zone of Transition
3. Zone of Low-cost homes
4. Zone of Better Residences
5. Commuters' Zone

Figure 2.1 - Concentric Zone Model**.**

Source: The University of North Carolina, 2002. http://www.uncc.edu/-hscampe/landuse/b-models/B-3mods.htm 2013

An important feature of this model is the positive correlation between physical development of urban lands and distance from the CBD – more affluent households were observed to live at greater distances from the central city. Burgess described the changing spatial patterns of residential areas as a process of "invasion" and "succession". As the city grew and developed over time, the CBD would exert pressure on the zone immediately surrounding it (the zone of transition). Outward expansion of the CBD would invade nearby residential neighbourhoods causing them to expand outward. As the city grew and the CBD expanded outward, lower status residents moved to adjacent neighbourhoods, and more affluent residents moved further from the CBD.

The concentric zone model, from the foregoing, is relevant for land use planning indicating the need to plan the process of "invasion" and "succession". The advantage of accessibility makes the demand for land in the CBD very great. In addition, the supply of land in this area is restricted which leads to high land values. The centrally placed characteristics of the CBD make it a focal point of commercial, social and civic life of the urban centre. Land in this area takes the form of shops, offices and hotels. Also, this core area is normally the original settlement which explains the centrality of the place. Figure 2.1 is a diagrammatic presentation of the model.

It is however argued that where variations occur in such factors as topography of the physical landscape, the ideal symmetry would be disturbed. Again, the fact that residential areas may further be sub-divided by race can affect the model. Nevertheless, critics argue that the theory failed to critically look at the development of complementary clusters and the possibilities which give rise to focal points other than the CBD. Also, the theory is criticized for assuming that the higher the income the further away a household is likely to locate from the centre.

From an economic perspective, this connotes that accessibility or access considerations are more than offset by preferences for space. Hence, the specialized pattern of land use produced by the theory points only to the importance of accessibility to the CBD. Notwithstanding these criticisms against the theory, it is of importance in explaining how land use in an urban area is structured (Asamoah, 2010).

2.6.2 Sector theory

Sector theory holds the view that housing areas in a city develop in sectors along the lines of communication; that is, from the CBD outwards. High quality areas run along roads and also reflect the incidence of higher ground. Industrial sectors develop along canals and railways, away from high quality housing. Thus a high status residential area will spread out along the lines of the sector by the addition of new belts of housing beyond the outer arc of the city. Once contrasts in land use have developed in a sector near the city, these contrasts will be perpetuated as the city grows. This theory was advanced by Hoyt (1939) as an alternative to Burgess' concentric model, and was based on residential rent patterns in the USA (Hoyt cited in Asamoah, 2010). Hoyt theorized that cities would tend to grow in wedge-shaped patterns or sectors emanating from the CBD and centred on major transportation routes (Chauncy and Ullman, cited in Nakatudde 2010: 28). The spatial manifestation of the theory in shown in Figure 2.2.

Hoyt observes that higher levels of access translate into higher land values. This means that many commercial functions remain in the CBD while manufacturing activities develop in a wedge surrounding transport route. Then residential land use patterns would grow in wedge-shaped patterns with a sector of lower-income households bordering the manufacturing/warehousing sector as depicted by Figure

2.2. This is because traffic, noise and pollution make these areas less desirable locations to live.

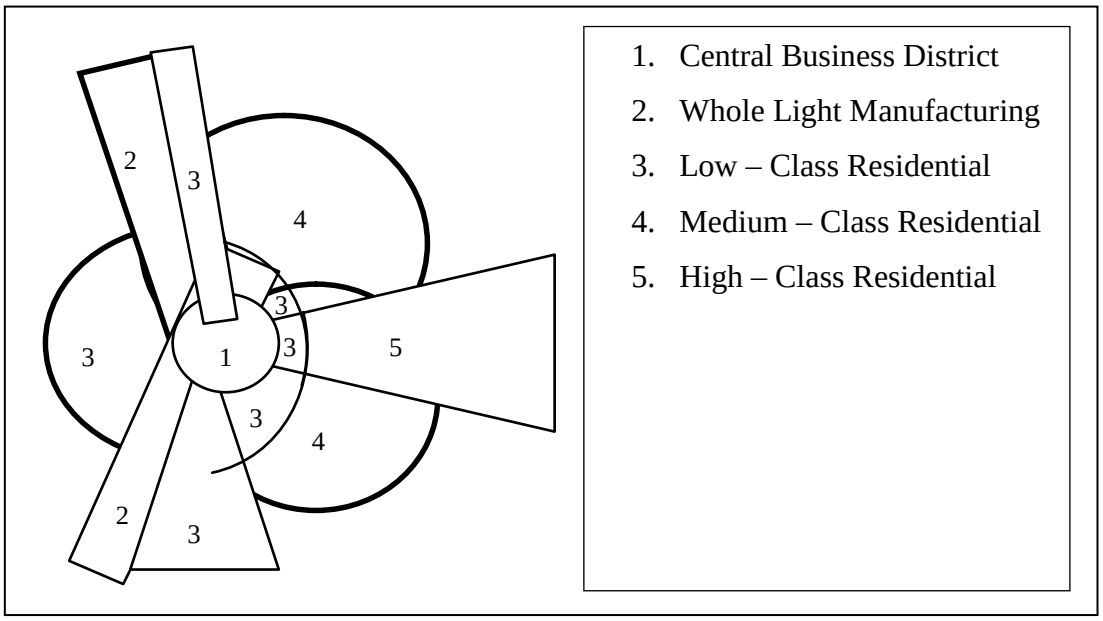


Figure 2.2 - Sector Model

Source: The University of North Carolina, 2002. http://www.uncc.edu/-hscampe/ land use/b-models/B-3mods.htm 2013

However, a sector of middle-and-higher income households would be located away from the industrial sites. In many respects, Hoyt's sector model is simply a concentric zone model modified to account for the impact of transportation systems on accessibility and land values.

2.6.3 Multiple Nuclei Theory,

This model, which is closer to reality, views a city as growing and assumes that urban growth takes place around several distinct nuclei. These nuclei could include a market, a nearby village, a factory, a mine or a railway terminal. Ultimately, all the nuclei would be combined into one urban area largely agglomerated by residential use and intra-city transportation. At the centre of the model is the CBD with light manufacturing and wholesaling located along transport routes (Chauncy and Ullman, cited in Nakatudde 2010: 28).

The model argues that cities of greater size develop into substantial suburban areas. Subsequently, some suburbs, which reach significant size, function like smaller

business districts. These smaller business districts act as satellite nodes or nuclei of activity around which land use patterns form. Under this theory, the CBD is still seen as a major centre of commerce. This suggests that specialized cells of activity would develop according to the specific requirements of certain activities and different rent-paying abilities. It is also suggested that there is a high tendency for some kinds of economic activity to cluster together. Heavy industry is thought to locate near the outer edge of the city, perhaps surrounded by low-income households. Suburbs of commuters and smaller service centres occupy the urban periphery. This is depicted in Figure 2.4.

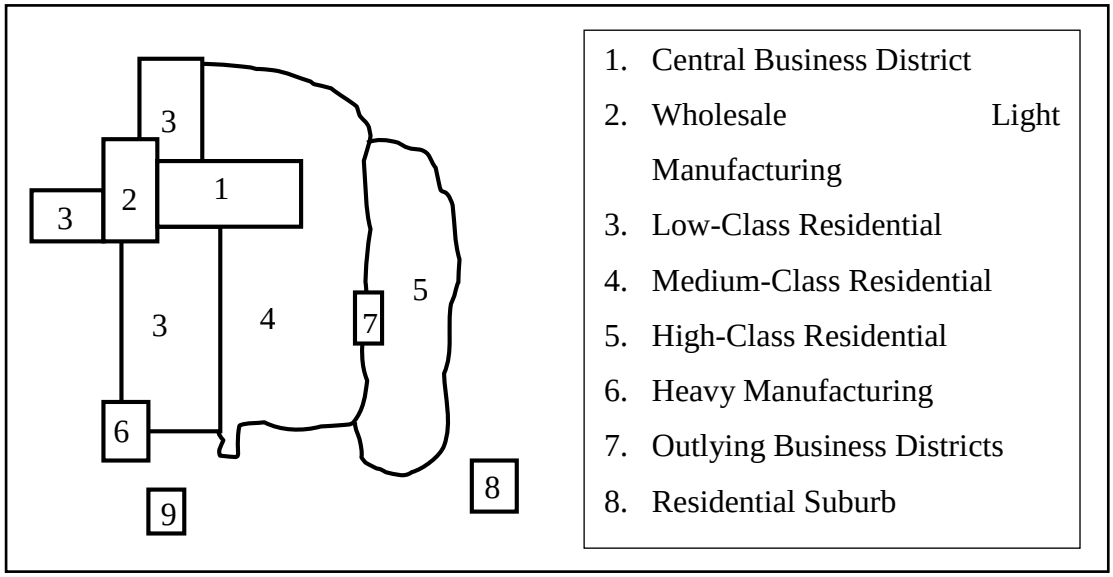


Figure 2.3 - Multiple Nuclei Model

Source: The University of North Carolina, 2002. http://www.uncc.edu/-hscampe/landuse/b-models/B-3mods.html 2013

2.7 Conceptual Framework of Land Use Planning and Human Settlements Development

This section presents the conceptual framework of the role of land use planning in the development of human settlements. This provides an understanding of the relationship and effects of effective land use planning on the physical development of settlements.

The development of human settlements has become central in the agenda of the global community. This is evident in the UNEP Agenda 21 (that aims to promote sustainable human settlement) and the United Nations Conference on Human Settlement (UNCHS) first held in Vancouver in 1976 (UNEP, 1996; Sarkar, 2010; UNCHS,

1990). Physical development of settlements are changes in the use of land occurring at various spatial levels and with various time periods. These are also the material expressions of environmental and human dynamics and of their interactions which are mediated by land (Briassoulis, 2000). Thus, physical development of settlements involves the use of land and its resources.

Efficient use of land is important to the development of settlements, especially when they experience a high level of urbanisation and pressure to accelerate housing and infrastructure delivery against a finite land resource. This requires an intervention in the utilisation of land and its resources for the diverse physical activities of humans to promote efficient land use within a settlement. A major tool for intervening in the use of land over the years is land use planning. The basic rationale of land use planning is to achieve; convenience and harmony in the use of space for all land uses; economy and efficiency in the use of resources and space; enhanced safety and adequate health standards in the space economy; and enhanced aesthetics and serenity in the built environment (Afrane, 2006 cited in Amponsah, 2011). Thus, the effective use of land use planning as a tool can be evaluated based on a number of attributes such as its contribution to density level (i.e. the number of people or the number of housing units within an area); Mix of land-use types (such as the location of commercial, residential and other important amenities together or close to each other, which is also related to clustering); Accessibility (the ability of people to be able to reach their desired activities and destinations; Green space: the portion of land used for parks, gardens, etc.) and non-motorised accessibility (the availability and quality of walking and cycling conditions). The effective application of land use planning should therefore result in a compact and smart physical development of settlements whiles the vice versa is expected to promote sprawl.

Compact development of settlements is more efficient, inclusive and sustainable. The cost of providing public facilities and infrastructure are lower, it promotes better access to services and facilities since thresholds are higher, it also promotes the livelihood of the urban poor and reduce social segregation. Travel time and cost are lower in such settlements and its growth has less effect on farmlands and environmental resources. In contrast, sprawl settlements do not provide for a functional mixed use of land and are characterised by unplanned, uncoordinated, separated or single-use development, low-population density and automobile

dependency. Such development is usually viewed negatively because of the excessive land consumption, increased commuting and socioeconomic segregation due to its exclusionary infrastructure and public utility deficit. It is also perceived as contributing to high costs for the provision of infrastructure and public services.

Figure 2.4 shows that, effective land use planning is achieved based on the principles of safety, aesthetics, harmony, convenience and economy. The effects of such effective land use planning are two - sided. The first effect is the achievement of compact or smart development which is characterised by reduced cost of providing infrastructure and utilities, better access to service and facilities due to improved transport network and neighbourliness. In effect, there will be new developments and redevelopments in such settlements. This argument is underpinned by the fact that one of the factors that influences people's choice of settling in a spatial unit is their quest to have a broader access to ranges of infrastructural facilities and utilities such as schools, clinics, local markets, electricity, water and telecommunications among others. These will have implications for population density and residential development. Figure 2.4, again, illustrates that smart development will lead to a well-served settlement with facilities including educational, commercial, health and sanitation facilities among others. With the housing density increased and coverage of infrastructural facilities and public utilities widened with the aid of land use planning, the goal of effective land utilisation could be achieved. With land utilisation used as the bench mark for measuring the changes in physical activities in space, the study asserts that effective land utilisation would lead to sustainable physical development of a settlement.

The second effect is the reduction of sprawl development which is underpinned by the claim that one of the solutions to reducing urban sprawl is land use planning. Reducing sprawl development will lead to confinement of development in a given space which could ensure a reduced cost of providing infrastructural facilities and utilities. Consequently, the availability of these infrastructural facilities and utilities could attract population leading to the expansion of the spatial form of the settlement (i.e. physical development). The following section focuses on theories that influence land use planning.

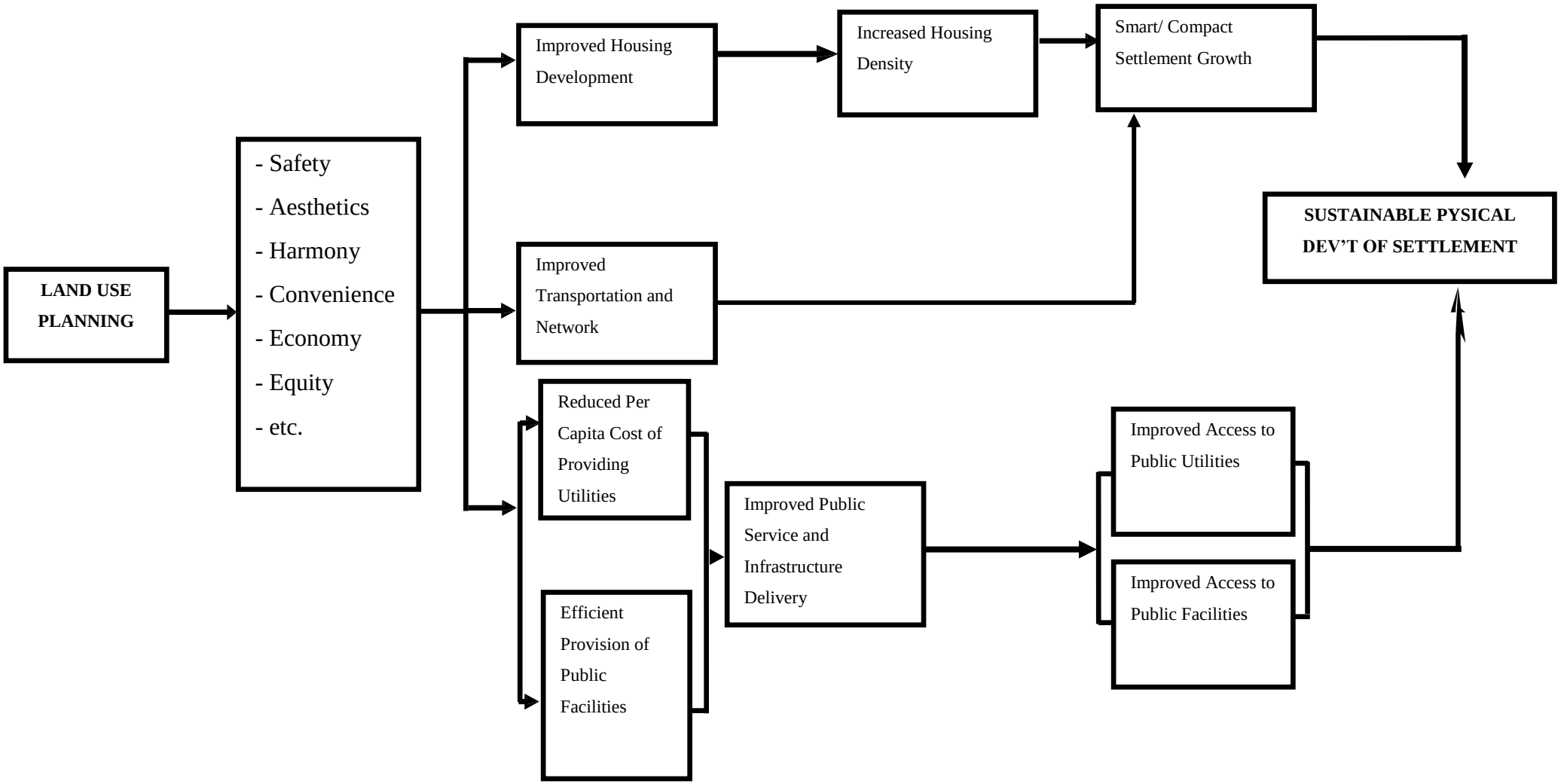


Figure 2.4 - Effect of Land Use Planning On Physical Development of Settlement

Source: Author's Construct, 2014

2.8 Lessons from the Review of Literature

The review of literature has revealed that human settlement brings together the most important aspects of human life including housing, transportation systems, economic activities, cultural, communication, political and administrative systems. Thus, human settlements play impeccable roles in national development. The roles settlements play are dependent on the level of development. Additionally, the literature also revealed that the development of settlements would occur whether it is planned or not. However, the sizes, arrangement and functional differences of human settlements have implications for space and spatial development. Challenges emanating from the development of settlements, affects the environmental, how population utilise land resources as well as their social and economic prosperity.

