UNIVERSITY OF CAPE COAST

EFFECTS OF THE CONSTRUCTION OF THE BUI DAM ON THE LIVELIHOODS OF THE SURROUNDING COMMUNITIES

PRISCA AMA ANIMA

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BY

PRISCA AMA ANIMA

THESIS SUBMITTED TO THE DEPARTMENT OF GEOGRAPHY AND REGIONAL PLANNING OF THE FACULTY OF SOCIAL SCIENCES, COLLEGE OF HUMANITIES AND LEGAL STUDIES, UNIVERSITY OF CAPE COAST, IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF MASTER OF PHILOSOPHY DEGREE IN GEOGRAPHY AND REGIONAL PLANNING

DECEMBER, 2015

DECLARATION

Candidate's Declaration

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

Candidate's Signature:..... Date:.....

Candidate's Name: Prisca Ama Anima

Supervisors' Declaration

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

Principal Supervisor's Signature:..... Date:.....

Name: Dr. Simon Mariwah

Co - Supervisor's Signature:..... Date:.....

Name: Dr. K. Barima Antwi

ABSTRACT

The main objective of the study was to assess the effects of the Bui Dam on the livelihoods of the surrounding communities. Employing a mixed method design, 188 households in the eight (8) affected communities were selected for the study through census. In addition, ten (10) key informants and stakeholders were purposively selected. Using interview schedules, in-depth interview (IDI) and observation, the data collected were analysed and presented using frequencies, percentages, cross tabulations and direct quotations.

The study revealed that the main assets from which the people draw their livelihoods are natural, physical, social, financial and human assets, with natural assets being the most dominant among the assets. Before the dam construction, farming and fishing were the major livelihood activities. However, the introduction of the dam has led to a great shift in the livelihood activities of the people from predominantly agriculture (farming and fishing) to trading, due mainly to decrease farmlands and loss of access to rivers and streams. It also revealed that the dam construction has led to both positive impacts like access to infrastructures like housing, schools and roads and negative impacts like decreased in farmlands, food insecurity and loss of culture.

It can be concluded that, the construction of the Bui Dam has brought more negative effects on the livelihoods of the affected communities. It is therefore recommended that, to ensure livelihood security, the Bui Power Authority should support technical and vocational training to enhance the employability of the residents in other sectors of the economy.

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DEDICATION

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LIST OF ACRONYMS

AA - Ghana	Action Aid – Ghana
ADB	Asian Development Bank
BPA	Bui Power Authority
CHPS	Community Health Planning Services
DFID	Department For International Development
EPA	Environmental Protection Agency
GSS	Ghana Statistical Service
HIV/AIDS	Human Immune Virus/Acquired Immune Deficiency Syndrome
IUNC	International Union for National Conservation
MASLOC	Microfinance and Small Loans Scheme
NEA	National Employment Association
NGO	Non-Governmental Organizations
UNISDR	United Nations International Strategy for Disaster Reduction
VRA	Volta River Authority
WCD	World Commission on Dams
WCED	World Commission on Environment and Development
BNP	Bui National Park
BV	Bui Village

CHAPTER ONE

INTRODUCTION

Background to the Study

Since the 1990's, efforts have been made to gain better understanding of rural livelihoods, and to introduce rural development strategies as a way of reducing poverty (Ellis, 2000). According to chambers and Conway (1992), "a livelihood comprises the capabilities, assets, activities required for means of living. A livelihood is sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base". Thus, livelihood is said to be sustainable if it can respond to the social, economic and cultural needs of people. Our ability to pursue different kind of livelihoods depends on the assets available to a particular society. Assets can be financial, economic, social, physical and cultural. Livelihood strategies are the practical means or activities through which people access food or income to buy food, while coping strategies are temporary responses to food insecurity (Sphere, 1998). There are three broad types of livelihood strategies that are available to rural folks in developing countries: these are agricultural intensification, livelihood diversification and migration (Carney, 1998:2). That is, rural folks that can increase agriculture productivity from intensification or off farm income activities like carpentry mason etc. or seek job from elsewhere.

Agricultural intensification is the use of a greater amount of non-land resources (labour, inputs etc.) for a given land area, so that higher output is

produced (Hussein & Nelson 1999). That is, it generally focuses on the increased production of crops and agricultural commodities best suiting the agro-ecological conditions of the region and the farm as well as existing market outlets. Rural households in many different contexts have been found to diversify their income sources allowing them to spread risk and smoothen consumption (Ellis, 1998).Diversification can be in the form of promoting rural non-farm activities, and these activities can be simulated by improving the enabling environment (post market processing and marketing of agricultural goods), providing advisory services based in non- farm areas, and the capacity to build and train the rural folks in order to enhance economic and employment opportunities in the non-farm sector.

Livelihood insecurity is a major concern for developing countries, especially Africa (World Bank, 2005). Africa is characterised by poverty, malnutrition, famine and above all, huge sum of debt and diseases like HIV/AIDS. In Ghana, poverty is more pronounced in rural areas (Abane, 2008). Data from the Ghana Statistical Service (2008) indicates that about 70 percent of the poor in Ghana live in the rural areas where they have limited access to basic needs. Examples of the needs rural folks lack are electricity, motorable roads, and safe drinking water. Even acquiring a piece of land to farm for their living is a very difficult duty (Abane, 2008).

Rural livelihood strategies worldwide depend on natural resource base. For rural folks, agricultural production and direct dependence on forest and water resources in the form of hunting and gathering, farming, fishing are the main

source of livelihood (Ellis 2000). However, these livelihood strategies and outcomes of the rural people are generally altered by external factors such as the mining concessions and the construction of dams, especially, for the purpose of generating electricity. Thus, it must be emphasised that the construction of a dam claims huge area of agricultural lands, thereby posing threats and uncertainty to livelihood of rural folks.

The construction, operation and output of large dams have social, environmental and economic impacts that are positive and negative, direct and indirect and are woven together in very intricate ways. In all cases, some people gain, such as urban dwellers who benefit from increased water and electricity supply while others lose, such as the poor, rural people who are displaced from their homes and agricultural land when dams are built. In many cases, an unacceptable and often unnecessary price have been paid to secure these benefits especially in social and environmental terms by people displaced, by community downstream, by tax payers and by natural environment (World Commission on Dams, November 2010).

Agreeably, dams have made important and significant contributions to human development and the benefits derived from them have been well documented (World Commission on Dams, November, 2000). They further stress that large dams produce 20 percent of the world's electricity and 12 percent of its food production, generating an income of 50 billion dollars annually. There are currently about 1600 dams planned or under construction in 46 river systems around the world, 40 of them in developing countries (Mahmud,

2006). Although dams as an industry are key ingredients to water resource management, Hydro Electric Power, and irrigation, their construction and use have prompted fierce debate and controversy between government institutions and civil society (World Commission on Dams, 2006). Governments build dams as a strategy to deal with very specific issues, including the prevention of floods, the provision of water for drinking, sanitation and irrigation and the generation of Hydro Electric Power.

Dam's proponents maintain that, once a dam is built, food production increases, food related infrastructure develops, floods are controlled, domestic and business consumers of urban areas have an enhanced supply of electricity and water. These elements combine to enrich the economy as a whole, encouraging foreign investment and leading to secondary economic gains in the service, health and education sectors (Mahmud, 2006). Construction of dams therefore brings about widespread improvement in income welfare, food, security and employment, both directly and indirectly which in turn leads to poverty reduction (Lang, 2004).

In addition, during construction, dams create quite a number of jobs for both skilled and unskilled labour (National Employment Association, 2008). For instance, the Tarbela Dam of Pakistan employed 15,000 workers during its peak period of construction (International River Network, 2006). Also, dams on Kariba (Zambezi River, Zambian and Zimbabwe) and Grand Coulee (Columbia River Basin, United States of America) employed between 10,000 and 15,000 workers each. Though employment generated is temporal and short term

(McCully, 2007), Asian Development Bank, (2006) observes that secondary effects of dams can include improved access to water for households' needs, improved health conditions, reservoir fisheries, increased local economic activities, increased access to market via roads, employment in construction and tourism, recession agriculture in the reservoir margins and recreation.

However, the construction of dams has a negative side. As World Commission on Dams (2007) observed, employment generated by dam construction is only temporary because once it is built and is operational, the highly sophisticated technology involved in its operation demands a relatively small number of employees all of whom must have technical expertise. As a result, government agencies or corporation usually take over the management of dams, and the community loses control over its water resource. Construction of dams devours villages, towns, heritage sites and social networking in some cases, displacing hundreds of thousands of people. Dams' flood vast tract of lands and create reservoirs in areas that were once river valleys. As a result, fragile river ecosystems that are habitat are fragmented and ruined. Fisheries are destroyed and migration paths of animals and fish may be blocked. Dams have been linked to the extinction of several species of fresh water fish.

Furthermore, dam construction often leads to loss of homes, possessions and social networks (Brun, 2005; Nillson 2005). For example, the Num Theun Two Dam project in Laos displaced 6,200 people and adversely affected more than 100,000 villagers who depended on the Xe Bang River for livelihoods (Nakhabout, 2008). Also in Sudan, the Merowe/Hamadad dam project displaced

9,500 families or 50,000 people, from homeland in the Nile Valley (Linaries, 2008). In Ghana for example, the Akosombo dam and the Kpong Hydro Electric power displaced 80,000 and 6000 people respectively and also affected their livelihoods because the construction of the dams led to drastic reduction in floodplain agriculture which was the main source of livelihood (Gregory, 2008). Relocated communities often become fragmented as they are moved to other locations to make way for reservoirs. Livelihood patterns and resources are diminished; downstream wetlands can dry out, and floodplain fertility can reduce.

Thus, dam construction destroys people's source of livelihood. Indeed, there is a major concern that displacements make or made people poorer due to joblessness, landlessness, marginalisation and food insecurity. Before the construction of the Pak Moon in Thailand, the water way contained over 250 species of fish. This plummeted over 80 percent when the dam began operation. The source of job for more than 20,000 people was destroyed because of the loss of the fishes (Farrell, 2010). The Kandaji dam development in Niger displaced 2700 people and destroyed farming activities like growing of millet and rice on the land and rearing of livestock and fishing in the floodplains that provided their livelihood. The displaced people lost their houses, fields and grazing land to dam (Yardley, 2007).

Most of the time, cost and benefits of dams do not balance out. The poor, vulnerable groups, marginalised and future generation are likely to bear disproportionate share of the social and environmental cost of large dams. In

India, between 40 -50 percent of those displaced by dam projects were minorities even though they account for only 8 percent of the population (Hvinstendahl, 2008). Linares (2008) opines that nobody has ever proven that the benefits of large dams go to the poor. Nakhabout (2008) lamented that, typically communities most affected by the construction of dams are normally left out of the planning process. Those displaced by dam projects are often left without compensation or housing. Global dam production has led to impoverishment of millions (Asmal, 2006). Those given some compensation are also forgotten after the compensations have been paid. Judge (1997) laments that the displaced families after given some monetary compensation, are forgotten. Being critical on socio economic impacts, he continued that, what happens to their living conditions? Where did they resettle? Could they socially integrate in their new settings? These issues need to be investigated as far as dam constructions are concerned.

Statement of the Problem

Ghana's long development trajectory led to the construction of the Bui Dam to supplement Akosombo and Kpong dams to generate Hydro Electricity power. In December 2009 the construction of the Bui dam started precisely in the Tain District of the Brong- Ahafo Region to generate about 400 megawatt (MW) hydro- electric. It is built on the Black Volta River at the Bui Gorge, at the Southern end of the Bui National Park. The project is a collaboration between the government of Ghana and the Sino hydro, a Chinese construction company. Its

first generator produced power for the grid on May 3rd 2013 with completion expected in 2014. Bui is the second largest hydroelectric power generating plant in the country after Akosombo Dam. The reservoir flooded about 20 percent of the Bui National Park and impacts the habitats for rare black hippopotamus as well as large number of wildlife species. It required the direct resettlement of 1,216 people and indirectly affected more (Bui Power Authority, 2007).

Studies have shown that, the construction of the Akosombo and the Kpong Dams on the Volta River had some effects on livelihoods. Generally, the Akosombo Hydro- Electric Power benefitted some industrial and economic activities in addition to lake transportation, increased fishing, new farming activities along the shoreline, and tourism. Volta River Authority (VRA) has estimated that the reservoir fishery today supplies 14 percent of Ghana's total fish consumption (Asian Development Bank, 2008). However, the loss of land experienced by the 80,000 people forcibly relocated meant the loss of their primary economic activities from fishing and agriculture, loss of their homes, loss of their ancestor's grave sites, loss of community stability and the eventual loss of important social values (Ayibotele, 2010).

In addition, the construction of Akosombo and Kpong Dam, led to a drastic reduction in floodplain agriculture as natural flooding no longer leaves rich alluvial deposits that improve soil fertility in the overlying upland areas, and an explosion in the growth of exotic weeds that have choked off the once lucrative shell fishery, increased the snail vectors for the debilitating bilharzias,

and fostered the formation of a permanent sandbar at the estuary (Gregory, 2008).

The Kpong Dam shellfish have been hit particularly hard. Before the dam, there was a robust clam fishery downstream from the dam. Clams that could only reproduce in blackish water moved up and down the river so they had a large habitat. Now that the front is fixed, they can only reproduce in a narrow strip. Due to the vegetation and water quality changes, clam picking, an occupation mainly dominated by women, has almost been eliminated. Many other commercially valuable species have severely declined or disappeared as well, including blue crab, shrimps, shad and herring (Ayibotele, 2010). Loss of agriculture, clam picking, and fishing activities have created intense poverty and led to a dramatic shift in income generating activities. Some 80,000 people are directly adversely affected by the change in livelihood. The Volta Basin Research Project has found that the decline in river-based incomes triggered an increase in prostitution, crime, sexually transmitted diseases, and the widespread migration of young people to urban areas (Gregory, 2008; IUNC, 2008).

Thus, with most rural livelihoods being heavily dependent on natural capital, the construction of the Bui Dam means rural livelihood would be greatly affected. However, empirical evidence of the effects of the Bui Dam on the livelihoods of the people is barely available. Even though there has been an earlier study; Atindana et al (2014), this study only considered two out of the eight communities, as a result its conclusion may not be accurate based on the fact that there were eight affected communities. It is against this background

that this study sought to assess peoples' responses to the effect of the construction of the Bui Dam in these eight communities on their major livelihood and to examine the role of stakeholders in ensuring livelihood security for these resettled communities.

Objectives of the Study

The main objective of the study was to assess the effects of the Bui dam construction on the livelihood of the people. Specifically, the study sought to:

1. Identify the assets that provided livelihood to the people in the study area.
2. Evaluate the changes in livelihood of the people in response to dam construction.
3. Examine the effects of the dam construction on the livelihood of the people in the study area ; and
4. Assess the role of stakeholders in ensuring livelihood security for the people.

Research Questions

The following research questions guide the study:

1. What type of assets do the people draw their livelihood from?
2. What changes have occurred to the livelihood of the people since the dam construction?
3. How has dam construction affected the livelihood of the people?
4. What are stakeholders doing to provide livelihood security for the people?

Significance of the Study

The reason for the study lies in the fact that most rural communities depend on natural capital (mainly farm lands) as their major livelihood asset from which they draw their livelihood (Brycesson, 1999). Livelihood insecurity is a problem in the Bui Dam area as farmlands and forest reserves are being taken over by dam constructions. As the people shift from one livelihood option to the other, there is no guarantee that their livelihood will become secure. The study is therefore expected to bring to bear the changes and effects in the livelihood activities of the people.In addition, the study would provide useful information to policy makers, planners and other stakeholders such as the District Assembly, Non-Governmental Organizations (NGOs) and dam constructors on the livelihood activities of the people in the District. This will help to put in place strategies to ensure livelihood security for the people.

Lastly, findings from the study would add to existing knowledge on rural livelihood. This will serve as a platform for further research into issues related to rural livelihood. It is expected that the research findings will provoke discussions among researchers on how rural people respond to dam construction by shifting their livelihoods.

Organisation of the Study

The study is organised into five chapters. Chapter One presents the background of the study, statement of the problem and the significance of the

study. The related literature for this study is reviewed in Chapter Two. In this chapter, what other people have written, theories other people have already built and concepts about the livelihood strategies were reviewed.

Chapter Three covers the methodology of the study. It explains the population, sample size, sampling methods, as well as data collection and analysis procedures. The results and discussion of the study were captured in Chapter Four. The Chapter Five gave the summary, conclusions, recommendations, as well as suggestions for further research.

CHAPTER TWO

LITERATURE REVIEW

Introduction

This chapter presents a review of existing literature related to the research problem. For the purpose of the review, the chapter is divided into the following sub-headings: concept of livelihood; rural livelihood and diversification; changes in livelihoods as a result of dam construction; impact of dam construction on livelihood; overview of dam construction in Ghana; role of stakeholders in livelihood security and theoretical issues and conceptual framework underpinning the study.

Concept of Livelihood

The concept of livelihood has been under discussion for a considerable time now, but has been a central development topic only in the last decade (Leonard, 2013). Chambers and others spearheaded this sharpening of interest in their seminar papers. The concept of sustainable livelihood as a systematic set of ideas has only been together a few years ago (Brand, 2002). Livelihood is the activities, assets, and the access that jointly determine the living gained by an

individual or household (Ellis, 1999). Drawing on Chambers and Conway (1992: 23), Carney (1998: 7) defines livelihood as "comprising the capabilities, assets (including both material and social resources) and activities required for a means of living. Capabilities refer to a set of alternative being and doing that a person can achieve with their economic, social and personal characteristics (Leonard, 2013). Livelihood also describes the resources people use, the ways in which they are used, and the benefits obtained (Baruah & Hazarika, 2007). Sherpard (1998) extended the definition to include, the quality of life and dignity of individuals. The livelihood definition directs attention to links between assets and options people have in practice to pursue alternative activities required for a living (Leonard, 2012).

Essentially, livelihood is about the ways and means of making a living (Scoones, 1998). It deals with people, their resources and what they do with their resources. Livelihood also involves creating and embracing new opportunities. In their quest to gain livelihood, people have to contend with risks and uncertainties such as rainfall failures, pressure on land, inflation, diminishing resources, global economic downturn, epidemics and natural disasters. These uncertainties, together with new emerging opportunities, influence how material and social resources are managed and used, and on the choices people make (Ellis, 2000). Livelihoods can be made up of a range of on-farm and off-farm activities that together provide a variety of procurement strategies for food and cash. Thus, each household can have several possible sources of entitlement which constitute its livelihood. Entitlements include the rights, privileges and assets that a

household has, and its position in the legal, political, and social fabric of society (Frankenberger, Becht & Mccaston, 2002)

A livelihood is sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets, while not undermining the natural resource base (Chambers & Conway, 1992). Hence, livelihood is said to be sustainable if it responds to the social, economic and cultural needs of people. Again, sustainable livelihood also refers to the maintenance and enhancement of secure ownership and access to assets, resources and income as well as ensuring adequate stocks of food and cash to meet basic needs (Leonard, 2013). Frankenberger, Becht and Mccaston (2002) defined Household Livelihood Security as adequate and sustainable access to income and resources to meet basic needs (including adequate access to food, potable water, health facilities, educational opportunities, housing, and time for community participation and social integration).

Definition of Livelihood Assets

Assets are the building blocks of a sustainable livelihood. By building assets, individuals and households develop their capacity to cope with the challenges they encounter and to meet their needs on a sustained basis (Chambers & Conway, 1992). Again, Ellis (2000) defined household assets broadly to include natural, human, financial, public and social capital as well as household valuables. These assets can be owned, controlled or claimed (Leonard, 2013) and may depreciate over time or may be expanded through investment (Kajia, 2007). Assets may be tangible, such as

food stores and cash savings, as well as trees, land, livestock, tools, and other resources. Assets may also be intangible such as claims one can make for food, work, and assistance as well as access to materials, information, education, health services and employment opportunities. People's assets are not merely means through which they make a living; they are the assets that give them the capacity to be and to act (Bebbington, 1999). Another way of understanding the assets, or capitals, that people draw upon to make a living is to categorize them into the following five groups: human, physical, social, natural and financial (Beck, 2005).

According to Ellis (2000), human assets can be enhanced by training and by the skills acquired through pursuing one or more economic activities. Education, good health and skills training are important human assets that enable people to engage in different activities to achieve their livelihood objectives (Carney, 1998). For instance, education plays a crucial role in every economy. As a form of human capital, it contributes greatly to the livelihood of people (Safo-Kantanka et al, 2006). Long (2001) asserts that, most rural residents often acquire skills in agriculture as it is the dominant economic activity in rural areas. Human asset is also measured by access to good health as the quality health of the people determines their capacity to engage in diverse livelihood activities to attain particular outcomes (Carney, 1998). Sen (1997) has noted that, the possession of human capital not only means people produce more, and more efficiently; it also gives them the capacity to engage more fruitfully and

meaningfully with the world and more importantly, the capacity to change the world.

DFID (1999) denotes social assets as consisting of social groups such as associations, clubs and voluntary organisations that rural residents draw upon in pursuit of their livelihood objectives. Often times, social assets represents a place of seeking refuge in mitigating the effects of shocks or stress through informal networks (DFID, 1999). For example, Moser (1998) argues that among other things, marriage (household relations) is an asset in the form of social capital. Thus, marital status has either a positive or negative influence on livelihood outcomes, as marital partners contribute to each other's welfare by helping to provide productive resources that enhance livelihoods. Joseph and Antoh (2005) argues that, rural residents belong to social groups, which contribute greatly to their livelihoods. Safo-Kantanka et al. (2006) opined that farmer associations are the dominant social group in the Banda and the Bole district because of the agrarian nature of the district.

DFID (1999) describes natural assets as natural resource stocks from which resource flows and services useful for livelihoods are derived These include land, forests, rivers, streams and others (Ellis, 2000). The main assets whose accumulation has been promoted has been land, based on the argument that land ownership and access are closely linked to agricultural production and corresponding food security and rural income generation (Winter, Davis & Carletto, 2009).

Physical assets (buildings, irrigation canals, roads, electricity, and hospitals) are not only important for meeting people's needs directly but also for providing access to other assets (Safo-Kanatanka et al & Johnson et al, 2007). Most of the times, when physical assets are present other types such as human assets, financial assets (savings, access to credit and loans) and natural assets (land, water, wildlife, trees) could become accessible to the people, since physical assets provide the avenue through which other types of assets can be harnessed (DFID, 1999; Ellis, 2000).

Johnson (1997) observed that most rural livelihoods are built around financial resources such as cash/loans, savings, bank deposits and stocks (food and livestock). Ardayfio-Schandorf, Attua, Agyei-Mensah, Yankson & Asiedu (2007) assert that foodstocks and livestock are the main sources of finance to most rural communities

Rural Livelihood and Diversification

Historically, farming has been considered the principal economic activity of rural households, particularly poor rural households and the dominant view of development has been the small farm first paradigm which emphasizes promoting agriculture among small holders (Ellis & Biggs, 2001). As such, the main assets whose accumulation has been promoted has been land, based on the argument that land ownership and access are closely linked to agricultural production and corresponding food security and rural income generation (Winter, Davis & Carletto, 2009). The small farm perspective emphasized land as the key

asset to bring about gains in both equity and efficiency (Winter et al, 2009). Reardon (2007) clearly shows that, rural households are involved in a range of economic activities and that agriculture, while remaining important is not the sole or in some cases, even the principal activity of the poor.

