Living with the Bui Dam; Implications for Community Livelihoods

by

Jones Lewis Arthur
B.Ed. (Hons), University of Cape Coast, 2000
M.A., University of Cape Coast, 2006
PGD, IHS Erasmus University Rotterdam, 2010

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Supervisory Committee

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Abstract

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The objective of this study was to develop an understanding of the effects of the construction of hydro dams on nearby communities. The construction of the 400 megawatt Bui dam ($8^{o}16^{l}42^{ll}$ N, $2^{o}143^{l}9^{ll}$ *W*) in Ghana has inundated seven communities and nearly a quarter of Bui National Park, including the destruction of community resources that provide for the livelihood needs of the people living near the dam. The dam led to the resettlement of seven communities, coordinated by the Bui Power Authority. Concerns expressed about the resettlement process indicate some weakness in stakeholder consultations relating to the resettlement, as well as weakness in the development of opportunities to address the anticipated effects of the Bui dam, including effects on community assets.

These issues were examined through a study of how the construction of Bui Dam was perceived by local communities representing several ethnic-linguistic groups, including the Ewe, Mo, and Nafana.

A mixed methods approach was used in the research, including document analysis, quantitative interviews of 329 households, key informant interviews with 22

households, and case studies of four families, including two families each from resettled and non-resettled communities. Data was obtained from 13 nearby communities, 7 of which had been relocated because of the dam.

The study considered examined how the Bui Dam was perceived to influence seven capital assets: cultural; natural; social; human; political; physical; and financial. Overall, people perceive these capital assets to be decreasing in most aspects as a result of the Bui Dam, with some variability among households. This variability was explored through analysis of a number of predictor variables: relocation, ethnicity, livelihood type, age, and gender. Villages not relocated tended to perceive effects less negatively, as did people of Nafana ethnicity, and those who rely mainly on a farming livelihood. Gender and age had little effect: gender mediated effects on some aspects of social and political capital, while age affected only some aspects of cultural capital.

Further analysis through the use of multiple regression analysis was undertaken to determine the relative influence of each of these predictor variables. Overall, each multiple regression analysis was significant, with high R squared values ranging from 0.761 to 0.260. The most powerful predictor was whether communities had been relocated or not ("relocate"), which was significantly related to each capital asset, with beta values ranging from 0.826 to 0.418. "Livelihood" was the next most important predictor variable, significantly related to all capital assets and with beta values varying from 0.520 to 0.231. "Ethnicity" was a significant predictor for four of seven capital assets, with beta values ranging from 0.133 to 0.055. "Gender" was a significant predictor variable for two of seven capital assets (social capital, with a beta value of

0.084, and political capital, with a beta value of 0.119). “Age” was a significant variable for just one capital asset (cultural), with a beta value of 0.038.

In summary, this study is consistent with other studies that have examined the effect of dams on the livelihoods of nearby communities in that for most households the consequences have been negative, although not as severe for those households that were not forced to relocate, people of Nafana ancestry, or people who rely mainly on farming. The presence of Bui National Park may have moderated these negative effects somewhat, through employment provided in the park; and through ecosystem services such as vegetative cover in the park supporting cloud formation and rain occurrence.

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Dedication

This work is dedicated to the following: my wife, Irene Akyaa Yeboah Arthur (Mrs.) for her unflinching love and support; parents - Mr. & Mrs. S.G. Arthur of Sunyani for nurturing my growth and development; Mr. and Mrs. S. D. Arthur (Accra), Dr. and Mrs. A.C. Arthur (London), Mrs. Joyce Ti-Ti Lartey, Yvonne Clara Ti-Ti Lartey, Lady Diana Yeboah; and my mentor, Professor Kwasi Nsiah-Gyabaah.

Chapter 1

INTRODUCTION

1.1 The Issue, and Related Theoretical Concepts

Biodiversity conservation is important to Ghana because biodiversity serves many important purposes: it provides people (particularly, vulnerable human societies) with opportunities for livelihood, water, food, clean air, genetic potential of wild species, cultural values, and visitor opportunities to visit nature sites (Dudley, 2008; CBD, 2010). However, in spite of the benefits of biodiversity, conservation remains a global challenge (Buchart, 2010; Lindenmayer, 2015; Woinarski et al., 2015). The challenge of biodiversity conservation has led to the adoption of a number of measures, including the development of National Biodiversity Strategies and Action plans, the setting of biodiversity targets such as Aichi targets, and the establishment and expansion of the global network of parks and protected areas to include 17% of the Earth's terrestrial surface and 10% of its seas by 2020 (Spalding et al., 2013). However, only about 13% of land and 1.6% of our oceans currently lie within protected areas, and half of the most important sites of nature remain unprotected (Pereira et al., 2013).

Much of the concern for biodiversity loss is focused on developing countries, but conservation needs in these regions often conflict with needs for economic development, sometimes linked to the construction of dams. Dams can: increase revenue; improve energy security and access (Rosen & Houser, 2007; Fullbrook, 2008; Kyei-Dompreh, 2012); provide local employment (Galipean et al., 2013; Nusser, 2014); provide flood control and irrigation abilities (WCD, 2000); and contribute to the development of

intensive agriculture (WCD, 2000). Dams can increase net irrigated area. For example, construction of the Akosombo Dam in Ghana was significant in transforming irrigation farming along the banks of the Volta River, especially in places close to the Volta Dam (Dzodzi, 2006). As a result of these benefits of the development of dams, countries like Ghana continue to value development of dams.

Development objectives, including dam construction, have become a major part of Ghana's national development agenda since independence (Alhassan, 2009). The construction of the Akosombo Dam was a key part of the 1951-1960 national development plan focused on rapidly modernizing and transforming the Ghanaian economy from agrarian to an industrial base (Dzorgbo, 2001). Arguments in favour of hydro power in Ghana have linked the provision of ready and cheap hydropower to Ghana’s economy relying almost 60% on mining, manufacturing, and commercial activities that employ a significant number of Ghanaians (Energy Commission, 2005). Therefore, the construction of dams in Ghana forms an important attempt to provide development that positively affects livelihoods and reduces poverty. For example, the development of the Akosombo Dam created a large lake which also incidentally created opportunities in some auxiliary economic activities such as fishing - increased fish yield and fisheries related activities in the upper Volta Lake (Sarpong, Quaatey, & Harvey, 2005) accounted for 90% (73,000-82,000 metric tonnes) of total fish harvested from inland waters in 2003, with an estimated value of fish caught (from the Volta) at US$2.4 million (FAO, 1991; 1995; Braimah, 2001). The dam led to more than 300,000 people being employed on an ongoing basis in lake fishing (Integrated Development of Artisanal

Fisheries [IDAF], 2003) and fishing-related jobs, as well as auxiliary jobs such as carpentry, and trading in fishing nets and outboard motors (Sarpong et al., 2005).

The Akosombo Dam led to the establishment of the Volta River Authority Special Allocation Fund for resettlement in 1996, which raised $500,000 USD per year (Diop, 2009). Resources from the fund were instrumental in improving the livelihoods and conditions of people resettled after the construction of the dam. Between 2000 and 2003, the fund was used to pay for the electrification of the resettled villages, installation of modern water and sanitation facilities, improvement in health and education status, and rehabilitation of roads in areas occupied by the resettled communities (Kalitsi, 2004).