The literature subsequently revealed that the challenges of human settlement development can be effectively managed with the application of effective land use planning. This form of planning brings balance between the competing demands of settlement functions (i.e. housing, social interactions, transportation and leisure among other things) on the limited land space. The impact of process is evaluated based on principles of safety, aesthetics, harmony, convenience and economy. The concept is revealed to have formed the basis for physical development of settlements in any civilised society. This explains why the international communities rely on it for the delivery of sustainable human development.

The review of literature also revealed that planned human settlement development uses land efficiently which results in compact and smart development and contrary to that, it also revealed that unplanned settlement development does not provide for a functional mixed use of land and is characterised by uncoordinated, separated or single-use development, low-population density and excessive land consumption.

Further, the review of literature revealed that compactness or sprawling nature of human settlement development has implications for density (population and housing), access to infrastructural services and facilities as well as cost of providing them. That is absence of planning in settlements can contribute to high fiscal costs for the provision of infrastructure and services while planned settlements encourage relatively high population and housing density as well as mixed use of land. This may be helpful in comparing settlement development that is based on land use planning to

another that is not for an evidence based conclusion on the impact of land use planning.

Based on the forgoing discussions, the study has identified two settlements; planned and unplanned settlement; to assess impact of land use planning on their development. Attention was given to the level of access to public amenities, facilities and services within the distinct settlements. The cost of providing these utilities and facilities was critical to the study. It is among relevant factors that determine the impact of land use planning on the development of settlements.

2.9 Linkage between Literature and the rest of the Study

The review of literature has re-echoed the need for land use planning in all human settlements irrespective of their population. This need is based on the increasing uncontrolled and uncoordinated development activities and its implication for sustainable development. However, UN-Habitat (2012) argues that the effective and sustainable physical development of settlements depends on the effectiveness of policies and programmes of action to regulate land utilisation. Thus, the availability and effectiveness of a settlement's land use plan determines its preparedness to control development activities towards sustainable human settlement development. Based on this assertion, chapter four explores the impact of land use planning on physical development in Tarkwa Nsuaem Municipal. This way, the Municipality's preparedness towards sustainable human settlement development can be inferred. Chapter Four is preceded by Chapter Three which indicates the methods the study employed in inferring the impacts. Chapter Three also outlines the methods the study employed to compare the distinct settlements as the basis for establishing the impact of the land use planning on the Municipality.

CHAPTER THREE
RESEARCH DESIGN AND DATA ANALYSIS TECHNIQUES

3.1 Introduction

The previous chapter reviewed literature on the study and it was intended to provide an understanding of the research topic. The chapter provided an overview of the concept of land use planning, theories and models that inform the process as well as some impact of the land use planning system. Chapter Two also outlined some cases of the impact of land use planning in the developed and the developing regions of the world. This chapter is devoted to the presentations of methods employed in the collection of data, tools of research and the study design; including the description of the research design approach, the sampling design, sample size determination as well as data sources and instruments for data collection. The chapter also presents the data analysis techniques of the study.

3.2 Research Design

The study assesses the processes of land use planning and their relationship to settlement growth, the provision of public utilities as well as the distribution and accessibility of public facilities in the Tarkwa Nsuaem Municipality. As a result, the cross sectional research design was adopted for the study. The choice was informed by the ability of the researcher to select settlements with and without land use planning schemes to establish the relationship between land use planning and physical development.

Again, the cross sectional design provides an opportunity for purposive selection of town expansion, the provision of public utilities and access to public facilities and infrastructure as variables of physical development for comparing the selected settlements in the Municipality.

With this study design, data are systematically collected at a particular point in time, analysed and presented to give a clear picture of the impact of land use planning on the physical development of the Tarkwa – Nsuaem Municipality. In this case, assessment can be made regarding the extent to which the objectives of the study are achieved. This will also help evaluate the outcome of policy interventions by government on land use planning and the physical development of settlements.

3.3 Key Variables of the Research and Unit of Analysis

3.3.1 Variables of Research

According to Frankfort-Nachmias and Nachmias (1996: p.55), a variable is an empirical property which can take on two or more values/forms. Thus, if a property can change either in quality or quantity, it can be termed as a variable in a research. Using variables as key elements of a research problem helps to move the research from conceptual level to empirical level. Based on these, the study's variables are indicated in Table 3.1

Table 3.1 - Research Variables, Definitions and Purpose

Variable	Indicators	Purpose
Housing density of the communities	Measured in terms of the total housing units in the total built up area of the communities. Used a scale high; low and medium to determine the density of the use of land	Helped to identify whether land use planning is effective or important in controlling housing development
Condition of roads networks in study areas	Used a three point Likert scale to assess the conditions of roads network in the communities 1. Good 2. Fair 3. Poor	Helped the study to describe the conditions or situation of the movement network in the study areas
Cost of extension of utilities in the communities	**Electricity** Measure along ECG's minimum cost of extension structure. ▪ GH¢300.00 for Single phase, GH¢80.50 Single Meter and within 40 meter distance from service lines (total cost = Gh¢380.50) ▪ GH¢600.00 for Triple phase, GH¢175.00 single meter and within 40 meter distance from service lines (total cost = Gh¢775.00) (ECG –Tarkwa, 2014)	It enabled the study to determine the degree land use planning influence access to utilities

<table>
<tr><th>Variable</th><th>Indicators</th><th>Purpose</th></tr>
<tr><td></td><td><u>Water - GWCL</u>
Measured along GWCL minimum cost of extension structure:
• GH¢500.00 within a 30 meter distance from service lines
(GWCL- Tarkwa, 2014)

<u>Other Sources</u>
Used a three point Likert scale to assess the perception on siting of community water supply points in the communities
1. Disagree
2. Neutral
3. Agree</td><td></td></tr>
<tr><td>Distance of public facilities from houses in the communities</td><td>The study used the TCPD – Ghana’s planning standards to assess the level of accessibility to public facilities and services in the communities;
Education
<table>
<tr><th>Facility</th><th>Maximum Distance From Most Houses</th></tr>
<tr><td>Pre – School</td><td>0.8km</td></tr>
<tr><td>Primary</td><td>1.25km</td></tr>
<tr><td>Junior High</td><td>3.5km</td></tr>
<tr><td>Senior High</td><td>4km</td></tr>
</table>
Health
<table>
<tr><th>Facility</th><th>Maximum Distance From Most Houses</th></tr>
<tr><td>Polyclinic</td><td>15 Mins.</td></tr>
<tr><td>Health Centre</td><td>-</td></tr>
<tr><td>Clinics</td><td>10 Mins.</td></tr>
<tr><td>CHPS</td><td>10 Mins.</td></tr>
</table>
Emergency Services
<table>
<tr><th>Facility</th><th>Max Distance/ Criteria</th></tr>
<tr><td>Fire Hydrants</td><td>120m intervals along town roads</td></tr>
<tr><td>Fire Station</td><td>Yes/ No</td></tr>
</table>
<u>Sanitation</u>
Used a three – interval Likert scale to assess the perception on the adequacy and distance to sanitary areas in the communities
1. Disagree
2. Neutral
3. Agree</td><td>The study adopted the walking time because respondents were oblivious of the actual distances of their houses to the facility

It enabled the study determine the influence of planning on the level access to the facilities</td></tr>
</table>

3.3.2 Unit of Analysis

Home owners were adopted as the unit of analysis for the study. This is because their demand and use of land, form the basis for settlement expansion. When settlements expand, the developers are normally the home owners and their demand for land has an impact on land development which results in the adoption of land use planning and the preparation of planning schemes for a better control of the use of land.

In the same way, the demand and extension of electricity and water, among other utilities, in a community is primarily determined by the rate at which the community expands. Therefore, the demand for land by potential home owners is likely to result in the demand and provision of utilities which have an impact on the use of land.

3.4 Data Requirement and Sources

The study employed mainly primary data in the analysis. The primary data included cross sectional data collected directly from home owners and tenants. Data were also collected from the Ghana Water Company Limited (GWCL) and the Electricity Company of Ghana (ECG) as utility providers as well as the Municipal Assembly and the Town and Country Planning Department as public facility providers within the study area. These data were collected in line with variables and issues relating to the study. Table 3.2 outlines the data requirements and sources for the study.

Secondary data sources were from population census reports, District Medium Term Plans and aerial photographs of the study communities as well as Population and Housing Census Report (2000). Other development related journals such as the *Journal of Urban Economics* and the *Journal of the American Planning Association*, among others, were also consulted from the internet.

Table 3.2 - Data Requirement and Sources

No	Research Objectives	Data Required	Data Source	Method of Data Collection
1.	To assess the relationship between land use planning and Housing	1.1 Number and characteristics of housing unit	TCPD, Landlords	Questionnaires
		1.2 Date of construction of housing units	Landlords	
		1.3 Planned and unplanned areas	TCPD	
		1.4 Monitoring and Control of Development	TCPD	
		1.5 Length and conditions of road and movement networks	Department Urban Roads	
1.	To assess the relationship between land use planning and the provision of public utilities	2.1 Coverage Of Utilities (Water and Electricity)	ECG, GWCL	Questionnaires
		2.2 Date of Extension/ provision of Utilities	Landlords	
		2.3 Cost Of Provision/ Installation	Landlords, Utility providers	
		2.4 Challenges of accessing/ providing utilities	Landlords/ Tenants	
2.	To assess the relationship between land use planning and the distribution and accessibility of public facilities;	3.1 Types of Facilities	Tenants, Municipal Assembly	Questionnaires
		3.2 Number of facilities	Municipal Assembly	
		3.3 Location of the facilities	Municipal Assembly	
		3.4 Cost of Providing facilities	Municipal Assembly	
		3.5 Distance to houses	Tenants	
		3.6 Level of patronage of facilities	Municipal Assembly	
		3.7 Challenges of provision / accessibility	Tenants, Municipal Assembly	

Source: Author's Construct, 2014

3.5 Sampling Techniques

The study purposively selected two communities (New Atuabo and Abonteakoon) within the Tarkwa-Nsuaem Municipality to assess the impact of land use planning on physical development of settlements. The communities were selected because of the fact that they represent the planned and unplanned scenarios in the Municipality. The selection also enabled the study to give attention to each of the primary units of analysis.

3.5.1 Sample Frame

The sample frames for the research which were obtained from the Town and Country Planning Department (TCPD) of the Municipality was the complete listings of the housing units in the two areas, the corresponding numbers and their owners or landlords. The frame was obtained for each of the study area in order to give an adequate representation of the areas in the sample size. Table 3.3 indicates the total number of housing units in the study areas. However, the list did not provide the total number of tenants or households in each of the houses enlisted.

3.5.2 Determination of Sample Size

The study used the Macorr Sample Size Calculator to determine the sample size at a confidence level of 95 percent and a confidence interval of 7 percent for the total population. The calculation is shown in Appendix A. The sample size of 160 houses was proportionally divided among the two study areas as shown in Table 3.2.

Table 3.3 - Number of Questionnaires Administered

Study Area	Total Number of Houses	Number of Questionnaires administered	Response Rate (%)
New Atuabo	423	79	100
Abonteakoon	434	81	100
Total	**857**	**160**	**100**

3.5.3 Sampling Techniques

Kumekpor (2002) indicates that a multi-stage sampling methodology is relevant for studies that do not have a more elaborate sample. Based on this strength, the study adopted the multi- stage sampling technique for the selection of the respondents.

First, the study purposively selected two communities within the Tarkwa Nsuaem Municipality. One had a planning scheme and the other had no planning scheme. The result of the purposive sampling procedure was the identification of New Atuabo (the community with a planning scheme) and Abonteakoon (the community without planning a scheme).

The stratified sampling procedure was then used to group the houses into different strata based on the dynamics and characteristics of the residential area of the communities as indicated in Appendix 2. This was adopted from Tipple (2011). Through a simple random sampling, the required number of houses was selected from the clusters for the study. The random sampling was operationalised by selecting any house that fell within the clusters identified. The houses were handpicked until the sample size for each identified cluster was exhausted. Only one respondent was selected from each of the sampled houses. Instances where the occupants were more than one, the selection of the single respondent was based on the willingness to be interviewed and perception of the enumerator.

A purposive sampling technique was also adopted in selecting the heads of Electricity Company of Ghana and the Ghana Water Company Limited at the district level as the providers of the selected utilities in the study area. The same technique was adopted in selecting the heads of the Town and Country Planning Department and the Municipal Planning Unit of the Assembly as providers of the public facilities in the study areas.

Consequently, a purposive sampling was adopted in obtaining data from this category of respondents. Thus, one respondent was selected from each of the institutions. These institutions were selected because they exercise direct influence, or are influenced, by the land use policy and planning issues relating to the study area. In this case, the information gathered from these institutions will help triangulate the assertions raised by the landlords and tenants in the study area.

3.6 Data Collections Methods

In gathering the primary data, a total number of four (4) institutional and 160 household questionnaires were administered to the respondents. The items in the questionnaire were a combination of close-ended and open-ended questions. The

close-ended questions consisted of a list of items with alternative answers for respondents to decide on their choice of answers. With the open-ended items, respondents were required to supply answers themselves. Sample of questionnaires for households, Town and Country Planning Department, Electricity Company of Ghana, Ghana Water Company Limited, and the Planning Unit of the Assembly are shown as Appendices 10, 11, 12 and 13 respectively

3.6.1 Response Rate

The study had 100 percent response rate for the tenants and landlords in the study areas as indicated in Table 3.3. The response rate reinforces the reliability of the study's findings. The direct interaction with the tenants and landlords adopted by the study accounted for the high (100 percent) response rate.

3.7 Data Analysis Techniques

The study adopted quantitative tools in analysing and presenting the data relating to housing stock, housing characteristics and the share of planned and unplanned areas. The variables of coverage and cost of providing utilities and public facilities were also analysed using the same tool.

The study also adopted descriptive statistics in summarising the quantitative data. Analytical tools such as the central tendencies (specifically, modes and means) were used to determine trends and averages of the variables of the study. The use of maps, tables, graphs, charts and diagrams were used to present the gathered data.

Data on the challenges of providing the utilities and the public facilities as well as their accessibility were triangulated with secondary data and information from other institutions. This helped to validate and check information provided by various institutions.

CHAPTER FOUR
THE PHYSICAL DEVELOPMENT OF TOWNS

4.1 Introduction

Following from the presentation of the research design and data analysis techniques in the previous chapter, this chapter the analysis of data on the impact of land use planning on the development of communities spatially. However, to ensure adequate appreciation of this analysis, a short presentation on the study area's location and profile precedes the chapter. This sets the tone for the discussion on the impact of land use planning on the physical development of towns which was achieved through the comparison of the planned and unplanned selected communities.