Higher incidence of poverty in rural areas has been traced to some environmental problems associated with agricultural production, high vulnerability to health hazards (Aix, 1998), lack of access to improved farm inputs and poorly developed infrastructural facilities (Okummadewa, 2003). Peoples' ability to pursue different livelihood strategies is dependent on the material, social, tangible and intangible assets that are available to them. Three broad clusters of livelihood strategies are available to rural households in developing countries, namely agricultural intensification, livelihood diversification and migration (Carney, 1998). That is for rural folks they can increase agriculture productivity from intensification or off farm income activities like carpentry, masonry or seek jobs from elsewhere.

Agricultural intensification refers to the use of a greater amount of non-land resources (labour, inputs etc) for a given land area, so that higher output is produced (Hussein & Nelson, 1999). That is it generally focuses on the increased production of crops and agricultural production of crops and agricultural commodities best suiting the agro-ecological conditions of the region and the farm and existing market outlets. Rural households in many different contexts have been found to diversify their income sources allowing them to spread risk and smoothening consumption (Ellis, 1998; Reardon, 2007).

Rural livelihood diversification is then defined as the process by which households construct a diverse portfolio of activities and social support capabilities for survival and in order to improve their standard of living (Ellis, 1998). The causes of the adoption by rural families of diversified income portfolios are better understood than the policy implications. Consideration of risks spreading, consumption smoothing, labour allocation smoothing, credit market failures and coping with shocks can contribute to the adoption, and adaptation over time of diverse rural livelihoods. Diversification can be in the form of promoting rural non-farm activities, and these activities can be simulated by improving the enabling environment (post market processing and marketing of agricultural goods), providing advisory services based in non- farm areas, and the capacity to build and train the rural folks in order to enhance economic and employment opportunities in the non- farm sector. Migration too can result in rural folks travelling to the cities or nearby towns to look for jobs.

Furthermore, rural-off farm activities provide opportunities for both the landless rural poor and the group of non-adopters that falls out of business when agriculture becomes more efficient. It curbs rural-urban migration and also reduces the number of non-motivated farmers who take up farming just because they have no other options, thus paving the way for more efficient farmers (Mwaniki, 2010).

Thus, for rural people, the range of options open to them is to either gain more of their livelihood from agriculture through the process of intensification, or diversify to off-farm income earning activities, or seek a livelihood elsewhere.

However, these pathways to livelihood are not separate. They are not mutually exclusive and can therefore be pursued together or in a sequence (Scoones, 1998; Safo-Kantanka et al, 2006). Hence, resources available within the immediate surroundings often serve as a source of livelihood to the people, and it is vital to note that rural livelihood strategies are often heavily reliant on the natural resource base. For instance, for forest fringe communities in rural areas, agricultural production and direct dependence on forest resources provide the main source of livelihood. In the past, it has often been assumed that farm output growth would create plentiful non-farm income earning opportunities in the rural economy via linkage effects. However, this assumption is no longer tenable; for many poor rural families, farming on its own is unable to provide a sufficient means of survival, and the yield gains of new technology display signs of levelling off, particularly in those regions where they were most dramatic in the past (Ellis, 1999).

Non-farm activities have become an important component of livelihood strategies among rural households. According to the portfolio theory of diversification, households- trade-off the relative high mean profitability of one activity to reduce risk and maximize utility. Employment in non-farm activities is essential for diversification of the sources of farm households' livelihood. It enables households to modernize their production by giving them an opportunity to apply the necessary inputs and reduce their food shortage during periods of unexpected crop failure (Babatunde & Qiam, 2008). Past studies (Awoniyi, 2004; Jonasson, 2005; Benjamin &

Kimhi, 2006; Kaija, 2007) have reported that the contributions of non-farm income sources to the rural economy cannot be neglected because they have grown substantially during the last two decades and their share to total household income ranges between 30% and 50% in some developing countries.

Empirical evidence from a variety of locations suggests that rural households do indeed engage in multiple activities and rely on diversified income portfolios. In sub-Saharan Africa, a range of 30-50% reliance on non-farm income sources is common; but it may attain 80-90% in southern Africa. In south Asia, about 60% of rural household income is from non-farm sources; however, this proportion varies widely between, for example, landless households and those with access to land for farming. In sub-Sahara Africa, reliance on agriculture tends to diminish continuously as income level rises (Ellis, 1999). Elsewhere, a common pattern is for the very poor and the comparatively well off to have the most diverse livelihoods. Gender is an integral and inseparable part of rural livelihoods. Men and women have different assets, and access to resources. In general therefore, diversification is more of an option than for rural men than women.

A study by Awoniyi (2004) found that agriculture alone does not provide sufficient livelihood opportunities hence diversification into non-farm activities is seen as coping mechanism. In this regard, level of non-farm income diversification, its effect on welfare status of farming households, and factors that determine level of non-farm income diversification were investigated. A

multi-stage sampling technique was employed in the selection of 495 respondents from the study areas. Information on household socio-economic characteristics, types of non-farming activities that they engaged in and the amount of non-farm income realized were elicited through the aid of structured questionnaire. The data obtained were analysed through the use of descriptive statistics, diversification index, fuzzy set and logit regression analysis (Awoniyi, 2004).

The study concluded that farming households that were not involved in non-farming activities were more vulnerable to poverty when compared with farming households that engaged in non- farm income. Therefore, in order to alleviate poverty among households in the study area, there was the need to develop the level of human capital base of the farmers in the study area in order to enhance the amount of income derived from non-farming activities (Awoniyi, 2004).

Changes in Livelihoods as a Result of Dam Construction

There are considerably environmental and social changes behind large dam projects (Wijessundra & Dayawansa, 2011). Large dam projects are implemented with multiple benefits in mind including water for agriculture, power generation and flood control. But most of the time the construction of dams leads to changes in livelihoods of people. Most of the time, the experiences of urban people who have received education is much different from rural families who live off the land and depend, on the natural resources

around them (Wilmot, 2012).

A study that focused on studying the changes in the cultural landscape of Teldeniya and its surrounding areas due to the construction of the Victoria reservoir. A methodology was developed using topographical maps and remotely sensed data. Various spatial and non-spatial data belonging to the period 1954 representing pre, and 2003 representing post construction period of the dam. In addition, an IRS III satellite imagery acquired in 1998 was also classified and analysed to support the study. Comparisons were made among the information extracted from 1954, 1998 and 2003 to assess the changes in the cultural landscape of the study area (Wijessundra & Dayawansa, 2011).

The study revealed that the land use, road networks and hydrological networks have changed considerably. There was also a drastic change in the cultural landscape of the study area as a result of the construction of the dam. Some of the land used previously had been submerged with the construction of the dam. The dam project brought new livelihoods options to the people in the study area. It was also clear that the repercussions are partly due to the changes that have occurred with the development of technology and society with time. The significance of this is that drastic changes are not only on tangible physical changes but also intangible aspects such as the culture and entire society of this region (Wijessundra & Dayawansa, 2011).

A study purported to develop monetary estimates of downstream impacts of dam on the livelihoods of the people if any. The study relied significantly on data by the Ratanakiri fisheries office. In order to quantify the losses described

in the Ratanakiri fisheries office report, this study collected additional information on livelihood activities and market prices (including barter exchange). The study estimates that the impact from the dam on livelihood activities resulted in over $2.5 million in lost income for households in Ratanakiri. It was also important to emphasise that livelihood impacts from the dam may continue for many years. Local people have few alternatives to pre-dam livelihood activities for income, therefore; it is unlikely that local people can make up for much, if any, of lost livelihood income through alternative livelihood activities (Mckenney, 2001).

The study estimates that the local people experienced more than $800,000 in other tangible losses from 1996- 1999, including loss of fishing equipment, boats, and livestock, housing and rice stocks. Local people have faced the difficult situation of replacing these losses in order to earn livelihoods. The dam has also caused important material and non-material impacts that could not be quantified in this study because of data. Non quantified impacts include deaths and illnesses, livestock losses due to suspected water quality problems and natural resource impacts (Mckenney, 2001).

In addition, as a result of livelihood income impacts and other losses caused by the dam, indebtedness and migration appeared to have increased significantly in the area. Many of the villages were living at subsistence level prior to experiencing losses of more than half of their livelihood incomes due to the dam. Estimates of losses caused by the dam would likely rise if all downstream impacts were assessed. The study concentrated on only a small

portion of the local people downstream (Mckenney, 2001).

Research conducted to examine the socio cultural implications of dam construction and the changes in livelihoods of the Tokwe Mukosi dam in Masvingo used qualitative methodology, unstructured interviews, focus group discussions and transect walks as data gathering instruments. The paper revealed that in most case, when development is to take place, displacement also occurs especially for the nearby communities and this has profound consequences on the socio cultural aspects of the communities concerned. It was also discovered that, as a result of the dam construction, there had been disintegration of family ties, destruction of shrines, graves, and cultural values of the locals (Tinotenda & Wellington, 2014).

Furthermore, the relocation also resulted in changes in livelihoods of the moved communities because some of the practices which were used to sustain them were affected. Women were disturbed as well and they were left with many duties and responsibilities and had to think outside the box for them to earn a living and to feed their families (Tinotenda & Wellington, 2014).

Also, to study the effects of Hydro Electric power establishment on the livelihood of forest dependent people in Thua Thein province, Huu, Artah and Burgers (2013) focused on changes in the entitlement of the people to forest lands due to the dam construction and the resettlement. Huu, Artah & Burgers, (2013) established that access to forest lands by the indigenes had decreased since the resettlement as a result of the dam construction.

The research was conducted in Bo Hon and A Den villages in Thua Hue

province. The villagers were displaced because of dams for Binh Dien and A Luoi hydropower plants respectively. Qualitative and quantitative methods were employed to analyse the data derived from a household survey, key informant interviews, participatory village mapping and village meetings (Huu, Artah & Burgers, 2013).

The research revealed that the Ka Tu Kiah and Taoi ethnics were forest dependent people but this subsistence and income opportunities from the forest have completely vanished. Access to the forest areas could no longer be secured. Instead, they have changed their source of livelihood into intensive agriculture. Although they received compensation payments, these were too little to cover the investment costs for the intensive agriculture and to buy food and construction materials, which could be obtained for free from the forest (Huu, Artah & Burgers, 2013).

A paper investigated the risks of impoverishment among the project-affected people in the resettled and downstream settlements who are in the fishing or agriculture sectors is by Hein (2007). This study found that the resettled population (because of the Bujagali hydro power dam in Uganda) have experienced a relatively high degree of impoverishment, and that it is mainly caused by the adverse effects on the status of their assets. The compensation they received has not been able to restore or improve their livelihoods and the site for the resettlement offers few possibilities for the resettled to counteract the impoverishment. The population was experiencing isolation, both geographically and also regarding the ability to affect their livelihoods. The

downstream settlements face a moderate risk of impoverishment by the dam. The potential adverse effects on the fisheries and a lack of access to uncontaminated water were the main effects of the dam. However, the research suggested that impoverishment can be reversed, mainly by expanding the options of the project-affected people by creating opportunities for alternative livelihood activities. Measurements can also be taken to ensure access to basic needs, especially water and health care (Hein, 2007).

The Impoverishment risks and reconstruction model and the sustainable livelihoods approach were used to analyse the data. The first one provided the research with concrete indicators of impoverishment, namely landlessness, joblessness, food insecurity and marginalisation. The latter further expanded the framework by allowing a broad analysis incorporating several elements which constitute a livelihood situation. The data collection was mainly based on interviews with complementary case studies (Hein, 2007).

For the past years, Ethiopia has been moving toward making better use of the waters from the Blue Nile. Studies by Eguavoen and Tesfai (2011) on the Koga dam project which analyses the socio-economic outcome of development-induced relocation of 500 relocated households, in particular the sub-set which moved to a nearby town. The delay in land reallocation had left households without livelihood base for much longer than expected and compensation payments were not sufficient to bridge the critical period. Households tended to maintain their social network and memberships in supportive rural associations after relocation but poverty acted as constraint in

some cases, especially when households did not find other income generating activities. Housing in town was made difficult due to the need to legalize land exchange arrangements. And it required a common interest (security) to initiate social relations between town dwellers and newcomers.

Impacts of Dam Construction on Livelihoods

All over the world, dam construction has had both positive and negative impacts on the livelihoods of the fringe communities. This section reviews some of the impacts of dam construction as empirically documented by researchers.

Positive Impacts of dams on Livelihoods

The contributions of dams to human development cannot be ignored. Dams help many communities and countries' economies in utilising and harnessing water resources from half of the world's dammed rivers primarily for food production, energy, flood control and other domestic uses (WCD, 2000). Dams have solved many problems of communities and have provided basis for economic development that has sustained itself. Employment opportunities have been generated, incidence of poverty has been reduced, rural populations including nomads have been stabilised locally and migration of rural unemployed population to urban centres have been reversed. Flood insecurity to ever growing population, protection from floods and droughts to chronically vulnerable areas and generation of clean energy are other importance of dams (International Commission on Irrigation and Drainage, 2000). The construction

of dams bring substantial benefits by providing water for irrigation, electricity from hydro power or flood protection (WCD, 2003).

Dam construction usually results in an economic boom due to the increased flow of money into the local economy where the project is built. It also leads to impacting the area of the project as it becomes a tourist attraction or recreational region. Other social impacts include, rise in standard of living in the area of the dam due to abundance of Hydro Electric power, which can be used in the establishment of new industries. These new industries employ thousands of people who move in with their families and establish new communities (Ghaly & Ferry, 2008).

Dams also impact the cultural, aesthetic and recreational values of natural rivers. During annual floods, the river deposits fertile silt along its banks in which tribes are able to grow food crops. Some tribes graze their cattle along the river bank becausa for much of the year, there is little grass elsewhere (WCD, 2010). Research that sought to evaluate the socio-ecological impacts associated with the Mushandike Dam showed that relocation had positive impacts on livelihood in the early years of the irrigated agricultural schemes as the standard of living for the families improved (Gwazani et al, 2012).

A study that employed quasi experimental control group methods to examine the effects of large dam reservoirs on country income, earning, population and employment growth for dams opened in the United States during the period of 1975 to 1984 showed that large dam reservoirs have some statistically significant positive effects and tend to stimulate growth

(Difrancesco, 2007). There was a considerable variation, however, with dams constructed for floods control purposes and dams located further away from markets and large cities having less of an effect (Aleseyed, Rephann, & Isserman, 2010).

Although dams and reservoirs may also provide some of these benefits (Doyle, 2008; Anderson, 2008), river based recreational activities and river front property associated with dam removal may provide more long term cultural, aesthetic, and recreational benefits (Sarkinos & Joseph, 2002; Provencher, 2008). Most of the time, the direct benefits of hydroelectric schemes and other public utility projects are generally reduced to monetary figures for economic analysis (Youg, 2001).Research on the Limpopo Basin showed that dams are found to be very important in the communities wellbeing as they are put to a number of uses which are livestock watering, domestic use, irrigation, fishing, brick making and collection of cypress spp reeds used for roofing (Youg, 2001)..

A study by Webber (2003) examines how the capacities of the Chinese State and the institutional structure of agriculture have affected the manner in which resettlement has influenced the livelihoods of peasants in two Henan villages in China. The villages were resettled because of construction of the Xiaolangdi dam on the Yellow River. Although located in the same region, the original villages exhibited different income levels, equality, and forms of production; since resettlement, incomes in the poorer village have risen, but in the richer village have fallen. According to the study, the villagers now have access to less land than formerly (though more of it is irrigated) but many now

work in new construction and transport activities, building the dam and the village infrastructure. In both villages, when construction ceases, incomes are expected to fall as well and this will adversely affect the people.

A study by Dutt (2012) traces the gendered changes in agrarian livelihoods in the lower Damodar Valley of Eastern India and connects these changes due to the large dam project of the Damodar Valley Corporation (DVC). More specifically the paper explores the changes in floods, changes in the farming economy, and the impacts of temporary sand dam on livelihoods of women and men in farming in the lower Damodar Valley. The study observed that even over a longer temporary scale, the changes unleashed by large water control projects have significant and gendered impacts on agrarian societies.

Negative Impacts of dams on livelihood

The social and environmental impacts associated with dams could leave those individuals living in the immediate vicinity of dams far worse off than they were before the dam construction (Morrissey, 2009). The creation of a reservoir from damming a river has multiple social and economic impacts on individuals living near the dam project. Resettlement and loss of land from reservoir inundation is the most prominent impact from dam construction (Marmula, 2001). Indigenous groups pursuing subsistence lifestyles are often most heavily impacted by loss of natural resources from dam construction (McCurlly, 2001). For instance, prior to the construction of the Aswan High Dam, the Nile River carried about 124 million tons of sediments to the sea each year, depositing

nearly 10 million tons on the floodplains and delta. The result of the dam has been a drop in soil productivity and depth among other serious changes in Egypt floodplain agriculture (WCD, 2000).

According to Tahmiscioglu, Anul, Ekmeka, Idurmus, and Ankara (2010), impacts of dams can be classified as long term or short term. They add that reproduction of migrating fish are hindered since the dam works as barriers, fisheries get damage whiles passing through the floodgates, turbines and pumps of the high bodied dams. Again, they opined that, normal passing ways of animals are hindered leading to a change in livelihood of the locals. This work concentrated much on ecological effects of dam construction on livelihoods.

Environmental impacts of dams and consequent reduction in access to availability of fish and other ravine resources may as well be affected. Reservoir fisheries may be poor substitute for river fisheries as a result of lower productivity and the need for periodic restocking of introduced fish populations that are not self-sustaining (Marmula, 2001). In many parts of the world, fish and other ravine resources are critical to sustaining human livelihoods by providing food and financial security (Shoemaker, 2007).

In Thailand, studies on the Pak Mun Dam found that, in the post dam period, fishing communities located upstream and downstream of the dam reported 50-100 percent decline in fish catch and the disappearance of many fish species. The number of household dependent on fisheries in the upstream region declined from 95.6 percent to 66.7 percent. Villages that were dependent on

fishing for income have no viable means of livelihood since the dam was built, despite efforts to provide training opportunities. As their food security and incomes dwindled, they sought various ways to cope including out migration to urban areas in search of wage labour (WCD, 2000). Furthermore, in order to survive, some households had to settle in forest reserves areas or on common property as the compensation money was insufficient to buy alternate land. The Thailand economy crisis affected households that did not use the compensation money to buy productive assets. Cropping incomes have declined and there has been a reduction in livestock as people are selling both due to shift from farm based occupation as well as reduced grazing land (WCD, 2000).

Research carried on the Mekong Hydro- Electric Power Dam construction showed that the dam was a constraint on agricultural (especially farming activities) and captured fisheries productivity which also led to constraints on incomes, profits and purchasing power of the local people. This has also reduced economic security in the area (Scott, 2012). In Scott (2012) work entitled "The impacts of continued Mekong Basin Hydro Electric power Development" opines that, the livelihoods of the Mekong Basin population are inextricably linked to the region's natural resources. Any agent of environmental change compromises these resources will therefore have a profound impact on local livelihoods. A reduction in the productivity of fishing and agriculture will have major consequences for the food and economic security of the local people. Hydropower development will deny much of the basin population the ability to sustainably support themselves. Many will be

forced to find alternative livelihoods, which will often lead to further environmental destruction, highlighting the unsustainability of continued hydropower development.

Scott (2012) also makes the observation that, it is important to take an interdisciplinary approach while assessing the impact of natural resource development projects. While environmental impact assessments have often been conducted for Mekong hydropower projects, the social impacts have generally received significantly less attention. Assessing only the environmental impacts fails to recognize the value of these natural resources, in their current state to the basin's inhabitants.

Again, as summarised by Blake (2001), "This is the lifeblood, the life source, for millions of people, you simply cannot afford to make any big mistakes with the Mekong (Blake, 2001). If the basin's inhabitants are to maintain the livelihoods they have enjoyed for centuries, policy-makers must strike a delicate balance between the pursuit of economic growth and the conservation of natural resources (Rix, 2003). This undoubtedly involves looking at more sustainable alternatives to the proposed hydropower projects. Even though this work has some similarities with the current study, there are differences in terms of research settings. The current research is in Bui while Blake's study was conducted in Mekong.

Amorim, (2009) argued that the construction of the Catanhao Dam in north-east Brazil did not bring only impoverishment but also protective measures that were supposed to be considered. The paper studied the

consequences of the dam construction. Qualitative primary data was used as the main source to collect data from the NGO's and professionals involved in the construction of the dam. Semi- structured interview was conducted to collect information from the inhabitants. The key finding was the dam led to the displacement of 100,000 people, causing them to become landless, jobless, marginalised, food insecure, increased morbidity and mortality, the loss of access to common property and services and social disarticulation.

Apart from the social and economic risks, Amorim (2009) revealed that certain elements were identified as absent due to the process of displacement. These elements were characterised as emotional grievances. The fact of leaving a house implied that people break off their relationship with neighbours as well as causing geographical rupture in the proximity between inhabitants (Amorim, 2009).

Research has also recognised that forced displacement threatens traditional kinship associations. Moreover, the abandonment of symbolic markers such as grave sites and ancestral lands can serve as linkages with the past and undermine communities' cultural identity (Namy, 2007). According to World Commission on Dams (2000), dams provide temporal employment against permanent displacement; dams displaced and deprived people resettlement focuses on only physical relocation, no land titles, no compensation, leading to a change in sources of livelihoods. They added that the Uria 1 Dam on the upper Sinu River of Columbia displaced 12,000 people but also severely affected more than 6,000 fishermen in the Lower

Sinu where the fish population drastically diminished as a result of the dam. Additional dam projects that displace indigenous populations can greatly erode social cohesion leading to long term loses in culture (Garrette, 2010).

Uyigue, (2008) observes that in the Nigerian context, as it has been reported in other parts of the world, it is clear that though dams have contributed to the economic growth of the country, their construction and operation has had negative effects on the health and environment of the communities hosting them to the extent that these communities can no longer be described as sustainable. Also, issues of health were not taken into consideration in the institutional structure for water resource development in Nigeria. Moreover, the legal infrastructure was found to be inadequate for the development of sustainable water resource management. The requirements for approval of development projects lacked health impact components.

Health wise, it was reported that reservoirs created behind dams are often breeding grounds for water borne illness such as schistosomiasis, malaria and cholera and other potentially toxic bacteria. Numerous studies have corroborated these health risks. For example a study undertaken in Ivory Coast documented significant increase in schisosomiasis, after the construction of large hydroelectric dams from 14% to 53% around Lake Kossou and from 0 to 73% around Lake Taabo (WCD, 2000). Again, a study in Sri Linka revealed that increase in malaria seem intimately related to hydrological changes brought about by the hydroelectric

schemes on the Mahaweli River (Namy, 2007).