However, the construction of hydro dams has been extensively criticized. Global reviews of many hydro dams have shown their non-profitability (Ansar et al., 2014). For example, the high cost of dam construction sometimes undermines capital investments into other sections of the economy, including health, education, and other infrastructure (see Fernside, 2016). This is illustrated by the construction of the Akosombo Dam in Ghana, which resulted in the flooding of 8,500 km^2, or 3.6% of the country, and the displacement, resultant resettlement, and changes in the livelihoods of more than 80,000 people (Kalitsi, 2004; Dzodzi, 2006). Construction of the Bui Dam has led to similar problems: the flooding of nearly a quarter of Bui National Park, displacement of seven communities, and the destruction of important plant and animal species (Ofori-Amanfo, 2005; ERM, 2007; IUCN, 2010; Ghana News Agency, 2012a; Miine, 2014).

Dams can destabilize fish movement, flood farmlands, destroy ecological resources and systems, and fragment social groups whose knowledge systems are grounded in their historical places (see Fullbrook, 2008; Sneddon & Fox, 2008; Zhang et

al., 2008; Miller et al., 2011). The construction of Bennett Dam at Williston Lake, British Columbia, Canada flooded lands used for hunting, fishing, and gathering, disrupted traditional animal migration routes, and cut off access to areas used to collect medicinal plants (Peter, 2013). In Ghana, the development of the Akosombo Dam, which created the Volta Lake, brought changes in the natural environment, affecting plants, animals, insects, and other living organisms, the atmosphere, and the chemistry of the water (Kalitsi, 2004). Other downstream impacts of the Volta Lake included increased incidence of water-borne diseases such as bilhazia, malaria, and hookworm. Other negative implications of the Akosombo Dam include the spate of floating weeds, such as *Pistia, Vossia spp.,* and *Ceratophyllum* (Kalitsi, 2004).

Dams can undermine the social and ecological integrity of community resources, displace and destabilize communities (International Rivers, 2013), and fracture relationships and social systems that form the foundation for effective governance arrangements (Hussein, 2002; Bennett, 2012; Peter, 2013). Dams can create social costs such as the 40-80 million people displaced by hydro dams worldwide (see Ligon et al., 1995; WCD, 2000; Cernea, 2000; Cornea, 2003; Krueger, 2009). Dams have led to the resettlement of communities, and deprived people of access to resources and assets such as farmlands, sacred groves, roads, health centres, and schools (Gordon & Amatekpor, 1999; Dzodzi, 2006: p. 115; Andam et al., 2010; Ferraro et al., 2011; UNDP, 2011a; International Rivers, 2013).

Dam-associated displacement and resettlement of communities is of central interest to this study. Resettlement can result in positive outcomes, such as improved housing and better schools. However, resettlement often has negative implications, such

as loss of infrastructure, economic upheaval, loss of cultural identity, shift in social roles, and loss of assets that support community livelihoods (Egre, 2007; Bennett & McDowell, 2012; Biswas, 2012; Peter, 2013; Fratkin, 2014). This literature indicates that the concerns of the displaced people are rarely highlighted. Dams can also adversely affect livelihoods and the socio-economic well-being of people living near dams (The World Bank, 2004). For example, the construction of the Arase Dam in Japan disrupted feeding routes of fish and diminished fish catch (Jovais, 2014). The Don Sahong Dam in Cambodia jeopardized migratory routes of fish, and undermined food security and livelihoods for millions of people (Ross, 2014). Dam-related resettlements have led to loss of land, legal authority over land, community support for members, and cultural and traditional healing systems (Teemacane Trust, 2002; Bennett & McDowell, 2012: p. 97).

Dams and resettlements have impacted governance in nearby communities. For example, the application of international laws over indigenous rights resulted in the loss of the voice of the people of San Kaputura (a resettlement community near Etosha National Park, Namibia), and led to a dependence on the government (see le Roux & White, 2004; Bennett & McDowell, 2012: p. 98). In the cases of dam-impacted communities, the voices of the displaced are rarely heard (Bennett & McDowell, 2012).

Further, dams can impact protected areas, including the flooding of ecological resources that uphold the ecological integrity of many conserved areas. For example, the construction of dams in the state of Maine in the United States reduced accessible lake area to less than 5% of the 892 km^2 habitat and 205 km^2 of stream habitat (Hall & Jordaan, 2011). In other cases of dam impacts, the construction of the Three Gorges Dam in the Yangtze River Basin in China has created negative impacts such as reservoir-

triggered seismicity, landslides, water quality control challenges, ecological problems, and siltation and sedimentation discharge (Li et al., 2013). Brazil's reliance on hydropower is also critiqued on the basis that it will lead to varied direct and indirect impacts on indigenous biota, such as widespread loss, fragmentation, and degradation of riparian and terrestrial habitats (Lees et al. 2016). The reliance on hydropower is particularly adverse for marine biodiversity resources since changes in water depth, discharge, and sedimentation patterns in reservoirs as a result of dams can remove the niches for many species, and also obstruct migration to spawning or feeding grounds for many organisms (Sa-Oliveira et al., 2015).

Although there have been studies on the dam/biodiversity conflict, there have been few studies of the effects of dams on communities that are in and around Protected Areas (PAs). PAs are "a clearly defined geographical space, recognized, dedicated and managed through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values" (Dudley, 2008: 8). PAs have become one of the greatest cornerstones for conserving biodiversity (CBD, 2004; MEA, 2005; Rand, et al., 2010). PAs are set aside to maintain functioning natural ecosystems, act as refuges for species, maintain ecological processes, and provide social benefits for local communities, such as economic revenue generated from nature-based tourism (Baird & Dearden, 2003; Dudley, 2008). PAs vary in size, age, purpose, designation, governance, management, and outcomes (Dudley & Stolton, 2010).

This dissertation examines communities adjacent to Bui Dam, on which construction began in 2009. Near to the dam is Bui National Park (BNP), established in 1971 primarily to protect biodiversity. The dam at Bui flooded over 20% of BNP, and

displaced eight communities of about 1,280 people (Ampratwum-Mensah, 2013). Hence the relocated communities, as well as those living near to the dam site, have not only had to make livelihood adjustments because of the park, but also as a result of dam construction. These communities have been relocated into two new resettlements located near BNP and the Bui Dam (Figure 2). The dam has affected biodiversity. The dam has also destroyed part of the bank of the Black Volta, created new features such as islands, caused damage to land resources such as the riverine gallery of forest (Ghana News Agency, 2012a), and altered habitats for the park's red-listed hippopotamus (CBD, 2010). At the time of data collection, seven communities were relocated (with the eighth yet to be relocated) because of the construction of this dam.

The study seeks to understand the changes experienced by these communities through a conceptual framework that builds on the sustainable assets framework (Carney, 1999; Hussein, 2002), and focuses on the concept of livelihoods (Carney, 1999). Livelihood issues have attracted much attention due to their critical effect on reducing poverty and improving living conditions (Carney, 1995; Scoones, 1998; De Haan & Zoomers, 2003; Ellis 2005). Livelihoods can be understood using the sustainable livelihoods approach, which emphasizes that livelihoods are about "…the capabilities, assets or resources, entitlements and activities required for a means of living" (Chambers & Conway, 1992: p.6). In this approach, livelihood capabilities looks at people's ability to cope with perturbations and the ability to identify and make use of livelihood opportunities and capital assets, discussed below (Carney, 1998; Hussein, 2002).