4.2 Profile of Tarkwa – Nsuaem Municipality

The profile of the Tarkwa Nsuaem Municipality specifies the location, size, spatial distribution of settlements as well as land use planning situation and its implication for physical development of the communities in the Municipality.

4.2.1 Geographical Location and Size of the Municipality

The Tarkwa-Nsuaem Municipality is one of the 22 administrative MMDAs in the Western Region of Ghana, located between Latitude $4^0$0'N and $5^0$4'N and Longitude $1^0$45'W and 201'W. It shares boundaries with Prestea Huni-Valley District to the north, Nzema East Municipal to the West, Ahanta West District to the South as well as Mpohor and Wassa East District to the East. It also has a total land area of 978.57 Square Kilometres. Figure 4.1 presents the Municipality in context (TNMA, 2010: 6).

The Municipality, in terms of trade is strategically located, since it is able to transact business with all the four other districts it shares boundaries with. The geographic location of the district makes transportation of goods and services to and from the Municipality easy and therefore encourages inter district trade (TNMA, 2010:21). These locational features has implications for the influx of people as well as the level of economic activities which in turn affects the level of its per capita income.

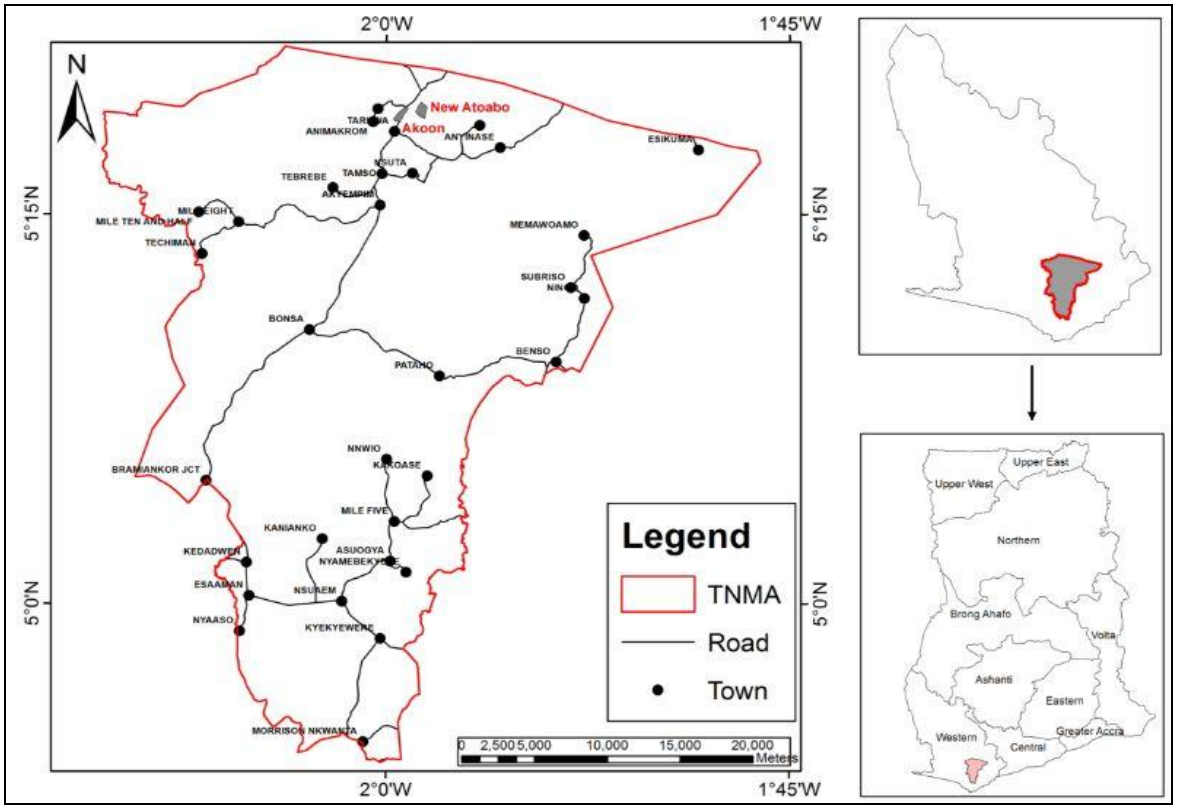


Figure 4.1 - Study Areas in National Context

Source: Town and Country Planning Department - TNMA, 2014

4.2.2 Population Characteristic of the Municipality

According to the 2000 *Population and Housing Census (PHC),* the population of Tarkwa-Nsuaem Municipality in 2000 was 107,712. The TNMA (2010, p. 11) estimated the population of the Municipality to be 127,413 in 2010 using an exponential formula and a regional population growth rate of 3.0 percent. However, the provisional *2010 Population and Housing Census* figure for the Municipality is estimated to be 90,477. The municipal authorities blame the discrepancies on the errors that may have occurred during the census and therefore base its planning on the projected figures of the 2000 PHC figures until what is regarded as an error is cleared with the Ghana Statistical Service (TNMA, 2013:3).

Considering that the Tarkwa - Nsuaem is one of the mining districts in Ghana, it can be appreciated that the large population has been attracted as a result of the mining and commercial activities in the Municipality. Other reasons include the centrality of Tarkwa as a nodal town with major arterial routes linking it to other districts in the region.

4.2.3 Spatial Distribution and Analysis of Settlements

With the exception of Tarkwa (the Municipal capital) and a few areas like Tamso, Nsuaem, Nsuta, Bankyim Benso and Simpa which have peri-urban status, majority of the communities in the Municipality have populations below 5,000 (Ghana Statistical Service, 2001). This implies that a high proportion of the population in the Municipality lives in rural areas; thus having a high rural-urban split of 67:33.

The higher percentage of rural areas (67.2 percent) makes it difficult for planning and the provision of social and technical infrastructure such as boreholes and other water facilities due to the lower threshold. The desire to obtain sufficient farm size holdings and small scale mining areas necessitates spreading out into the unsettled areas. The larger settlements are also accounted for by either their proximity to Takoradi or their access to the main trunk roads.

The rural settlements in Tarkwa - Nsuaem are mostly deprived of basic services like health and water. Settlements like Esuoso, Aklika and Efuanta, among others, are gradually turning into mining towns but does not follow any layout. On the other hand, the peri-urban settlements have large populations and mostly act as dormitory towns, but for most of them, their service distribution does not match their population sizes. In the same way, there are urban settlements in the Municipality with service distribution that do not match population sizes; some are either over-served or under-served with services. The layouts of these urban settlements are mostly compact and there are commercial activities along the major roads.

According to the 2013 district profile of the Assembly, the distribution of facilities and services fairly matches the distribution of population in the communities in the Municipality. Tarkwa, being the capital, has facilities and services of higher order than other equally highly populated communities. Tarkwa performs 31 functions of different levels whiles Tamso and Nsuaem perform 19 and 14 functions respectively. However, the Municipality can be credited for its performance in terms of the supply of water, electricity and educational needs to its people. Almost all the communities have access to water, electricity and basic education.

4.2.4 Land Use Planning and Pattern in the Tarkwa Nsuaem Municipality

The Municipality is mainly a mixed - use area made up of major land uses such as residential, commercial, civic and culture, industrial and public open spaces (POS); among others. In several communities, there are fully developed residential areas. Large scale mining, constituting the major industrial activity, is built in a confined area towards the northern part of the Municipality; precisely in Tarkwa and Nsuta communities. The northern and central portion of the Tarkwa - Takoradi Highway, the Simpa road, the Nsuaem - Apimanim Junction road as well as the Tarkwa - Bogoso road are the commercial zone of the Municipality. The sides of most of the local roads are dominated by commercial activities. The estimated land uses and the area they occupy in the Municipality are presented in Table 4.1.

Table 4.1 - Land Use Pattern of Tarkwa Nsuaem Municipality

Land Use Type	Area (Sq. Km)	% of Total
Residential	201.28	20.6
Commercial	42.00	4.3
Industrial	166.17	17.0
Agriculture	102.55	10.5
Open Space	235.84	24.1
Others	230.73	23.6
Total	**978.57**	**100**

Source: Town and Country Planning Department – TNMA, 2014

Tarkwa - Nsuaem Municipality as indicated in Section 4.2.1 has a total land coverage of 978.57 square kilometres with 438 communities. In spite of the fact that the entire municipality is a statutory planning area which had been declared as such under the Town and Country Planning Act (Cap 84), 47 out of the 438 communities representing 10.70 percent have been planned with approved local plans or planning schemes governing development (Tarkwa - Nsuaem Municipal Assembly, 2013). This implies that majority of the physical developments do not conform to any spatial plan. Obviously such phenomenon of land utilisation does not only affect the compactness of development but also affect the provision of utilities and infrastructural services.

4.3 Description of the Study Areas

Following from the description of the land use planning pattern and having identified that less 11 percent of the communities in the Municipality have planning scheme

directing development, this section briefly describes the areas the study selected to explore the impact of land use planning on development. The selected communities, as indicated in the scope of study, are New Atuabo and Abonteakoon which represent the planned (areas with approved local plans) and unplanned (areas without approved local plans) scenarios respectively.

4.3.1 New Atuabo Community

New Atuabo community was created when residents were resettled by the current Goldfields Ghana Limited (GFG) from the Old Atoabo in 1996 to its current location. The increasing need for safe mining compelled the company to resettle the residents of Atoabo to their current location because the community and the activities of the mine were in conflict with the principles of social and environmental safeguards (Yirenkyi, 2008).

Prior to the resettlement, Old Atoabo community was occupied by about 3,000 households and nearly 20,000 people (Yirenkyi, 2008). The inhabitants of the community were mainly farmers living in mud houses (Atakpame) as well as wattle and daub houses. The settlement pattern of the community could hardly be defined because of the haphazard and congested nature. Migrants and new households had to settle on the outskirts of the community which led to organic expansion of community. Figure 4.2 presents a section of the Old Atoabo Community before the resettlement project.

In 1996, proximately 22,000 people were resettled in the New Atuabo community in what is, to date, the largest mine - related resettled community in West Africa. Figure 4.3 shows an aerial view of the resettled community. The major housing units in the community are detached, semi-detached, compound houses and storey - building of not more than three storeys.

Figure 4.2 - An aerial view of Old Atoabo community in 1995

Source: Yirenkyi, 2008

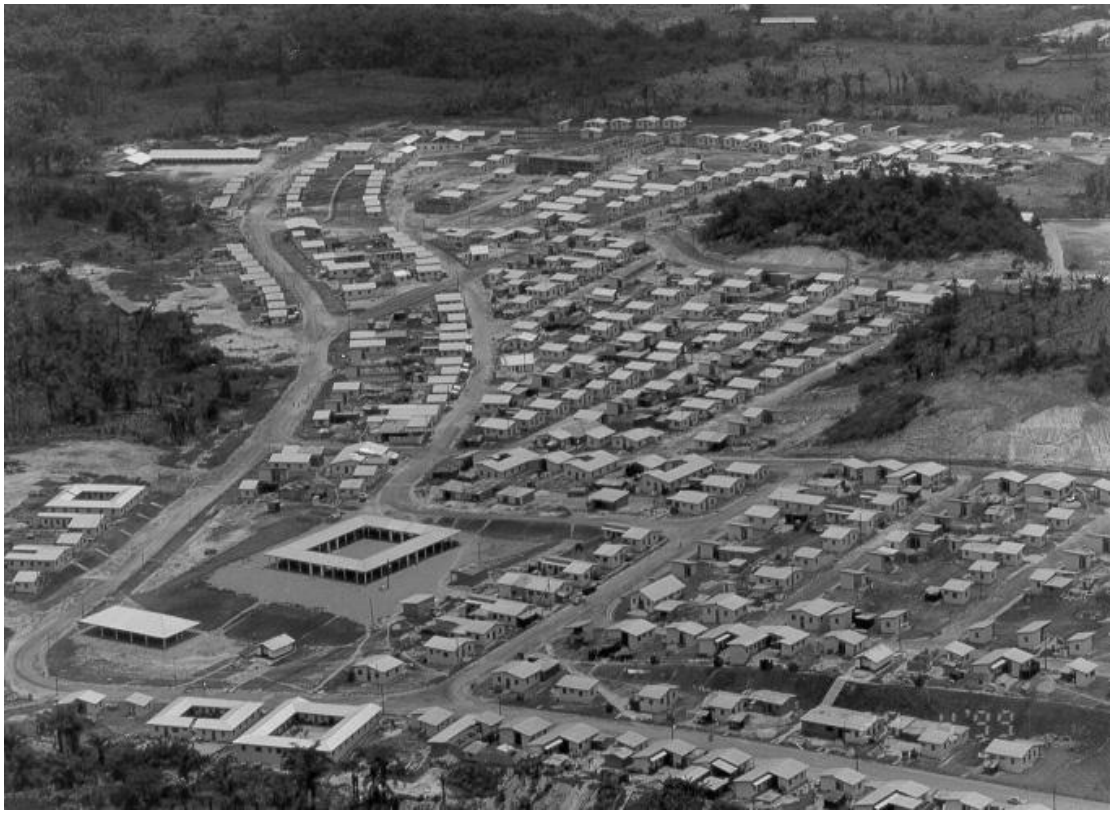


Figure 4.3 - A sessional aerial view of New Atuabo Community in 2000

Source: Yirenkyi, 2008

4.3.2 Abonteakoon Community

Unlike New Atuabo, the history of the Abonteakoon dates back to the 1930s with the operation of the Abonteakoon Mine or Amalgamated Banket Area Limited (ABA Mines). The native community came into existence with the construction of new detached residential quarters and workers' compounds for workers of the mine between 1936 and 1938. The housing units were mainly occupied by junior staff and artisans who worked in the Mine (SRK Consulting, 2004).

The organic expansion of the community started in the 1950s with the closure of the Abontiakoon Vertical Shaft (AVS) of the former ABA Mines. The massive sale of land by the traditional authorities after the collapse of the company resulted in the increase in housing in the community. The housing types include the native detached houses, compounds, semi-detached houses and modern house types. The community has no local plan and the existence of such plan implied a level of control over development which the community never had. The aerial view presented in Figure 4.4 depicts that the Abonteakon has been expanding in a linear pattern. Underpinned on this pattern is the fact that the community lies between two ridges that restrict the circular expansion and the fact that earlier housing structures constructed were in a lateral pattern. This implies that the expansion of the community is being shaped by both nature and history rather than planning.

Figure 4.4 - Aerial view of Abonteakoon Community in 2012

4.4 The State of Physical Development in the Study Areas

Physical development of settlements is critical for the development of nations (Miller, 2013). There is therefore a nexus between physical development and other forms of national development. On the basis of this, this section explores the level of physical development of the study areas. In assessing the level of physical development, the study considered the issues of housing infrastructure development as well as the densities of the communities. The section also explores the level of accessibility to utilities and infrastructural services and facilities within the selected communities.

4.4.1 Housing Infrastructure and Density

The *2000 Population and Housing Census* (PHC) revealed that the housing stocks in New Atuabo and Abonteakoon were 434 and 541 respectively and increasing at an annual rate of 2.8 percent (Ghana Statistical Service, 2001). Projection based on the 2000 PHC figures indicate that, the housing stock in New Atuabo should have been 681 and 747 and that of Abonteakoon; 546 and 599 in 2010 and 2013 respectively. Estimates in 2010, that is thirteen years after Goldfields Ghana Limited resettlement project, also indicate that the housing stock in New Atuabo was 633 (Goldfields Ghana Limited, 2010). It was thus inferred that there are more houses in the New Atuabo than in the Abonteakoon community.

In terms of housing types, the study identified four distinctive housing types in the study areas, namely: compound houses, single-storey houses, multi-storey houses (mostly two storey) and semi-detached houses. The study also observed that 30 percent of the sampled houses were detached, single - storey or self-contained houses (see Appendix 2). On the other hand, 22 percent of the sampled stock in Abonteakoon were detached buildings. Afrane and Asamoah (cited in Adarkwa, 2011) describe detached housing units as being developed by the middle income households mostly for their own occupation. Based on this, it was inferred that most of the housing units in New Atuabo are occupied by tenants rather than the house owners as compared to Abonteakoon.