Research on impacts of Nam Ngum Hydro- electric Power project on community culture by Sengkham, (2007) indicated that, the Nam Ngum 2 project developers currently run against the basic principles of the Lao government and the Lao Central Party Committee, which can be summed up by their well-known motto: "The loss of traditional culture is the loss of the Lao nation" (Phomvihanea, 1996). Using semi structured interviews, participatory and ethnographic research methods, Phomvihanea (1996) found out that the people's livelihood was changed due to change in their culture. For instance, the Lao government demands national development, at the same time, it values the protection of the traditional culture of all ethnic people, all of which are tied to ecologically and socially sustainable livelihoods. Economic development alone will not ensure an improvement of the countries' people. The protection of the traditional culture of the ethnic people is of equal importance.

The beliefs of ethnic people also have environmental value essential for sustainable development. For example, most ethnic people traditionally believed that the forest is the source of their livelihoods. The forest keeps them from danger and throughout times of hunger and disease, and helped them live together in peace. Ethnic people often believe in a mountain spirit and forest spirit, and they cannot destroy the forest without retribution from these spirits.

Another study by Namy, (2007) has also showed that the

construction of dams leads to dispossession of basic rights because of the loss of agricultural lands, forest, fishing grounds, grazing lands and other resources on which communities rely for their livelihoods and cultural practices or cultural alienation. Displacing these communities risks loss of valuable traditional knowledge systems and destroying part of the world's cultural heritage.

Dam construction has also compromised the gendered livelihoods of settlers as the example of Chigwizi village, with women being more disadvantaged as they have difficulties in land access and utilisation in rural Zimbabwe based on male primogeniture, and political and cultural considerations (Mutupo, 2011). Disruptions of social life, trauma and health effects, resulting from displacement have serious impacts on women and poorer families. For example, loss of lands means loss of traditional knowledge and forest resource management capabilities, a domain where women have a significant role. Another example is the construction of Bakum Hydro-electric Dam Project and the resettlement of Orangulu indigenous communities in the Asap resettlement scheme (Youg, 2001).

In the old settlement, women could easily access nearby gardens and fields by walking or fields further away by driving their own boats. The construction of the dam pushed the farms further afield, meaning that cost of transportation to the farms forced the women to stay behind whiles the husbands worked. Thus the women could not carry on the rice planting traditions and rituals of the ethnic group (Youg, 2001). Similarly, the Iban

women in Sarawak lost the esteem status as keeping padi pun, or rice seedlings with their appropriation of their lands including paddies for the construction of Batang Ai Dam in 1981.

In Uganda, research on Bujagali Hydro- Power Dam found that the construction of the dam led to displacement of people. The resettled population has experienced a relatively high degree of impoverishment, which is mainly caused by the adverse effects on the status of their assets by the dam. The compensation inhabitants received has not been able to restore or improve their livelihoods and the site for the resettlement offers few possibilities for the resettled to counteract the impoverishment. The population is experiencing isolation, both geographically and regarding the ability to affect their livelihoods. The downstream settlements face a moderate risk of impoverishment by the dam. The potential adverse effects on fisheries and a lack of access to uncontaminated water are the main effects of the dam. However, the research suggests that impoverishment can be reversed, mainly by expanding the options of the project-affected people by creating opportunities for alternative livelihood activities (Heien, 2007).

Overview of Dam Construction and its Impacts on Livelihood in Ghana

The Akosombo Dam remains the first and largest dam in Ghana, covering an area of 8502 square kilometres and has an installed capacity of 1020MW of power. The Volta Lake created by the dam is the largest reservoir by surface area in the world and the fourth largest by volume.

Akosombo Dam holds back both the White Volta and the Black Volta which formerly converged where the middle of the reservoir now lies, to form a single Volta river.

The Kpong Hydro Electric project is the second to be constructed and third largest dam in Ghana built to supplement the Akosombo Dam. It is commonly called the Volta River Project. It has a total installed capacity of 160MW.

Ghana's second largest dam, the Bui Dam has a structural volume of 1,000,000 meter cube with a surface area of 444 kilometres square. Its reservoir also measures 40km in average length and has a maximum water depth of 88m. Construction of the Bui Dam is to increase power supply to meet the growing consumer and industrial demand and is expected to generate 400 megawatts of power (Agbengo, 2009).

A study by Agbengo (2009) that sought to assess the effects of Akosombo and Kpong Hydro Electric power projects on the lives of the people and the natural environment in six Mafi communities within the lower basin in the Volta region found that the Hydro Electric Project on the Volta river have brought untold hardships unto the people, retarded the development of the community and fuelled dislocation of established family units and socio cultural values in the study area. The study further revealed that the schemes have negatively affected the natural environment directly and also influenced human induced environmental degradation in the area. They showed farming, firewood, charcoal burning and out migration were

the main coping measures.

These are the great engines of riverine and marine biodiversity and the environmental services that they provide for the myriad of human livelihoods that are dependent upon a fully-functioning river system. The Akosombo Dam construction led to a drastic reduction in floodplain agriculture as natural flooding no longer leaves rich alluvial deposits that improve soil fertility in the overlying upland areas, and an explosion in the growth of exotic weeds that have choked off the once lucrative shell fishery, increased the snail vectors for the debilitating bilharzias, and fostered the formation of a permanent sandbar at the estuary. Gregory (2008) also revealed that the creation of the Akosombo Dam led to industrialisation in the major cities like Accra, Tema, Kumasi, Sekondi and Akosombo. It led to widespread migration, particularly, of young and energetic men and women (Gregory, 2008).

On the other side of the ledger, the reservoir has created a very productive reservoir fishery (120 species have been recorded), which is presently being threatened by excessive and illegal fishing activity. The Volta River Authority (VRA) has estimated that the reservoir fishery today supplies 14% of Ghana's total fish consumption (African Development Bank, 2008). Considerably less attention has been paid to the downstream effects of Akosombo operations.

The Kpong Dam shellfish has been hit particularly hard. Before the dam, there was a robust clam fishery downstream from the dam. According

to Ayibotele (2010), clams that could only reproduce in brackish water moved up and down the river so they had a large habitat. Now that the front is fixed, they can only reproduce in a narrow strip. Due to the vegetation and water quality changes, clam picking, an occupation mainly dominated by women, has almost been eliminated. Many other commercially valuable species have severely declined or disappeared as well, including blue crab, shrimps, shad and herring (Ayibotele, 2010). Before the dams, the shoreline erosion was estimated at 2-5 meters per year. Today, the beach is eroding at the rate of 10 meters per year at Ada, for example. The coastal erosion also affects neighbouring Togo and Benin, whose coasts are now being eaten away at a rate of 10-15 meters per year. This is because the dam trap the sediments that replenish the beaches (WCD, 2010). The overall effect of the loss of agriculture, clam picking, and fishing activities has created intense poverty and led to a dramatic shift in income generating activities. Some 80,000 people are directly adversely affected by the change in livelihood source. The Volta Basin Research Project has found that the decline in river-based incomes triggered an increase in prostitution, crime, sexually transmitted diseases, and the widespread migration of young people to urban areas (Gregory, 2008; IUNC, 2008).

The proposed Pwalugu Multipurpose dam which is to provide hydro power generation, will contribute to the development of irrigation, and prevent flooding in the project area has the potential to negatively impact upon the surrounding environment and community (Environmental

Protection Agency, 2007).

A comparative study on the socio-economic impacts of the creation of the Bui dam on some aspect of livelihoods, culture and demographics in Lucene and Agbegikuro by Atindana et al (2014) indicated that there were no significant differences in income levels before and after the dam. Again, they also observed that before the creation of the dam, farming, fishing, trading were the main source of livelihoods in both communities whereas fishing, farming and trading were still common after the dam (Atindana, et al, 2014). Also, they also observed that job opportunities and infrastructure improved after the dam creation but culture was affected due to loss of sacred ground, structures and totems. They added that education and housing were the least affected in Lucene and Agbegikuro. The study concentrated on only two communities out of the eight communities affected by the construction of the Bui Dam. Therefore, there is the need for a study that will cover all the resettled communities in order to ascertain the real impact of the dam on the people. It is against this backdrop that this present study becomes relevant.

Roles of Stakeholders and Institutions in Ensuring Livelihood Security

Broadly, institutions are regarded as 'regularised practices (or patterns of behaviour) structured by rules and norms of society which have persistent and widespread (Safo-Kantanka, et al, 2006). Access to livelihoods is thus determined by how developed institutions are and how

institutions function (Dorward, Kydd, Morrison & Poulton, 2005). According to Davies (1997), institutions are the social cement which link stakeholders to capital of different kinds to exercise power and so define the gateways through which they pass on the route to positive or negative (livelihood) adaptation. Institutions may thus be formal and informal, fluid and ambiguous, and usually subject to multiple interpretations by different actors (Scoones, 2009). The role of institutions is to reduce uncertainty by establishing a stable structure for human interaction (North, 1990: 6). Institutions determine who gains access to what assets, the effective value of the assets gained, and which livelihood strategies are open or attractive to pursue.

Scoones (1998) notes that institutions really matter for the development of livelihood security. He offers a number of inter-related reasons for his claim including the following:

- Understanding institutional processes allows the identification of restrictions and opportunities (or 'gateways') to livelihood security. Since formal and informal institutions mediate access to livelihood resources and in turn affect the composition of portfolios of livelihood strategies, an understanding of institutions is therefore vital to designing improved sustainable livelihood outcomes.
- An institutional approach sheds light on the social processes which underlie livelihood sustainability. Achieving livelihood security is not a deterministic affair; contestations, negotiations and trade-offs

occur at every turn. An insight into social relationships, their institutional forms (formal and informal) and the power dynamics embedded in them is vital. Interventions in support of livelihood security therefore must be attuned to such complexity.

- An approach which emphasises both formal and informal institutions and underlying rules and norms suggests a complex matrix mediating the processes of livelihood. Any analysis of rural livelihoods should consider the wide range of institutions and organisations operating at different levels –from within the household through to the national and international levels (O' Laughlin, 2004). Recognition of such complexity allows scope for planned interventions particularly for the poor rural folks whose livelihoods are mostly natural resource based.

Institutions are mediated by power relations and this makes contestations over institutional practices, rules and norms very important (DFID, 1999). Struggles over access involve both individual efforts and collective action through organised politics involving alliances, movements or party politics (Ellis, 2009). The livelihood discourse pays less attention to how livelihoods are structured by relations of class, caste, gender, ethnicity, religion and cultural identity (Ellis, 2009). Much attention is rather given to 'empowerment' without being clear about how the process takes place or who might be 'disempowered' for it to occur (O' Laughlin, 2004).

From the foregoing, the social position of individuals and households

within the society should be central to any livelihood analysis. This is in view of the fact that different people have different access to different livelihood resources (Ellis, 2000). Access is dependent on institutional arrangements, organisational issues, power and politics. A socially differentiated view to analysing livelihoods is therefore critical, one that disaggregates the chosen unit of analysis – whether community, village or household – and looks at individuals or groups of social actors and their relationships, in relation to the range of relevant dimensions of difference (wealth, gender, age, culture, etc) and the distribution of and control over resources (Carney, 1998; Ellis, 2009).

The 1980's and 1990's saw an increase in the number of NGO's active in relief and development. The rise of NGOs on the international scene is an important phenomenon which has implication for the development prospects for the poor marginalised rural households, for the future of these organisations themselves, and for the wider political economy of which they form a small or growing part (Edwards, 1998). Donors and non-governmental Organisations support rural livelihoods by supporting their rights and access to natural resources; through participatory and accountable knowledge and advisory processes; by enhancing poor rural producers to market their goods and by supporting their participation in policy and government processes (Prato & Longo, 2012). NGOs have a reputation for facilitating development in rural areas especially in developing countries, where there is a general belief that the rural populations will benefit if resources are channelled through projects (Aix, 1998).

However, Mwaniki (2010), revealed that poor policies have greatly affected food security in Africa. The problem arises when the focus of policies, structures and institutions is put above that of the people themselves.

NGOs provide extension activities including demonstration and the provision of advice and investment in food processing projects, which often incorporate training in environmentally friendly production techniques. These organisations promote the exchange of ideas by organising seminars, workshops and conferences and also support or sponsor mass communication programmes especially on television and radios. Providing credits and organisational support to the poor who do not have collateral security to facilitate loan agreements from formal financial institutions have been the key elements of the NGOs' approach to improving livelihoods in many developing countries (Asamoah, 2010)

Mwaniki (2010) argued that part of good governance is the provision of safety nets to vulnerable groups, provision for the minority and be totally inclusive in decision-making and delinking political interest from the basic needs of the rural folks. Also, governments need to establish effective interactive frameworks of activities through a broad range of government institutions. Agriculture and other relevant ministries need to be restructured to facilitate effective participation of small farmer led private sector and rural organisations in the planning , implementation , monitoring and evaluation of the programs and activity mechanisms at decentralised levels between government agencies, private sector agro- enterprises and institutions including representative small farmers, producers and marketing organisations, agricultural co-operatives and

community levels NGOs (Mwaniki, 2010). Although governments need to provide all these services, it is evident that governments alone cannot mobilise all the necessary resources for the needed investments. Therefore practical solution will have to be found at the local community and regional levels. Also large scale donor support from developed countries and the World Bank will be needed. The most important factor is the change in attitude among political leaders and senior level government officials in favour of agriculture and needs of the rural poor.

Studies on livelihood diversity in sub-Saharan Africa have confirmed that men and women have different assets, access to resources, and opportunities (Brycesson, 1996; FAO, 2006; Scoones, 2009). Women rarely own land, may have lower education due to discriminatory access as children, and their access to productive resources as well as decision-making tend to occur through the mediation of men (Brycesson, 1996). Women typically confront a narrower range of labour markets than men, and lower wage rates. For such people, natural assets in the form of land, forest, water bodies and vegetation is vital to their livelihoods. Consequently, any effect on the natural asset makes them vulnerable and threatens their livelihoods.

In the context of this study, dam construction, which involves the alienation of large tracks of land, is regarded as a shock to the communities located in and around the Bui Dam. Under the circumstances, the role of various institutions in providing livelihood security becomes paramount. Ghana's dam construction institutions can be traced from the various levels of government and

private sector institutions that control and influence dam construction operations in general. These include the Ministry of Water Resources, Works and Housing, Ministry of Energy, Ministry of Environment, Water Resource Commission, Volta River Authority, Bui Power Authority, Environmental Protection Agency (EPA), Local Government (District Assembly), Non-Governmental Organisations (NGOs), Traditional Authorities, Opinion Leaders and Community Members. This study will bring to light the likely changes in the livelihood of communities in the Bui Dam Area and the roles being played by the various institutions, here referred to as stakeholders, in providing livelihood security for the people.

Theoretical Issues

Rural Vulnerability

The concept of vulnerability is more dynamic and better captures change processes as people move from, in and out of poverty. Moser (1998) opines that vulnerability is the insecurity and sensitivity in the well-being of individuals, households and communities in the face of changing environment, and implicit in this, their responsiveness and resilience to risk that they face during negative changes. Environmental changes that threaten welfare can be ecological, economic, social and political and they can take the form of sudden shocks, long term trends or seasonal cycles (Moser, 1998). People's livelihoods and the wider availability of assets are fundamentally affected by critical trends as well as by shocks and seasonality over which they have no control. The livelihoods of

communities are increasingly threatened in a rapidly globalizing world in which amplification of pathways of environmental, social and economic vulnerability are always the outcome (Gray, 2002).

Vulnerability draws attention to the fact that couple of influences are directly responsible for many of the hardships faced by rural poor people in the world due to the inherent fragility of poor people's livelihoods which make them unable to cope with stresses whether predictable or not (DFID, 2000). One way of managing vulnerability is to help people to become more resilient and better able to capitalize on its positive aspects. This can be achieved through supporting poor people to build their assets. The resilient approach acknowledges that communities and other systems such as families, individuals, and ecosystems, have aspects or components which may be vulnerable to specific changes. However, this approach also takes into account the resources and the adaptive capacities of communities which enable those vulnerabilities to be overcome (Magurie & Cartwright, 2008). Thus, the means of resistance are the assets and entitlements that individuals, households and communities can mobilize and manage in the face of hardship (Moser, 1998). Vulnerability is therefore closely linked to asset ownership. The more assets people have, the less vulnerable they are and the greater the erosion of the people's assets, the greater their insecurity. The ability to avoid or reduce vulnerability depends not only on initial assets, but also the capacity to manage them, to transform them into income, food or other basic necessities (Moser, 1998).

Resilience

There is increasing evidence that variety of factors are affecting the ability of many local communities to thrive and in some cases even survive (Adger, Arnell & Tompkins, 2008). The concept of resilience originally was proposed in ecological literature (Holling, 1973), and was successively proposed to explore the relative persistence of different states of nature in complex dynamic systems such as socio economic systems. Resilience can be defined as the capacity of a system, community or a society, potentially exposed to hazards, to adapt by resisting or changing in order to reach and maintain an acceptable level of functioning and structure (United Nations International Strategy for Disaster Reduction, 2005). Resilience has also been defined as the capacity of a system to absorb disturbances and reorganize while undergoing change to still retain essentially the same function, structure identity, and feedbacks. Resilience is, thus, seen to be a collective property of the community than the individuals. Again, it is also emphasized that resilience in the face of disturbance and stress and the capacity to change and adapt, means that resilience has a transformative capacity (Resilience Alliance, 2012; UNISDR, 2012). Resilience is measured by the size of displacement the system can tolerate and yet return to a state where a given function can be maintained (Forbes, 2009). Resilience can also be described as the capacity of systems to cope with stresses and shocks by anticipating them, preparing for them, responding to them and recovery from them (Pain & Levine, 2012).

Community resilience has been defined as the ability of groups or communities to cope with external stresses and disturbances as a result of social and environmental change (Adger, 2009). The resilience of human systems is affected by both human induced factors such as dam construction and natural disturbances (Adger, 2000). A resilient community is able to respond to changes or stresses in a positive way, and is able to maintain its core functions as a community despite those stresses. A particular change may have vastly different consequences in different communities, and different communities will demonstrate different degrees of resilience to the change (Kelly, 2004).

Disturbances can have both endogenous and exogenous causes (Cumming, 2005); although recent commentators have also highlighted that many disturbances can also come from evolutionary processes of vulnerability within communities themselves (Davoudi, 2012; Shaw, 2012). The complexities of disturbances affecting human systems suggest that communities are never stable but that they are continuously and simultaneously affected by several disturbances at any point in time. Communities can therefore never reach maximum resilience levels but can only strive towards maximizing resilience (Wilson, 2014). Many sociologist and geographers see well developed social capital as the key ingredient for resilient communities, especially in the context of bonding (group cohesion), bridging (ties between groups) and linking (vertical relationships) (Megis, 2014). Thus social capital does not incorporate only processes of social integration but also cultural and political capital (Wilson, 2014).

Social resilience can be both preventative (avoiding poor outcomes by developing coping strategies) or it may facilitate recovery after traumatic event or catastrophe (Wilson, 2014). Research on social resilience is often based on bottom-up approach, predicated on understanding human drivers and indicators of resilience at community level and acknowledges the importance of politics, power and socio-economic, psychological and moral parameters in resilient pathways (Cumming, 2005). Social resilience is about preemptive change which sees resilience as a desirable state, rather than simply a process to avoid disturbances. Resilience in this view is an outcome, especially when linked to dynamic changes over time associated with community learning and the willingness of the communities to take responsibility and control of their development pathways (Chastin, 2008; Davoudi, 2012). The resilient approach identifies the resources and adaptive capacity that a community can utilize to overcome the problems that may result from change. The approach builds upon the inherent capacities of a community, rather than relying on external interventions to overcome vulnerabilities (Magurie & Cartwright, 2008).

Adger (2000) highlights the notion that social resilience is essentially about understanding a positive quality of a community under investigation while community vulnerability is usually used to describe exposure and sensitivity of a community not able to cope with disturbance with negative quality. Resilience is related but a different concept from vulnerability. Both share a common sets of parameters such as shocks and stresses to which a social economic system, and the response and adaptive capacity of the system. Nevertheless, vulnerability

analyses tend to measure only susceptibility of an individual or household to harm and the immediate coping mechanisms adopted. Resilience analyses tries to identify the different responses adopted by a household and capture a dynamic component of the adopted strategies (Alinovi, D'Errico, Mane & Donato, 2010). A resilience approach investigates not only how disturbances and change might influence the structure of a system but also how its functionality in meeting these needs might change. Resilience and vulnerability can thus be expressed as a simple spectrum of decision-making options for community members, with a complete disappearance of a community due to destruction of the livelihood base at one end, and a strongly resilient community at the other.

Transformation/Transition theory

Transition theories suggest that, coherent phases of societal organization can be identified while at other times complex and even chaotic transitional characteristics may dominate, leading eventually to a new set of structured coherence (Wilson, 2014). Transition theory is used to understand rural transitions and sustainable transitions (Wilson 2010; Geels, 2011). Transition theory assumes that there are key stages or periods in societal change, and that any of these stages may, in turn, become the starting point of the next transition. The transformation view of resilience is concerned with the concepts of renewal, regeneration and re-organization (Folke, 2006). In a resilient social-ecological system, disturbances have the potential to create opportunity for doing new things, for innovation and for development. A resilient community is able to use

the experiences of change to continually develop and to reach a higher state functioning.

The transformation view of resilience is particularly useful for understanding how a community can respond positively to change. It accepts that change is inevitable, rather than seeing change as a stressor from which a community needs to recover to its original state. The view of resilience as transformation embraces the dynamic character of community and human ecosystem interactions and sees multiple potential pathways within them. Viewing resilience as transformational also draws the focus to the adaptive capacities of a community, the characteristics which enable it to develop and innovate in response to a change rather than vulnerabilities (Magurie & Cartwright, 2008).

In this, knowledge, experience and accumulated wisdom are passed on from generation to generation and from actor to actor but such pathways are further influenced by human institutions and forms of governance that can actively influence or shape pathways of change (Wilson, 2012). Transition theory allows both to forecast based on existing pathways of change and to look back at the past because of incremental transitions evidence. It also highlights the bounded nature of short and long term transitional opportunities, and the way successive choices can progressively alter boundaries of community evolution through incremental progress (Wilson, 2014).

Most importantly, to understanding resilience, transition theory focuses attention on the often overlapping nature of processes of change at community

level that often lie submerged beneath stylized portrayals of polarized pathways especially by deciphering these through its emphasis on how decision nodes create and alter trajectories between community and vulnerability (Barley and Wilson, 2009). Community resilience and vulnerability can best be conceptualized on the basis of how well economic, social and environmental capital are developed in a given community and how these capital interact (Wilson, 2012).

Conceptual Framework

Livelihood thinking dates back to the work of Robert Chambers in the mid-1980s. Examples of successive livelihood frameworks are the Sustainable Rural Livelihoods Framework by the Institute of Development Studies (IDS) (University of Sussex), CARE'S Household Livelihood Security Model which explains that the risk of livelihood failure determines the level of vulnerability of a household to income, food, health and nutritional insecurity. The greater the share of resources devoted to food and health service acquisition, the higher the vulnerability of the household to food and nutritional insecurity. Therefore, livelihoods are secure when households have secure ownership of, or access to, resources (both tangible and intangible) and income earning activities, including reserves and assets, to off-set risks, ease shocks, and meet contingencies. Households have secure livelihoods when they are able to acquire, protect, develop, utilize, exchange, and benefit from assets and resources (Frankenberger, Becht & Mccaston, 2002).Other examples of the livelihood

analysis framework are,- Oxfam's Food Security Assessment Model, Ellis Livelihood Framework for Micro Policy Analysis or Rural Livelihood, Sustainable Livelihood Framework for the Pacific Islands and the DFID's Sustainable Livelihood Framework (Carney, 1998; Drinkwater & Rusinow, 1992; Cahn, 2006).