In spite of the contributions of the livelihood concept to the scholarly discourse on improving living conditions for many people, the significance of livelihood lies in

whether it can be considered sustainable. A livelihood can be considered sustainable "when it can cope with, and recover from, stresses and shocks, maintain or enhance capabilities, assets, and entitlements, while not undermining the natural resource base" (Chambers and Conray, 1992; p.6).

An extension of the sustainable framework concept for understanding the effects of relocation is capital assets, the stock of assets and capabilities available to households (Carpenter et al., 2006; Green & Haines, 2012). The literature suggests seven types of capital assets: social, natural, human, physical, financial, cultural, and political (Carney, 1995; Rakodi, 1999; Hussein, 2002). These can be stored, accumulated, exchanged, or depleted, and can be put to work to generate a flow of income or other benefits (Norris & Stevens, 2006; Folke et al., 2010; Bennett et al., 2012). Capital assets are important in developing strategies to help cope with stresses in livelihoods (Moser, 2008; Nelson, 2010), and have been linked to improvements in household access to education, indigenous knowledge, cultural values and norms, efforts to secure access to land for rural farmers, increase in farm production, and rural poverty reduction (Besley, 1995; Carney, 1995; Hussein, 2002; Dzodzi, 2006; Folke et al., 2010; Bennett et al., 2012).

1.2 Geographical Context

The study area (Figure 2) is located in the Banda and Bole districts of the Brong Ahafo and Northern Regions of Ghana, respectively.

1.2.1 Political and Administrative Structure

The Banda, Bamboi, and Bole Paramount Chiefs are responsible for villages within the study area near BNP (ERM, 2007). There are three governing systems in the area: (1) government institutions; (2) chieftaincy systems; and (3) Community Based

Organizations (CBOs). CBOs in the study area include informal groups such as livelihood and cultural groups that support socio-cultural networks in the area. The traditional chieftaincy system provides leadership and regulation of community activities. Government agencies provide leadership through institutions such as the District Assemblies. The Banda District Assembly has six electoral areas, two Area Councils, one each located at Sabiye and Banda Ahenkro (Banda District Assembly, 2013; Ghana Statistical Service, 2014b). In all, there are nine members in the Banda District Assembly (six elected and three appointed). By constitutional instrument, the Assembly is comprised of a District Chief Executive (DCE), Presiding Member, Member of Parliament, and Assembly Members (Government of Ghana, 1992). In both Banda and Bole Districts, administration is led by the District Chief Executive, who is appointed by the President of the Republic, followed by a Presiding Member, Member of Parliament, and Assembly Members (Government of Ghana, 1992). In other cases, governmental institutions such as Bui National Park (BNP) and the Bui Power Authority (BPA) are responsible for the management of BNP and Bui Dam respectively. The selected communities for this study (resettled and non-resettled) are located within the two dam-affected districts (Ghana Statistical Service, 2012b).

1.2.2 Biophysical Characteristics

The Banda District (previously part of the Tain District), with its capital Banda Ahenkro, is among the new districts and municipalities created by the government of Ghana under the Legislative Instrument (L.I.) 2092 and inaugurated in 2012 (Ghana News Agency, 2012b). The Banda District (see map, Figure 1) falls within latitudes 7° and 8° 45' N and longitudes 2° 52' and 0° 28' W and covers 2,298.3 $km^2$of the Brong

Ahafo Region (39,558 km^2) (Ghana Statistical Service, 2014b). The district shares borders to the west with the adjacent country of Cote d'Ivoire, to the south with the Tain District Assembly, to the north with the Northern Region, and to the east with the Mo Traditional Council of Kintampo South District.

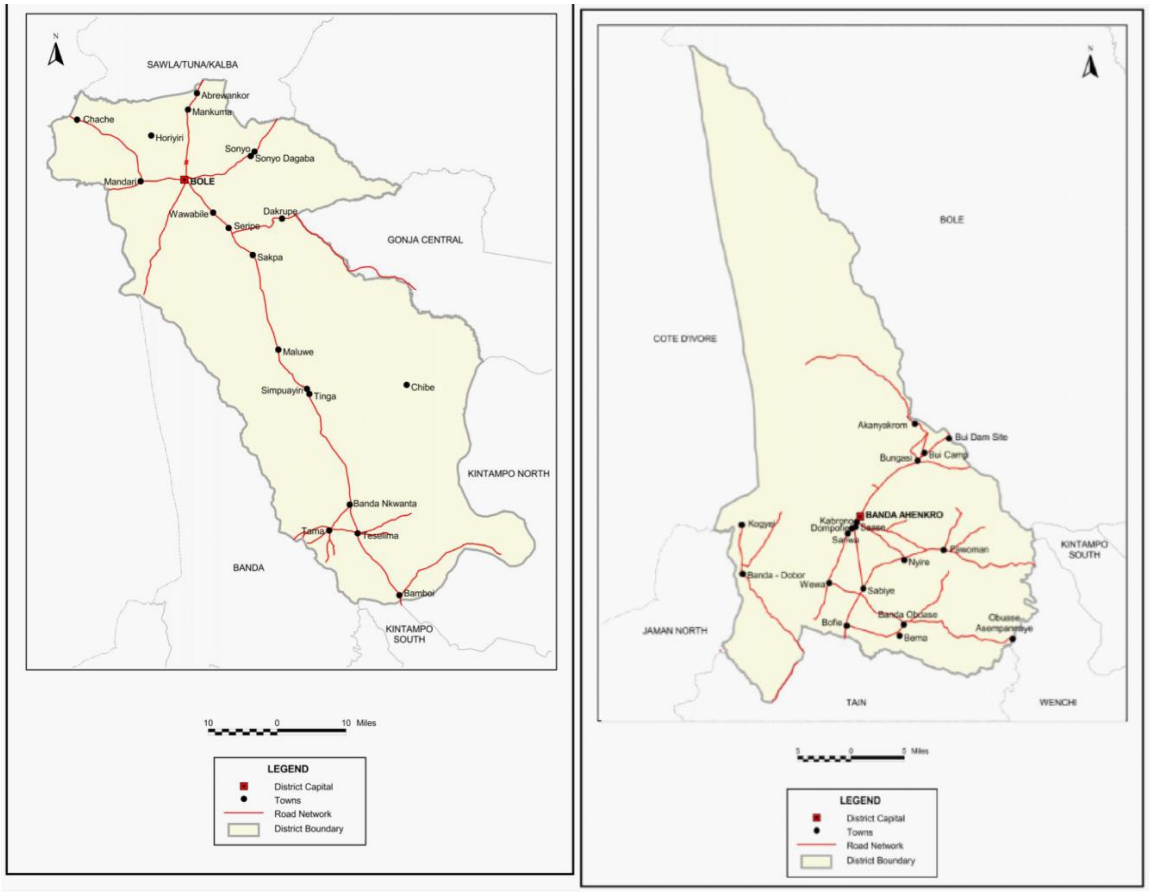

Figure 1 District Map of Banda and Bole, Ghana

Source: Ghana Statistical Service, 2014a, 2014b

Banda is a small district with an approximate population of 45,000 in 33 communities (Ghana Statistical Service, 2012b). The population density in the district is 27 persons per km^2 (compared to the regional figure of 45.9, and national of 49.3 - see Ghana Statistical Service, 2012a).