The study also gathered that the total built up environment of New Atuabo and Abonteakoon is about 81 and 48.5 hectares respectively (Town and Country Planning Department - TNMA, 2014). Using the 2013 projected housing stock in the two communities indicated above, it was gathered that households in New Atuabo

community live in a lower density of 9.2 houses per hectare compared to 12.4 houses per hectare in Abonteakoon (See calculation in Appendix 3). This has implications for movement as well as access to basic utilities.

4.4.2 Conditions of Road Network

In describing the level of physical development of the two study communities, the study assessed the conditions of road network within the communities. The study collected data on the road network from the Department of Urban Roads in the Municipality. Based on the data, it was identified that the conditions of the roads in the study areas vary considerably. Table 4.2 portrays this observation to an extent considering that the length of road surface types differ with selected communities.

Table 4.2 - Conditions of the Roads in the Study Areas

Loc.	Surface Type	Good		Fair		Poor		Total length
		Km	percent	Km	percent	Km	percent	
New Atuabo	Bitumen	5.91	76%	1.31	17%	0.6	8%	7.82
	Earth	0	0%	1.27	43%	1.66	57%	2.93
	Total	5.91	55%	2.58	24%	2.26	21%	10.75
Abonteakoon	Bitumen	0.34	100%	0	0%	0	0%	0.34
	Earth	0.61	32%	1.19	63%	0.1	5%	1.9
	Total	0.95	42%	1.19	53%	0.1	4%	2.24

Source: Department of Urban Roads - TNMA 2014

Table 4.2 indicates that 55 percent of the roads in New Atuabo are in “Good” condition, 24 percent in “Fair” condition and 21 percent in “Poor” condition. The situation in Abonteakoon indicates that 42 percent of roads are in “Good” condition, 53 percent in “Fair” condition and 4 percent in a “Poor” condition.

It can also be observed that, 76 percent of the bitumen roads in the New Atuabo community are in “Good” condition, 17 percent are in “Fair” condition and 8 percent are in “Poor” Condition. For the earth roads, none of them are in “Good” condition. However, 43 percent are in “Fair” condition and 57 percent are in “Poor” condition. It is further observed that bitumen surface roads in Abonteakoon are in “Good” condition with none being in “Fair” or “Poor” condition. It is also discernible that 42

percent, 53 percent and 4 percent of the earth surface roads in that community are in "Good", "Fair" and "Poor" conditions respectively.

4.4.3 Access to Public Utilities

According to Afrane and Asamoah (cited in Adarkwa 2011) a housing unit must have the needed utilities such as water supply, electricity and sewage; among others to ensure decent life. The study considered the supply of water and electricity as the basic utilities to determine the level of physical development in the study communities.

(a) Water Supply

In terms of water supply, the study revealed that all (100 percent) households in New Atuabo and Abonteakoon communities have access to potable water facilities in the form of pipe - borne water, boreholes and hand - dug wells. However, it was revealed that 50 percent of the households had access to pipe - borne water facility from Ghana Water Company Limited (GWCL) in the New Atuabo community. The study also revealed that 20 percent of the households in Abonteakoon had access to pipe - borne water facility in their homes. This is represent 31 percent below the Municipal coverage of pipe - borne water (i.e. 51 percent of households in the Municipality).

From the field survey, 63 percent of the households interviewed in New Atuabo have access to pipe - borne water facility in their houses. Compared to Abonteakoon, only 26 percent of the households have had pipe - borne water facility extended to their houses as indicated in Table 4.3.

Table 4.3 - Respondents with Access to Pipe – Borne Water

Location	With Access		Without Access		Total
	Frequency	Percent	Frequency	Percent	
New Atuabo	51	63.0	30	37.0	81
Abonteakoon	26	32.9	53	67.1	79
Total	77	48.1	83	51.9	160

Source: Field Survey, June, 2014

It was also observed that most of the respondents (51.9 percent) do not have pipe - borne water facility in their houses because of: (i) the availability of mechanised borehole facility that supplies the community; (ii) the long distance between GWCL

service lines and most houses, particularly in the Abonteakoon community. Notwithstanding the fact that there are mechanised boreholes, the higher number of households with pipe - borne water facility in their houses in the New Atuabo community, was attributed to the proximity of most houses to the water service lines in the community. This appears to allow for easy and less costly extension of the facility to the houses.

(b) Electricity

With regard to electricity supply, the study revealed that 97 percent of the households in New Atuabo have electricity supplied to their homes compared to 99 percent of the households of the Abonteakoon that have electricity as indicated in Table 4.3.

Table 4.4 - Coverage of Electricity in the Study Areas

Community	Coverage Level (Percentage of residents with Access)
New Atuabo	97
Abonteakoon	99

Source: Electricity Company of Ghana – Tarkwa, May 2014

It can also be observed from Table 4.5 that, all the houses in the two study areas visited by the enumerators had electricity supply.

Table 4.5 - Access to Electricity in the Study Areas

Location of Respondent	Frequency	Percent
New Atuabo	81	100.0
Abonteakoon	79	100.0
Total	**160**	**100.0**

Source: Field Survey, June, 2014

4.4.4 Coverage and Access to Public Facilities

The provision and a population's access to public infrastructural facilities such as education, health, sanitation and sewage systems among others are very essential in shaping the physical or spatial form of cities or communities (UN - Habitat, 2009). The physical development of a community therefore requires that adequate access of its population to these public facilities is ensured. In order to identify the relationship between land use planning and household's access to public facilities, the study

assessed the level of coverage of the educational, health, sanitation and emergency service/ facilities in the study communities.

(a) Education

In the area of education, the study identified that only first cycle or basic level of educational system existed in both study areas. Specifically, kindergarten or pre – school level, primary school level and junior high school level existed in the New Atuabo and Abonteakoon communities. Table 4.5 presents the number of schools facilities in the study areas.

Table 4.6 - Distribution of Education Facilities in the Study Areas

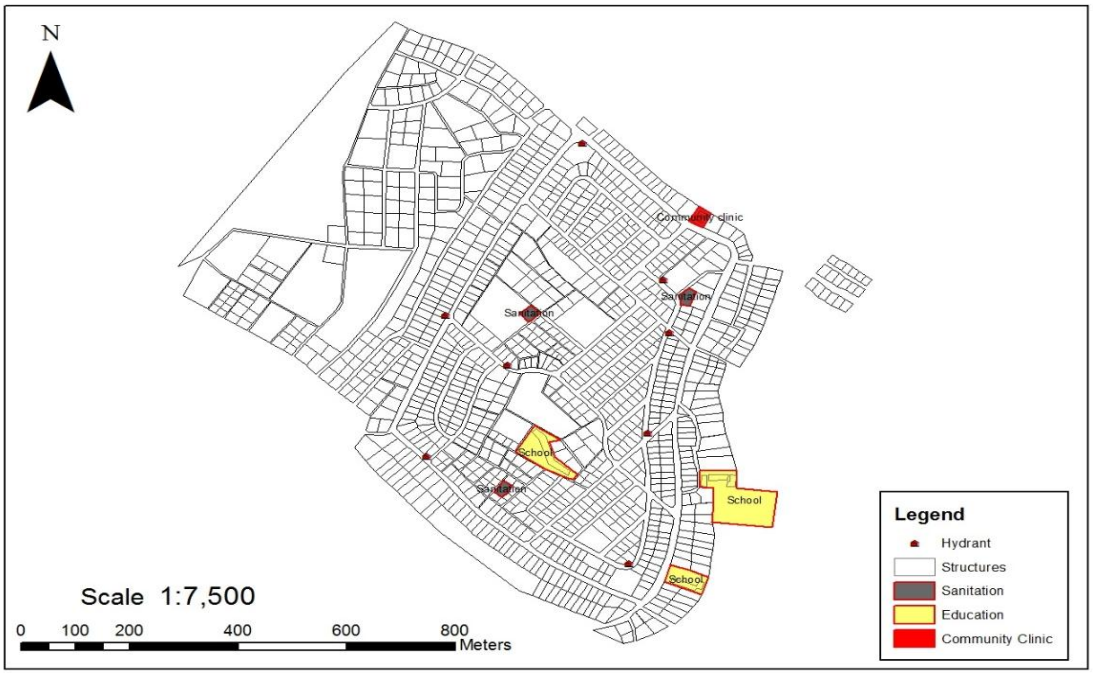
School Level	**New Atuabo**			**Abonteakoon**		
	Public	**Private**	**Total**	**Public**	**Private**	**Total**
Kindergarten	3	3	6	3	1	4
Primary	3	3	6	2	1	3
JHS	3	2	5	2	1	3

Source: Municipal Planning and Coordinating Unit – TNMA, 2014

From Table 4.6, it is clear that, there are more schools in New Atuabo community than the Abonteakoon community.

The study observed that the schools (both private and public) in the New Atuabo community have not been clustered but have been distributed widely within the community. Figure 4.5 shows the spatial distribution of educational facilities in New Atuabo. The average distance of all three facilities to most houses (13 minutes walking distance) is a lower than the 15 minutes maximum walking distance stipulated in the Ghana's planning standard for siting pre-schools in communities (See Appendix 4). However, in terms of primary and junior high education, the distances of all three facilities was shorter than 18 and 52 maximum walking distance stipulated in the same planning standards (Town and Country Planning Department, 2011).

Figure 4.5 - Spatial Distribution of Socio-economic Facilities in New Atuabo



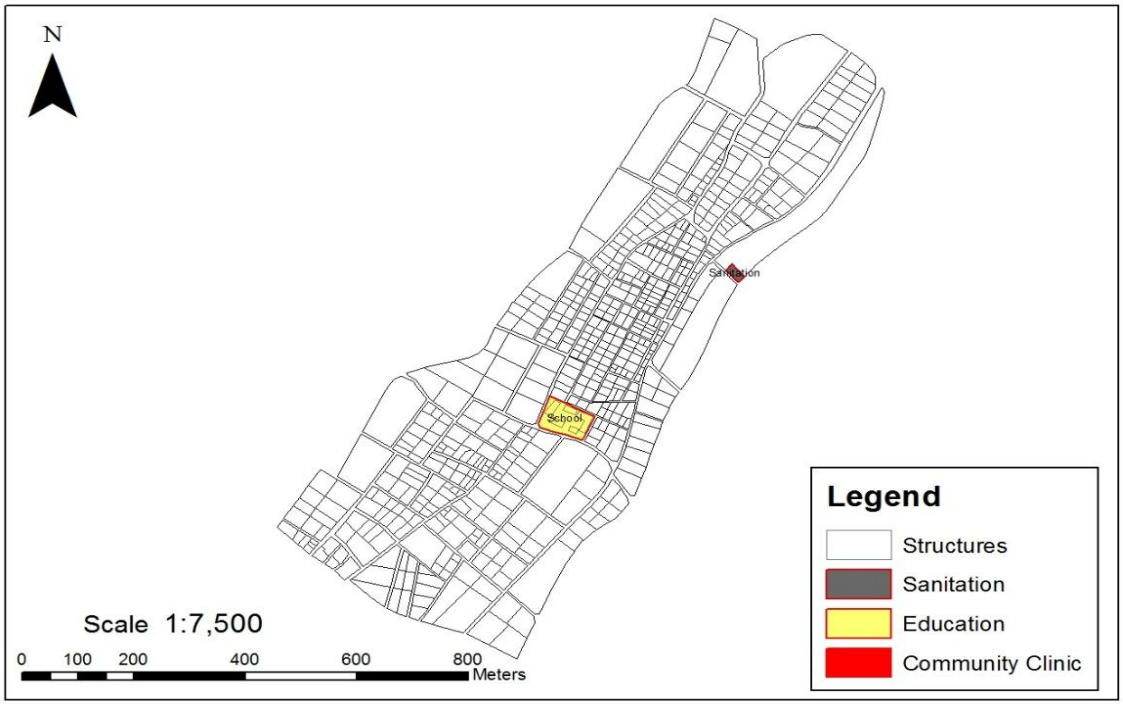
Source: Town and Country Planning Department, Tarkwa 2014

The study also observed that the schools in Abonteakoon are clustered in a single location within the community as depicted in the Figure 4.6. The average distance of the facility to most houses was estimated at 21 minutes' walking distance (Refer to Appendix 4). Compared to the maximum walking distance of 10 and 18 minutes for accessing pre-school and primary school respectively, the average distance of the facility to most houses in Abonteakoon is considered to be higher than the standards for siting basic educational facilities in Ghana

Based on the above, it was inferred that, the relatively shorter distance between the educational facilities and most houses in New Atuabo can be attributed to the distribution of the facilities across the community. On the other hand, the distance between the facilities and most houses in Abonteakoon can also be attributed the clustering of the facilities in a single location.

Notwithstanding the fact that the distribution of the facilities differ between the study areas, all households (100 percent) interviewed in both communities had access to the educational facilities in their respective communities.

Figure 4.6 - Spatial Distribution of Socio-economic Facilities in Abonteakoon



Source: Town and Country Planning Department, Tarkwa 2014

(b) Health

In terms of health, the study identified that the New Atuabo community had two types of health facilities in the community; pharmacy and a community clinic. Abonteakoon, on the other hand, had a pharmacy as the only health facility in the community as indicated in Table 4.7.

Table 4.7 - Number of Facilities in the Study Areas

Facility	**Number**	
	New Atuabo	**Abonteakoon**
Pharmacy	3	1
Community Clinic	1	-

Source: Municipal Planning and Coordinating Unit – TNMA, 2014

The planning standards of Ghana does not state the maximum distance households must cover to access a pharmacy but indicates that, community clinics should be sited within a maximum of 10 minutes walking distance from most houses (Town and Country Planning Department, 2011). The study, however, observed that the average walking distance between the clinic in New Atuabo and most houses in the community was approximately 17 minutes (7 minutes higher than required walking

distance). On the other hand, residents in Abonteakoon had to walk more than 60 minutes to access the nearest clinic in adjoining community (See Appendix 5).

Comparing the standards with the estimated distances between the clinics and most houses, the distance variation (7 minutes walking distance) in New Atuabo can be attributed to the siting of facility at the lateral rather than centre of the community as indicated in Figure 4.5. It was also inferred that, the variation in distance with respect to Abonteakoon community is as a result of the nonexistence of the facility in the community.

Again, it was inferred that, the relatively shorter distance between the clinic and most houses in New Atuabo compared to the distance in Abonteakoon was as a result of the availability of the facility in the former community. In effect, New Atuabo was inferred to be more functional in terms of the provision of health services than the Abonteakoon community.

(c) Sanitation

With respect to sanitation, the study identified that, there are three transfer stations in the New Atuabo community and only one in the Abonteakoon community. Figures 4.5 and 4.6 show the spatial distribution of the sanitary sites in the New Atuabo and Abonteakoon community respectively.

The study observed that, the average walking distance between the three sanitary sites and most houses in New Atuabo was approximately 12 minutes. Compared to the estimated 26 minutes' walking distance in Abonteakoon, it was inferred that the single sanitary site is far from most houses in the community (See Appendix 6). This has implications for sanitation conditions in the study areas, in that, households located far away from such facility are likely to resort to other forms of waste disposal such as burning, burying and indiscriminate dumping among others.

(d) Emergency Services

From the survey, it was also identified that there are eight fire hydrants in New Atuabo which have been distributed within the community as indicated in Figure 4.5. Contrary to that, Abonteakoon does not have a single fire hydrant and any other emergency service facility in the community. In effect, the community is at higher risk should there be a fire disaster. The absence of the fire hydrant can be attributed to

the absence of required space for siting such facility in the community. According to Ghana's planning standards, fire hydrants should be sited at 120 meters intervals along major town roads and should be located at a minimum of 15 meters from the nearest building. However, in Abonteakoon, such required spaces have been heavily encroached by developers making the siting of the facility nearly impossible.

It is with above background on the state of physical development that the role played by planning in the level of physical development of the study communities is examined next. In this discussion, the differences between the study areas with regards to the cost and level of accessibility to the selected facilities will be highlighted. The role played by planning in achieving the diversities in the level of physical development of communities will also be stressed.