Chambers and Conway (1992) defined livelihood as the capabilities, assets, and activities required for a means of living. It is based on the assumption that asset status is fundamental to understanding the options open to an individual, the strategies that can be adopted to attain a livelihood, the outcomes aspired to and the vulnerability context under which one operates (Ellis, 2003). The livelihood concept is derived from the 'sustainable livelihood' approach which has been defined broadly as a means of living which is resilient to shocks and stresses, and also does not adversely affect the environment (Meikle, Ramasut & Walker, 2003).

The concept of sustainable livelihood (SL) first appeared in the report of an advisory panel of the World Commission on Environment and Development (WCED) titled "Food 2000" (Cahn 2002). Since the "Food 2000" report, concurrent discourses on poverty, sustainability and livelihood systems have led to the formalization and development of various livelihood approaches. The approach recognises that livelihoods are essential contextually and can only be captured in particular contexts. The approach thus helps in understanding how households derive their livelihoods by drawing on their capabilities and assets to develop livelihood strategies compose of range of activities (Leonard, 2013).

This thesis adopts the Sustainable Livelihood Framework as adapted for migration and livelihoods by Tanle (2014) as a conceptual framework. It has some comparative advantages over the others (sustainable livelihood framework, transitiona/transformational theory, resilience and rural variability). It recognizes diverse livelihood strategies, whether natural resource based or non-natural resource based. Also, it provides a wide range of indicators such as monetary, non-monetary and food security for measuring livelihood outcomes and its last component, wellbeing, measures the overall livelihood outcome, which could be positive or negative or neutral. The Sustainable Livelihood Frameworks for migration is a modification of the Pacific Island Framework.

There is a consensus in the livelihood discourse that the background characteristics of rural populace influence the type of livelihood strategies they pursue (Scoones, 1998; Ellis, 2000).Livelihood are those owned, controlled, claimed, or by some other means accessed by the households. These assets may be described as stocks of capital that can be utilized directly or indirectly, to generate the means of survival of the households (Ellis, 2000). Livelihood capital/resources have been categorized into five: natural, financial, human, social, and physical (DFID, 2001). This division of five categories of assets can provide a useful starting point for a household livelihood analysis as well as a guide, which can help investigators gain a more complete picture of the household and its livelihood assets (DFID, 2001).

The natural capital/assets include land, water, trees and wildlife and biological resources that are utilized by people to generate means of survival

(Ellis, 2000). It is clearly important to those who derive all or part of their livelihoods from natural resource-based activities such as farming, fishing and gathering in forests (DFID, 2001).

Financial capital refers to stocks of money to which the household has access. This is chiefly likely to be savings, and access to credit in the form of loans (Ellis, 2000). Financial capital for household livelihoods sometimes is not only in the form of money.

Human capital at a household level is a product of the amount and quality of labour available with its education, skills, and health (Ellis, 2000; DFID, 2001). Human capital is increased by investment in education and training, as well as by the skills acquired through pursuing one or more occupations (Ellis, 2000). Human capital covers skills, education and health.

Social capital was defined by Moser (1998) as reciprocity within communities and between households based on trust deriving from social ties (Ellis, 2000: 36). In the guidance sheets on sustainable livelihoods from DFID (2001), the importance of social capital seems to be considered as resource of last resort a buffer that can help households to cope with a shock and a safety net to ensure survival during periods of intensive insecurity. These can influence rural livelihoods activities in the type of livelihood strategies that they adopt. Social capital consists of networks and associations.

Physical capital comprises what is created by economic production processes. Examples are: buildings, irrigation canals, roads, tools and so on are physical assets (Scoones, 1998; Ellis, 2000). Hence, a given state of

infrastructure as well as physical property will bring households advantages or disadvantages. Infrastructural facilities such as housing, education, health, roads and electricity are among the physical capital needed in rural areas to facilitate livelihood activities.

The next component of the conceptual framework is livelihood strategies. In general, livelihood strategies have been identified as agricultural intensification or extensification, livelihood diversification including both paid employment and rural enterprises, and migration (Carney, 1998; Scoones, 1998; Cahn, 2002; Ellis, 2002). Generally, people tend to choose livelihood strategies which, in their estimation, provide them with the best or optimum livelihood outcomes. Household's livelihood strategy is determined by different exogenous and endogenous factors, such as environmental, socio-economic, political and institutional factors. It varies from place to place and from conditions to conditions (DFID, 2001). Livelihood strategies consist of activities that generate means of household survival (Ellis, 2000). The level and nature of diversification is a crucial element of any discussion on livelihoods (Ellis, 2000; Murray, 2002). Many researchers have studied livelihood strategies. Among these studies, Lerise, (2001) and Okali (2001) confirm that most of people in Africa and Asia rely on the combination of activities; these people do not specialize in crop production or trade and services to the total exclusion of other income-earning activities. Carswell (1997) focuses on agricultural intensification, Toulmin, Brock & Coulibaly (2000) stresses the diversification

of livelihoods, and Tegegne (2000) highlights the rural non-farm activities and the production decision of farmers.

The other component of the framework is institutional structures and processes. These serve as transforming factors and consist of public domain, private sector domain and traditional domain. They are basically internal or external laws, policies or regulations, norms, beliefs and incentives that could have positive or adverse effects on livelihood strategies, livelihood outcomes and wellbeing. Individual's livelihoods are strengthened by policies, institutions and processes that operate from local to international and from public to private levels (Ellis, 2000).

Policies, institution and processes influence whether people will get access to or will not get access to capital. Again, in case of any shocks, changes in trends or seasonality, they help to reduce the impact that will be felt by the people. They can also check people's livelihood and impact directly on the people. Institutions and organizations mediate between the vulnerability context and the livelihood assets of the household. They are critical in defining the types of bargaining and decision-making that take place within the trade-offs referred to earlier. As part of the political environment, they are also important in the vulnerability context and in the development of policy to reduce the impact of shocks on the poor (Scoones, 1998). Both formal and informal institutions are important, particularly at the community and district level. Formal institutions can determine the capacity of households to increase their asset base and

secure new sources of provision. Informal institutions like community-based organizations undertaking other routine community activities.

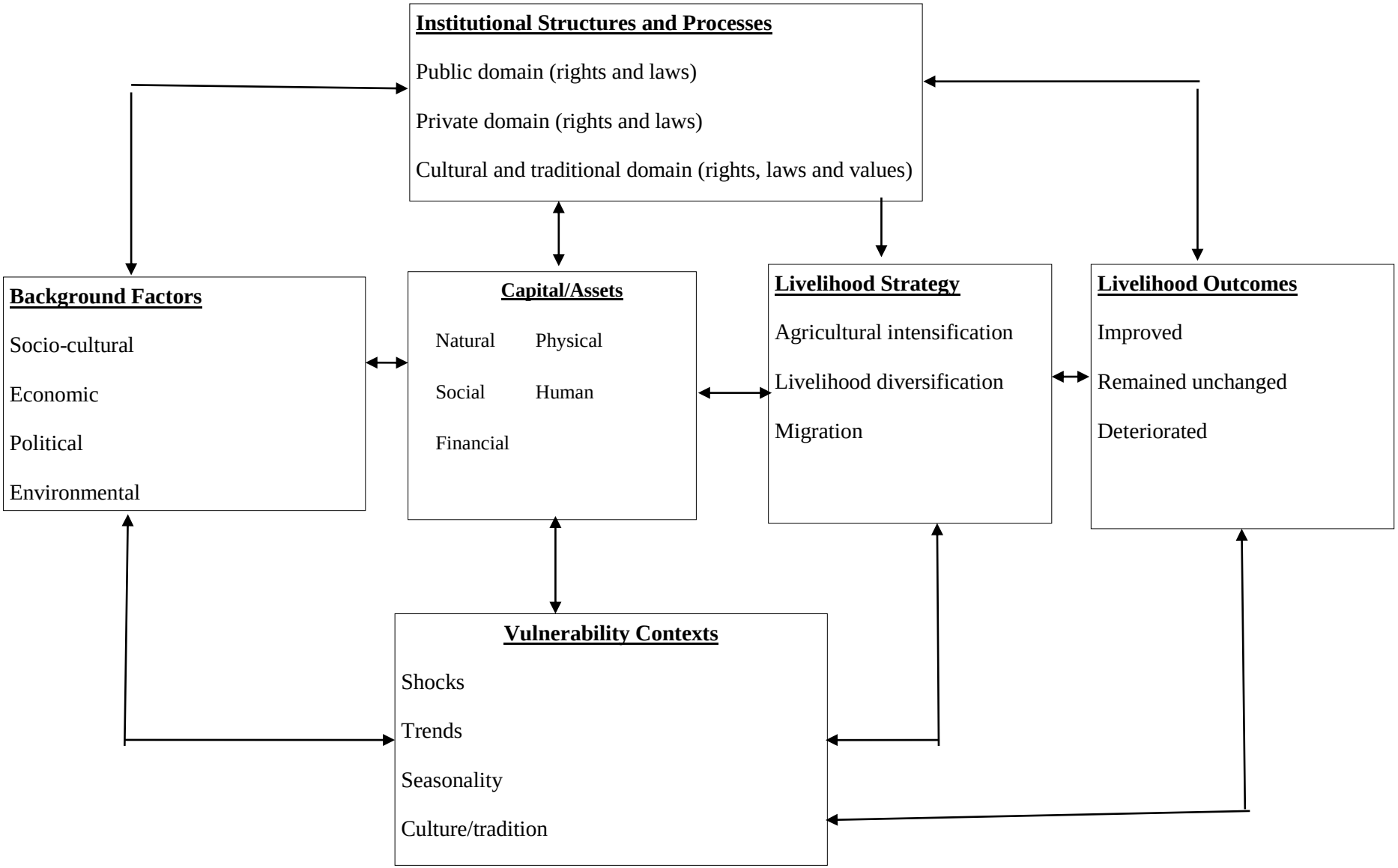
In the context of the Bui Dam construction, the role played by key stakeholders like the central government, decentralized departments (District Assembly and the Ghana Volta River Authority), various NGO's and private organizations can significantly increase or decrease peoples wellbeing (Addo, 2008). Depending on their livelihood strategies or vulnerability context in which they found themselves and their access to policies, processes and institutions, people choose livelihood strategies that provide them with their ideal livelihood outcomes. The outcomes could be pessimistic or optimistic or both.

One other external component of the framework, which may influence access to capital, livelihood strategies and livelihood outcomes, is the element of vulnerability. According to Moser (1998), vulnerability is the insecurity of the well-being of individuals or communities in the face of changing environments (ecological, social, economic and political) in the form of sudden shock, long term trends, or seasonal cycles. It provides the external environment within which people live and seek livelihoods. In an attempt to improve upon their livelihood status, rural folks may pursue their livelihoods within the context of vulnerability.

The sustainable livelihood framework holds the views that people are operating within the vulnerability context. This context of vulnerability causes shocks like floods, droughts, cyclones, seasonality of prices and production, trends and changes in population and markets and trade. These entire

vulnerability contexts continue to chain people in the vicious cycle of poverty (Chambers & Conway, 1992). In this study the construction of the dam is seen as a shock to the communities but within this vulnerability context, people have a way of responding to these shocks, seasonality and trends. That is, people have access to assets which includes social, human, financial, natural and physical. This is what they termed as the 'coping strategies'. These five assets are what were classified as the assets pentagon in the sustainable livelihood framework. This livelihood pentagon was developed because livelihoods are affected by diversity of assets, people's amount of assets and how balanced the peoples assets are. These three things help people to make a meaningful living (Carney, 1998).

The ultimate component of the framework is livelihood outcomes which broadly comprise monetary and non-monetary elements. The outcomes could be positive, negative or neutral. The Sustainable Livelihood Framework is people centred and participatory (Tanle, 2014). It identifies what people have and the capacity to actively shape their future. But for the purpose of this study, the sustainable livelihood framework for migration and livelihoods was modified since it did capture only migration as the form of livelihood strategy without regard to agricultural intensification and livelihood diversification. The Sustainable Livelihood Framework is graphically presented in Figure 1.



Source: Adapted from Tanle (2014)

Figure 1: Sustainable Livelihood Framework

CHAPTER THREE

METHODOLOGY

Introduction

This chapter covers issues on the profile of the study area, research design, target population, sample and sampling procedure, data and sources, research instruments, pilot study, community entry protocol, data collection and analysis procedures and ethical issues. The chapter ends with a discussion of the challenges encountered during the field survey.

Profile of the Study Area

Bui is located in the Brong- Ahafo region of Ghana precisely, the Banda District. But the selected communities for this study can be found in both the Banda District (Brong - Ahafo) and Bole District (Northern Region).

Banda District is a new district carved out of Tain District in the Brong Ahafo region. The Banda District has Banda Ahenkro as its capital. Banda District lies within latitudes 7ºand 8º 45` North and longitudes 2º 52` and 0º 28` West. The District shares boundaries with the Bole District (Northern Region) to the north, Tain District to the south, La Cote D'Ivoire to the west and Kintampo South to the east. Banda Ahenkro, the district capital, is 126 km away from Sunyani, the regional capital (approximately 1 hour 47 minutes' drive by road). In terms of land area, the District covers a total of 2,298.34570 km^2 out of the regional size of 39,558km^2.

Bole District is made up of 11 bigger towns and a major river which flows through the district is the Black Volta. The Bole District covers an area of 70,

384 km^2. The district capital is Bole. The population is sparse with a population density of about 14 per square kilometres. It is located in extreme western part of the Northern Region. The district is bordered to the north by Sawla/Tuna Kalba District, to the west by Cote –d'Ivoire, to the east and to the south by Wenchi and Kintampo districts respectively.

The people of the Bui Gorge are made up of the Ligbi, the Nafaana, Ntorre Awutu, Degha, Bono, Gonja, Ewe, Kulangho, Mo, Banda, and Dargarti. Bui can also boast a national park which is the 3rd largest park in the country. The people of the Bui Gorge catchment area are peasant farmers and cultivate mainly yam, cassava, guinea corn, groundnuts and bottle gourds for their seeds commonly known as *duatoa* in Akan. They also cultivate calabash plants and generally keep livestock in communal kraals with common herdsmen who are paid through individual contributions. They usually sell their products at the Techiman market, in the Techiman Municipality in the Brong – Ahafo Region (BPA, 2012).

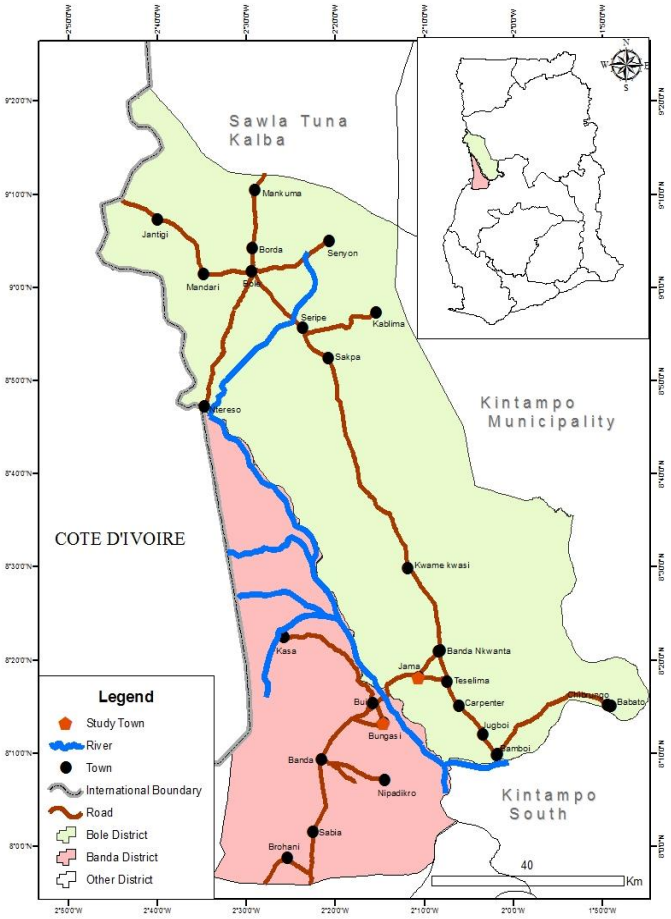


Figure 2: Map of the Study Area

The main food relished in the area are yam *fufu* and *Abetie* (cassava dough steamed in maize porridge), locality called *Kode* and *Koo* in Guan and *Degh/Vagli* respectively eaten with soups ranging from plain sauce to wet and dried vegetables. Until the establishment of the national park and the enforcement of the wildlife protection laws, the people of Bui depended on fish and game as their source of protein.

The Bui Project is located on the Black Volta River at the border of the Bole (Northern Region) and Wenchi (Brong-Ahafo Region) districts in north-

western Ghana, approximately 150 Kilometres (km) upstream of Lake Volta. The climate in the project area is characterised mainly by a single rainy season (maximum in July-August).There are three distinct vegetation zones in the Black Volta catchment area above the Bui dam site, resulting in a relatively rare juxtaposition of riverine gallery forest along the Black Volta River and its tributaries and the Guinea savannah woodland away from the river.

Rural districts characterized by dispersed settlements surrounded by agricultural lands that are actively cultivated or lying fallow, and savannah type open lands. Most villages are very small consisting of only housing compounds and perhaps a primary school (BPA, 2012).

The land occupy by the Bui Project is predominantly vegetation comprising about 50 percent grassland, 25 percent savannah woodland and 25 percent water and riverine gallery forest. It also includes six villages which are home to about 1,360 people (127 households). A further village, Dokokyina, comprising 55 households and 350 people, will not be inundated but will be required to relocate because it remains within the National Park, and will be physically isolated by the reservoir, with no easy access to anywhere else in Ghana without crossing the international border into Côte d'Ivoire. However, because of the resettlement, these eight communities have been merged in two that is, Resettlement A comprising Lucene, Dam site, Agbegikuro and Brewohodi which are found in Jama in the Northern Region and Resettlement B comprising Bui Village, Dokokyina, Bator Akwanyikrom and Bui National Park Workers which are found in Bugase in the Brong Ahafo Region (EPA, 2007).

Research Design

The study adopted a mixed methods approach. This involved triangulation of both quantitative and qualitative methods of data collection concurrently. Triangulation focuses on collecting and analysing both qualitative and quantitative data in a single study (Creswell, 2003). The idea of triangulation in this study lies in the belief that the validity of research findings and the degree of confidence in them will be enhanced by the deployment of more than one approach to data collection (Bryman, 1992).

Triangulation involves 'within method' triangulation in which the same method is used on different occasions and 'between method' triangulation where different methods are used in the same study (Mikkelsen, 1995). The latter was employed in this study. Hence, the interview schedule (quantitative method), in-depth interview and observation (qualitative methods) were used to collect data for this study. Indeed, the complex nature of strategies that people adopt in the construction of their livelihoods and the variety of groups involved in the study, in this case of affected communities, key informants or stakeholders, called for the use of the mixed approach to data collection.

Some criticisms labelled against triangulation include the fact that even if the results from different data sources tally, there is no guarantee that the inferences involved will be accurate. The results may generate two incorrect but similar conclusions (Blaikie, 2000). In addition it is time consuming in terms of analyzing both text and numeric data (Creswell, 2003).

The above criticisms notwithstanding, there are far more convincing reasons in support of triangulation of methods. Creswell (2003) asserts that triangulation allows the researcher to confirm findings from different data sources. Similarly, Depoy and Gitlin (2005) observed that the mixed method opens the way for richer and potentially more valid interpretations, helps the researcher to gain better understanding of the phenomenon being studied, and complements the strength of the qualitative and quantitative methods. Indeed, by using both qualitative and quantitative methods, the study sought to provide a deep description and insight into the livelihood strategies of the respondents with the introduction of dam construction in the area and eventually, promote a greater understanding of the findings from the study.

Data and Sources

Data for the study were collected from both primary and secondary sources. It is argued that using multiple methods of data collection will reduce the peculiar biases of each one (Blaikie, 2000). Hence, the interview schedules, in-depth interviews, and observation formed the basis of primary data collection. Data collected from these sources centred on the background characteristics of respondents, their livelihood assets and activities, the changes in their livelihoods as well as their response to these effects. Information on the role of stakeholders in ensuring livelihood security for the people in the communities affected by dam construction was also collected through the field survey.

In the case of secondary sources, information from published and unpublished sources including journals, textbooks, periodicals, the internet as well as reports and official documents from the District Assembly and Bui Power Authority were used to support the primary data.

Study Population

The study population constitutes the groups of persons, objects or institutions that define the objects of the investigation (Creswell, 2003). The target population for this study comprised household respondents from eight communities in the Bui Dam Area, namely: Brewohodi, Dam Site, Agbegikuro, Lucene, Bui Village, Bator Akanyakrom, Dokokyina, and Bui National Park. These settlements were selected because they were the communities that were resettled because of the construction of the Bui dam project (BPA, 2012).

Opinion leaders or stakeholders such as Chiefs and Assembly Members in each of the eight communities and the District Assembly where the communities are found were also included as key informants. The inclusion of opinion leaders (Chiefs and Assembly Members) and the District Assembly in the target population is based on the fact that, as stakeholders, they play key roles in ensuring that there is livelihood security for the people in the District. The policies and programmes implemented by these stakeholders impinge on the livelihood of the people.

Sampling Size and Sampling Procedure

Due to the small nature of households, criteria for selecting the target population for this study was the complete census approach. This means that all the households in the affected communities were included in this study. In all 219 household respondents was arrived at for the study.

In addition, eleven key informants were purposely selected including eight opinion leaders (one each from the eight communities), the Public Relation Officer of Bui Power Authority (BPA) the District Planning Officer and District Coordinating Director. This made the total population 230. The distribution of the sample is shown in Table 1.

Table 1: Total Population for the Study

Units	Population for the Study
Household Respondents	219
Opinion Leaders (Chiefs and Assembly Members)	8
District Coordinating Director	1
District Planning Officer	1
Public Relation Officer of BPA	1
Total	230

The total number of households was 219 (BPA, 2012), and hence census approach (sample technique) was used in other to include all households. The unit

of analysis was the households and for that matter interview schedule was administered to heads of household. The distribution of the households in various communities is indicated in Table 2.

For the key informants, the non-probability technique, particularly the purposive sampling technique was used to select respondents from the District Assembly, opinion leaders from the eight communities and the various stakeholders. The purposive sampling technique was deemed the appropriate means of getting respondents who are knowledgeable and well abreast with the subject matter of interest (Sarantakos, 1998). As such the following key informants were identified for in-depth interview: Opinion leaders (chiefs and Assembly Members), Public Relation Officer of Bui Power Authority (BPA), District Planning Officer and the District Coordinating Directors of the two districts.

Data Collection Instruments

In line with triangulation as the underlying philosophy guiding the study, interview schedules, interview guide and observation checklist were developed to collect primary data from the field. These three primary sources of data collection instruments were used because it is generally agreed that interview schedules, IDIs and observation are the most appropriate means of primary data collection when information should come directly from 'people' and 'actors' who are actively involved and are aware of the problems under investigation (Patton, 2002).