The district's geology is underlain mostly by the Birimian formation and consists of metamorphosed sediments such as phyllite and cast. The geology of the area lies in the Voltaian soil formation that occupies most of the Guinea Savannah Zone (Zitzman, 1998). The soils range from moderately deep reddish brown fine sandy clays with occasional ironstone concretions on valley sides, to brownish poorly drained deep alluvial sands and clays in the valley bottoms (Ghana Statistical Service, 2014b). Timber species such as Odum (*Milicia excelsa*), Sapele (*Entandrophragma cylindricum)*, Wawa (*Triplochiton scleroxylon*), and Mahogany (*Khaya ivorensis)* are available in places such as Dorbor and Bongaase (Ghana Statistical Service, 2014a). The district falls within the moist-deciduous forest and Guinea Savannah Woodland zones. The land is generally low lying, and most of the soils are rich in nutrients and suitable for the cultivation of a variety of cereals, tubers, and vegetables, and animal rearing. Further, the people of Banda also relied in the past on food crops such as pearl millet supplemented by soghum in wetter periods, as well as cowpea, okro, and shea butter (Logan, 2012). The original forest vegetation has been subjected to degradation caused mainly by human activities including bush burning, slash and burn agriculture, and logging and fuel wood collection.

The Banda District lies in the savannah zone with a bi-modal rainfall pattern, and distinct wet and dry seasons. The temperature ranges between 24.5°C and 32°C, with humidity of 60% in dry season to 80% in the rainy season (Dickson and Benneh, 1970). Average maximum and minimum temperatures are 30.9°C and 21.2°C, respectively, but the hottest months fall within February, March, and April. The average annual rainfall is between 1,140 and 1,270 mm from March to the end of July, with a short dry period in

August. The rest of the year is generally hot and dry, mainly due to the dry, dust-laden harmattan winds that blow over the district.

The Banda District is drained by the Tain (the largest river in the district), the Tombe, and the Black Volta rivers. Other rivers draining the district are Chin, Idoo, Lepla, Kuhuli, Yooloo, Seeloo, Jinde, Fini, and Gojongo. Some of the rivers are seasonal and dry up in the dry season. The northern border of the district is marked by the Black Volta, which flows throughout the year (Ghana Statistical Service, 2014a). The Black Volta is dammed at the Bui Gorge, located at the southern portion of BNP, and it marks the boundary of the district with the Northern Region of Ghana. Ground water in the district is highly variable, depending on rainfall and the underlying rocks. In the dry season, heavy run-off and high evaporation and low filtration occur because of the absence of water storage facilities during the rainy season, thus contributing to water deficiencies in human settlements, and low agricultural production.

The Bole District has a population of 61,593 people, with 51.4% males and 49.6% females (Ghana Statistical Service, 2012b). Population distribution is sparse; about 10 persons per km^2. The Bole District is located at the extreme western section of the Northern Region of Ghana between longitudes 1° 50' E and 2° 45' W and latitudes 8° 10' N and 5° 09' N (Ghana Statistical Service, 2014a). Day temperatures range between 28°C and 40°C, but this can be under 28°C at night when the skies are cloudless. A sudden rise in temperature is experienced during the harmattan (March-May), when temperatures can exceed 30°C (Bole District Assembly, 2006). Rainfall is seasonal and single maximum with an annual rainfall of about 1,100 mm. Rainfall, usually characterized by

thunderstorms, is heaviest in August, but rains occur from May through to August and in October-November.

The Bole District (Figure 1) shares borders on the north with the Sawla-Tuna-Kalba district, and on the west with the Republic of Cote d'Ivoire, where the Black Volta serves as the boundary. In terms of size, the district is 6,169.2 km^2 compared to the 69,776.3 km^2 of the Northern Region of Ghana (Ghana Statistical Service, 2014a).

Various types of soils are found in the Bole District, including savannah orchrosols, tropical brown earth, and terrace soils. Savannah orchrosol soil samples are poor in organic matter and nutrient due to persistent bushfires that result in the absence of dense vegetation (Ghana Statistical Service, 2014b). Vegetation types prevalent in the Bole District consist of savannah woodland, with economic tree species including sheanut (*Vitellaria paradoxa*), dawadawa (*Parkia biglobosa*), teak (*Tectona grandis*), kapok (*Ceiba pentandra*), and in recent times, cashew (*Anacardium occidentale*).

1.2.3 Historical and Cultural Context

The dominant people in the district are Nafana, speakers of Nafaanra, which is affiliated with the Senufo languages (Stahl, 2001: p.52). They trace their origins to Kakala in present Cote d'Ivoire, and according to oral histories migrated to the area sometime in the seventeenth or eighteenth centuries (Stahl, 2001: p.52). Other ethnic groups in the district include Ligby people, as well as the minority Kuulo/Dumpo people, Kologo, Bono, Gonja, Akan, Wala, Dagarti, and Lobi (Stahl, 2001; Tain District Assembly, 2012). Major festivals of the Banda people are the yaw festival, fire festivals, and in recent past "Mana ndiom" (an adulthood initiation rite for girls) which have been outlawed (Stahl, 2001; Tain District Assembly, 2012).

In the Banda District, land is communally owned and members of the family have user rights. The chief (Banda Paramount Chief) is the custodian of the land and holds land in trust for the community. A paramount chief is a chief of a traditional area with oversight responsibility over other chiefs and sub-chiefs serving under him. The Banda Traditional Council is headed by a paramount chief, who is assisted in his functions by other sub-chiefs. The chiefs have their own territories, and apart from overseeing them, they have a function at the courts of their paramount chiefs as their "ministers."

District Assemblies are subdivisions of the regions of Ghana that deal with the local administration. Although outright purchase of family land is not permitted, *abunu* and *abusa* systems enable migrants to have access to land for farming. Under these systems, the tenant is entitled to either half or a third of the crops, while the landlord takes the half or two thirds, respectively. For places around Bui, lands were freely acquired with the payment of a token (usually 20-30 tubers of yam, one cockerel, and 20-30 Ghana Cedis) to the land owner.

Unsustainable land use practices such as illegal small-scale mining, timber exploitation, charcoal burning, and indiscriminate bush burning are contributing to the destruction of forests and wildlife resources, loss of soil fertility, soil erosion, and air and water pollution (Ampratwum-Mensah, 2013). Generally, the majority of lands in the Bole District are owned by individual families with the custody and control resting with the family head. Land acquired for construction of houses, after passing through a procedure for land acquisition, becomes permanent.

In Bole, the major ethnic groups are Gonja, Vagla, Safalba, and Mo. Ethnic groups that did not originally hail from the area include Birifor, Lobi, and Dagaaba, who

are mainly engaged in subsistence farming (Ghana Statistical Service, 2014b). Many communities in this study area are multi-ethnic; the dominant people in the Bole District are Gonja or Mo, and in the Tain District (previously covering the Banda Ahenkro District) are Mo and Nafana (Stahl, 2001; p. 189).

1.2.4 Current Socio-economic Conditions

Educational infrastructure and facilities in the Banda District are few and poorly developed. In times past, the people in the community readily mobilized support to construct and maintain a school, but had minimal assistance from the government, including supplying the school with teachers. The efforts of the communities to attract teachers for a school were challenged by the poor state of infrastructure, such as staff accommodation, and access to good drinking water and electricity. As a result, the community had to rely on National Service personnel posted to teach in the community school. Other deficiencies in education include poor staffing and low female participation (3,623 females compared to 4,124 males; see Ghana Statistical Service, 2014a). High illiteracy rates among the farming population affects farmers' ability to adopt new and environmentally sustainable farming methods for increased agricultural production (Ghana Statistical Service, 2014a).