4.5 The Impact of Land Use Planning On the Physical Development of the Study Areas

Following the description of the state of physical development of the communities, the study assessed the effect of land use planning on the achievement of the distinctive levels of development. The impact was assessed by comparing the development situations of planned area with the unplanned settlement. The basis for comparison were the key variables outlined in Chapter Three. Specifically, the comparison was made based on the level of accessibility with the communities, cost of extending utilities and distance of socio-economic facilities from most houses in the selected communities. This helped in making useful inferences about difference in the level of physical development between the study areas.

4.5.1 Level of Accessibility and Road Network

Geurs and Wee (2004) identified that, accessibility can be used as an indicator for determining the impact of land use plans on development as well as transportation on the functioning of settlements in general. A listing of the different forms of accessibility is presented in *Appendix 7* together with the definitions. The study adopted the transportation component of accessibility as a basis for measuring the impact of land use planning on the physical development of the study communities. This component determines the ease with which people cover a distance between an origin and a destination.

In determining the ease with which people in the study communities cover distances, a three - point Likert scale was used to analyse the views of respondents on a number of statements which border on the ease with which residents move from one place to another by walking and by vehicle as well as the adequacy of the transport infrastructure as presented in *Appendix 8*. The procedure for analysing these perceptions is outlined as follows;

$Y = A_{ij} + B_{ij} + C_{ij}$

Where:

Y = Perception of the Respondents in a study area

A = "Disagree" scale

B = "Neutral" scale

C = "Agree" scale

i = weight of individual scale (i = 1, 2 and 3)

j = proportion of respondents for individual scale

The final mark (Y) represent the collective perception of respondents on individual statement (See Appendix 8). Within the scale, the point two means that respondents neither "Disagree" nor "Agree" with the statement (that is, they are neutral). Therefore, points less than two means respondents "Disagree" with the statement and points greater than two means they "Agree" with the statement. The perceptions of the respondents on various statements are presented in Table 4.8.

As may be seen in Table 4.8, the statements for testing the perception of the respondents are in two parts. The first part (statements No. 1 to No. 4) are related to accessibility level (whether or not it is easy) to different land uses and facilities whiles the second part (statements No. 5 to No.9) are asking on the adequacy of the road and other infrastructure that ensure the level of accessibility required.

Table 4.8 - Perceptions of Local Residents on Level of Accessibility

No	Questions/ Statement	Final Marks	
		New Atuabo	Abonteakoon
1.	Houses can easily be accessed by vehicles	2.65	1.19
2.	Community facilities can easily be accessed by vehicles and walking	3.00	1.95
3.	Commercial areas can easily be accessed by vehicles and walking	3.00	1.96
4.	I can get to the main road easily	3.00	1.00
5.	Houses are well – connected with roads and links	3.00	1.25
6.	The Community has bus stops for public vehicles	2.56	1.00
7.	The community has well – maintained right of ways	2.02	1.01
8.	I am satisfied with pedestrian walkways in the community	2.17	1.01
9.	I am satisfied with road network in the community	2.99	1.00

Source: Field Survey, April 2014

It can be inferred from the Table 4.8 that, residents in New Atuabo can easily access their houses and community facilities such as community centres as well as commercial areas either by vehicles or by walking. Similarly, it indicates that, houses in the community are well connected with roads and residents can easily access the main roads from their houses. The responses to statements No. 6 and 9 also indicate that, the community has adequate designated areas for loading and offloading of public vehicles and that residents are generally satisfied with the road network in the community respectively.

On the other hand, the Table 4.8 indicates that, respondents in Abonteakoon cannot easily access their houses, community facilities and commercial areas by vehicle or walking. In addition, houses of residents are not well connected with the roads and residents cannot access the main roads easily. With respect to transport infrastructure, the Table 4.8 indicates that, the Abonteakoon community does not have adequate designated areas for loading and offloading of public vehicles. Based on the calculation of perception, it was observed from Table 4.8 that, residents are not satisfied with the road network in the community.

From the above, it becomes clear that, the planned area has a better road network with reservations that are not encroached by other development which allows for pedestrian walk. Again, the presence of designated areas for loading and offloading seem to encourage the operation of public vehicles in the community thereby making houses, facilities and other land uses easily accessible in the planned area. The study is, however, unable to prove the relationship between the designated space for loading and the influx of public vehicles in the planned area for lack of data. Unlike the planned area, it becomes clear from the above that, accessibility is a problem in the unplanned area as a result of the inadequate transport infrastructure.

The foregoing becomes even clearer when considered alongside with the discussion on the conditions of the road network in Table 4.3. The study identified that, the planned area has much more extensive road network (10.75 kilometres) than the unplanned area (See Table 4.3). What is therefore clear is that, the development of planned area, contrary to the unplanned area, conforms to planning which requires that a settlement should have a road network or circulatory system, including parking and pedestrian walkways to facilitate the movement people and goods (Town and Country Planning Department, 2011).

4.5.2 Cost of Extension of Utilities

The impact of the land use planning on the physical development of the study areas was also determined using the cost at which residents extended selected utilities to their houses. With each utility service examined, the factors that determine the cost of extension and their relation with the status of land use planning of the space it serves were assessed.

Following from the coverage of household access to utilities (See Section 4.3.3), the study assessed the amount involved in extending pipe - borne water facility and electricity to houses in the study areas and inferences were made from the variations between two communities with respect to the amounts paid by residents to extend these public utilities to their houses. On the basis of the above, the amounts paid by respondents to extend the selected utilities were analysed to make inferences for the impact of land use planning in the communities.

(a) Extension of Pipe - Borne Water Facility

Before identifying the how much residents in the communities pay to extend pipe - borne water facility to their houses, the study first reviewed the Ghana Water Company Limited's cost structure for extending a pipe - borne water facility to houses.

The study identified that Ghana Water Company Limited's cost structure is tied to the distance (measured in meters) between available water supply lines and the customer's house. That is, the longer the distance of the house from the supply lines, the higher the cost of extension. The company's cost structure also showed a three tier cost of extension as indicated in Table 4.9. The first category, represents customers within a maximum of 30 meters from the services lines. In the second category of cost structure, the customer must be within 30 to 100 meters from the service lines. In the third category, the customer must be within 100 to 200 meters from the service lines.

Consequently, customers within 30 meters from the service lines are required to pay a maximum of GH¢500.00 to extend the water facility to their houses with the cost of providing water meter inclusive. Similarly, customers within the second and third category are required to pay a maximum of GH¢1,900.00 and GH¢ 2,500.00 respectively. It was indicated that, customers beyond 200 meters were required to pay additional amounts as may be indicated by the company.

Table 4.9 - Cost of Extending Pipe-borne Water Facility to Houses

Category	Distance from Service lines (in meters)	Maximum Amount Required to be paid (GH¢)
1	0 – 30	500.00
2	30 – 100	1,900.00
3	100 – 200	2,500.00

Source: Ghana Water Company Limited – Tarkwa, 2014

Following from the identification of the cost structure of GWCL, the study assessed the amounts paid by residents in the study areas to extend pipe – borne water facility to their houses.

As indicated in Table 4.3, 51 out of 81 respondents in the New Atuabo community and 25 out of 79 respondents in the Abonteakoon had pipe – borne facility in their houses. The assessment of the cost of extension of water facility was therefore based

on the number of respondents with access to the facility. The respondents paid different amounts for the extension of the water facilities as indicated in the Table 4.10.

Table 4.10 - Amount Paid for Extension of Water Facility by Respondents

Amount Paid (GH¢)	New Atuabo		Abonteakoon	
	Count	Percent	Count	Percent
1 – 500	34	66.7	8	32.0
501 – 1000	17	33.3	13	52.0
1001 – 1500	0	0.0	3	12.0
1501 – 2000	0	0.0	1	4.0
Total	**51**	**100.0**	**25**	**100.0**

Source: Field Survey, April 2014

Table 4.10 indicates that, 66.7 percent of respondents with pipe water facility in New Atuabo compared to 32 percent of respondents in Abonteakoon community paid a maximum of GH¢500.00 to have the facility extended to their houses. Again, 33 percent and 52 percent of respondents in New Atuabo and Abonteakoon community respectively paid between GH¢500.00 and GH¢1000.00 to have the water facility extended to their houses.

A cross tabulation of the amounts paid by respondents in the two communities with distances of their houses from the water supply lines provided some explanations to variations in the number of respondents within the various cost categories.

Table 4.11 - Distance of Respondents' Houses from Supply Lines in New Atuabo

Amount Paid (GH¢)	Distance From Supply Lines (in Metres)						Total
	0 – 30		30 – 100		100 – 200		
	Count	Percent	Count	Percent	Count	Percent	
1 – 500	29	85.3%	5	14.7%	0	0.0%	34
501 – 1000	2	11.8%	15	88.2%	0	0.0%	17
Total							51

Source: Field Survey, April 2014

Table 4.11 indicates that, among the respondents who paid a maximum of GH¢500.00, 85.3 percent had their houses within 30 meters away from the water supply lines whiles the remaining 14.7 percent had their houses between 30 to 100 meters away from the supply lines. Similarly, out of the 17 respondents who paid

between GH¢500.00 and GH¢1000.00 and are expected to be within 30 to 100 meters away from the supply lines, only 88.2 percent were within the required distance. The remaining 11.8 percent were within a distance of 30 meters and below from the water supply lines.

Table 4.12 - Distance of Respondents' Houses from Supply Lines in Abonteakoon

Amount Paid (GH¢)	Distance From Supply Lines (in Metres)						Total
	0 – 30		30 – 100		100 – 200		
	Count	Percent	Count	Percent	Count	Percent	
1 – 500	1	12.5	6	75.0	1	12.5	8
501 – 1000	2	15.4	11	84.6	0	0.0	13
1001 – 1500	0	0.0	2	66.7	1	33.3	3
1501 – 2000	0	0.0	0	0.0	1	100.0	1
Total							25

Source: Field Survey, April 2014

Again, Table 4.12 indicates that, out of the eight respondents who paid a maximum of GH¢500.00 to extend the water facility, six of them representing 75 percent had their houses between 30 to 100 meters away from the supply lines. It also indicates that, 84 percent of the respondents who paid between GH¢500.00 and GH¢1000.00 lived between 30 metres and 100 metres away from the water supply lines.

What is noticeable about the foregoing information is that, more (approximately 69 percent) respondents in the unplanned areas paid more (more than GH¢500.00) to extend pipe – borne water facility to their houses because of the far distance (30 – 200 meters) of their houses from water supply lines. Contrary to that, majority of the respondents paid less (less than GH¢500.00) to extend the facility because of the relatively shorter distance (less than 30 meters) of their houses to the supply lines.

It was inferred from the above that, houses in the planned area are much closer to water supply lines because the water supply lines are extensive and covers various part of the community. The extensiveness of the water supply lines can also be attributed to the conformity of development of the area to its planning scheme which is expected to detail out a plan for water reticulation and distribution network (TCPD, 2011). The houses in the unplanned area are relatively far from the supply lines because the distribution network is seen to be limited in the community. This can

fairly be attributed to limited road network (See Table 4.3) in the unplanned area which serve as conduits for these supply lines.

(a) Extension of Electricity

With the extension of electricity, the study again assessed the cost of extending electricity to houses in the study areas by reviewing the Electricity Company of Ghana's cost framework for electricity extension. The cost framework was identified to be based on two category of extension service indicated in Table 4.13.

The first category represents single phase power extension and the second represents triple phase extension. Within each phase, there are three types of service offered; that is, the straight service extension, the one additional pole service extension and the two additional pole service extension. With the straight service extension, customers are required to be within a 40 metre radius from the nearest supply line. Customers who are beyond the 40 metre radius are required to opt for either one - pole extension or the two - pole service extension depending on the distance of the target house from the available supply line.

Table 4.13 - ECG's Cost Structure for Extending Electricity

Category	**Type Of Service**	**Approved Charges**		
		Extension Cost	Cost of Meter	Total
1- Phase	Straight Service	300.00	80.50	380.50
	1 – Pole Extension	1,500.00	80.50	1,580.50
	2 – Pole Extension	2,600.00	80.50	2,680.50
3- Phase	Straight Service	600.00	172.50	772.50
	1 – Pole Extension	2,400.00	172.50	2,572.50
	2 – Pole Extension	4,200.00	172.50	4,372.50

Source: Electricity Company of Ghana – TNMA, April 2014

Consequently, customers with single phase extension are required to pay GH¢380.50 for straight service, 1580.50 for one - pole extension and GH¢2,680.50 for double pole service extension. Similarly, customer who opt for a three phase power extension are required to pay GH¢772.50 for straight service extension, GH¢2572.50 for one - pole service extension and GH¢4372.50 for two - pole service extension. However, a request for extension of service that involves more than two poles is considered as a project that will require engineering studies. In such cases, the service extension may or may not be undertaken depending on the results of the engineering studies.

Table 4.14 shows the amount paid by respondents in the various study communities to extend electricity to their houses.

Table 4.14 - Cost of Extending Power in the Study Areas

Amount GH¢	New Atuabo		Abonteakoon	
	Frequency	Percent	Frequency	Percent
1 – 500	23	28.4	51	64.4
501 – 1000	42	51.9	20	25.3
1001 – 1500	14	17.3	8	10.1
1501 – 2000	1	1.2	0	0.0
2000 and Above	1	1.2	0	0.0
Total	81	100.0	79	100.00

Source: Field Survey, April 2014

As may be seen in Table 4.14, twenty - eight percent of the respondents in New Atuabo paid a maximum of GH¢500.00 to extend power to their houses as compared to 64 percent in Abonteakoon community. It also shows that the proportion of respondents increase as the amount paid increases in the New Atuabo community than in Abonteakoon. That is, 69 percent of the respondents paid between GH¢1000.00 and GH¢2000.00 to extend electricity in New Atuabo compared to 35 percent in Abonteakoon.

The above seems to indicate that, it costs more to extend power to houses in the planned area than in the unplanned area. However, a cross tabulation of the amount paid by respondents and category of extensive available in their houses indicates that, the high cost of extension of electricity in New Atuabo is explained by the fact that, most residents have extended multiple phase electricity to their houses. Table 4.15 presents the cross tabulation between amount paid and category of electricity extension in study areas.

Table 4. 15 - Category of Extension Service and Amount Paid by Respondents.

Amount Paid	New Atuabo				Abonteakoon			
	Single		Multiple		Single		Multiple	
1 – 500	17	21.0	6	7.4	51	64.4	0	0.0
501 – 1000	3	3.7	39	48.1	20	25.3	0	0.0
1001 – 1500	0	0.0	14	17.3	8	10.1	0	0.0
1501 – 2000	0	0.0	1	1.2	0	0.0	0	0.0
2000 and Above	0	0.0	1	1.2	0	0.0	0	0.0

Source: Field Survey, April 2014

From the Table 4.15 it becomes clear that, when the category of electricity extension is compared with the amount paid for the extension by respondents, the cost of extending electricity in the unplanned area clearly outweighs that of the planned area. It is instructive to note that, with the same amount paid (that is GH¢500.00 to GH¢1000.00), 48 percent of the respondents in New Atuabo extended a triple - phase power to their houses whereas, none of the respondents in Abonteakoon had the same service. Thus, residents in Abonteakoon were identified as paying more for less service with respect to the extension of electricity.

The analysis therefore indicates that, it costs more to extend power to houses in the unplanned area than in the planned considering the category of power extension within the two areas. However, there is limited justification for the relationship between land use planning and the cost of extending electricity, because the variation in cost is more determined by the category of service offered rather than spatial factors. Notwithstanding this fact, the Electricity Company of Ghana revealed that land use planning is essential to their operations as it makes it easier for the company to extend power to its customers and erect electricity poles in communities (especially in new or developing areas) without litigations. The company also indicated that, land use planning helps in the mapping of its coverage areas.

Generally, the study observed that costs of extending utilities (water and electricity) in the planned area is relatively lower than that of the unplanned area. As result, developers prefer to settle in the planned area than in the unplanned area, accounting for the expanded density (both population and housing) in the planned community rather than the unplanned community.