Table 2: Distribution of Households in the Affected Communities

Affected Communities	Total Number of Households	Total Number of People
Brewohodi	10	48
Damsite	6	36
Agbegikuro	22	107
Lucene	4	26
Bui village	42	297
Bator Akwanyikrom	63	437
Dokokyina	36	165
Bui national park	36	100
Total	219	1216

Average Household Size: 5.5

Source: BPA (2013)

Interview Schedules (Questionnaire)

An interview schedule was prepared and administered to household respondents in the eight communities. Interview schedule was used because most of the respondents could not read and write and for that matter self – administered questionnaire was practicable. The interview schedule was used because of its ability to build rapport, create a relaxed and healthy atmosphere in which respondents easily co-operate, answer questions, as well as clear misapprehensions about any aspect of a work (Kumekpor, 2002). It also enabled the researcher and the field assistants to translate questions into the *Twi* which is widely spoken in the Bui Dam area

Prior to designing the instrument, a thorough literature search was conducted to determine and categorize concepts and variables used in similar past studies. These were then modified to suit the goal of the present study. The instrument comprised open-ended, close ended and Likert scale questions. With respect to questions that required a 'yes' or 'no' response, the instrument provided an opportunity for respondents to explain the response they chose. The set of questions elicited responses on issues regarding the background characteristics, changes in livelihoods, and the impact of dam construction on their livelihoods and roles of stakeholders in ensuring livelihood security.

In-Depth Interview (IDI) Guide

A key requirement for using IDIs is that questions posed to informants during the interview must address the research objectives (Taylor & Bogdan, 1998). Consequently, IDIs were conducted to ten key informants in the District. These key actors were purposively selected on the basis of their level of expertise and the role they play in providing livelihood security for the people. The IDIs sought the opinion of respondents on the effects of dam construction on livelihoods, measures designed to address such effects and other coping strategies meant to enhance livelihood security of fringe communities affected by the dam construction in the area. The interview guide for the IDIs was in semi-structured format in line with Hockey, Robinson and Meah's (2005) assertion that semi-structured interviews are flexible, and they allow for the exploration of emerging themes and ideas.

Observation checklist

The study also made use of non-participant observation. In this kind of observation, the observers, on their own, study their respondents or the study area from outside the group without participating in the activities of the respondents (Sarantakos, 1998). Certain parts of the environment were observed without participating in the activities of the people there. Observation checklist was prepared to guide the process. The livelihood activities of communities, their physical assets and impact on the environment were some of the key features observed. This helped to provide on the spot information without relying on the

reports of others. Where appropriate, photographs were taken to show some of the impact of the dam construction on the livelihoods of the local residents.

Community Entry Protocol and Data Collection

In the process of collecting information from research subjects, it is important to follow standard procedures (Economic and Social Research Council, 2002). In view of this, right of entry and assurance from the communities were gained by personally sending an advance letter of introduction from the Department of Geography and Regional Planning, through the Head of Department to the District Assemblies and the External Relations Officer of Bui Power Authority – Jama (see Appendix D) - With respect to the Chiefs and Assembly Members of the eight communities.

The actual field work took place between 16th November and 13th December, 2014. The researcher personally administered the interview schedule to respondents in the eight communities and the IDIs for the key informants. The opinion leaders and the Bui power authority personnel were identified anud time was scheduled for the interviews, especially those who could not make time upon first visit.

Ethical Issues

Ethical issues that were considered include informed consent and the anonymity of the respondents.

Data Analysis

The data collected through the field survey was examined and edited to ensure consistency of responses. The completed interview schedules were then coded and fed in a computer. The Statistical Product for Service Solution (SPSS Version 21) was used to generate frequencies, percentages and cross tabulation from the interview schedules while the in-depth interviews were transcribed and categorised and analysed manually based on emerged themes.

Challenges from Fieldwork

Getting a key informant from Bui Power Authority to participate in the study was really problematic. Several visits to conduct IDI with the external Relations Officer of BPA proved futile even when it was pre-arranged. This reduced the total target population for the key informants to 10.

In addition, during the time of the data collection, some of the fishermen had gone to fish and did not return throughout the data collection. Again, some of the workers at the wildlife and Game Reserve (Bui National Park) had gone to the field and did not return throughout the data collection. This reduced the number of households to 188 instead of 219. This reduced the total target population for the households to 188.

Similarly, some residents showed open discontent and unwillingness to participate in the study because they perceived the researcher was just collecting the data which would not benefit them because the BPA had done that on several

occasions. To address this challenge, the researcher explained the objectives and purpose of the research to the respondents.

Limitation of the Methodology

The study employed the "before and after" methodology to evaluate the effects of the construction of the Bui Dam on the surrounding communities. The main limitation of this methodology was how to empirically establish whether the resettled communities are better off or worse off after the construction of the dam. This is because the study used a cross-sectional data without any baseline study to assess the livelihood situation of the resettled communities after the construction of the Bui Dam. This limitation notwithstanding, the study made an assumption that the respondents would be able to remember fairly accurately what their livelihood condition used to be before the dam was constructed (Afrane, 2002). This methodology was also employed by Quartey (2015) to study the impact of microfinance on the growth of small businesses in urban Ghana and found it to be more suitable given the absence of a baseline study. Afrane (2002) however notes the possibility of having inaccurate responses in some cases. He therefore suggests the need for the interviews to be carried out in a way that could reduce the problem of unreliability of data. In light of this, the interviewer was well equipped to carry out the interviews in an efficient manner, especially where respondents faced the problem of memory lapses. The findings of this study must however be interpreted bearing in mind the strengths and weaknesses of the "before and after" methodology.

CHAPTER FOUR

RESULTS AND DISCUSSION

Introduction

This chapter presents the main findings of the study and situates them in the context of the theoretical and conceptual framework. The chapter covers the socio-demographic background of respondents, the assets from which people derive their livelihoods, changes in livelihoods and the role of stakeholders in ensuring livelihood security for the surrounding communities.

Socio-Demographic Characteristics of Respondents

There is a consensus in the livelihood discourse that the background characteristics of rural people influence the type of livelihood strategies they pursue (Scoones, 1998; Ellis, 2000). Consequently, information was sought on some socio-demographic characteristics of respondents that have a bearing on the study. The socio-demographic variables covered in this study included age, sex, level of education, ethnicity, and level of income of respondents.

From Table 3, out of the 188 respondents, 32.4 percent of the respondents interviewed were from Bator Akwanyikrom, followed by 19.7 percent of the respondents from Bui village, while Dokokyina had 19.1 percent of the respondents. About 12.2 percent of the respondents were from Agbegikuro, 6.4 and 4.8 percent of the respondents were from Bui National Park and Brewohodi respectively, whereas nearly 3.2 percent of the respondents were from Lucene.

It can be observed from Table 3 that, 57.4 percent of the respondents were males while 42.6 of the respondents were females. The males outnumbered the females because traditionally males are heads of households in Ghana. The predominant ethnic groups in the study area are the Mo (34.6%), followed by the Ewe (32.4%) while Christianity (64.9%) and Islamic (27.7%) constituted the major religions of the people. Most of the respondents were within the ages of 40 – 49 years (40.4%) and 30 – 39 years (30.9%). Considering that these two age categories as productive, the implication is that a majority of the respondents (71.3%) were likely to be involved in one economic activity or the other (Dauda, 2011).

Analysis of marital status is important in rural livelihood studies. Moser (1998) argues that among other things, marriage (household relations) is an asset in the form of social capital. Thus, marital status has either a positive or negative influence on livelihood outcomes, as marital partners contribute to each other's welfare by helping to provide productive resources that enhance livelihoods. It was therefore relevant to find out the marital status of respondents. From table 3, 75.5 percent of the respondents were married while 3.2 percent of the respondents were single.

Education plays a crucial role in every economy as well as in livelihood analysis. As a form of human capital, education contributes greatly to the livelihood of people (Safo-Kantanka et al, 2006). Hence, the study sought information on the highest level of education attained by the respondents. It was found that 70.2 percent indicated that they had no formal education, while 21.8

percent had basic education (Table 3). Only 5.3 percent of the respondents were secondary/vocational/technical graduates, whereas 2.9 percent of the respondents had some form of tertiary education.

Table 3: Socio – Demographic Characteristics of the Respondents

Variables	Frequency	Percent
Communities		
Brewohodi	9	4.8
Dame site	6	3.2
Agbegikuro	23	12.2
Lucene	4	2.1
Bator Akwanyikrom	61	32.4
Dokokyina	36	19.1
Bui National Park	12	6.4
Bui village	37	19.7
Sex		
Males	108	57.4
Females	80	42.6
Ethnicity		
Akan	6	3.2
Mo	65	34.6
Banda	17	9.0
Gonja	4	2.1
Ewe	61	32.4

Table 3 (continued)

Dargarti	30	16.0
Grushi	3	1.6
Bussana	1	.5
Sisala	1	.5
Religion		
Christian	122	64.9
Islamic	52	27.7
Traditional	14	7.4
Age		
20-29	11	5.9
30-39	58	30.9
40-49	76	40.4
50-59	26	13.8
60-69	14	7.4
70-79	3	1.6
Marital status		
Never married	6	3.2
Married	142	75.5
Separated	13	6.9
Widowed	25	13.3
Divorced	2	1.1

Table 3 (continued)

Level of education		
No formal education	132	70.2
Basic level	41	21.8
Secondary school	10	5.3
Tertiary	5	2.7
Total	188	100.0

Source: Field Data, 2014

Livelihood Assets of the People

The type of livelihood strategies people pursue depends on the type of assets available to them (Scoones, 1998; Ellis, 2000). Five types of assets, are generally mentioned as being accessible to rural communities namely; physical, natural, social, financial and human assets (DFID, 1999). In line with the modified SL-framework and objectives of the study, the types of assets that the people depended on for their livelihood before and after the dam construction in the study area were identified. These assets were categorised as outlined in the following sections.

Physical assets

Physical capital comprises what is created by economic production processes. Examples are: buildings, irrigation canals, roads, tools and so on are physical assets (Scoones, 1998; Ellis, 2000). Physical assets are not only important for meeting people's needs directly but also for providing access to

other assets (Safo-Kanatanka et al, 2007). Respondents were asked to select from a list of physical assets that existed in the study area prior to the introduction of the dam. Key physical assets indicated included accessible road networks, housing facilities, school buildings, personal toilets (KVIPs), health facilities (clinics, CHIPS Compounds,), electricity, access to radio stations, access to mobile networks, community centre and public standpipes. From Table 4, before the introduction of the dam, it was only Bator (100%), Brewohodi (100%) and Damsite (4.3%) who had access to accessible roads while after the dam, all the communities have access to accessible roads. Again most of the communities did not have access to electricity but the introduction of the dam had led to access to electricity in their communities.

However, there was no market facility in Agbegikuro, Dam site, Lucene and Brewohodi communities but in the other communities' the market was still under construction. Thus in terms of physical assets, these communities are better off after the introduction of the dam as compared to before the dam was constructed. Though toilet facilities were provided in every house for the resettled households, most of the communities were not using the toilet facility in their individual houses because they complained that the toilets were not well constructed and it makes the place smell whenever they use them. With these physical assets present in the study area, other types such as human assets, financial assets and natural assets could become accessible to the people, since physical assets provide the avenue through which other types of assets can be harnessed (DFID, 1999; Ellis, 2000).

Table 4: Physical Assets

Physical Assets	Communities															
	Before								After							
	Brewohodi	Damsite	Agbegikuro	Lucene	Bator	Dokokyina	BNP	BV	Brewohodi	Damsite	Agbegikuro	Lucene	Bator	Dokokyina	BNP	BV
Tarred roads	100	4.3	0.0	0.0	100	0.0	0.0	0.0	100	100	100	100	100	100	100	100
Schools	0.0	0.0	4.3	0.0	0.0	0.0	100	0.0	100	100	100	100	100	100	100	100
Electricity	0.0	0.0	4.3	0.0	0.0	0.0	100	0.0	100	100	100	100	100	100	100	100
Mobile networks	0.0	0.0	4.3	0.0	6.6	0.0	91.7	0.0	100	100	100	100	100	100	100	100
Toilets	0.0	100	100	0.0	100	0.0	100	100	100	100	100	100	100	100	100	100
Information Centre	0.0	0.0	4.3	0.0	0.0	0.0	100	100	100	100	100	100	100	100	100	100
Market	0.0	95.7	0.0	93.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hospital	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Clinic	100	4.3	0.0	0.0	100	100	100	100	100	100	100	100	100	100	100	100
Public Standpipe	100	4.3	0.0	95.2	0.0	100	0.0	100	100	100	100	100	100	100	100	100
N	9	6	23	4	61	36	12	37	9	6	23	4	61	36	12	37

Source: Field Data, 2014

Natural Assets

The SL-Framework describes natural assets as natural resource stocks from which resource flows and services useful for livelihoods are derived (DFID, 1999). These include land, forests, rivers, streams among others (Ellis, 2000). It was observed that the Black Volta and its tributaries in which the people depended on were used to construct the dam. The main asset whose accumulation has been promoted is land, based on the argument that land ownership and access are closely linked to agricultural production and corresponding food security and rural income generation (Winter, Davis & Carletto, 2009).

Before the construction of the dam, most of the respondents relied solely on these natural assets such as land, forest and rivers but the construction of the dam had destroyed most of these natural assets. From Table 5, it can be seen that before the dam construction, about 98 percent of the respondents had these natural assets at their disposal but since the introduction of the dam, there had been a drastic reduction in access to these assets especially that of forest and rivers from over 95 percent to as low as 4.8 percent. This supports the assertion that subsistence lifestyles among indigenous groups are often most heavily impacted by loss of natural resources from dam construction (McCully, 2001).

The number of people who depended on forests for their livelihoods after construction is relatively low because most of the forests found in the District where people were resettled to are reserves for wildlife and game (Bui National Park). By law such forests are regarded as protected areas and people are not allowed to enter or use resources from such reserves. Hence, those who rely on

forests for their livelihoods utilise resources from the few off-reserve forests scattered in the Banda and Bole Districts.

Table 5: Natural Assets of Respondents

Natural assets	Before		After	
	Frequency	Percentage	Frequency	Percentage
Land	185	98.4	124	66.0
Forest	185	98.4	9	4.8
Rivers/streams	182	96.8	9	4.8

Source: Field Data, 2014

Human Assets

Education, good health and skills training are important human assets that enable people to engage in different activities to achieve their livelihood objectives (Carney, 1998). Just about 27.7 percent of the respondents interviewed had some form of formal education, including basic education (18.6%), secondary/ technical / vocational (10%) and tertiary education (2.7%). This is showed on Table 3.

According to Ellis (2000), human assets can be enhanced by training and skills acquired through pursuing one or more economic activities. Thus, further investigations were conducted to find out if the respondents had been trained in any employable skill(s). The results showed that about 83 percent of the respondents have not been trained in any employable skills. Out of the 17 percent

of the respondents who have been trained in employable skills, about 90.3 percent of them were trained artisans. Table 6 represents the detail account of the various economic activities in which respondents had received training.

Table 6: Areas of Training for Respondents

Areas of Training	Communities								Total
	Brewohodi	Damsite	Agbegikuro	Lucene	Bator	Dokokyina	BV	BNP	
Agriculture	33.3	0.0	14.3	0.0	0.0	0.0	0.0	0.0	6.5
Service	0.0	0.0	14.3	0.0	0.0	0.0	0.0	0.0	3.2
Artisan	66.7	100	71.4	100	100	100	100	100	90.3
%	9.7	3.2	22.6	6.5	29.0	12.9	12.9	3.2	100
N	3	1	7	2	9	4	1	4	31

Source: Field Data, 2014

As indicated in Table 6, respondents from only Brewohodi and Agbegikuro had received training in agriculture, only respondents in Agbegikuro had been trained for service and the rest of the respondents with skills acquired in artisanship. These findings presuppose that the people have not acquired much skills and capabilities that can be harnessed in various livelihood activities to achieve their livelihood objectives. The findings however do not support the view of Long (2001) that most rural residents often acquire skills in agriculture as it is the dominant economic activity in rural areas.

Again, 93.8 percent of the respondents who had some form of training admitted that they gained the training before the dam construction and the training

was sponsored mostly by their parents (93.8%). This means that the Bui Power Authority has not done much when it comes to the training of inhabitants of the surrounding communities or equipping them with new skills that will enhance their livelihoods.

Human asset is also measured by access to good health as the quality of health of the people determines their capacity to engage in diverse livelihood activities to attain particular outcomes (Carney, 1998). To determine residents' concern in improving their health, the study sought to ascertain treatment facilities they used when they fell sick and the quality of the services. The results indicated that about 98.9 percent and 68.1 percent of the respondents go to the clinic and CHPS compound respectively because of better services they provide. The result is an indication that the people were concerned with their health conditions. This was confirmed during an interview with a chief of one of the communities when he said:

> *Physical accessibility to health is now very good with the introduction of the Community Health Planning Services (CHPS) which aims at bringing health care to the door steps of the people.*

Financial Assets

Johnson (1997) observed that most rural livelihoods are built around financial resources such as cash/loans, savings, bank deposits and stocks (food and livestock). Before the construction of the dam, most of the respondents relied

on cash (84%), livestock (86.7), food stocks (93.1) and savings (83%). There had been a reduction and some shifts in their financial assets after the dam construction. As found in the study, after the dam construction most of the respondents relied on food stocks (60.1%) and cash (12.7%) as their main financial asset (Table 7) with remittance and pension allowances being the least. Through observation, it was confirmed that the people relied on food stock as a form of financial asset. These include Food stocks like cereals, groundnuts and others as a form of financial asset. The findings confirm those of Ardayfio-Schandorf et al (2007) that food stocks and livestock are the main sources of finance to most rural communities in Ghana.

Social Assets

The SL-Framework denotes social assets as consisting of social groups such as associations, clubs and voluntary organisations that rural residents draw upon in pursuit of their livelihood objectives (DFID, 1999). The study revealed that about 75 percent of the respondents belong to various social groups which they drew upon in pursuit of their livelihoods or when they experienced shocks. This confirms the observation by Joseph and Antoh (2005) that rural residents belong to social groups, which contribute greatly to their livelihoods.

Table 7: Financial Assets of Respondents

Financial Assets	Before		After	
	Frequency	Percentage	Ferquency	Percentage
Cash	158	84	24	12.7
Livestock	163	86.7	12	6.4
Food stocks	175	93.1	113	60.1
Remittances	73	38.8	2	1.1
Loans	24	12.8	14	7.4
Savings	156	83	20	16
Pension allowances	3	1.3	1	1.5

Field Data,2014

The various social networks in the study communities included religious associations, friendships, workers co-operatives, community based organisations (CBOs) youth associations and farmer associations (Table 8). Before the construction of the dam, most of the respondents relied on religious associations, family members, community based associations, friends and kinships as their source of social groups or association. For instance social groups like family members had almost 100 percent for all the communities. This finding contradicts that of Safo-Kantanka et al (2006) that farmer associations is the dominant social group in rural communities because of the agrarian nature of the districts. But after the dam construction, although that of religious groups and family associations remained the dominant social groups, there had been a decline

especially that of friendship and kinships. This is because at the new place (where they were resettled to), the settlements were not arranged like they were before the dam construction hence leading to a breakdown in friendships and kinships since most friends are now living farther away from each other.

Often times, social asset represents a place of seeking refuge in mitigating the effect of shocks or stress through informal networks (DFID, 1999). The social groups in the study area served as avenues through which respondents received various forms of assistance. As indicated in Table 9, prior to the construction of the dam, about 96.8 percent of the respondents received assistance in the form of psychological and emotional support while about 4.8 percent of the respondents received monetary support from group members. With this support, the value is almost the same after the dam construction because the reduction is very negligible. That is psychological and emotional support dropped to 94.7 and 96.8 percent each respectively.

Analysis of the various livelihood assets (physical, natural, human, financial and social) helps to determine the livelihood activities of the people. This is exemplified in the SL-framework (see chapter two), where the assets available to the people influence their livelihood activities (Tanle, 2014). Out of the assets available to the people in the study area, they construct and contrive a living, by pursuing a range of livelihood activities aimed at attaining particular outcomes.

Table 8: Social Groups of Respondents

Social Groups	Communities															
	Before								After							
	Brewohodi	Damsite	Agbegikuro	Lucene	Bator	Dokokyina	BNP	BV	Brewohodi	Damsite	Agbegikuro	Lucene	Bator	Dokokyina	BNP	BV
Workers	11.1	33.3		0.0	8.2	2.7	75	24.3	44.4	16.7	4.3	50	3.3	8.3	58.3	2.7
Youth	22.2	33.3	26.1	0.0	37.7	22.2	0.0	40.5	22.2	16.6	8.7	50	3.3	8.3	58.3	2.7
Religious	77.7	83.3	95.7	75	95.1	100	91.7	97.3	77.7	66.6	73.9	100	63.9	97.2	91.7	83.8
Family	100	100	100	100	95.0	100	100	97.2	77.8	66.7	82.6	100	86.9	97.2	53.8	91.9
CBA	100	85.3	91.3	75	55.7	94.4	33.3	94.6	0.0	0.0	26.1	25	19.7	22.2	41.6	27
Friends	100	83.3	95.7	100	95.1	100	91.6	97.2	0.0	11.5	56.5	25	75.4	91.7	91.7	86.5
Kinships	88.9	100	91.3	100	68.9	83.3	16.6	86.5	0.0	0.0	17.4	63.9	14.8	63.9	16.7	70.3
N	9	6	23	4	61	36	12	37	9	6	23	4	61	36	12	37

Source: Field Data, 2014

Table 9: Benefits Derived from Social Groups

Assitance Received	Before		After	
	Frequency	Percentage	Frequency	Percentage
Monetary contribution	111	59	9	4.8
Advice and encouragement	188	100	178	94.7
Psychological and emotional support	188	100	182	96.8
Gifts and benevolence	181	96.3	85	45.2
Provision of farmlands	171	91.0	10	5.3
Provision of farm inputs	147	78.2	4	2.1

Source: Field Data, 2014

Changes in Livelihood as a Result of the Dam Construction

In the context of the SL-Framework which was adapted for the study, dam construction which involves the utilisation of large tracks of land is considered as a shock to the communities located in and around the concessions of the dam construction. Under the circumstances, the people are exposed and thus become

vulnerable. However, given that the people have access to assets (the asset pentagon) they will shift to different livelihood activities to escape from the vulnerability context. These activities may be agricultural or non-agricultural.

In responding to a question on whether or not there had been a change in their livelihood activities after the dam construction, 134 respondents (69.7%) admitted there had been a change in their livelihood activities while 30.3 percent of the respondents said there was no change in livelihoods. From Table 10, 95.5 percent of the respondents in Bator who had experienced a change in their livelihood activities attributed it to the presence of the dam construction while just a handful attributed it to retirement and health reasons. Included in this group of people were those whose lands had been partially or totally taken away by the dam construction, those who have been resettled by the Bui Power Authority and those who had shifted to different economic ventures in anticipation of the economic prospects that accompanied the dam construction.