Some communities, including Bui, Bator, and Dokokyina, have permanently lost some infrastructure, such as schools, clinics, and roads to the Bui Dam construction. Most of the loss of infrastructure, which is permanent, is due to the construction of access roads and electricity transmission lines (Table 1) (ERM, 2007).

Table 1 Villages that Lost Land and Natural Resources to the Bui Dam (ERM, 2007; Tain District Assembly, 2012)

Construction Activity	*Village/Community/District*		*Risk and Level of Effect of Dam*
	Banda	*Bole*	
Two saddle dams and camp construction site	Bungase	-	Major
Quarries	Bungase and Banda Ahenkro	-	Minor
Road upgrading	-	Bamboi, Banda Nkwanta, Teselima, Carpenter, Gyama	Minor-Negligible
Transmission line	Gyama and Teselima		Moderate
Creation of the reservoir - total inundation	Bui, Bator, Dam Site, Dokokyina,	Lucene, Agbegikro, Brewohodi,	Major
Creation of the reservoir - inundation of forest and farmland only	Banda Ahenkro, and Bungase	Banda Nkwanta, Gyama,	Major

Education in the Bole District differs substantially from that in the Banda District. The Bole District has 2 secondary high schools, 20 junior high schools, 79 primary schools, 2 day care centres, and 3 day nurseries. Again, secondary education in the Northern Region is state-supported, unlike that in the Brong Ahafo Region and other places south of the Volta where the Banda District is located. In addition, non-formal education is actively pursued by people who could not access education when younger (Bole District Assembly, 2006; Ghana Statistical Service, 2014a).

The district has a high potential for boat cruising, sale of fish, and other tourism-related activities because of the Bui Dam and BNP. The Bole District is served by the national electricity grid that provides energy to a large number of the inhabitants. The district also has important market centres in places such as Bole, Sawla, Tuna, and Balba. The district currently has good access roads that support major economic activities such as inter-city trade compared to areas in the Banda District.

A large proportion of economic activities in the Banda District are for subsistence. Before the dam, many households engaged in cashew farming, and more generally in subsistence yam cultivation, and fishing (Tain District Assembly, 2012; Ghana Statistical Service, 2014a). The creation by the dam of a large lake, as well as the increase in fish stock, has motivated a number of indigenous fishermen and fishmongers to expand their livelihood activities for economic purposes. The large influx of immigrants into the dam area has also increased the profitability of trading. Renting rooms to visitors to the community, though on a minimal scale, also provides some additional sources of revenue for the families. However, the shortage of lodging spaces presents a challenge for people, including workers who are posted to teach in the schools or work in the clinic, and visitors to the community such as tourists and researchers.

Other forms of livelihood are carpentry, trading, teaching, masonry, weaving, craftsmanship, and brewing (Akonor, 2009; Tain District Assembly, 2012). Mining potential is being explored on a small scale by Birim Goldfields. The Banda District has a number of important potential tourist attractions, including BNP, scenic hills, and a rock shelter whose use during times of warfare is described in local oral histories (Ameyaw, 1965).

Banking services were previously non-existent in many communities in the study area. In spite of the unavailability of banking services, people in the community engaged in local resource mobilization strategies, such as the formation of livelihood groupings to provide small scale loan facilities for the benefit of members (Ghana Statistical Service, 2014a; 2014b). People who still required banking services had to access banks in nearby towns such as Wenchi and Bole. Development of the Bui Dam has not improved the

difficulties associated with accessing banking services. Branches of Zenith and Ecobank (now closed) were established to provide some level of banking services in their established post in the community. In addition, the Nafana Rural bank with a branch in Banda Ahenkro, and Brodi Community Credit Union provide some financial services to the people in the district (Ghana Statistical Service, 2013). This development has greatly affected savings culture, and access to funds to engage in livelihood activities that can have the potential to provide some form of mitigation to the effects of the Bui Dam.

Financial and insurance activities are very minimal in the Bole District. In all, 0.1% of the 25,514 employed population is involved in some form of financial and insurance services in the Bole District (Ghana Statistical Service, 2014b). The Assembly has five financial institutions operating in the District: two commercial banks, one rural bank, and two credit unions (Bole District Assembly, 2013).

The economy of the Bole District is mainly agrarian (Bole District Assembly, 2006; Ghana Statistical Service, 2014b). Cultivated crops include yam, pepper, cassava, groundnut, cowpea, and plantain on large scale. Markets for produce are in neighbouring districts such as Sawla, Tuna, Kalba, and Wa, as well as in the southern parts of the country (Bole District Assembly, 2006; 2013). Livestock production includes cattle, goats, and sheep. Poultry is kept by households and allowed free range. Many people and households continue to engage in small-scale livelihood activities such as farming, fishing, and livestock rearing to provide for the basic needs of their families. However, agricultural lands are not sold, hired or leased for peasant farming (Bole District Assembly, 2006; 2013). Rather, a token of “kola money” is presented to the landowner to secure land for farming. Illegal mining activities termed “galamsey” also abound in

places such as Kui, Dakrupe, ad Gbombiri in the Bole District as well as to the west of the mountains of Dokokyina (Tain District Assembly, 2012; Ghana Statistical Service, 2014b). Tourism also contributes to the economy, including the Sonyor Deng festival (that forms part of the Damba festival) celebrated by the people of villages within Gonjaland in May, and the Damba festival held after the Moslem fasting.

1.2.5 Effects of Bui Dam

BNP was formed to protect riverine vegetation around the Banda Gorge, at the same time as it protects 80 species of wildlife, including 305 hippopotamus, considered red-listed by the IUCN and of global conservation concern (Government of Ghana, 1961; Ofori-Amanfo, 2005; IUCN, 2010). BNP is the only protected area in Ghana that contains a large component of relatively undisturbed riverine forest associated with wooded savannah, and is one of the least developed parks in Ghana (IUCN, 2010).

In 2007, Ghana established the Bui Power Authority (BPA) to oversee the construction of Bui Dam (Government of Ghana, 2007; Ampratwum-Mensah, 2013). The Bui Dam at full capacity of 183 metres above sea level (but minimum operation level is 168 metres above sea level) is expected to inundate 21% of BNP, destroy 85 km of the bank of the Black Volta River (dammed at Bui), create 36 islands and a 500 km reservoir shoreline, and destroy 50% of grassland, 20% of savannah woodland, and 25% of the water and riverine gallery forest (ERM, 2007; Ghana News Agency, 2012). The timeline to reach this maximum capacity has not been achieved due to the poor nature of rains upstream of the dam, as well as places around the dam. The park is also threatened by encroachment through settlement, mining, and harvesting of timber. This development has therefore undermined the significance of the park in helping to conserve biodiversity

and, to some extent, support community livelihoods through outflows from tourism. The dam, which has displaced people and led to the resettlement of communities, can negatively affect the livelihoods of communities living nearby the dam.

Although some infrastructure, as well as social amenities such as roads, clinic, community centre, and block houses, has been provided for the resettled communities, many people continue to live hand-to-mouth. Some communities, such as Bator Akainyakrom, have become better off with improved fish harvest from the abundant fish and large fishing area provided by the new lake created by the dam. However, other ethnic groups, such as Mo, Dagarti, and Nafana, have lost significant arable farming land to inundation and subsequent displacement of their communities to new camps at Bui and Jama. This will be described in detail in chapter four of this dissertation.