4.5.3 Distances of Public Facilities from Most Houses

Another indicator for assessing the impact of land use planning was the distance of public facilities from most houses in a community. The study compared the distance between educational, health, sanitation and emergency facilities and most houses in the study communities to make inference on the contribution of land use planning in achieving the various level of distances.

(a) Education Infrastructure and Services

In terms of education, the analysis revealed that only basic level education existed in New Atuabo and Abonteakoon community (See Section 4.4.4). In view of that, the study examined the standards for providing facilities for these levels of education. As may be seen in Table 4.16, Ghana's standards for providing pre-schools/ kindergarten indicate that, such facility should be sited within 80 metres (that is about ten (10) minutes walking distance) from most houses within a community. Whereas for primary schools and junior high schools, it is expected that such facilities be located within 18 and 52 minutes' walk from most houses respectively. These standards for siting educational facilities are meant to enhance households' access to such facilities.

Table 4.16 - Standards for Siting Educational Facilities

Facility	Max Distance (Km)	Max. Walking Time (Min)
Pre – School	0.80	10
Primary School	1.25	18
Junior High	3.50	52
Senior High	4.00	60

Source: Town and Country Planning Department, 2011

From the field survey, the study identified the walking distance of each facility from the sampled houses in the study communities. From Table 4.17, 77 percent of respondents in New Atuabo compared to 25 percent in Abonteakoon have access to a pre-school/ kindergarten within 10 minutes walking distance from their houses. The Table also indicates that 75 percent of respondents in Abonteakoon compared to 23 percent in New Atuabo cover a distance of 11 to 50 minutes to access a pre-school/ kindergarten. This distance is beyond the required distance (10 minutes walking distance) for accessing a pre-school/ kindergarten within a community in Ghana.

Table 4.17 - Walking Distance between Pre-school and Respondents' Houses

Walking Distance (In Minutes)	New Atuabo		Abonteakoon	
	Frequency	Percent	Frequency	Percent
1 – 10	62	76.5	20	25.3
11 – 20	13	16.0	41	51.9
21 – 30	6	7.4	10	12.7
31 – 40	0	0.0	4	5.1
41 - 50	0	0.0	4	5.1
Total	81	100.0	79	100.0

Source: Field Survey, April 2014

In the same way, 77 percent of respondents in New Atuabo compared to 25 percent in Abonteakoon have access to both primary and junior high schools within 10 minutes walking distance from their houses. This trend is not different from pre-school because each of the schools identified in *section 4.4.4* provide the three levels of education in the study communities.

The analysis of the distance between educational facilities and the visited houses revealed that, planning thriving on issues of thresholds and ranges, has contributed to the siting of schools within a relatively shorter distance in the planned area with the reverse happening in the unplanned area. Specifically, the distance between 77 percent of the houses and the schools in planned area conform to the standards for siting a pre-school. Contrary to this, the distance between the schools and 25 percent of sampled houses in Abonteakoon conform to the standards for siting a pre-school. In terms of primary school, 92.5 percent compared to 77.2 percent in the planned and unplanned area respectively conform to the standard for siting a primary school. This validates the assertion of Schill (2004) who believes that land use planning is capable of reducing the distance people have to cover to access public facilities.

(b) Health infrastructure and Service

In terms of health, the standards for siting health facilities (See Table 3.1 in Chapter Three) indicate that, the maximum walking distance that a households needs to cover to access, for instances, a clinic from their houses should be within 10 minutes walking distance. Table 3.1 shows that, these maximum walking distances increase with the levels of health facilities.

The study identified that, New Atuabo had three pharmacies/ licensed chemical shops whereas Abonteakoon had one. It was also identified that, Abonteakoon had no clinic or any other health facility apart from the pharmacy. As such, residents had to travel over a distance to access health care in other communities. The distance travel by residents to access health care and the proportion of respondents that travel such distances have been presented in Table 4.18.

Table 4.18 - Walking Distance between Clinic and Most Houses

Walking Distance (In Minutes)	New Atuabo		Abonteakoon	
	Frequency	Percent	Frequency	Percent
1 – 10	11	13.6	0	0.0
11 – 20	22	27.2	0	0.0
21 – 30	25	30.9	0	0.0
31 – 40	14	17.3	13	16.5
41 - 50	9	11.1	44	55.7
51 - 60	0	0.0	10	12.7
Above 60	0	0.0	12	15.2
	81	100.0	79	100.0

Source: Field Survey, April 2014

Table 4.18 indicates that 89 percent of the visited houses in New Atuabo are located within 1 to 40 minutes away (that is a maximum of 260 meters) from the existing clinic in the community. Similarly, the table indicates that, 16.5 percent of the houses in Abonteakoon are between 30 to 40 minutes away from the nearest clinic. The situation gets worse for Abonteakoon as 84 percent of the houses are located within 40 to 60 minutes and beyond, away from the nearest clinic.

Comparing the figures in Table 4.18 with the planning standards, the study identified that the location of 13.6 percent of the houses in New Atuabo conform to the required distance of locating a clinic from most houses within a community. Contrary to that, none of the location of houses in Abonteakoon conforms to the standard between a clinic and most houses. Thus, the distance between existing health facilities and most houses in the planned is relatively shorter than that of the unplanned area. The study therefore makes the inference that, the relatively shorter distance of the facility from most houses in New Atuabo is as a result of the availability of the facility in the community rather than the siting or distribution of the facility.

(c) Emergency Services

In terms of emergency service, the study identified that, fire hydrants was the only emergency facility present in one of the two study communities (Refer to Section 4.4.4). The standards for providing these hydrants, however, indicate that the facility should be sited at 120 metres interval along major town roads (Town and Country Planning Department, 2011). From the field survey, the study identified that, New Atuabo community had fire hydrants which had been sited along the streets of community as depicted in Figure 4.5. Contrary to that, Abonteakoon had no fire

hydrants as well as other emergency facilities. Based on the analysis of road networks, the study makes inferences that, the nonexistence of the fire hydrants in Abonteakoon could be as a result of the limited road network in the community.

Again, the standards for providing fire hydrants indicates that, the facility should be within 15 meters (that is 2.25 minutes walking distance) from the road side to the nearest building (Town and Country Planning Department, 2011). As may be seen in Table 4.19, the nearest buildings were within 5 minutes' distance (that is 30 meters) away from the facilities in the New Atuabo community.

Table 4.19 - Distance between Emergency Facilities and Houses

Walking Distance (In Minutes)	New Atuabo		Abonteakoon	
	Frequency	Percent	Frequency	Percent
1 – 5	19	23.5	0	0.0
6 – 10	35	43.2	0	0.0
11 – 15	27	33.3	0	0.0
Not Applicable	0	0.0	79	100.0
	81	100.0	79	100.0

Source: Field Survey, April 2014

The impact of land use planning on emergency service delivery is visible as it affects both the distribution of facilities and the required distances within which the facilities should be sited. Table 4.19 indicates that, the planned area has access to emergency services whiles the unplanned area does not. This was attributed to the availability of suitable space in former area for siting the facility whereas the absence of the facility in the latter was attributed to non-availability of suitable space for siting the facility. Similarly, the table indicates that, 23 percent of the houses are very close to facility in the planned which allows for access to emergency services in the planned area.

(d) Sanitation Infrastructure

Land use planning also affects the distance within which residents of a community cover to access sanitary facilities. The study identified that residents in an unplanned area cover a relatively longer distance to access a sanitary site/ transfer station than in the planned area. Table 4.20 gives an indication of the distances covered by residents in the study areas.

Table 4.20 - Distance to Sanitary Site from Most Houses

Walking Distance (in Minutes)	New Atuabo		Abonteakoon		Total
	Frequency	Percent	Frequency	Percent	
1 – 10	51	63.0	8	10.1	59
11 – 20	15	18.5	26	32.9	41
21 – 30	10	12.3	20	25.3	30
31 – 40	5	6.2	10	12.7	15
41 - 50	0	0.0	10	12.7	10
51 - 60	0	0.0	5	6.3	5
Total	81	100.0	79	100.0	160

Source: Field Survey, April 2014

Table 4.20 indicates that, 63 percent of the respondents in the planned area are able to access a transfer station within a radius of 60 meters (10 minutes' walking distance) compared to 8 percent in the unplanned area. Again, over 50 percent of the respondents in the unplanned area access the only existing transfer station within 30 to 60 minutes walking distance from their houses compared to 18 percent in the planned area. This was observed to be due to the relatively limited number of sites in the unplanned area as compared to that of the planned area.

The limited number of sanitary sites also raises issues of adequacy. Based on a Likert scale and the result in Table 4.21, it was observed that, the sanitary sites in the unplanned area are also inadequate to serve the needs of residents in the community. Within the planned area, residents were quite satisfied with the number of sanitary sites in the community. Table 4.21 gives indications of the adequacy of the sanitary sites in the planned and unplanned area.

Table 4.21 - Number and Distribution of Transfer Station

Questions/ Statements	Final Mark	
	New Atuabo	Abonteakoon
Number of stations are adequate for the community	2.68	1
Stations are adequately spaced for easy access	2.877	1
Distance from house allows for easy access	2.654	1
Stations do not conflict with other land uses	2.494	2.785

Source: Field Survey, April 2014

Using the same calculation method as indicated in *Section 4.5.1*, the study revealed that residents of New Atuabo are satisfied with the number of transfer stations in the

community compared to residents of Abonteakoon who disagree with the statement that, "the number of stations are adequate for the community". It was also revealed that the available transfer stations are adequately spaced for easy access in the former community compared to that of the unplanned area. Again, the distances from most houses in the community to the facility allow for easy access in New Atuabo than in the Abonteakoon community. As indicated in Table 4.21, residents in both communities agree that the transfer stations in their respective communities are not in conflict with other land uses.

On the basis of distance and adequacy of these sanitary facilities, it was inferred that land use planning accounts for the adequate provision of the sanitary facilities and its efficient distribution. This minimises the distance within which residents cover to access the facility. On the other hand, the absence of planning in an area affects the provision of sanitary facilities because of the limited allocated space for such facilities. It also affects the distribution and as a result, widen the distance that residents cover to access the facilities.

The analysis of distance between the above facilities and most houses in a community as an indicator for the impact of land use planning leads to the conclusions that the planning of the use of land within a community affects the siting of the facilities as well as the distance within which residents cover to access such facilities. Most of the distances of the facilities from houses in the study conform to standards in planning which affirms that effective planning results in efficient distributions of facilities (Peterson, 2002).

According to Geurs and Wee (2004), efficient distribution of facilities reduces distance and travel time for accessing such facilities. On the basis of this, it was inferred that, since population is attracted to areas where public facilities exist (Eminsang, 2010), people will be willing to locate in areas where there is convenience in terms of distance and time spent in accessing facilities. Thus, towns with easy access to public facilities and have relatively shorter distances between public facilities and residents are likely to grow faster than towns without facilities and have longer distance between residents and such facilities. In effect land use planning affects physical development of towns by reducing the distance that people travel to access basic public facilities and services.

4.6 Emerging issues on Land use planning in the study Areas

Realising the level of development in the study communities and the role of land use planning in achieving the various levels, the study examined some issues relating to land use planning in the Municipality. The emerging issues assessed hinged on the monitoring of expansion of physical activities like building construction among others by local planning authorities. Other issues bordered on the involvement of these authorities in the provision of public utilities and facilities within the Municipality.

4.6.1 Monitoring of Physical Development

The study revealed that monitoring of physical development in planned communities within the Municipality is done through: the issuance of building permit by the Physical Planning Department of the Assembly, periodic site inspections of identified construction works in the Municipality by the Municipal Works Department to advice on authorised development and halt unauthorised development; and through the complaints of the general public of perceived unauthorised development being carried out in the Municipality. Indicators for such monitoring activities, are the conformity of the development to zoning scheme of the community and the conformity of the structure to Ghana's building codes. On the other hand, monitoring of physical development in the unplanned communities is also done through the issuance of permit, periodic site inspections and the response to the complaints of the general public. However, the indicators for such monitoring activity only look out for whether or not the structure obstructs existing or proposed road network or whether it is being developed in existing water ways. It was also revealed that the Physical Planning Department of Assembly considers dominant land uses in an area to either grant or refuse potential developers permit to develop in such areas.

The challenges to monitoring development in the planned areas were identified as the proliferation of unauthorised structures being developed in such areas. The Physical Planning Department complained of structures being developed at odd hours by developers to escape being noticed by officers at the Department. On the other hand, the major challenge to monitoring of physical development in the unplanned areas is the absence of planning schemes which are expected to serve as the basis for halting unauthorised developments.

4.6.2 Provision of Public Utilities

The study revealed that the Assembly's involvement in the provision of public utilities in the planned area was mainly the furnishing of utility providers with schemes to guide the installation of the utilities. The schemes details the proposed land areas in the communities for utility service lines. In the unplanned areas, the Assembly assists the utility providers to find suitable areas in the communities through consultations with the Traditional Authorities and other stakeholders.

The study also revealed that the challenge with the provision of utilities in the planned areas is the occasional rezoning of land uses and revision of local plans for such areas. This often results in re-positioning or relocation of the service lines. On the other hand, the identified challenge within the unplanned area was the frequent litigation over land that serves as conduits for the utility service lines.

4.6.3 Provision of Public Infrastructural Services

The study observed that the provision of the selected public facilities was mainly provided by the Municipality. It was identified that the provision of these facilities is done through the implementation of the District Medium Term Development Plan (DMTDP). It was revealed that the Physical Planning Department as a member of the Municipal Planning and Coordinating Unit (MPCU) provides advice on the acceptable planning standards with respect to siting, determination of walking distances from most houses and the population threshold for a given facility being provided. It was revealed that within the planned areas, the provision and siting of public facilities are done strictly based on the scheme of the area. The Assembly, on the other hand, negotiates with the traditional authorities for suitable and "litigation - free" sites before facilities are provided in unplanned areas.

In terms of challenges, it was identified that the major challenge to the provision of utilities in the planned area was the encroachment of reserved lands from implementation of such projects. Another challenge identified is the absence of land-titles and other legal documents on lands reserved for the provision of public facilities in the planned areas.

4.7 Summary

A major objective of the chapter was to present the physical developments of a planned area and an unplanned area with the view of assessing the impact of land use planning in achieving the levels of development. The analysis established a clear distinction in the level of physical development. The planned area showed a high level of physical development in terms of road conditions, access to public facilities and utilities and above all in the development of housing. In all instances, the unplanned area showed a situation which was quite minimal than the planned. The comparison of the development situation with standards even made it clearer that planned area was better-off than the unplanned area.

The impact of land use planning was further assessed based on the indicators of cost of extending utilities, the distance between public facilities and most houses as well as the level of accessibility with the communities. In the process, the planned area was identified as more accessible with an extensive and better condition of road network, has relatively lower cost of extending utilities, and has limited distance between facilities and houses, on the basis of which it was argued that land use planning indeed impacts physical development positively. The chapter argues that unplanned area limited considering the level of physical development in the area.

CHAPTER FIVE

SUMMARY OF FINDINGS, RECOMMENDATIONS AND CONCLUSION

5.1 Introduction

Following from the analysis and discussion of the survey data in chapter four, this chapter presents a summary of findings as related to the objectives of the study. The chapter collates the major issues related to the impact of land use planning on the physical development towns. It primarily seeks to unveil the key policy issues so that the study's findings can become the bases for policy recommendations in efforts aimed at national wide adoption of land use planning as a prerequisite to land use development in Ghanaian communities. The chapter ends with recommendations for promoting land use planning within communities as well as districts in Ghana. For easy appreciation, the major findings have been presented under various themes with references made to the study communities to amplify the points made.

5.2 Findings of the Study

5.2.1 Land use planning and Housing Development

One of the objectives of this study was to assess the relationship between land use planning and housing development in the study communities. In line with that, the study revealed that the planned area had an extensive built-up area of 81.2 hectares. This was relatively larger than the 48.5 hectares built-up area in the unplanned area. Both communities displayed four main housing types and the planned community had more housing stock than the unplanned community. The study however, identified that the unplanned community had a higher housing density of 12.35 houses per hectare than the planned area which had a housing density housing of 9.1 houses per hectare. The lower density of the planned community could be explained by the fact, the size of the built-up area in the planned area was much bigger than that of the unplanned area.