Further inquiries were conducted to ascertain a change or otherwise in livelihood activities of the people. This was done by comparing the main economic activities of respondents before and after the operations of the dam. The result from Figure 1 shows that the change in livelihood activities was more pronounced in farming where the proportion reduced from 59 percent before the introduction of the dam construction to as low as 25.5 percent. This confirms Gregory's (2008) findings that the introduction of the Akosombo Dam construction led to a drastic reduction in floodplain agriculture especially farming activities. Similarly research carried on the Mekong hydro- electric power project

also confirms that the dam was a constraint on agricultural especially farming activities (Scott, 2012).

Table 10: Reasons for Changes in Livelihood Activities

Changes in Livelihood	Communities								
	Brewohodi	Damsite	Agbegikuro	Lucene	Bator	Dokokyina	BNP	BV	Total
Presence of Dam	100	100	100	75.0	95.5	100	0	96.4	97
Health Reasons	0.0	0.0	0.0	25.0	2.3	0.0	0.0	0.0	1.5
Retirement	0.0	0.0	0.0	0.0	2.3	0.0	2.3	0.0	1.5
%	5.2	3.0	13.4	3.0	32.8	21.6	0.0	20.9	100
N	7	4	18	4	44	29	0.0	28	134

Source: Field Data, 2014

The main reason for the reduction in farming was because large tracts of land had been taken from the people. This supports studies which emphasised that construction of a dam covers huge area of land including agricultural lands (WCD, 2000). One such study is that by Yardley (2007) which supports the fact that the Kandaji dam development in Niger displaced 2700 people and affected farming activities like growing of millet and rice on the land and rearing of livestock and fishing in the floodplains that provided their livelihoods.

Because of the reduced farmlands, people cultivate only crops such as maize, cassava and vegetables on subsistence basis to feed households and little or

no surplus for sale as compared to before the dam construction whereby cash crops like cocoa, cashew among others were grown for the larger market.

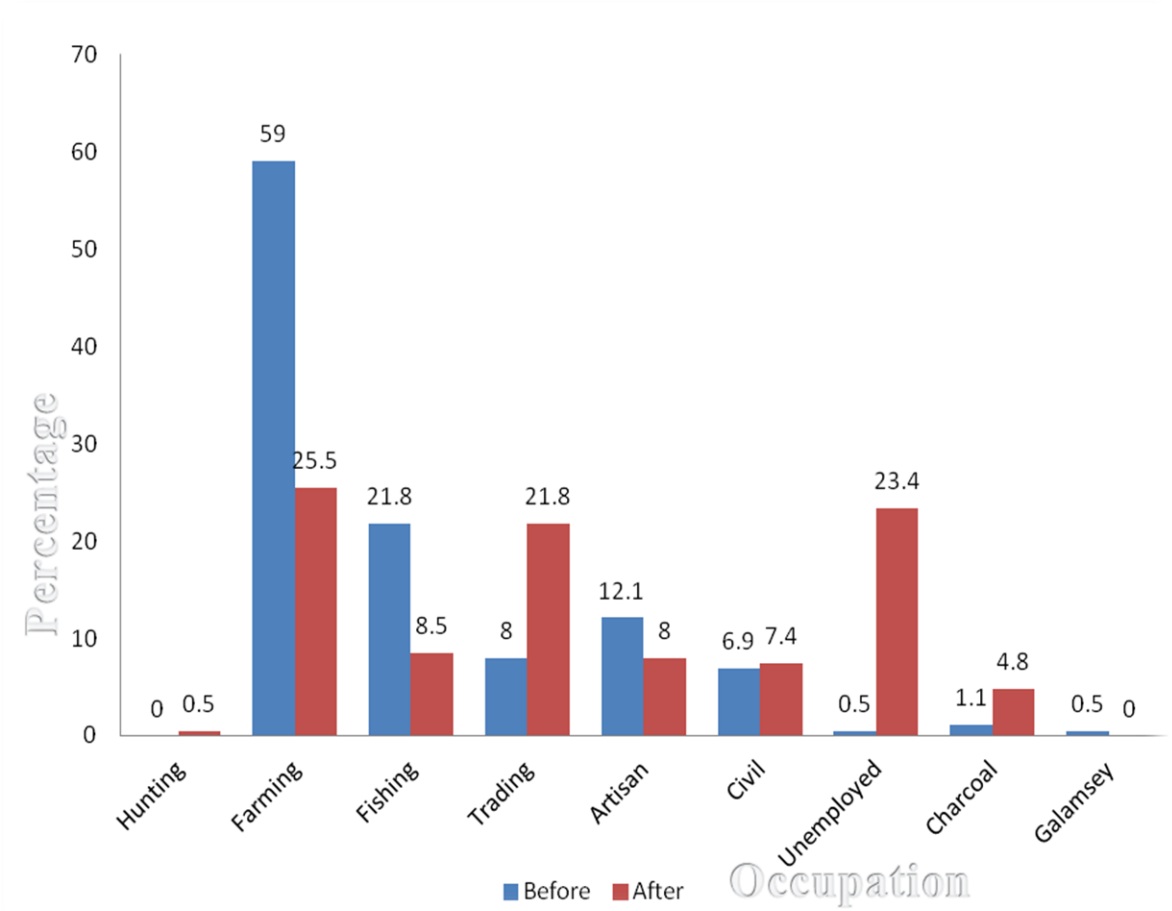


Figure 3: Livelihood Activities Before and After Construction

Source: Field Data, 2014

The proportion of people engaged in trading saw an increase, from 8 percent before the dam construction activities began to 21.8 percent at the time of the survey. This was because there had been influx of people from all over the world which have resulted in economic boom in terms of demand for various commodities, thereby leading to increase in training activities. The findings supports that of other studies which have concluded that dam construction usually

results in an economic boom due to the increased flow of money and people into the local economy of the area where the project is built, which leads to increase in sales of goods and services hence trading activities (Ghaly & Ferry, 2008).

Unemployment also increased from 0.5 percent before the dam construction to 23.4% during the dam construction. This increased because, at the initial stage of the dam, most of the local people were employed as unskilled labourers but during the time of the study, most of the local people were dismissed because the latter stage of the dam construction required people with the requisite skill and knowledge which the local people did not have. This is recorded elsewhere by World Commission on Dams-, (2007) that, during dam construction, it provides people with employment but once it is built, the highly sophisticated technology involved in its operation demands a relatively small number of employees all of whom must have technical expertise.

A chi square statistic was used to find out whether significant differences existed between respondents sex and occupation before and after the dam. The result showed that significant difference (X^2= 37.806; ρ= 0.000 for before and X^2= 58.061; ρ=0.000 for after) existed between respondents' sex and respondents' occupation. The chi square statistic by interpretation means that sex is a key factor in determining the kind of occupation one pursues both before and after the dam construction.

Income is a key variable that determines people's access to livelihood assets and as well, their livelihood strategies (Scoones, 1998; Ellis, 2000). Consequently, the average monthly income levels of the respondents before and

after the dam construction were compared. From Figure 2, before the dam construction, 4.3 percent of the respondents earned less than one hundred Ghana cedis but the introduction of the dam had increased the proportion of people earning this amount to 52.7 percent. Also before the dam construction, 13.8 of the respondents earned above five hundred Ghana Cedis but the introduction of the dam decreased it to 2.5 percent. Figure 3 clearly shows a drastic reduction in income. However, this was somehow different from an earlier research by Atindina et al, (2014) that the creation of the Bui dam led to no significant differences in income levels of residents of the two communities they studied (Lucene and Agbegikuro).

The reason for the differences in the income levels for these two studies was that during the time of this study, most of the workers employed at the construction sites had been laid off as compared to the first study where some of the residents were employed at the construction sites which increased their incomes. Again, Atindina et al, (2014) compared only two (2) villages as compared to this study which looked at all the eight (8) resettled communities.

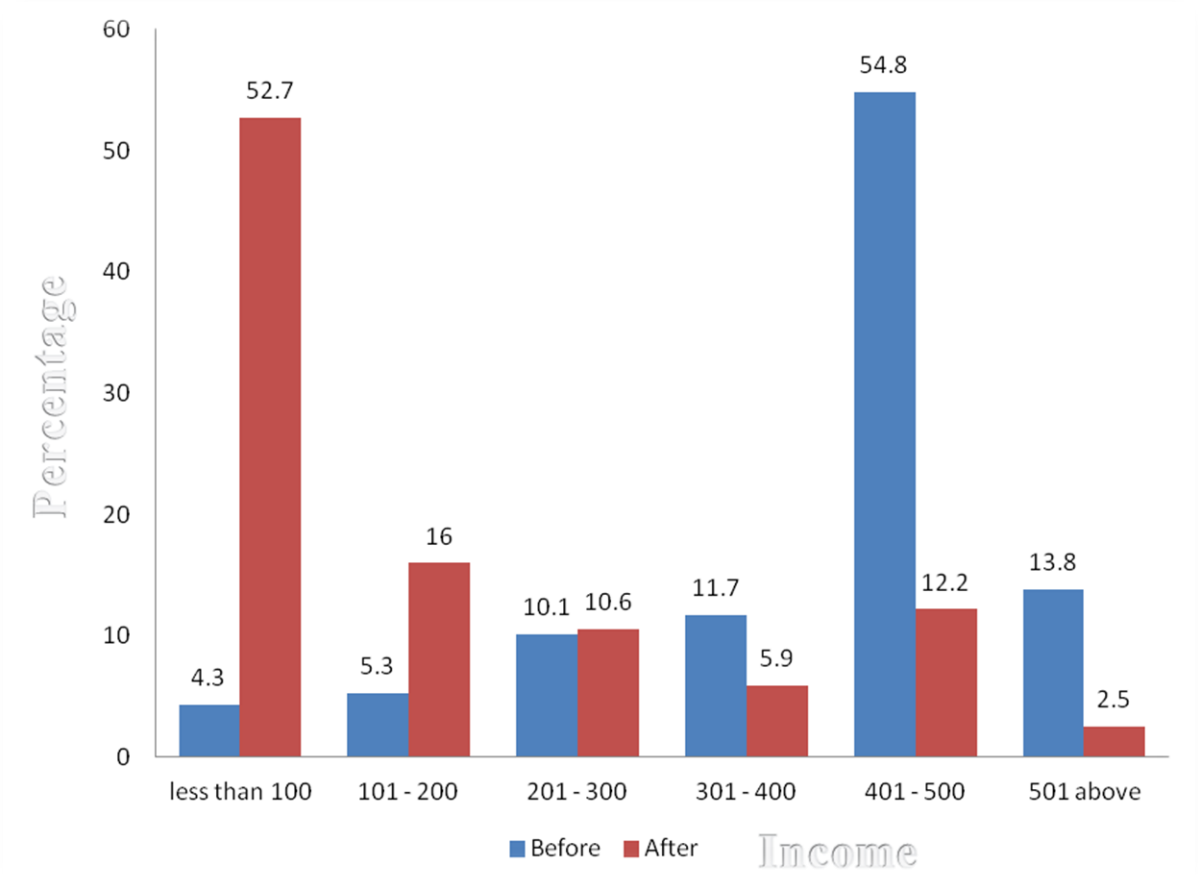


Figure 4: Income Levels of Respondents Before and After Construction

Source: Field Data, 2014

Since the relative value of money changes over time, the respondents were asked to indicate whether they considered their incomes to be high or low before and after the dam construction. From Table 10, about 50.5 of the respondents said their income before the dam was high while only 7.4 percent said it was high after the inception of the dam, a decrease of about seven (7) folds. Again before the construction of the dam, 2.7 percent of the respondents said their income was low, but the introduction of the dam increased it to about 31.9%. This supports the assertion that introduction of a dam destabilises incomes and as a result inhabitants seek various ways to cope (World Commission on Dams, 2000).

Table 11: Classification of Income

Income	Before		After	
Classification	Frequency	Percentage	Frequency	Percentage
Very high	55	29.3	2	1.1
High	95	50.5	14	7.4
Normal	29	15.4	29	15.4
Low	5	2.7	83	44.1
Very low	4	2.1	60	31.9
Total	188	100	188	100

Source: Field Data, 2014

During construction, a dam creates a large number of jobs for both skilled and unskilled labour (National Employment Association, 2008). It provides people with employment but once it is built, the highly sophisticated technology involved in its operation demands a relatively small number of employees all of whom must have technical expertise. As a result, government agencies or corporations usually take over the management of dams, and the community loses control over its water resource (WCD, 2007). In view of this, the respondents were asked if any of them worked with the Bui Power Authority. Out of the 188 respondents, only 13.8 percent of the residents responded in affirmative. Consequently, the respondents were asked the kind of work they were hired for. Out of the 25 hired at the dam for the latter stage of the dam construction, 96.2 percent were unskilled labour.

Impacts of the Dam Construction on Livelihoods

The construction, operation and output of large dams have social, environmental and economic effects that are positive and negative, direct and indirect and are woven together in very intricate ways (WCD, 2007). Therefore, one of the specific objectives of the study was to assess the impact of dam construction on the livelihoods of the affected communities. This section is divided into two subsections, with the first subsection dealing with the positive impact while the second subsection presents the negative aspects.

Positive impact of dam construction on livelihoods

The study sought the views of respondents on the benefits they derived from the presence of dam construction in their communities. In connection with the benefits derived from dam construction, all the communities agreed that housing and electricity were the major benefits associated with the dam construction to the communities. A number of projects undertaken by Bui Power Authority in the various communities were observed (Plate 1) and confirmed by some respondents. These projects were in the form of construction of school buildings, health facilities and community information centres and provision of boreholes for all the communities.

Most of these projects were undertaken as part of the resettlement scheme and social responsibility towards the development of communities located in and around the dam concessions. This supports other findings that the constructions of

dams bring substantial benefits by providing electricity from hydro power (World Commission on Dams, 2003).

Plate 1. Accommodation (Housing)

Source: Field Data, 2014

Plate 2. Bui CHPS Compound

Source: Field Data, 2014

Plate 3. Church

Source: Field Data, 2014

Plate 4. School Buildings

Source: Field Data, 2014.

Plate 5. Accessible Roads

Source: Field Data, 2014

Furthermore, using a 5-point likert scale, respondents were asked about some positive impacts of the dam on their communities. The results as presented in Table 12 show that the construction of the dam has led to access to educational facilities, access to health facilities, access to road constructions and repairs, reduced environmentally related diseases, tourist attraction, increased in trading activities and potable water. Out of 188 respondents, 95.2 percent of the respondents agreed that they have access to roads and about 93 percent of the respondents agreed to increase in sales of goods and services. This result is in line with that of the African Development Bank, (2008) which observed that secondary effects of dams can include improved access to water for households' needs, improved health conditions, increased local economic activities, and increased access to market via roads. When the respondents were asked whether

the operations of the dam have enhanced the livelihoods of the residents of the surrounding communities, a chief responded as follows:

> *The construction of the dam has brought enormous positive impacts. For instance, before the construction of the dam; we did not have access to health facilities, good roads, mobile network, block house and electricity. But now because of the construction of the dam, we can boast of all these facilities. In fact now I can even go to Accra (which is the nation's capital) and come back the next day as compared to the era before the dam was created, which would have taken me about one week. The difference is that now we have accessible road network that links us to major towns.*

However, most of the respondents disagreed with the statements that dam construction has improved incomes, employment, training in employable skills and food security. As a result, the respondents were asked to indicate their level of satisfaction in relation to the positive impacts of the dam and from Table 13; about 65.3 percent of the males were satisfied and about 34.7 percent for the females

A Chi-square statistic showed that significant differences (x^2= 45.371; ρ= 0.020) and (X^2=20.280; p=0.000) existed among communities and sex in terms of respondents' level of satisfaction with the positive impact of the dam.

Table 12: Positive Impact of the Dam Construction

Positive Impacts	N	A	U	D	T
Higher incomes (improved income)	188	4.8	0	95.2	100
Permanent employment throughout the year	188	8	0.5	91.5	100
Permanent food throughout the year	188	5.3	.5	94.1	100
Educational infrastructure	188	91.5	0	8.5	100
Legal status to our accommodation and assets	188	19.1	0	80.9	100
Provision of health facilities	188	95.2	0	4.8	100
Training in employable skills	188	9.5	0	90.5	100
Road construction and repairs	188	92.5	.5	7.0	100
Environmental related diseases are not common	188	76.6	0	23.4	100
Dam construction has made this area a tourist centre	188	66.4	0	33.5	100
increase in sales of goods and services	188	93	0	7.0	100
Provision of portable water	188	88.9	0	11.1	100

{A = Agree; U= Undecided or Uncertain; D = Disagree; N = Number of Respondents; T=Total}

Source: Field Data, 2014

Table 13: Level of Satisfaction with Positive Impacts of the Dam

Level of Satisfaction	Sex		Total
	Males	Females	
Very satisfied	0	3.8	1.6
Satisfied	61.1	43.8	53.7
Satisfactory	5.6	23.8	13.3
Not satisfied	25.9	17.5	22.3
Not satisfied at all	7.4	11.3	9.0
Percent (%)	57.4	42.6	100
N	108	80	188

Source: Field Data, 2014

Negative impacts of dam construction on livelihoods

Most of the time, the construction of dams causes insecurity of the well-being of individuals or communities in the face of changing environments (ecological, social, economic and political) in the form of sudden shock, long term trends, or seasonal cycles.

The social and environmental impacts associated with the dam could leave those individuals living in the immediate vicinity of the dam far worse off than they were before the dam construction (Morrissey, 2009). Thus, in spite of the positive impacts some people gain, such as increased water and electricity supply, there are also negative impacts such as the poor, rural people who are displaced from their homes and agricultural lands when dams are built (WCD, 2007). In

view of this, the study sought to find out the negative impacts of the dam on livelihoods of the surrounding communities within the Bui Dam area.

Out of the 188 respondents, about 73.7 percent confirmed that they lost some livelihood assets as a result of the activities of the dam construction (Table 14). These assets included farms, farmlands and rivers. All the respondents in Brewohodi, Dam site, Agbegikuro and Dokokyina affirmed that they had lost their farmlands where as about 25 percent of the respondents in Lucene lost water bodies which served as a source of employment for the surrounding communities. The results corroborate the loss of land and river experienced by about 80,000 people after the construction of the Akosombo Dam. Communities were forcibly relocated leading to the loss of their primary economic activities from fishing and agriculture (Gyau-Boakye, 2001). The Bui Dam construction occupied vegetation comprising about 50 percent grassland, 25 percent savannah woodland and 25 percent water and riverine gallery forest. Considering the fact that more than 59 percent of the people were involved in farming, the taking over of farmlands implies a significant reduction in the natural asset (land) which is a key resource to rural residents, particularly farmers.

Table 14: Assets lost as a Result of Dam Construction

Asset loss of respondents (%)	Communities								Total
	Brewohodi	Damsite	Agbegikuro	Lucene	Bator	Dokokyina	BNP	BV	
Farmlands	100	100	100	75.0	95.5	100	0	96.4	97
Rivers	0	0	0	25	4.6	0	0	2.3	3.02
%	5.2	3.0	13.4	3.0	32.8	21.6	0	20.9	100
N	9	6	23	4	61	36	0	37	176

Source: Field Data, 2014

Again it was also observed that, the flooding of the reservoir had also taken a larger portion of their land. This also contributes to the reduction in farmlands, decline in fisheries and deterioration of the quality of water for drinking. Similarly, studies conducted on the Nam Lik 1-2 hydropower dam in Vientiane (Lao People's Democratic) confirmed that the dam had significantly impacted livelihood activities. The main impact included flooding of the paddy fields and river banks, vegetable gardens, decline in river fishering and deterioration of water quality to the point that it was deemed unwholesome to drink by villagers (Largergvist, Phasouysaingam & Scurrah, 2013).

Most of the time, cost and benefits of dams do not balance out. The poor, vulnerable groups, marginalised and future generation are likely to bear disproportionate share of the social and environmental cost of large dams (Hvinstendahl, 2008). Consistent with the above observations, and in line with the conceptual framework adapted for the study, a three point Likert scale was used to

seek the views of respondents concerning the negative impacts of dam construction on their livelihoods and the results are presented in Table 15. Respondents were asked to indicate the extent of their agreement or otherwise with statements that explained the adverse impacts of the dam on them.

As presented in Table 15, all the respondents admitted that the construction of the dam in the area has had some adverse impacts on them. More than 90 percent of the respondents agreed that the operations of the dam have had serious consequences for the family as a supportive social unit. New housing arrangements for resettled communities have disrupted long established family networks in the area. Most of them were far away from relations and friends. For instance, in resettlement A, comprising Lucene, Agbegikuro, Damsite and Brewohodi, the four communities were mixed up. This led to loss in culture, friendships and social belongingness.

Table 15: Adverse Impacts of the Dam Construction

Statements	Level of agreement (%)				
	N	A	U	D	Total
Farmlands taken away	188	100	0	0	100
Land size for farming reduced	188	100	0	0	100
High cost of living	188	100	0	0	100
No or inadequate compensation	188	92.1	0	7.9	100
Reduced fish catch	188	100	0	0	100
Deforestation	188	96.8	0	3.2	100
Promicuity	188	83.0	0	17.0	100
Rise in crime activities	188	31.9	0.5	67.6	100
increased in migration	188	95.2	0	4.8	100
family disorganisation and social disarticulation	188	97.1	0	2.9	100
False promise of employment	188	99.5	0	0.5	100
Galamsey activities	188	21.8	0	78.2	100
Displacement	188	100	0	0	100
Loss of common property	188	91.5	0	8.5	100
Marginalisation	188	98.9	0	1.1	100
Food insecurity	188	98.1	0	1.1	100

{A= agree; U= undecided or uncertain; D= disagree; N= number of respondents}

Source: Field Data, 2014

In many parts of the world, fish and other riverine resources are critical to sustaining human livelihoods by providing food and financial security (Shoemaker, 2007). One of the known negative effects of dam construction is reduction in fisheries. Fisheries are destroyed and migration paths of animals and fish may be blocked. Dams have been linked to the extinction of several species of fresh water fish (Nillson, 2005). Again, in Thailand, studies on the Pak Mun Dam found that in the post dam period, fishing communities located upstream and downstream of the dam reported 50 - 100 percent decline in fish catch and the disappearance of many fish species (WCD, 2000). All the respondents interviewed attested to the fact that dam construction has led to drastic reduction in fish. One traditional ruler of the communities noted:

> *The quantity of fish catch made the local economy so vibrant that people from far and near descended on the communities daily to either buy fish for resale elsewhere or to sell manufactured goods to the local people. Women were also involved in fish trade between the communities and commercial towns like Banda Nkwanta, Bamboi, Wenchi, Sunyani, and Techiman. But now the construction of the dam has brought all these activities to a halt. Even if you come to the reservoir with a lot of money you will not get some of the fish to buy or it is very expensive all because of the reduced fishes caused by the dam.*

A reduction in the productivity of fishing and agriculture will have major consequences for the food and economic security of the local people. The Bui Dam construction has led to food insecurity in the area. Out of the 188

respondents, 98.1 percent of the respondents attested to the fact that the dam construction had led to food insecurity.