Table 2 Villages Displaced by the Bui Dam (ERM, 2007)

Village	*Population*	*Number of Households*
Bator	437	63
Bui	297	42
Dam Site	36	6
Brewohodi	48	10
Lucene/Loga	26	4
Agbegikro	107	22
Dokokyina	165	36
Total	1,116	183

Many of these communities have been relocated from their previous settlements located near BNP. The creation of Bui Lake and the attendant loss of lands to inundation have resulted in the total loss of livelihoods and immovable assets of seven communities (Table 2) (ERM, 2007).

Communities such as Bongaase, Banda Nkwanta, and Gyama permanently lost their land, cultivated crops, and trees to the creation of the lake. Dokokyina was not inundated, but had to be relocated because the community was to be surrounded by the dam on the south, east, and west, and therefore totally cut off from access routes in Ghana (Figure 2) (ERM, 2007). Such a community, if not relocated, would have been accessible only through Cote d'Ivoire. Meanwhile, a number of households in the Dokokyina village refused to relocate, and at the time of writing were living in makeshift shelters in the area of the old village.

Generally speaking, cash compensations were provided by BPA for people who lost property to the Bui Dam construction. For example, resettlers were given financial support, such as a resettlement grant of GHS 50 (US $34.48) to support starting a new farm, and a monthly support grant of GHS 100 (US $68.96) paid to each household for one year (see BPA, 2010), compared to national monthly minimum wage of GHS 83.97 ($57.90 at US $1=GHS 1.45) for 2010. The cash disbursement was intended to provide financial security for the resettlers with the hope that, by the end of 1 year, they would have more sustainable income-generating sources; however, these payments were reported to be insufficient for the purposes.

Some communities in the Bole District have also been affected by the Bui Dam construction. Communities such as Dam Site, Brewohodi, Lucene/Loga, and Jama (Gyama) have been inundated by the Bui Dam, and consequently resettled in the Jama/Gyama resettlement camp. Other communities in the Bole District have been affected through loss of land and other community resources to the construction of saddle dams, road upgrading, and inundation of forests and farmlands (Table 1).

On average, non-timber products accounted for as much as 20% of household income, but construction of the dam led to the loss of such livelihood benefits. Products lost to dam construction included shea nut, dawadawa, medicinal plants, bush meat, and timber (Bole District Assembly, 2013). The effect has been the complete loss of land, crops, and trees, and access to fishing grounds for many of the households affected by the Bui Dam (ERM, 2007). Households involved in livestock have also been greatly impacted by the dam, because livestock grazing was conducted on fallow land for a distance of up to 1.5 km from the villages. Other livelihoods such as trading and wage labour enjoyed before the dam have been challenged to a large extent, except for the few households that were able to revamp their trading livelihoods after resettlement through the process of securing additional farmlands from nearby communities for farming, mobilization of small loans from livelihood groups to start economic activities such as trading, and diversification into new livelihoods such as fishing and fish mongering (Bole District Assembly, 2013; Ghana Statistical Service, 2014b).

Cultural properties in the form of cemeteries, sacred sites, ancestral villages, and churches have also been lost to the construction of the Bui Dam. In some cases, experts were sourced from the Department of Archaeology and Heritage Studies at the University of Ghana, Legon to enable the villages to exhume and rebury the ancestral remains of Bui people in the new camps (Akonor, 2009). However, even in such cases, burial sites did not have a befitting mausoleum for the departed souls of the ancestors, as promised in the resettlement package. This has a negative impact due to relatively strong traditions and cohesive social networks of the people in the study area (Tain District Assembly, 2012).

Generally, communities in the study area are ethnically mixed, and some are comprised of migrants who settled in the Bui area in the mid- to late eighteenth century (Stahl, 2001: p.155). For example, some Ewes settled in the Bui area in the 1930s (Stahl 2001). Many migrants have been gradually incorporated into the communities over the years, because they have arrived slowly, giving local people ample time to absorb them into the social fabric on their own terms (Stahl, 2001; Ampratwum-Mensah, 2013). The Banda people, for example, have numerous rules and regulations that outline the rights and obligations of settlers, and these are rigorously enforced by the Banda Paramount Chief and the sub-chiefs (ERM, 2007; Banda District Assembly, 2013). However, the sudden influx of possibly a sizeable number (1,500-2,000) of relatively economically stable workers with diverse cultures, some of whom work with Bui Power Authority and other construction firms that built the dam, can have negative impacts on social networks, and contribute to social vices such as prostitution, and social tension between locals and outsiders. Furthermore, the resettlement process that led to the separation of families and households can lead to the break of social ties and negatively impact on the people who greatly relied on livelihood support from family relations and associates (Akonor, 2009).

There have been increased health challenges for people near the Bui Dam, including greater incidences of Bilharzia, Trypanosomiases, and Onchocerciasis (ERM, 2007). In addition, the incidence of blackfly and tsetse fly continue to threaten people's health (Ampratwum-Mensah, 2013). The situation is worsened by the destruction of the many medicinal plants that previously provided local alternatives for treating sicknesses.

In summary, the Bui Dam seems to have created a number of negative effects on nearby communities. Some efforts have been made to address these issues and develop

alternate livelihoods, but it is not clear how effective these efforts have been. Therefore, this study aims to examine differences in perception of dam effects.

1.3 Research Questions

The purpose of this study is to examine the effects of the dam construction on the communities adjacent to BNP. The study addresses three research questions:

Q1. How do communities near Bui Dam perceive the effects of the dam on their capital assets (resources)?

Q2. Are perceived effects of the Bui Dam on capital assets influenced by age, gender, ethnicity, type of livelihood, and whether communities have been relocated?

1.4 Organization of Dissertation

The dissertation is organized into five chapters following this introduction. Chapter 2 (Literature Review) outlines the relevant literature, including livelihood studies, and capital assets. Chapter 3 (Methodology) explains the research process and the quantitative and qualitative approaches adopted for the study. Chapter 4 (Results Related to Capital Assets) presents the results from document analysis, interviews, cases studies, and surveys related to effects of dams and resettlement on capital assets of nearby communities (Research Questions #1 and #2). Chapter 5 (Results of In Depth Interviews) presents the results of qualitative data collected through in depth interviews with four families. It also provides information on how the key informant and survey results inform the in-depth interviews. Chapter 6 (Conclusions) provides a summary of key findings from the two results chapters and how they inform one another, and outlines how each finding contributes to knowledge about the topic and the current related literature.

Chapter 2

LITERATURE REVIEW

2.1 Introduction

This dissertation examines dam and resettlement effects on livelihoods of communities adjacent to Bui Dam and Bui National Park (BNP) in Ghana. While considerable literature has examined the positive and negative effects of "shocks" such as dam construction on the livelihoods of nearby communities, and another body of literature has examined how PAs affect livelihoods, the literature contains few examples of situations where shocks (dam construction) to livelihoods are experienced in communities where livelihoods are already being shaped by virtue of being located in and around a national park. The literature suggests that some communities can benefit from shocks, while other communities do not fare as well, and at times are plunged into poverty (Ofori-Amanfo, 2005; ERM, 2007; Miller et al., 2011; Miine, 2014). This study seeks to understand the changes perceived by communities in and around Bui Dam, and to better understand why some communities might perceive impacts differently than others. The analysis is undertaken through a conceptual lens that builds on the sustainable livelihood framework, particularly on capital assets (Carney, 1995; Hussein, 2002). The aim of this chapter is to review these and related concepts and to demonstrate how the dissertation research can contribute to this literature.