Consequently it was inferred that people prefer to develop and stay in planned community than unplanned neighbourhood. Again, planned communities are able to accommodate more housing units than unplanned communities. Therefore land use planning promotes housing development

5.2.2 Land use planning and Conditions of Road and Movement Network

Analysis of the study communities revealed a significant level of relationship between land use planning and road network as well as conditions. Although the extensiveness of the road network were different for the study areas, the comparison of the two underpinned the identified relationship between land use planning and road networks of the study communities. In terms of network, the relationship becomes clearer as in the planned community more than 10 kilometres of road network which far outweighs the 1.92 kilometres in the unplanned area. This relationship remains unchanged with the consideration of road conditions of the communities. The planned area was revealed to have higher proportion of the road network as being "good" compared to that of the unplanned area. Hickman and Banister's (2007) view that landuse planning plays a significant role in the transportation and movement pattern within settlements is validated in this analysis of the relationship between land use planning and road networks in the study communities.

The implication of the foregoing is that, any intervention to improve road network in a community should start with the preparation of planning schemes that details the use of land and the proposed road layout of that community. In other words, land use planning can be considered as the basis for demarcating roads and tracking the conditions of the existing roads. This should, therefore, guide the development of new areas by land developers.

5.2.3 Land use planning and Access to Public Utilities

Another objective of the study was to assess the relationship between land use planning and access to public utilities in the study areas. The utilities considered in the study were electricity, pipe - borne water from Ghana Water Company Limited and mechanised borehole facilities. In terms of access to water, the study revealed that, residents of the study communities had access to potable water, however, the percentage coverage of the water sources and the degree of accessibility differ between the two communities.

In examining the cost of extending the pipe-borne water facility to houses, the average cost of extending such facility in the unplanned area was identified to be relatively higher than that of the planned area. In the case of the later, the average cost of

extending pipe-borne water facility was estimated to be GH¢500.00, while residents in the unplanned area are estimated to pay GH¢1,900.00 to have the facility extended to their houses. This difference in the cost of extension is explained by the distance of the water service lines from the houses of most of the respondents in the unplanned area as compared to the planned area.

In terms distance, the study revealed that, over 85 percent of the respondents in the planned area had the water service lines within a distance of 30 metres from their houses. Contrary to that, less than 13 percent of the respondents in the unplanned area had the service lines within the same distance from their houses. This commensurate with the cost structure of the Ghana Water Company Limited for extending water facility, such that, customers are required to pay more for water extension depending on their distance from major service lines within their communities.

In the case of electricity, the cost of extending power was revealed to be more dependent on the category of service a customer chooses; that is, either a single phase or triple phase extension, rather than distance. Depending on the phases of power being extended, a household or customer could pay between GH¢380.50 and GH¢4,372.50 to extend power to their houses. The study further revealed that, the Electricity Company of Ghana had a standard distance of 40 metres within which a house must be from a tension line in order to have electricity extended to it. Beyond such distance a customer would be required to pay approved fee before power is extended.

As indicated in the previous chapter, majority of the respondents in the unplanned paid less to extend power to their houses compared to the planned area. This situation could be explained by the fact that, the respondents in the unplanned area opted for a single-phase electricity whereas those in the planned area had a triple phase electricity extension to their houses. What is, therefore, clear is that planning the use of land affect the cost of extending water more than electricity because of the former's relationship with distance rather than the later. In effect, land use planning, impacts households' access to water more than their access to electricity.

5.2.4 Land use Planning and Access to Public Facilities

Evidence from comparing the availability, distribution and distance of houses from the selected facilities within the study communities also indicated some level of relationship between land use planning and households access to public facilities. In terms of availability of facilities, the study revealed that the planned community had more educational, sanitation and emergency facilities than the unplanned community.

The distribution of the facilities was also revealed to differ among the study areas. In the case of the planned area, schools, transfer stations and the fire hydrants were observed to be adequately distributed with the facilities sited at different locations within the community to ensure adequate access of households to these facilities. On the other hand, the schools in the unplanned area were clustered in a single location with the only available transfer station following in that order.

In terms of distance from most houses, the planned area was observed to have all the selected facilities located within a shorter (i.e. less than 15 minutes' walk) distance from most houses. In the unplanned community, the selected facilities were distant from the majority of the houses with the exception of the schools.

On the basis of the above, the study inferred that land use planning promotes improve access to public facilities by ensuring that facilities are distributed equitably and efficiently.

5.3 Recommendations

Emanating from the above are number of policy issues that decision makers and planners need to be concerned about as communities within Ghana continue to develop physically. Among such issues is the sporadic development of land which springs from inadequate control over the development of physical activities. This tends to increase in per capita land consumption and in effect results in the inefficient use of land with its negative environmental consequences as well as increase in capita cost of providing social economic infrastructure and utilities (Adarkwa, 2014).

Another issue is inadequate provision of socio – economic infrastructure in unplanned communities. Such challenge which is normally blamed on the inadequate land for providing such facilities, often result in lack of household's access to essential facilities and services. This section therefore presents recommendations for tackling

these issues with the aim of ensuring physical development of towns that is sustainable;

5.3.1 Preparation and Implementation of District Level Spatial Plans

Curtailing the sporadic nature of physical developments and efficiently managing the development of land in Ghanaian communities, would require that Metropolitan, Municipal and District Assemblies pursue and institutionalise a comprehensive spatial planning system at the district level. Such a planning system would require that MMDAs prepare district level spatial development frameworks (DSDFs) which are indicative plans, showing the expected developments over a period time, say 15 to 20 -year period, which will include the location of key components of the strategy aimed at achieving the desired development. It would require the preparation and implementation of the Structural Plans (SP) which define all land uses, including residential, commercial, industrial and mixed use areas, major open space, agricultural areas and areas requiring special treatment, such as areas of out-standing natural beauty, conservation areas and areas of historic or cultural importance, as well as areas for upgrading or regeneration and security areas. The last feature of this planning system is the preparation of detailed Local Plans (LP) which is derived from SPs to guide development at the community level or individual parcels of land (Town and Country Planning Department - Ghana, 2011).

The Ministry of Environment, Science and Technology (MEST) through the Town and Country Planning of Department of Ghana have introduced this three – tier spatial planning model as well as the manual for the preparation of these spatial plans which spells out the planning process and approaches involved in the preparation of the three levels of spatial plans discussed above. The manual gives indications of plan initiation process, roles and responsibilities of key stakeholders, resources needed including data requirements and data sources for the various levels of plans, approaches to stakeholder consultations, approval process and monitoring and evaluation processes which the MMDAs can use for the preparation and implementation of the plans.

The Town and Country Planning Department of the MMDAs should take advantage of the spatial planning programmes such as the Local Government Development Programme (LOGODEP) under USAID and the Land Administration Project (LAP)

to assess and prepare spatial plans for the districts and communities without such plans in Ghana.

The instutionalisation of this district level spatial planning system would also require that, legal and institutional frameworks are developed to guide the enforcement of the approach. In other words, there should be laws enforcing the operationalisation of the spatial planning system.

5.3.2 Preparations and Update of Local Plans through Stakeholder Consultations

The challenge against planning the use of land in most communities emanates from the implementation of outdated local plans and permitting of physical development in areas without plan. This can be mitigated by updating exiting but out-dated local plans. The study identified that, by simply updating existing local plans for communities; the use of land could be monitored and effectively controlled.

The Municipal Assembly should first of all, embark on a sensitization exercise, preferably radio sensitisation explaining the essence of land use planning to development of the Municipality as well as other stakeholders in land development. The Assembly should also organise consultative meetings with relevant stakeholders particularly the traditional authorities, on the need to plan their lands before selling to developers. The Town and Country Planning Department should also endeavour to update the local plans of communities in the Municipality to the statutory timelines for updating these plans.

5.3.3 Support for Research into Spatial Development Framework

In view of the fact that, spatial development frameworks are linked to land use planning at the district level, the Government of Ghana through the Ministry of Environment Science and Technology (MEST) should support research institutions to carry out research into the implementation spatial development frameworks to assess possible challenges such as non-adherence to these plans. This is essential as the findings of such research can facilitate the presentation of measures towards the mitigation of such challenges.

5.4 Conclusion

The study sought to assess the impact of land use planning on the physical development of Tarkwa - Nsuaem Municipality. Even in the absence of sufficient data, this objective has been achieved to a large extent. The study has demonstrated that, land use planning does not only optimise space for the housing development, but also improves housing density and ensures extensiveness of road network within communities. Additionally, land use planning was revealed to impact positively on physical development of settlements by reducing the per capita cost of accessing public utilities particularly pipe-borne water. A further analysis of this relationship unveiled that the cost of accessing utilities is reduced by ensuring the proximity of houses to utility service lines. Future research should therefore explore how stakeholders can capitalise on this relationship to expand the coverage of utilities in Ghanaian communities.

Another concern of this study was the assessment of the relationship between land use planning and the distribution and accessibility of public facilities. The analyses of the distance covered by households to access public facilities indicate that land use planning ensures improved access to public facilities through effective and efficient distribution of such facilities within communities/ neighbourhoods. Unravelling such impact of land use planning is essential as it facilitates an understanding of its dynamics and relationship with the physical development of human settlements.

In line with findings of the study, further research will be required to explore how MMDAs can effectively implement spatial/ land use planning at the district level; how the role of traditional authorities in district level spatial planning can be enhanced; as well as how the relationship between land use planning and revenue mobilisation at the district level can be established and enhanced.

The study have tried to unveil an intellectual discourse on how the impact of land use planning on the dimension of physical development of settlements can be best understood so that it can contribute its quota to overall national development. It is expected that this study would provide the needed step towards the transition from academic research to a policy discourse.

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Appendices

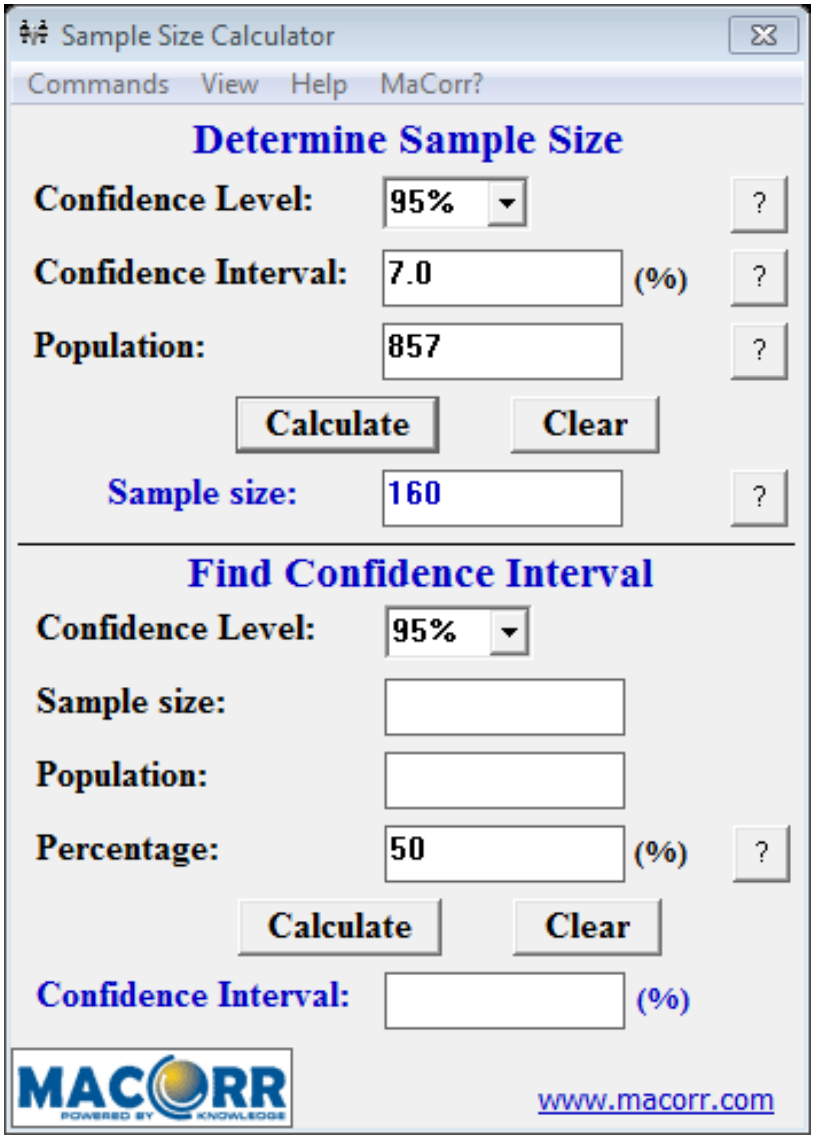
Appendix 1 - Calculation of Sample Size

Total Sample Population = 857

Confidence Interval = 7%

Confidence Level = 95%

The Figure below shows the calculation of the sample size using the Sample Size Calculator



Therefore of 160 houses were visited in the two study areas

Appendix 2 - Residential Areas Characteristics and sample distribution of the Study areas

Characteristics of Residential Areas	New Atuabo	Abonteakoon
Third Class Sector Typical communities are poorly serviced with water, electricity and telecommunications. Most are inaccessible to vehicular traffic. Plot sizes are less than 0.1H Mainly compound housing.	Sample Size (n) = 25 Sample Proportion = 31%	Sample Size (n) = 35 Sample Proportion = 44%
Second Class Sector Fairly well served with roads, water, electricity and telecommunication. Plot sizes range between 0.1 -0.2Ha. Fairly clean environment.	Sample Size (n) = 36 Sample Proportion = 44%	Sample Size (n) = 25 Sample Proportion = 32%
High Cost Sector Houses are developed on large plots for single households. Population densities are low. Well serviced and therefore attract high rent. Mostly inhabited by wealthy businessmen and senior civil servants.	Sample Size (n) = 20 Sample Proportion = 25%	Sample Size (n) = 19 Sample Proportion = 24%
Total Sample size	81	79

Source: Adopted from Tipple (2011) and modified by Author, 2014

Appendix 3 - Housing Density of the Study Areas in 2010

Location	2013 Projected Housing Stock	Built up Area (In Hectares)	Housing Density (per Hectare)
New Atuabo	633	81.2	9.18
Abonteakoon	510	48.5	12.35
Calculation: $Housing\ Density = \frac{Total\ Number\ of\ Housing\ Unit}{Total\ Built\ Up\ Area}$			

Source: Ghana Statistical Service, 2001; Town Planning Department – TNMA, 2013

Appendix 4 – Walking Distance of Educational Facilities to Residents' Houses

Distance (In Minutes)	New Atuabo		Abonteakoon		Total
	Frequency	Percent	Frequency	Percent	
1 – 10	62	76.5	20	25.3	82
11 – 20	13	16.0	41	51.9	54
21 – 30	6	7.4	10	12.7	16
31 – 40	0	0.0	4	5.1	4
41 - 50	0	0.0	4	5.1	4
Total	81	100.0	79	100.0	160
	*Mean = 13 Minutes		* Mean = 21 Minutes		

* Estimated

Source: Field Survey, April 2014

Appendix 5 – Walking Distance of Community Clinic to Residents' Houses

Distance (In Minutes)	New Atuabo		Abonteakoon		Total
	Frequency	Percent	Frequency	Percent	
1 – 10	43	53.1	0	0.0	43
11 – 20	26	32.1	0	0.0	26
21 – 30	9	11.1	0	0.0	9
31 – 40	3	3.7	1	1.3	4
41 – 50	0	0.0	15	19.0	15
51 – 60	0	0.0	49	62.0	49
Above 60	0	0.0	14	17.7	14
Total	81	100.0	79	100.0	160
	*Mean = 17 Minutes		* Mean = 60 Minutes		

Source: Field Survey, April 2014

Appendix 6 – Distance to Sanitary Site from Most Houses in the Study Area

Walking Distance (in Minutes)	New Atuabo		Abonteakoon		Total
	Frequency	Percent	Frequency	Percent	
1 – 10	51	63.0	8	10.1	59
11 – 20	15	18.5	26	32.9	41
21 – 30	10	12.3	20	25.3	30
31 – 40	5	6.2	10	12.7	15
41 - 50	0	0.0	10	12.7	10
51 - 60	0	0.0	5	6.3	5
Total	81	100.0	79	100.0	160
	* Mean = 12 Minutes		* Mean = 26 Minutes		

Appendix 7- Component of Accessibility

Components	Definition
Land-Use Component	reflects the land-use system, consisting of (a) the amount, quality and spatial distribution opportunities supplied at each destination (jobs, shops, health, social and recreational facilities, etc.), and (b) the demand for these opportunities at origin locations (e.g. where inhabitants live), (c) the confrontation of supply of and demand for opportunities, which may result in competition for activities with restricted capacity such as job and school vacancies and hospital beds.