Most of the time, construction of dams devours villages, towns and heritage sites in some cases displacing hundreds of thousands of people. Dam construction often leads to loss of homes, possessions and social networks (Brun, 2005). The story of this study was similar to that of other results because all the respondents attested to the fact that the construction of the dam had led to displacement and as such had affected their culture and social networks. Most of the respondents complained that the displacement had led to a lot of doom as expressed by a chief in one of the communities:

> *Compared to where we were at first, this present place is not the best for us. Over there, about 60 – 70 percent of the population have their own work like: Fishing, Farming, canoe tourism (taking tourist in around the River Volta using canoe) and many more. Every day, there was an income. Now most of the people do not have access to these works anymore because of the displacement.*

Amorim, (2009) observed that the construction of dam leads to displacement of 100,000 of people causing landlessness, joblessness, marginalisation, food insecurity, the loss of access to common property and services and social disarticulation. His findings are corroborated in this study because about 98.9 percent and 91.5 percent of the respondents agreed that the construction of the dam has led to marginalisation and loss of common property respectively (see Table 15).

Poverty has been breeding poverty; in some cases, the handicap of poverty is passed from one generation to another in the study area, possibly as a result of the family being caught in a poverty trap"-. My daughter, go round the town and look at the nature of people's living places and eating habits. I tell you, the few people who are not suffering are people from outside the community (that is the workers at BPA and Bui National Park). We cannot send our children to colleges after Junior High School education because of lack of money"

Studies have observed that even over a longer temporary scale, the changes unleashed by large water control projects like dams have significant and gendered impacts on agrarian societies (Dutt, 2012). In view of this, the study sought to find out the group of people who are at much disadvantage due to the dam construction. As shown in Table 16, 79.3 percent of the respondents said that males were the most affected group because in their culture, the male is supposed to fend for the female and the children. Just 16 percent of the respondents admitted that females are more disadvantaged than their male counterparts when it comes to the impact of the dam construction (see table 16). A chief from one of the communities summarised it as:

Males are more disadvantaged than females and children because most of them have lost their jobs. Most of them can't farm because at their previous place, they were purely fishermen or farming was not their occupation. The requisite skill needed to farm is different from fishing. Although the skills for both work are different, those ready to go through

the stress and adapting to farming do not have access to land. Even the few who had lands are complaining of the land not been arable.

Table 16: Group Most Affected

Group Most Affected group	Frequency	Percentage
Males	149	79.3
Female	30	16.0
Children	9	4.8
Total	188	100.0

Source: Field Data, 2014

These findings are different from research on settlers in Chigwizi village (dam construction community) which found that women were more disadvantaged as they had difficulties in land access and utilisation in rural Zimbabwe based on male primogeniture, political and cultural considerations (Mutopo, 2011). The difference in the findings may be explained by variations in culture where different expectations and responsibilities are assigned to males and females in different cultures

Those displaced by dam projects are often left without compensation (Asmal, 2006). In cases that they have been given compensation, the compensation received has not been able to restore or improve their livelihoods and the site for the resettlement offers few possibilities for the resettled to counteract the impoverishment (Heien, 2007). Specific to compensation, 100

percent of the males said they have been compensated as well as 100 percent of their female counterparts who lost their assets to the dam construction (Table 17). Compensation paid to project-affected communities was in the form of cash and housing. Respondents who were paid compensation expressed dissatisfaction with the package because the compensation was inadequate (see Table 18).

Table 17: Compensation by Gender

Compensation (%)	Sex		Total
	Males	Females	
Yes	100	100	100
No	0.0	0.0	0
%	57.4	42.6	100
N	108	80	188

Source: Field Data, 2014

It was found that all the respondents had been compensated but they expressed dissatisfaction with the package because the compensation was deemed inadequate (See Table 18). This finding confirms that by Heien, (2007) that most of the time, the compensation received by affected people during dam construction is inadequate and as such has not been able to restore or improve their livelihoods. In order to survive, some households had to settle in forest reserves areas or on common property as the compensation money was insufficient to buy alternate land (World Commission on Dams, 2000).

Table 18: Adequate Compensation

Adequate Compensation	Frequency	Percentage
Strongly disagree	152	80.9
Disagree	21	11.2
Agreed	3	1.6
Strongly Agree	12	6.4
Total	188	100

Source: Field Data, 2014

Indeed, because of the negative impact of dam construction on livelihood activities, compensation has become a constant source of argument between the BPA and the local people. A chief from one of the study communities captured the concerns of the people as follows:

> *When we were at the other place, we used to grow vegetables, cash crops, and rear animals on our lands. Now we don't do them anymore because the land had been taken away by the BPA. The money they paid as compensation for the land and the crops were not enough. This has led to hunger and poverty in our communities.*

Role of Stakeholders in Ensuring Livelihood Security

Judge (1997) laments that the displaced families, after been given some monetary compensation, were forgotten. Being critical on socio economic

impacts, the author questioned, what happened to their living conditions? Where did they resettle? Could they socially integrate in their new settings? This made it necessary to assess the role of stakeholders in ensuring that living conditions are better at their new communities. Carney (1998) and DFID (2000) acknowledge the significance of stakeholders in ensuring that people attain viable livelihoods. The policies, institutions and processes aspect of the SL-Framework (DFID, 1999) emphasise the role of various stakeholders in providing livelihood security for people in the face of stress, shocks and trends.

Stakeholders in Ghana's Bui Dam construction include the various levels of government (the various ministries and public sector dam construction support organisations, other allied institutions, and district assemblies), NGOs, traditional authorities, community members and opinion leaders. Government, through the various ministries, is supposed to make policies, laws and establish institutions that will ensure livelihood security for the communities. The district assemblies are supposed to carry the needs of the people to the government while NGOs give aid in capacity building in different forms such as advise, guidance and the provision of goods and services to the local people.

In assessing the role of stakeholders in ensuring livelihood security for the people more than 90 percent of the household respondents complained of lack of support from the central government and other public sector support organisations to mitigate the negative impact of dam construction on their livelihoods. Respondents were also concerned about the apparent lack of support from the

local government (District Assembly) on matters relating to the negative impacts of the dam construction on the various communities' One chief commented:

> *No government has come to our aid: we are really suffering. Whenever they come to our communities, they make promises and they do not fulfil them. We want them to build us a fish pond and also train us in any employable skills. Most of the time, they come and write our names and petitions but nothing happens afterwards.*

The study also revealed what the chiefs are doing or have done to ensure livelihood security of their people. One chief asserts:

> *From our own resources we are preparing new sites where the people will have access to the lake and the river. We are also raising a shed at the shore. Again we have started a complementary basic education for those between 12 – 15 years so that they can join the public schools from there. The fund for the projects mentioned is from our local based community funds. Mostly the money is from profits made from selling of premix fuel to our fishermen.*

Although some of the chiefs expressed positively what they were doing to ensure livelihood security for their people, there were others who hoped for assistance from government or other people coming to their aid. For example a chief from one of the communities indicated:

> *We wished to train our people in any employable skills that will provide them with funds since our farmlands have been flooded by the reservoir but we are still soliciting for funds from the government or*

district assemblies. So we are hoping that they will adhere to our worries and come to our aid. We have the opportunities but how to grab them is the problem.

The survey found just one NGO (Menaya Lolo) operating in these communities. Only 6.4 percent of respondents affected by the operations of the dam said they have received support from that NGO in the form of goats to only females. Respondents however expressed satisfaction with the support provided by the NGO because this has served as a support to improve livelihoods of the women in the affected communities. This supports the finding by Asamoah (2010) that NGOs provide support to the poor to improve livelihoods in many developing countries.

The study also revealed that information on the activities of the BPA was adequate. When respondents were asked whether they had access to information concerning the activities of BPA that had a bearing on their well-being, 71.3% answered in the positive. For instance, one chief in one of the selected communities said:

Infact BPA is doing well. For instance the presence of the oncho flies increases whenever they open the dam. In view of this, through education and constant announcement, it has been known to us that at the end of every six weeks, BPA will open the dam so it always gets us prepared and the necessary precautions are taken. This has helped to improve our wellbeing health wise.

On channels for redressing grievances, 88.3 percent of respondents confirmed that BPA had established mechanisms for seeking redress on issues regarding its operations that affected residents. Furthermore, 53.7 percent of the respondents expressed satisfaction with the existing mechanisms but argued that the system is bureaucratic and at times not reliable.

A regulatory body such as the Wildlife Division of the Forestry Commission was present in the communities. The officials however complained of logistics such as vehicles to carry out their duties effectively. Under the circumstances, the ability of this agency to enforce environmental quality standards is limited. An officer at the wildlife and Game Reserve commented that:

> *We are supposed to educate the local people intensively on conservation of the little resources they are left with, linking them to NGO'-s and building their livelihood capacity like training them in bee keeping but the workers are not enough. Vehicles and inadequate funds have been the major constraints. But with that of the natural resource conservation, we are trying our best by educating the locals.*

When asked if the activities of BPA were impacting negatively on the livelihood of the people, an official of the Assembly answered in the negative and hinted that because the district was new and they were yet to be abreast with the activities of the BPA and the communities in the study area. As to what role(s) the Assembly was playing to mitigate the negative impact, an official indicated the inability of the Assembly to provide the needed support for the affected communities:

The District Assembly is supposed to meet the officials of the BPA from time to time to discuss issues relating to its activities. We were also supposed to take part in the compensation negotiation process to ensure that the package is adequate. Plans to assist the vulnerable are yet to begin. But the assembly is a newly created assembly so we are still building our capacity. To be frank with you, the assembly has not done anything to help mitigate any adverse effects of the dam on the livelihoods of the selected communities.

This notwithstanding, most of the respondents still had confidence in the ability of some of the stakeholders to provide livelihood security. For example, when respondents were asked to give their impressions on the roles being played by the various stakeholders in respect of livelihood enhancements and opportunities, communities such as Bator Akwanyikrom (62.3%) and Dokokyina (61.1) expressed high satisfaction (see Table 19).

When the stakeholders were asked to comment on their roles in ensuring that people attained sustainable livelihood in the face of the adverse impacts of the dam construction, most of them disclosed that they had specific roles to play but were quick to add that they could not perform their roles efficiently because of poor logistics, and inadequate human and financial resources. For example one district officer said:

The strength of my district is not satisfactory because it is a newly created district and the communities too are a minority in the district. I need more

logistics and financial support. Hence, we are not able to perform our duties up to expectations.

Table 19: Respondents' Assessment of Stakeholder Roles in Providing Livelihood Security

Level of Satisfaction	Communities								Total
	Brewohodi	Damsite	Agbegikuro	Lucene	Bator	Dokokyina	BNP	BV	
Very Satisfied	0.0	33.3	0.0	0.0	33.3	0.0	0.0	0.0	1.6
Satisfied	11.1	33.3	34.8	25	62.3	61.1	58.3	59.5	57.7
Undecided	55.6	16.7	17.4	75	8.2	5.6	16.7	8.1	13.3
Not Satisfied	22.2	16.7	34.8	0.0	14.8	27.8	8.3	29.7	22.3
Not Satisfied at all	11.1	16.7	8.7	0.0	13.1	5.6	16.7	2.7	9
%	4.8	3.2	12.2	2.1	32.4	19.1	6.4	9.7	100
N	9	6	23	4	61	36	12	37	188

Source: Field Data, 2014

Another important issue that was looked at was the level of collaboration among the Land Planning and Management Institutions. Collaboration is one important element that helps institutions to work together as a single unit to provide fast and quality services. All the interviewees through the IDIs admitted that the level of collaboration among them was very poor. They attributed the

situation to bureaucratic procedures involved in establishing co-ordination, lack of trust among the various institutions and absence of a legal framework that provides the platform for the institutions to work together. For example, a district officer interviewed said:

> *We planned to organise a meeting between BPA, the district assembly, Wildlife Division and a representative each from all the affected communities to address all grievances but BPA kept on telling us that they have to get response from headquarters and up to now the meeting is still pending.*

Some of the stakeholders also attributed the inability to perform their roles effectively to policies and laws. To them, there are no clear cut policies on ensuring livelihood securities for communities in which dams are constructed. One chief lamented that:

> *We don't know if there are any clear cut policies that are to safeguard our livelihoods. We don't even know if there is anyone who is to ensure that those policies are strictly followed. It appears BPA has a lot more power than we the residents in the area.*

The finding above conforms to that of Mwaniki (2010) who found that poor policies have greatly affected livelihood in Africa. The problem arises when the focus of policies, structures and institutions is put above that of the local people themselves. In the event where the various institutions are weak or suffer some limitations, livelihood security becomes a problem. The consequences are that the well-being of the people cannot be guaranteed and vulnerability will be

increased. Eventually, residents in dam constructing communities may be compelled to undertake livelihood activities that are not sustainable.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Introduction

This chapter presents the summary of the major findings of the study. The conclusion drawn and recommendations made. It also presents the study contribution to knowledge, some areas for further research as far as the issue under investigation is concerned.

Summary of the Study

The main objective of the study was to assess effects of the construction of the Bui Dam on the livelihoods of surrounding communities. Specifically, the study was undertaken to:

1. Identify the assets that provided livelihood to the people in the study area;
2. Evaluate the changes in livelihood of the people in response to dam activities;
3. Examine the impact of dam construction on the livelihood of the people in the study area and;
4.
5. Assess the role of stakeholders in ensuring livelihood security for the people.

Employing a mixed methods design, all the 219 households in the eight (8) affected communities were selected for the study through census. However, in all 188 household heads were covered due to the unavailability of some household heads and their members during the period of the data collection. In addition, 10 key informants and stakeholders were purposively selected.

The research instruments used for the study were interview schedule, interview guides and observation checklists. Data collected included the livelihood assets of the people, the changes in their livelihood activities as a result of the introduction of the dam and the impacts of the dam on the livelihoods of the people. Information was also sought on the role being played by the various stakeholders in the dam construction industry to ensure livelihood security as well as the challenges facing them in the execution of their roles. Data collected was analysed and presented using frequencies, percentages and cross tabulations. The Chi-square statistic was used to test relationships that existed between some of the variables.

Summary of Findings

1. The majority of the respondents in the eight communities were within the age cohort of 40 – 49 (40.4%) with many of them having no formal education (70.2%). Mo and Ewe (34.6% and 32.4% respectively) formed the dominant ethnic group in the study area.
2. The main assets from which the people draw their livelihoods were natural, physical, social, financial and human assets. Key natural assets

identified in the study area were land, forest reserves, rivers and streams. Physical assets such as road networks, schools, and sanitary facilities, mobile networks, electricity, community centres, clinics, public standpipes were not present before the dam construction but now existed in the study area after the introduction of the dam.

3. Religious associations, family relations and friends were the dominant social assets for both before and after the dam construction. Most of the respondents benefited from social groups in the form of advice and encouragement (100%), psychological and emotional support (100%) before the dam construction. Although the respondents still depends on these benefits but they had reduced to 94.7 percent and 96.8 percent respectively.
4. The bulk of financial assets came from food stocks (93.1%) and livestock (86.7%) before the dam construction but after the construction of the dam food stocks (60.1%) was the most dominant.
5. There have been a significant shift in the livelihood activities of the people in the study area as confirmed by 69.7 percent of the respondents. The presence of the dam construction was the main driving force behind the current trend of events in all the communities with the exception of Bui National Park. Prior to the introduction of the dam construction, farming (59%) and fishing (21.8%) were the major livelihood activities. However the introduction of the dam led to an increase in trading and a drastic reduction in farming. The main

reason for the reduction in farming was that large tracts of land have been taken from the people.

6. Before the introduction of the dam, 4.3 percent of the respondents earned less than one hundred Ghana Cedis but the introduction of the dam increased it to 52.7 percent. Again, before the construction of the dam, 13.8 percent of the respondents earned above five hundred Ghana Cedis but with the introduction of the dam this decreased to 2.5 percent.
7. The introduction of dam construction in the study area has brought some benefits to the people. Respondents pointed out the provision of infrastructure such as houses (61.7%), electricity (22.9%), accessible roads (11.2), boreholes (1.1%), toilet facilities (3.2%) as the key benefits of the dam construction. Furthermore potable water, tourist attraction, increase in sales of goods and services were also the major positive impacts of the dam.
8. On the down side, a majority of the respondents (73.7%) believed the construction of the dam had led to loss of their livelihood assets such as: farmlands (53.6%) and rivers (46.6%). Loss or reduced farmlands, high cost of living, inadequate compensation, reduced fish catch, deforestation, increased out migration, family disorganisation, false promise of employment, displacement, food insecurity, marginalisation were found to be the key negative socio – economic impacts of the dam construction on the communities.

9. The study found that the combined effects of loss of traditional jobs and out-migration caused by the hydropower schemes, resulted in dislocation of established families and family values. Respondents strongly believed that-, out migration was a coping strategy for these communities. They felt the damage caused to fishing and farming activities in the communities by the dams forced many of the economically active people to migrate to other places to look for jobs.
10. Stakeholders were aware of their inability to provide livelihood security to the people. Constrains in the form of human resource, logistics and finance, and lack of collaboration among the various institutions were identified as the factors that hindered the capacity of the various stakeholders to provide livelihood security to the people.

Conclusions

Based on the findings of the study, the following conclusions could be drawn:

1. The study area is endowed with various livelihood assets that the people can make use of to enhance their livelihoods. However, lack of access to capital has prevented the people from fully harnessing the other assets to construct their livelihoods. Also, the advent of the dam construction has put pressure on the available assets.
2. There has been a great shift in the livelihood activities of the people from predominantly agriculture (farming and fishing) to capacity to reap full benefits of trading. As the number of people engaged in

agriculture declines, employment in the other sectors (service, industry and commerce) is expected to increase, with commerce being the fast moving sector.

3. The diversification of livelihoods of most of the people in response to the dam construction has not led to improved food security. Neither has it reduced vulnerability. The intensification of dam activities has rather imposed fear and anxiety on the people as shortage of farmlands, rivers or streams have brought negative outcomes on livelihood. The capacity of the communities to effectively combat poverty is in doubt.
4. There is presently, the problem of food insecurity in the communities which previously did not lack food. The decline in food production has led to increases in the cost of food stuffs. The farmers with limited incomes are priced out because they can hardly compete with dam construction workers who receive high and regular salaries. Thus, the livelihood of farmers is impacted adversely.
5. Accessibility to land is becoming a key issue in the study area following the introduction of the dam. The large scale alienation of land by BPA has affected the social norms of the people.
6. There have been positive outcomes to the livelihoods of some of the people in the study area. The increased commercial activities and development of some infrastructure are vital to sustaining livelihoods particularly, rural livelihoods (Ellis, 2000).

7. Nonetheless, there are negative outcomes to livelihood of the majority of the people due to the activities of the dam construction. Compensation to project-affected people is not adequate in terms of these incomes matching the expected incomes from past economic activities. In addition, unemployment caused by the loss of livelihood assets appears to be increasing the vulnerability of most of the people.
8. Stakeholders are not able to provide affected people with livelihood security because of inadequate logistic problems, inadequate collaborations between the stakeholders and no clear cut polices or laws in ensuring livelihood security for the affected communities.

Recommendations

Based on the findings and conclusions of the study, the following recommendations are made:

1. *Financial Assistance*

   The activities of BPA have undermined the livelihoods of residents in the dam construction communities. In order to sustain their livelihoods, the local communities should be economically empowered by improving their financial capital base. Credit schemes such as Microfinance and Small Loans Scheme (MASLOC) should be made available so that the people will benefit. The Assembly, Commercial Banks, NGOs, BPA and other private financial institutions should establish tailored micro-credit

schemes so that the people can access funds to expand their economic activities and attain a greater well-being.

2. *Provision of Adequate Compensation*

   To mitigate the livelihood adversities that result from the operations of the dam, adequate compensation must be paid by BPA to those who have lost their assets to the dam construction. Further discussions preceding action on relocation, resettlement and compensation should involve the active participation of the affected people.

3. *Employment Opportunities*

   To attain viable and sustainable livelihoods in the face of the crisis brought about by the operation of the dam, BPA should create employment opportunities for the people by providing on-the-job training for future regular employment in and around the dam. The company should also start and expand technical and vocational training module to cover more people. Priority should be given to the local people in the award of contract jobs.

4. *Establishing Agric-Business*

   Since fishing is one of the traditional occupations of the people in the study communities, it is recommended that the Banda and Bole Assemblies and BPA should promote aqua-culture in the area. It is also suggested that the Bole and Banda Assemblies tasks BPA to facilitate establishment of an integrated agri-business, starting from crop cultivation, processing industries and marketing facilities, with out-

growers programmes in the communities to provide jobs for the people. These, when implemented, will provide the residents with gainful employment that will ensure regular and reliable sources of Livelihood for them and stem the out- migration phenomenon with its associated socio-economic problems in the study area.

5. *Collaboration Among Stakeholders*

Inadequate cross-sectoral linkages among stakeholders contribute greatly to some of the environmental and socio-economic problems that are impacting negatively on livelihoods of the communities. There should be effective co-ordination among public sector dam construction support institutions, BPA and other stakeholders such as the District Assembly, traditional authorities, opinion leaders and members of the communities affected by the operations of the dam. A joint committee consisting of these stakeholders should be formed to deal with issues related to the operations of the dam. Such collaboration will promote transparency, accountability and ensure that the interests of the communities are given prominence in the planning and execution of the project.

6. *Resourcing Regulatory Institutions*

The institutions that are supposed to support the local people in ensuring livelihood security should be adequately resourced. Government should provide adequate financial and technical support to these institutions. In particular, the district assemblies and the Wildlife Division of the Forestry Commission in the study area should be adequately resourced with

additional staff and office equipment to make it more pro-active in monitoring the activities of BPA. It will also enable these institutions build the capacity of the local communities to monitor the negative impacts of the dam.

Contribution to Knowledge

Silverman (2000) asserts that a study's contribution to knowledge could be determined in four areas namely; developing a concept or methodology; thinking critically about your approach; building on an existing study; and being prepared to change direction. In line with the assertion above, the study's contribution to knowledge include:

1. The research was able to build on existing studies (such as Gregory, 2008; Agbengo, 2009; Ayibotele, 2010; Atindana et al, 2014) that focused on the impact of dam construction on livelihoods of surrounding communities in Ghana. This study reinforced the views of these researchers that the socio-economic and environmental effects of dam constructions in Ghana are enormous.
2. The contribution to knowledge base on how residents of dam construction communities in Ghana respond to the activities of dam constructors that affect their livelihoods and more specifically, in the Banda and Bole districts. Most of these themes have focussed on that of Akosombo and Kpong Dams of Ghana (such as Gregory, 2008; Agbengo, 2009; Ayibotele, 2010; Atindana et al, 2014). Thus, this study has contributed to

the knowledge base on how residents of dam construction communities in the Banda and Bole Districts are responding to the changes in their major livelihood assets as a result of the introduction of dam in these districts.

Areas for further research

This study focused on the effects of the Bui Dam construction on the livelihoods of surrounding rural communities. Further studies can be undertaken to look at the detailed impact of dam construction on the livelihoods of the residents of the entire area. This is because sometimes the effects of the dam construction extend beyond the immediate communities. Such a study will bring to the fore how the activities of the dam are impacting on the districts and the coping strategies being adopted by the districts.