The chapter reviews literature primarily related to shocks in livelihoods, and begins with an overview of the effects of national parks on adjacent communities, followed by analysis of the literature on the effects of dam construction. These sections are followed by discussions of livelihoods, and capital assets.

2.2 Effects of National Parks on Conservation and Community Livelihoods

Biodiversity conservation continues to form one of the key objectives of the international community, due in part to the increasing awareness of the link between biodiversity and sustainable development (Convention on Biological Diversity, 2014). Biodiversity provides a critical foundation for ecosystem services, including climate regulation, food production, nutrient cycling, and regulation of water cycle, and is therefore intricately linked to human well-being (Duriappah et al., 2005; Carpenter et al., 2006; Pereira et al., 2013). For example, Agyare (2014) links the application of a Community Participatory Approach such as Community Resource Management Area (CREMA) to conservation.

The expanding human footprint on the planet continues to endanger the foundation of biodiversity and increase biodiversity declines. Currently, over half of the large rivers of the world have been affected by dams (Nilsson et al., 2005), and multiple drivers also have strongly affected 40% of the ocean (Halpern, et al. 2008). The global effect of land use change, modification of river flow, freshwater pollution, and exploitation of marine resources currently constitute the most important drivers of biodiversity change (Convention on Biological Diversity, 2010). For example, 35-40% of the world's forests and other habitat (free of ice) have been converted to cropland and pasture (Foley et al., 2005; Klein et al., 2011). One study (Dornelas et al., 2014) analysed a sample of more than 35,000 terrestrial and aquatic species across the earth and revealed a systematic change in local community composition, as well as a net biodiversity loss at the global scale. Further, the effect of biodiversity loss on human development is most

severe in tropical developing countries, where poor communities rely heavily on natural resources (UNDP, 2011a).

International efforts to address biodiversity decline have included setting up the Strategic Plan for Biodiversity 2011-2020, together with the Aichi Biodiversity targets (CBD, 2010). Amongst the targets is to at least halve the rate of loss of natural habitat; that is, to expand the protected area (PA) conservation target to 17% of terrestrial and inland water areas and 10% of marine and coastal areas (see Spalding et al., 2013), and to restore at least 15% of degraded areas.

PAs can promote tourism, enhance supply of ecosystems services, reduce rates of species loss, mobilize knowledge, and build capacities to protect neighbouring communities from poverty traps (Brockelman & Dearden, 1990; Baird & Dearden, 2003; Porter-Bolland et al., 2012). For example, PAs in rural areas can stimulate growth in ecotourism and economic activities, from which local people derive tangible benefits (Hvenegaard & Dearden, 1991; Mowforth & Munt, 2003; CBD, 2010; Appiah-Opoku, 2011; Bennett et al., 2012). PA establishment can also provide opportunities to reduce human-wildlife conflicts in places that have had to confront wildlife destruction of community resources such as farmlands (Acquah, 2013).

PAs are mainly created for conservation, but can also have negative effects, such as placing restrictions on community access to land and other resources (Curran et al., 2004; Naughton-Treves, 2010; Nelson, 2010; Ferraro et al., 2011). PAs are home to some of the world's poorest citizens, who in many cases depend on forests "for income or as a 'safety-net' during natural disasters or periods of social strife" (Naughton-Treves, 2010: p. 235).

Biodiversity conservation priority areas are important for ensuring efficient biodiversity targets through the services those areas provide for supporting human well-being (Turner et al., 2012). Biodiversity serves as a means of providing input into poor people's livelihoods; and also acts as a "buffer against risks and shocks, helping smooth livelihoods and consumption patterns" (CBD, 2010: p. 13). In some cases, the development of tourism has been noted to improve the benefits of conservation to communities near protected areas (Nelson & Agrawal, 2008; Bennett et al., 2012).

PAs can have both positive and negative effects on communities, and the balance between them depends on diverse factors related to the particular context of the park, and the need to study the particular geography of the situation, such as this study of the effects of Bui Dam on livelihoods of communities near a PA, Bui National Park (BNP). PAs are mainly instruments for conservation, but they can also assist in economic development. Dams, on the other hand, are constructed primarily to aid economic development, but can have both positive and negative effects on local communities, as will be reviewed in the next section. Therefore, it is important that PA systems are "further integrated within broader-scale approaches to conservation and land/water use, which include both protected land and water and a wide variety of sustainable management practices" (Dudley, 2008: p. 10). In this dissertation research, BNP provides part of the context for understanding how nearby communities have adjusted livelihoods in response to the effects of Bui Dam construction.

2.3 Effects of Resettlements Caused by Dam Construction

Resettlement is often considered to be a negative consequence of dam construction, including loss of infrastructure, economic upheaval, loss of cultural identity,

shifts in social roles, and loss of assets that support community livelihoods (Egre, 2007; Bennett & McDowell, 2012; Biswas, 2012; Peter, 2013; Fratkin, 2014). Forced eviction of people, such as those relating to land disputes, can adversely affect community assets, as happened in the case of resettlement of some communities in Phnom Penh, Cambodia (Cave et al., 2010). However, resettlement can also result in positive outcomes, such as improved housing and better schools.

Resettlement is defined as "the sudden and uncompromising removal from what is familiar" to a different settlement, which sometimes destroys social relationships, and compound risks and hazards for displaced people (Bennett & McDonald, 2012: p. 1-2). Bartolomé et al. (2000: p. 4) also suggest that resettlement is "the involuntary and forced relocation of people." The construction of dams may lead to resettlement of communities, and the deprivation of people's access to resources and assets such as farmlands, sacred groves, roads, health centres, and schools (Gordon & Amatekpor, 1999; Andam et al., 2010; Ferraro et al., 2011; UNDP, 2011a; International Rivers, 2013).

In resettlement-related forced land acquisition, communities can be affected through the loss of access to lands for farming and generating incomes (Syagga & Olima, 1996; Han & Vu, 2009). Abbink (2012) argues that the construction of hydro dams can have substantial effects on the environment, socio-economic systems, livelihoods, and the social organization and culture of the people living near the dam or downstream. The Akosombo Dam project in Ghana, for example, led to the loss of community shrines, traditional religious grounds such as sacred groves, and also led to an adverse health implication for some nearby communities (Kalitsi, 2004; Dzodzi, 2006). Further, the Akosombo Dam reservoir led to an increase in some water-borne diseases including

bilharzia and malaria, but also resulted in the reduction and elimination of other diseases, such as river blindness (onchocerciasis), in some areas near the dam (Kalitsi, 2004).

Some literature has also argued that the failure to foresee such adverse consequences of the Akosombo Dam construction makes it difficult for a comprehensive plan to be developed and implemented to address dam impacts, such as the anticipated social and health effects (Lerer & Scudder, 2005). Some authors have argued that the social cost associated with the construction of large dams does not make economic sense for their construction (Ansar et al., 2014). The actual costs of hydropower megaproject development dam construction can adversely impact on conservation efforts such as established protected areas (ERM, 2007). For example, Bui Dam resulted in the exhumation and reburial of some ancestors buried in the communities, but many ancestral heritage sites, and community landmarks for the communities of Bator Akaiyakrom, Bui, and Dokokyina could not be salvaged (ERM, 2007; Ghana News Agency, 2012). Although these ancestors have been reburied, there is still no plan to construct a proper structure, such as a tombstone, to preserve the royalty of the ancestors (even though these burial marks did not exist in the original burial sites). Of critical importance is the destruction of nearly a quarter of BNP, together with the ecological resources and integrity that sustained tourism in the Bui area (ERM, 2007). The Bui Dam construction has also led to the loss of visitor opportunities to the park, which in 2008 stood at 280 (Jachmann et al., 2011). The implication for the loss of visitor opportunities is reduced revenue for the park.