Components	Definition
Transportation Component	describes the transport system, expressed as the disutility for an individual to cover the distance between an origin and a destination using a specific transport mode; included are the amount of time (travel, waiting and parking), costs (fixed and variable) and effort (including reliability, level of comfort, accident risk, etc.). This disutility results from the confrontation between supply and demand. The supply of infrastructure includes its location and characteristics (e.g. maximum travel speed, number of lanes, public transport timetables and travel costs). The demand relates to both passenger and freight travel.
Temporal Component	Reflects the temporal constraints, i.e. the availability of opportunities at different times of the day, and the time available for individuals to participate in certain activities (e.g. work, recreation).
Individual Component	Reflects the needs (depending on age, income, educational level, household situation, etc.), abilities (depending on people's physical condition, availability of travel modes, etc.) and opportunities (depending on people's income, travel budget, educational level, etc.) of individuals. These characteristics influence a person's level of access to transport modes (e.g. being able to drive and borrow/use a car) and spatially distributed opportunities (e.g. have the skills or education to qualify for jobs near their residential area), and may strongly influence the total aggregate accessibility result.

Source: Geurs and Wee, 2004

Appendix 8 - Perceptions of Respondents on Level of Accessibility within Study Areas

No	Questions	New Atuabo			Abonteakoon		
		Disagree (1)	Neutral (2)	Agree (3)	Disagree (1)	Neutral (2)	Agree (3)
1.	Houses can easily be accessed by vehicles	14	0	67	69	5	5
		17.3%	0.0%	82.7%	87.3%	6.3%	6.3%
2.	Community facilities can easily be accessed by vehicles and walking	0	0	81	41	1	37
		0.0%	0.0%	100.0%	51.9%	1.3%	46.8%

No	Questions	New Atuabo			Abonteakoon		
		Disagree	Neutral	Agree	Disagree	Neutral	Agree
		(1)	(2)	(3)	(1)	(2)	(3)
3.	Commercial areas can easily be accessed by vehicles and walking	0	0	81	41	0	38
		0.0%	0.0%	100.0%	51.9%	0.0%	48.1%
4.	Houses are well – connected with roads and links	0	0	81	61	16	2
		0.0%	0.0%	100.0%	77.2%	20.3%	2.5%
5.	I can get to the main road easily	0	0	81	79	0	0
		0.0%	0.0%	100.0%	100.0%	0.0%	0.0%
6.	The Community has bus stops for public vehicles	16	4	61	79	0	0
		19.8%	4.9%	75.3%	100.0%	0.0%	0.0%
7.	The community have well – maintained right of ways	24	31	26	78	1	0
		29.2%	38.3%	32.1%	98.7%	1.3%	0.0%
8.	I am satisfied with pedestrian walkways in the community	21	25	35	78	1	0
		25.9%	30.9%	43.2%	98.7%	1.3%	0.0%
9.	I am satisfied with road network in the community	0	1	80	79	0	0
		0.0%	1.2%	98.8%	100.0%	0.0%	0.0%

Appendix 9 –Perceptions of Respondents on the Adequacy of Sanitary Sites

No	Questions	New Atuabo			Abonteakoon		
		Disagree	Neutral	Agree	Disagree	Neutral	Agree
		(1)	(2)	(3)	(1)	(2)	(3)
1.	Number of stations are adequate for the community	13	0	68	79	0	0
		16.0%	0.0%	84.0%	100.0%	0.0%	0.0%
2.	Stations are adequately spaced for easy access	4	2	75	79	0	0
		4.9%	2.5%	92.6%	100.0%	0.0%	0.0%
3.	Distance from house allows for easy access	14	0	67	79	0	0
		17.3%	0.0%	82.7%	100.0%	0.0%	0.0%
4.	Stations do not conflict with other land uses	3	35	43	0	17	62
		3.7%	43.2%	53.1%	0.0%	21.5%	78.5%

Appendix 10

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY
COLLEGE OF ARCHITECTURE AND PLANNING
DEPARTMENT OF PLANNING

PROJECT TOPIC: Land Use Planning and Its Impact on the Physical Development of Tarkwa – Nsuaem Municipality

The researcher is a student from KNUST, reading MSc. in Development Policy and Planning, researching into the above stated topic. This questionnaire has been designed for data collection and academic purposes only.

QUESTIONNAIRES FOR HOUSEHOLD HEADS/ TENANTS/ LAND LORD

1. Date of Enumeration ----------
2. House Number: ----------
3. Location :
   a) New Atuabo [ ] b) Abonteakoon [ ]
4. Status of Respondent
   a) Tenant [ ] b) Landlord/ lady [ ]

SECTION A: HOUSING

The following set of questions are used to describe the characteristics of housing units in the study

5. What is the type of building unit?

Detached	[ ]
Semi Detached	[ ]
Two storey	[ ]
Compound House	[ ]
Others (specify)	[ ]

6. When was this house constructed?

Before 1957	[ ]
1957-77	[ ]
1977-1997	[ ]
1997-2014	[ ]
Still under construction	[ ]

7. What is the use of the building now?

Residential [ ]
Commercial [ ]
Mix use [ ]
Others (specify) [ ] ----------

SECTION B: TRANSPORTATION AND MOVEMENT NETWORK

The following questions are used to describe the situation of movement network in the study areas.

No	Questions	Disagree	Neutral	Agree
8.	Houses can easily be accessed by vehicles			
9.	Community facilities can easily be accessed by vehicles and walking			
10.	Commercial areas can easily be accessed by vehicles and walking			
11.	Houses are well – connected with roads and links			
12.	I can get to the main road easily			
13.	The Community has bus stops for public vehicles			
14.	The community have well – maintained right of ways			
15.	I am satisfied with pedestrian walkways in the community			
16.	I am satisfied with road network in the community			

17. What is the condition of links/ networks in your vicinity?

Roadways Fair [ ] Walkways Fair [ ]
Good [ ] Poor [ ] Good [ ] Poor [ ]

10. What challenges do the conditions of the links pose to you?

Unable to access house easily [ ]
Unable to access emergency service easily [ ]
Unable to access community facility easily [ ]
Others (specify) [ ] ----------

SECTION C: ACCESS TO PUBLIC UTILITIES

The following set of questions are used to describe the situation of public access to selected utilities in the study area.

ELECTRICITY

18. Do you have electricity in your house?

Yes [ ]
No [ ]

19. If No, why?

High cost of extension	[ ]
Alternative source of power	[ ]
Yet to extend	[ ]
Others specify ----------	[ ]

If yes, (20 – 23)

20. When was electricity extended to your house?

Before 1957	[ ]
1957-1977	[ ]
1977-1997	[ ]
1997-2014	[ ]

21. How many phases do you have?

Single phase	[ ]
Multiple phase (3 – Phase)	[ ]

22. How much did it cost you to extend the electricity

GH¢ 1 – 500	[ ]
GH¢ 501 – 1000	[ ]
GH¢ 1001 – 1500	[ ]
GH¢ 1501 – 2000	[ ]
GH¢ 2000 and Above	[ ]

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

Purchase of extra poles	[ ]
High cost of acquiring meter	[ ]
High labour costs	[ ]
Litigation over land	[ ]
Others (Specify)	[ ]

WATER

24. Do you have piped water system in your house?

Yes	[ ]
No	[ ]

25. If no, why?

High cost of extension	[ ]
Availability of Community water supply	[ ]
Will extend when economic	[ ]
Circumstance improve	
Others (specify)	[ ]

If yes;

26. When was it extended to your house

Before 1957	[ ]

1957-1977 [ ]
1977-1997 [ ]
1997-2014 [ ]

27. How much did it cost you to extended water to your house

GH¢ 1 – 500 [ ]
GH¢ 501 – 1000 [ ]
GH¢ 1001 – 1500 [ ]
GH¢ 1501 – 2000 [ ]
GH¢ 2000 and Above [ ]

28. What challenges did you encounter with the extension of water to your house?

High cost of extension [ ]
Cumbersome institutional procedure [ ]
Others specify [ ]

If respondent depends on community/ public water supply system (31 – 32)

Questions	Disagree	Neutral	Agree
29. Number of point sources/ stand pipes are adequate for the community			
30. Point sources/ stand pipes are adequately spaced for easy access			

31. How far (in minutes) is the community water supply from your house

1 – 15 mins [ ]
16 – 30 mins [ ]
31 – 45 mins [ ]
46 – 60 mins [ ]
Above 60 mins [ ]

SECTION D: ACCESS TO PUBLIC FACILITIES

This set of questions are used to describe the situation of public access to selected community facilities in the study.

EDUCATION

32. Which of the following educational facilities are in your community?

Nursery/ Crèche [ ]
Primary School [ ]
Junior High School [ ]
Senior High School [ ]

33. How far is the nearest facility from your house (In Minutes/ Hours)

Facility	Tick if Present	Duration (In Minutes/ Hours)
Nursery/ Crèche		
Primary School		
Junior High School		
Senior High School		

34. What challenges do you face in accessing these facilities

Long distance from house [ ]
Location conflict with other land uses [ ]
Nature and conditions of services offered [ ]
Other (Specify) [ ]

HEALTH

35. Which of the following health facilities are in your community

Pharmacy/ Licenced Chemical Shop [ ]
CHPs Compound [ ]
Clinic [ ]
Health post [ ]
Health Centre [ ]
Poly Clinic [ ]
District Hospital [ ]

36. How far (walking distance) is/ are the nearest health facility (ies) from your house (In Minutes/ Hours)

Facility	Tick if Present	Duration (In Minutes/ Hours)
Pharmacy		
CHPs Compound		
Clinic		
Health post		
Health Centre		
Poly Clinic		
District Hospital		

37. What challenges do you face in accessing these facilities

Long distance from house [ ]
Location conflict with other land uses [ ]
Nature and conditions of services offered [ ]
Other (Specify) [ ]

EMERGENCY SERVICE

38. Which of these firefighting facilities are in your community

Local fire post/ station	[ ]
Fire Hydrant	[ ]

39. How far (walking distance) is/ are the nearest firefighting facility (ies) from your house (In Minutes/ Hours)

Facility	Tick if Present	Duration (In Minutes/ Hours)
Local fire post/ station		
Fire Hydrant		

SANITATION

40. Do you have a transfer station in your community

Yes
No

41. If no, how do you dispose of refuse?

Indiscriminate dumping	[ ]
Burying	[ ]
Burning	[ ]
Others (specify)	[ ]

If yes

Questions	**Disagree**	**Neutral**	**Agree**
42. Number of stations are adequate for the community			
43. Stations are adequately spaced for easy access			
44. Distance from house allows for easy access			
45. Stations do not conflict with other land uses			

46. What is the distance (walking time) of the nearest transfer station from your house?

1 – 15 mins	[ ]
16 – 30 mins	[ ]
31 – 45 mins	[ ]
46 – 60 mins	[ ]
Above 60 mins	[ ]

Appendix 11

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY
COLLEGE OF ARCHITECTURE AND PLANNING
DEPARTMENT OF PLANNING

PROJECT TOPIC: Land Use Planning and Its Impact on the Physical Development of Tarkwa – Nsuaem Municipality

The researcher is a student from KNUST, reading MSc. in Development Policy and Planning, researching into the above stated topic. This questionnaire has been designed for data collection and academic purposes only.

QUESTIONNAIRE FOR ELECTRICITY COMPANY OF GHANA

1. What is the coverage level (in percentage) of electricity in the Municipality?

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2. Is your outfit providing services in New Atuabo and Abontiakoon residential areas?

   Yes [ ] No [ ]

   (a) If no, why?

   ---

3. Have you extended power to every house in these areas?

   Yes [ ] No [ ]

   (a) If no, why?

   (b) If yes what motivating it?

   Government policy [ ]

   Individual lobbying [ ]

   Others (specify) [ ]

   ---

4. What is the actual coverage level in these communities

Community	**Coverage (%)**
New Atuabo	
Abontiakoon	

5. How much does it cost (on the average) to extend power to a house in;

Community	**Amount GH¢**	**AV. Distance from the Supply point (Km)**
New Atuabo		
Abontiakoon		

6. In your opinion what accounts for the difference (if there is)

   ---

7. Does the planned nature of an area create any advantages for your company?

   Yes [ ] No [ ]

   (a) If yes, how?

   (b) If No, Why Not?

   ---

8. If yes, does it contribute to a denial of adequate power supply to the residential areas?

   Yes [ ] No [ ]

9. If no, how do you manage the situation?
10. Does your outfit have any problems as a result of the planned nature of selected areas?

    Yes [ ] No [ ]

11. If yes, what are they?
12. What solutions do you suggest?

Appendix 12

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY
COLLEGE OF ARCHITECTURE AND PLANNING
DEPARTMENT OF PLANNING

PROJECT TOPIC: Land Use Planning and Its Impact on the Physical Development of Tarkwa – Nsuaem Municipality

The researcher is a student from KNUST, reading MSc. in Development Policy and Planning, researching into the above stated topic. This questionnaire has been designed for data collection and academic purposes only.

QUESTIONNAIRE FOR GHANA WATER COMPANY LIMITED

1. What is the coverage level (in percentage) of Water Supply in the Municipality
2. Is your outfit providing services in New Atuabo and Layout residential areas?

   Yes [ ]

   No [ ]
3. (a) If no, why?

   (b) If yes, what was the motivating factor?
4. Have you extended water to every house in these areas?

   Yes [ ]

   No [ ]
5. If no, why?

   If yes, what facilitated the extension? (e.g Government policy, Municipal Assembly, lobbying etc)
6. What is the actual coverage level in these communities

Community	**Coverage (Percentage %)**
New Atuabo	
Layout	

7. How much does it cost (on the average) to extend water to a house in;

Community	Amount GH¢	Distance from Supply Point (KM)
New Atuabo		
Layout		

8. In your opinion, what accounts for the difference (if any)
9. Does the planned nature of an area create any advantages for your company?

   Yes [ ]

   No [ ]

10. If yes, how?
11. If yes, does it contribute to a denial of adequate water supply to the residential areas?

    Yes [ ]

    No [ ]

12. If no, how do you manage the situation?
13. Does your outfit have any problems as a result of the planned nature of selected areas?

    Yes [ ]

    No [ ]

Appendix 13

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY
COLLEGE OF ARCHITECTURE AND PLANNING
DEPARTMENT OF PLANNING

Land Use Planning and Its Impact on the Physical Development of Tarkwa – Nsuaem Municipality

INTERVIEW GUIDE: TARKWA – NSUAEM MUNICIPAL ASSEMBLY

1. Has your outfit provided any facility (ies) in the study areas under the following categories

   Education [ ]

   Sanitation [ ]

   Safety [ ]

   Health [ ]

   Recreation [ ]

2. What facilities are provided and how many are provided under these categories

FACILITIES	**NUMBER**	
	NEW ATUABO	**LAYOUT**
Education		
Sanitation		
Safety		
Recreational		

3. What is the average cost of providing the facilities listed above?

FACILITIES	**AMOUNT GH¢**	
	NEW ATUABO	**LAYOUT**
Education		
Sanitation		
Safety		
Recreational		

4. What has accounted for the differences (if any)
5. Does the planned nature of an area create any advantages for the provision of these facilities?
6. If yes, how?
7. Does the unplanned nature of areas contribute to a denial of these facilities in the study areas or any area in the municipality
8. How do you manage the situation of facility provision when the area is unplanned
9. What problems are faced as a result of the unplanned nature of an area when providing it with these facilities?