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APPENDICES

APPENDIX A

INTERVIEW SCHEDULE FOR SELECTED COMMUNITIES AFFECTED BY THE BUI DAM CONSTRUCTION

UNIVERSITY OF CAPE COAST

COLLEGE OF HUMANITIES AND LEGAL STUDIES

FACULTY OF SOCIAL SCIENCES

DEPARTMENT OF GEOGRAPHY AND REGIONAL PLANNING

Dear sir/Madam

Thank you for agreeing to take part in this study on effects of dam construction on livelihood. The purpose of the study is to investigate effects of the Bui Dam construction on the livelihood of the surrounding communities. The study is primarily for academic work, and therefore you are assured of confidentiality and anonymity in all the information that you provide. I am interested in learning from you about all your experiences and opinions about this topic. Your experiences, both positive and negative will be appreciated since there are no rights or wrong answers. Thank you once again for your time and participation.

Section A: Socio-demographic Background of respondents

In this section, we would need data on your demographic background.

1. Settlement a. Brewohodi [ ] b. Dam site [ ] c. Agbegikuro [ ] d. Lucene [ ]

e. Bator - Akwanyikrom [ ] f. Dokokyina [ ] g. Bui National Park [ ] h. Bui Village [ ]

2. Sex: Male [ ] Female [ ]

3. Number of people in the house……

4. Main occupation a. Unemployed [ ] b. Farming [ ] c. Fishing [ ] c. Trading [ ] d. Artisan [ ] e. Civil/ Public servant f. Others please specify……..

5. Ethnicity a. Akan [ ] b. Mo [ ] c. Banda [ ] d. Gonja [ ] e. Ewe [ ] f. Dargarti [ ] g. Others please specify……..

6. Religion; a. Christian [ ] b. Islamic [ ] c. Traditional [ ] d. Others please specify ……

7. Age: a. Less than 19 [ ] b. 20 – 29[ ] c. 30 – 39[ ] d. 40 – 49[ ] e. 50 – 59[ ]

f.60 – 69[ ] g. 70 -79[ ] h. 70+[ ]

8. Marital Status: a. Never married [ ] b. Married [ ] c. Separated [ ] d. Widowed [ ] e. divorced [ ] f. Others please specify……..

9. Level of education: a. No formal education [ ] b. Basic level [ ] c. Secondary school [ ] d. Tertiary [ ] e. Others please specify [ ]

10. Among which of the following income brackets per month will you place yourself? a. Less than GH¢100 [ ] b. GH¢101 – 200 [ ] c. GH¢201 – 300 [ ] d. GH¢301 – 400 [ ] e.GH¢401 – 50 [ ] f. Others please specify…….

SECTION B: ASSETS THAT PEOPLE DRAW THEIR LIVELIHOOD

11. Which of the following facilities were available or did you have access to in your community before and after the dam construction? (Answer as many as possible)

Physical assets

ITEM	BEFORE (yes or no)	AFTER (yes or no)
a.Tarred Roads		
b. School buildings		
c. Electricity		
d. FM/ Radio Station		
e. Mobile Masts/ networks		
f. Toilet/ KVIP		
g. Community information centre		
h. Market		
i.Hospital		
j. Clinic		
k. Public standpipe		
l. Others please specify		

Natural Assets

12**.** Which of the following natural assets did you depend on for your livelihood? (Answer as many as possible)

ITEM	BEFORE (yes or no)	AFTER (yes or no)
a. Land		
b. Forest		
c. Rivers/Streams		
e. Others please specify		

13. What did you use the land for?

Items	Before	After
a. Renting		
b. Cash crop farming		
c. Food crop farming		
d. Plantation		
e. Animal husbandry		
f. Building		
g. Others Please specify		

14. Of what use did you make of the streams/ river? (Tick as many as possible)

Items	Before	After
Fishing		

Irrigation		
Drinking		
Others, please specify		

Human Assets

15. Have you received any formal education?

(a) Yes [ ]

(b) No [ ] (Skip to 17)

16. If yes, what is your level of formal education?

a. Basic education [ ] b. secondary/vocational/technical education [ ] c. Tertiary education [ ] d. Others, please specify……

17. Were you trained in any employable skill(s)?

(c) Yes [ ]

(d) No [ ] (Skip to 2)

18. If yes, in which area have you acquired the skill(s) training?

(a) Agriculture [ ]

(b) Commerce [ ]

(c) Service [ ]

(d) Artisan [ ]

(e) Others please specify.....

19. When was the training given to you?

a. Before the dam [ ] b. After the dam [ ]

20. Who sponsored the training?

a. Parents [ ] b. Chiefs [ ] c. Government [ ] c. Bui Power Authority [ ] d. NGO's [ ] d. Others please specify…...

21. When you are sick, which of the following treatment facilities do you use?

a. Hospital [ ] b. Clinic [ ] c. Chemical store/ Pharmacy [ ] d. Herbal Centre [ ] e. Prayer Camp [ ] f. Others please specify ……..

22. Why was that particular facility chosen?

a. Less expensive [ ] b. Better services [ ] c. Know someone there [ ] d. Nearest to me [ ]

e. Workers are friendly [ ] g. Others please, specify……

23. How would you describe the quality of services provided by the health facility?

a. Very good [ ] b. Good [ ] c. Satisfactory [ ] d. Poor [ ] d. Very poor [ ]

Financial Assets

24. Which of the following financial asset(s) served as sources of livelihood before and after the construction of dam construction? (Answer as many as possible)

ITEMS	BEFORE (yes or no)	AFTER (yes or no)
a. Cash		
b. Livestock		
c. Food Stocks		
d. Remittances		
e. Loans		
f. Savings		
g. Pension Allowances		
h. Others please specify		

25. What is your main economic activity before and after the construction of dam in your community?

ITEMS	BEFORE (yes or no)	AFTER (yes or no)
a. Farming		
b. Fishing		
c. Trading		
d. Artisan		

e. Civil/Public service		
f. Hunting		
g. Timber Industry		
h. Charcoal Making		
i. Boat Operation on the River		
j. Others Please Specify		

26. How much income do you earn per month from your economic activity?

Item	Before (yes or no)	After (yes or no)
a.Less than GH¢ 100		
b.GH¢ 101 – 200		
c.GH¢ 201 – 300		
d.GH¢ 301 – 400		
e.GH¢401 – 500		
f.Others please specify		

Social Assets

27. Which of the following social group(s) did you rely on for assistance before and after the dam construction? (Answer as many as possible)

ITEMS	BEFORE (yes or no)	AFTER (yes or no)
a. Workers co-operatives		
b. Youth Associations		
c. Religious Association		
d. Family Relations		
e. Community-Based Associations		
f. Friends		
g. Kinships		
h. Others please specify		

28. What form of assistance did you receive from the social group(s)?

Item	Before (yes or no)	After (yes or no)
a. Monetary contribution		
b. Advice and encouragement		
c. Psychological and emotional support		

d. Gifts and benevolence		
e. Provision of farmlands		
f. Provision of farm inputs		
g. Others please specify		

SECTION C: CHANGES IN LIVELIHOOD

29. Before the construction of the dam, what was your main economic activity?

a. Hunting [ ] b. Farming [ ] c. Fishing [ ] d. Trading [ ] e. Artisan [ ]

f. Civil/ public servant [ ] g. Galamsey [ ] h. Others specify [ ]

30. How will you classify your pervious economic activity?

a. Full – time [ ] b. Part – time [ ] c. Others please specify [ ]

31. How much income did you earn from your previous economic activity/activities?

a. Less than 100 GH¢ [ ] b. GH¢101 – 200[ ] c. GH¢201 – 300[ ] d. GH¢301 – 400[ ] e.GH¢401 – 50[ ] f. Others please specify…….

32. How will you classify the income earned from your previous economic activity?

a. Very high [ ] b. High [ ] c. Normal [ ] d. Low [ ] e. Very low [ ]

33. Presently, what is your main economic activity?

a. Hunting [ ] b. Farming [ ] c. Fishing [ ] d. Trading [ ] e. Artisan [ ]

f. Civil/ public servant [ ] g. Galamsey [ ] h. Others specify [ ]

34. Is the above stated economic activity different from the one you engaged in before the dam construction?

a. Yes [ ] b. No [ ] (if no skip to 32)

35. What reasons accounted for the change in the economic activity?

……

……

……..

36. How will you classify your present economic activity/ activities?

a. Full – time [ ] b. Part – time [ ] c. Others please specify [ ]

37. How much income do you earn from your present economic activity per month?

a. Less than 100 GH¢ [ ] b. GH¢101 – 200[ ] c. GH¢201 – 300[ ] d. GH¢301 – 400[ ] e.GH¢401 – 50[ ] f. Others please specify…….

38. How would you classify the income earned presently?

a. Very high [ ] b. High [ ] c. Normal [ ] d. Low [ ] e. Very low [ ]

39. Do you or any member of your household work with Bui Power Authority?

a. Yes [ ] b. No [ ] (if no skip to 37)

40. If yes, how many ……

41. If yes what kinds of work do they do?.....

a. Skilled labour b. Un-skilled c. permanent c. temporary

SECTION D: IMPACT OF DAM CONSTRUCTION ON LIVELIHOOD

The following statements describe the impacts of dam construction to your community. Kindly indicate the extent to which you agree or disagree with the statements.

SA: Strongly Agree

A: Agree

U: Undecided

D: Disagree

SD: Strongly Disagree

Positive Impacts of Dams on Livelihoods

61. To what extent are you satisfied with the benefits derived from the dam construction?

a. Very satisfied [ ] b. satisfied [ ] c. undecided [ ] d. not satisfied [ ]

e. not satisfied at all [ ]

62. Do you expect additional benefits from the dam construction?

a. Yes [ ] b. No [ ] (skip to 64)

63. If yes, state the additional benefits you expect from the dam construction?

……

Negative Impacts of Dams on Livelihoods

ITEMS	SA	A	U	D	SD
64. Pollution of rivers and streams by activities of the dam					
65. Farmlands taken away by the dam construction					
66. Land size for farming reduced					
67. High cost of living					
68. Rain water polluted by dust from dam construction					
69. Increased distances to farms					
70. No or inadequate compensation					
71. Dust from vehicular movements					
72. Reduced fish catch					
73. Burden of carrying water to farms					
74. Harassment by security force					
75. Deforestation by dam construction					
76. Prostitution					
77. Rise in crime activities					
78. Increased in migration					
79. Family disorganization/social disarticulation					
80. Low crop yields					
81. False promise of employment					
82. High school dropout rate					
83. Child labour					

84. Galamsey activities					
85. Displacement of people					
86. Increased water borne diseases like bilharzias					
87. Loss of common property					
88. Marginalization					
89. Increased morbidity					
90. Food insecurity					

91. Which group of people is at disadvantage prior to the dam construction?

a. Males [ ] b. Females [ ] c. children [ ]

SECTION E: ROLES OF STAKEHOLDERS/INSTITUTIONS IN ENSURING LIVELIHOOD SECURITY

Please provide the information necessary required.

92. Have any institutions or stakeholders put any program or project in place to reduce the effects of the dam construction on the people since the dams came into being?

a. Yes [ ] b. No [ ]

93. If yes kindly mention the institutions concern? a. Government [ ] b. Non- Governmental Organizations [ ] c. Bui Power Authority [ ] d. Volta River Authority [ ] e. Opinion Leaders/Chiefs [ ] f. Others please specify……..

94. What role did the stakeholders play?

…….

95. Has your community been compensated by these organizations? a. Yes [ ] b. No [ ]

96. Have you been dislocated as a result of the dam construction?

(a) Yes [ ]

(b) No [ ] (Skip to 98)

97. If 'Yes', have you been relocated/ resettled by the Bui Power Authority or any stakeholder?

(a) Yes [ ]

(b) No [ ]

98. If 'Yes', indicate the facilities/ amenities provided by the company (Tick as many as possible).

(a) Housing [ ]

(b) Water (Borehole/ pipe/ well) [ ]

(c) Electricity [ ]

(d) School [ ]

(e) Toilet/ KVIP [ ]

(f) Clinic/ Hospital [ ]

(g) Others please specify.....

99. Have you received help from any level of government to mitigate the adverse impacts of dam construction?

(a) Yes [ ]

(b) No [ ] (Skip 102)

100. If yes, what type of assistance did you receive?

(a) Cash [ ]

(b) Housing [ ]

(c) Provision of farm inputs [ ]

(d) Others, please specify

……

101. Indicate level of government that provided assistance.

(a) District Assembly [ ]

(b) Regional Administration [ ]

(c) State Government [ ]

(d) Others please, specify……..

102. Have you received support from any NGO?

(a) Yes [ ]

(b) No [ ] (Skip to 105)

103. If yes, indicate name of NGO……..

104. Indicate type of help

(a) Cash [ ]

(b) Legal Service [ ]

(c) Farm inputs [ ]

(d) Training in employable skills [ ]

(e) Others please specify.....

105. Do you have access to information from Bui Power Authority with regard to its operations that affect your well-being?

(a) Yes [ ]

(b) No [ ]

106. Are there established mechanism(s) for you to channel complaints regarding the operations of the dam?

(a) Yes [ ]

(b) No [ ]

107. What are your expectations from the activities of the dam construction, the District Assembly, NGOs and other institutions in respect of livelihood enhancement and opportunities?.....
.....

108. What is your general impression about the activities of Bui Power Authority in your community?.....

109. Please state three most important things you like since moving here in order of priority.

a. ……

b. ……..

c. ……

110. Please state the most important things you disliked since moving here.

a. …….

b. ……..

c. …….

111. What suggestions do you have to ameliorate the things you dislike most in your new community……
……

APPENDIX B

INDEPTH INTERVIEW GUIDE FOR STAKEHOLDERS IN SELECTED COMMUNITIES AFFECTED BY THE BUI DAM CONSTRUCTION

UNIVERSITY OF CAPE COAST

COLLEGE OF HUMANITIES AND LEGAL STUDIES

FACULTY OF SOCIAL SCIENCE

DEPARTMENT OF GEOGRAPHY AND REGIONAL PLANNING

Dear sir/Madam

Thank you for agreeing to take part in this study on effects of dam construction on livelihood. The purpose of the study is to investigate effects of the Bui Dam construction on the livelihood of the surrounding communities. The study is primarily for academic work, and therefore you are assured of confidentiality and anonymity in all the in any information that you will provide. I am interested in learning from you about all your experiences and opinions about this topic. We need all your experiences, both positive and negative; there are no rights or wrong answers. To enable me record all comments, I want to use a tape recorder to record the discussion which will take place.

Date of interview:

Place of interview:

Name of interviewer:

Designation of interviewee:

BIO DATA

1. Age

2. Sex
3. Marital status
4. Educational attainment
5. Religious affiliation
6. Average monthly income
7. Number of people in your household
8. Occupation

Section B: Assets that people draw their livelihood

9. What assets do the affected people draw their livelihoods from? (Probe for financial, natural, human, capital and social)
10. What livelihood strategies are available to them? (Probe for agricultural intensification, diversification and migration)

Section C: Changes in livelihood

11. Do you think there has been any change in the livelihoods of the surrounding communities?
12. If yes, (Probe for the changes in economic activities, income).
13. In-case there is a change, what accounted for the change?

Impacts of the dam on livelihoods

14. Do you think the construction of the Bui dam has had any positive impact on the surrounding communities' livelihoods?

15. If yes, (Probe for generation on employment, training in employable skills for additional income, compensation, , recreational site, access to common property)

16. Do you think the construction of the Bui dam has had any positive impact on the surrounding communities' livelihoods?

17. If yes, (Probe for marginalization, access to common property, social cohesion, crime, prostitution, migration)

18. Which group of people is at disadvantage or more vulnerable prior to the dam construction? (Probe for male or female)

Roles of stakeholders in ensuring livelihood security

19. Was there any environmental impact assessment studies conducted on the Bui dam project before the dam was constructed?
20. What roles are you supposed to play as a stakeholder in ensuring livelihood security for the affected people? (probe for reasons)
21. What effort has your outfit made to minimize the effects of the project on the lives of the affected people?
22. Has the construction of the dam open new opportunities for you (probe for novelty or innovations or how resilient they have been).

APPENDIX C

OBSERVAIONAL CHECKLIST ON EFFECTS OF BUI DAM CONSTRUCTION ON LIVELIHOODS OF THE SURROUNDING COMMUNITIES

UNIVERSITY OF CAPE COAST

COLLEGE OF HUMANITIES AND LEGAL STUDIES

FACULTY OF SOCIAL SCIENCE

DEPARTMENT OF GEOGRAPHY AND REGIONAL PLANNING

Date:

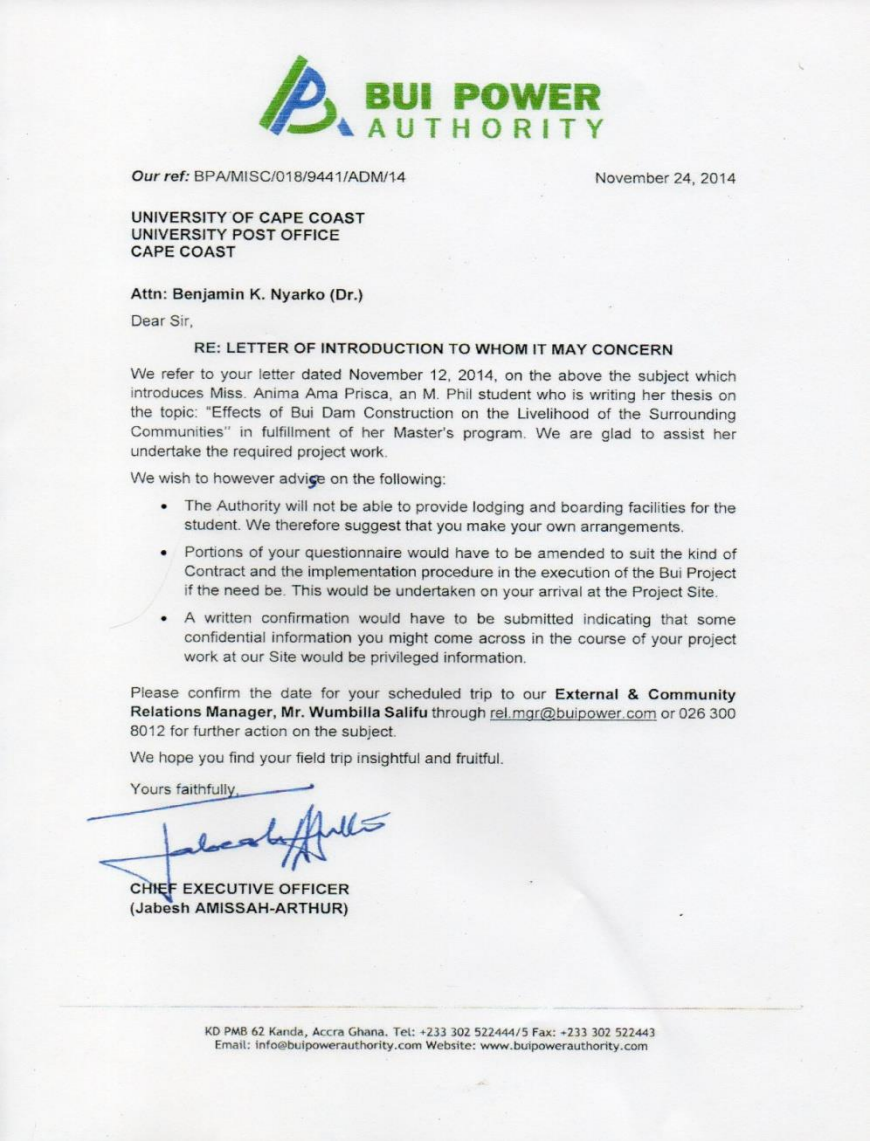
Time:

Place observed:

NUMBER	ITEMS OBSERVED	YES	NO
1	Springing up of new buildings		
2	Construction of new roads		
3	Maintenance of old roads		
4	Churches		
5	Hotels		
6	Restaurants		
7	Drinking bars		
8	Community information centres		
9	Financial institutions like banks		
10	schools		
11	Boreholes		
12	Pipe-borne water		
13	Health facilities-clinic, health centre, hospital		
14	Street lights		
15	Electricity		
16	Community centre		
17	Recreational grounds		
18	Police post/ station		
19	Market structures		
20	Public Toilets/ KVIPs		

21	Workshops for skills training		
22	Destruction of watersheds through clearing of vegetation		
23	Diversion of water bodies (streams, rivers, ponds)		
24	Cracks in buildings		
25	Noise and vibration from damming equipment		
26	Demolition of houses to give way to dam construction		
27	Change in the colour of water in streams, rivers, ponds due to discharge of toxic and effluents from dam processing plants		
28	Noise and vibration cause stress and discomfort		
29	Evidence of child labour in dam construction operations		
30	Displacement as a result of construction of dam		

APPENDIX D



BUI POWER AUTHORITY

Our ref: BPA/MISC/018/9441/ADM/14 November 24, 2014

UNIVERSITY OF CAPE COAST
UNIVERSITY POST OFFICE
CAPE COAST

Attn: Benjamin K. Nyarko (Dr.)

Dear Sir,

RE: LETTER OF INTRODUCTION TO WHOM IT MAY CONCERN

We refer to your letter dated November 12, 2014, on the above the subject which introduces Miss. Anima Ama Prisca, an M. Phil student who is writing her thesis on the topic: "Effects of Bui Dam Construction on the Livelihood of the Surrounding Communities" in fulfillment of her Master's program. We are glad to assist her undertake the required project work.

We wish to however advise on the following:

- The Authority will not be able to provide lodging and boarding facilities for the student. We therefore suggest that you make your own arrangements.
- Portions of your questionnaire would have to be amended to suit the kind of Contract and the implementation procedure in the execution of the Bui Project if the need be. This would be undertaken on your arrival at the Project Site.
- A written confirmation would have to be submitted indicating that some confidential information you might come across in the course of your project work at our Site would be privileged information.

Please confirm the date for your scheduled trip to our **External & Community Relations Manager, Mr. Wumbilla Salifu** through rel.mgr@buipower.com or 026 300 8012 for further action on the subject.

We hope you find your field trip insightful and fruitful.

Yours faithfully,

CHIEF EXECUTIVE OFFICER
(Jabesh AMISSAH-ARTHUR)

KD PMB 62 Kanda, Accra Ghana. Tel: +233 302 522444/5 Fax: +233 302 522443
Email: info@buipowerauthority.com Website: www.buipowerauthority.com

APPENDIX E

UNIVERSITY OF CAPE COAST
FACULTY OF SOCIAL SCIENCES
DEPARTMENT OF GEOGRAPHY & REGIONAL PLANNING

GRP/S.4

Our Ref:

Your Ref:

UNIVERSITY POST OFFICE
CAPE COAST, GHANA
WEST AFRICA

12th November, 2014

Dear Sir/Madam,

LETTER OF INTRODUCTION
TO WHOM IT MAY CONCERN

We write to introduce to you **Miss Anima Ama Prisca**, an M. Phil Student with registration number SS/PGR/13/0002 at the Department of Geography and Regional Planning, University of Cape Coast.

She is writing her thesis on the topic: ***Effects of Bui Dam Construction on the Livelihoods of the Surrounding Communities.***

We shall be very grateful if you could accord her all the necessary assistance she requires for her thesis.

Thank you.

Yours faithfully,

Dr. Benjamin K. Nyarko.
(Head)

Telephone: *(Head)* 03321-30681, *(General Office)* 03321-30680
Fax: 03321-34072 E-mail: geography@ucc.edu.gh