Resettled communities also face additional challenges, as illustrated by the Akosombo Dam construction in Ghana. Here the Volta River Authority (a body

mandated by the Government of Ghana to regulate and oversee the Akosombo Dam project) established a Resettlement Office to plan and execute the program to resettle people who would be displaced by the impending Volta floods (Dzodzi, 2006). However, the process of the resettlement was impeded, in part, by the delay in establishing the government machinery to execute the project (Kalitsi, 2004). Furthermore, the process of evacuation and relocation of communities cut-off by the Akosombo Dam was stalled by the fact that some affected communities also located along the edge of the Volta Lake could only be accessed by boats, and in some cases neither by road nor water. For many resettlements, ineffective compensation measures, and lack of productive lands and livelihood alternatives weaken the resistance of communities to the impacts (Ding, 2007; Ty et al., 2013). In the case of the Akosombo Dam construction, evaluators establishing compensation entitlements did not value land, but allowed individual claimants to seek compensation by establishing their rights to their lands at the Lands Department (Kalitsi, 2004). The cumbersome nature of the valuation, as well as some teething challenges associated with institutional bureaucracies, resulted in the inability of some affected communities to receive appropriate compensation.

Resettlement of communities after dam construction can be positive when it incorporates an effective compensation program, including the payment of appropriate and realistic compensation packages, provision of alternative housing units, and effective planning to uphold or provide livelihood opportunities for dam-affected communities (Marfo, 2014; Bennett & McDowell, 2012). For example, the Akosombo Dam resettlement process focused on key guiding principles and policies to mitigate the potential effects of relocation on the livelihoods of affected people (Kalitsi, 2004). Key

amongst the policies is the use of the resettlement as an opportunity to enhance the social and economic condition of the people, and the provision of cash compensation for those who opted to receive cash rather than relocating themselves, or being resettled, that is receiving compensation in kind, specifically joining a centrally planned resettlement program (Kalitsi, 2004). In other resettlement situations, such as the Bui resettlement process, key policies such as the improvement of the agricultural system from subsistence to cash economy was, in principle, paramount (ERM, 2007). In the Bui resettlement process, people who opted to build or expand their houses could only do so after evacuation to a settlement of choice and an allocation of a resettlement house as compensation in kind. For example, BPA for some years in advance disallowed people from modifying their homes in the villages slated for resettlement.

Therefore it is important to reiterate that compensation principles and policies need to be geared towards mitigating the effects of dams, and providing opportunities to enhance livelihood opportunities available to the affected people. For example, plans to construct dams should first address the potential effects of the dam on nearby communities such that people's concerns including livelihoods would be secured before the potential effects are felt. People could be resettled earlier and allowed to readjust to livelihoods in their new communities well ahead of the impoundment of the dam and resultant flooding phases of the dam construction. In the case of the Bui Dam construction, communities were made to face effects such as flooding of farmlands, and to relocate to new settlements in which some structures, such a clinics, community centre, and schools, were not yet completed.

Resettlement programs have not always been effective, due to the failure to incorporate the concerns of the communities into the overall resettlement process, including the location of new resettlements, design and construction of new structures, changes in livelihoods, and plans to minimize the adverse effects of the intended dam construction.

2.4 Livelihoods

How communities respond to changes, such as the establishment of a PA, or the construction of a dam, can be understood through the lens of livelihood analysis. Livelihood issues have attracted considerable attention due to the critical effects that sustainable livelihoods can have on reducing poverty and improving living conditions for many countries (Carney, 1995; Scoones, 1998; De Haan & Zoomers, 2003; Ellis 2005). Livelihood is about "the capabilities, assets or resources, entitlements and activities required for a means of living" (Chambers & Conway, 1999: p. 6). Livelihood capabilities assessment looks at people's ability to cope with perturbations and to identify and make use of livelihood opportunities, and assets or resources. These assets, also referred to as capital, include: social capital (collective rules, norms and use of family connection to secure food, clothing, or shelter); physical capital (e.g., access to housing, or lands for house construction); and financial capital (e.g., income, savings, supplies of credit and insurance) (Carney, 1998; Hussein, 2002).

Some literature argues that a livelihood can be considered sustainable when it can continue to uphold and sustain the needs of people through situations where the livelihood is impacted by factors, such as flooding, droughts, or dams, that tend to undermine the natural resource base of the people (Chambers and Conway, 1992; Adger

et al., 2006; Krueger, 2009; Nelson, 2010). These livelihoods are measured by assessing how dam-affected people or communities continue to access resources such as capital assets after being impacted by the dam. For example, livelihoods available for people to make a living even after the Bui Dam construction are critical to the development of efforts to reduce the anticipated effects of Bui Dam on community livelihoods.

The approach to applying livelihood studies for many developing countries has transformed over the years. Before the 1990s, livelihood studies emphasized the poor as passive victims, but in the 1990s the assumption of livelihoods was transformed to become an issue of strategies for survival, including those of lived experiences at the levels of household, social networks, and the community (Scoones, 1998; Kirkby, O'Keefe, & Howorth, 2001; De Haan & Zoomers, 2005). It was at this time that the term "sustainable livelihoods" became part of the development discourse. The incorporation of sustainable development has given increased attention to poverty reduction, a people-centred approach, and sustainability in the theory and practice of development (Chambers, 1981; 1984; 1987; Scoones, 2009). Arce (2003) argues that the theoretical roots of the sustainable livelihood approach focused on a shift toward an advocacy for the analysis of the realities of poor and marginalized people from their own perspective. The sustainable livelihood (SL) approach focuses on six underlying principles:
(1) understanding people's priorities and livelihood strategies (people centred);
(2) responding to the expressed priorities of the poor people (response and participatory);
(3) ensuring that micro-level realities (such as capital assets and capabilities) inform macro-level institutions and processes (multi-level); (4) sustainable from economic, institutional, social, and environmental dimensions (sustainable); (5) working with

public, private, and civil society actors (conducted in partnership); and (6) process-oriented, responding to changing livelihoods (dynamic) (Chambers and Conway, 1992). The 1990s approach to livelihood was about the actor (including the poor people), the place (such as communities), and specific context to apply livelihood studies (such as poverty reduction).

This study focuses on the application of SL at the household level. Households for this study represented people forming domestic social units, sharing resources such as a meal a day, accommodation, and expenditures (Bender, 1967; Yanagisago, 1979; Wilk & Miller, 1997; Davenport et al., 2000: p. 901; Casimir & Tobi, 2011). Other studies have focussed on the relationships between vulnerability, social security, and disturbances, such as dam construction (Hussein, 2002; Cornea, 2005; Dzodzi, 2006; Fullbrook, 2008; Folke et al., 2010). Such studies emphasize the need to examine issues that weaken the ability for communities to sustain the livelihood structures. Communities that display vulnerability to issues such as dam construction tend to be predisposed to social insecurity, such as loss of family ties and associations that provide some kind of support such as food, clothing, and shelter to their families.

The SL approach has been applied by many organizations (bilaterals, multilaterals, NGOs, governments, and researchers) to address a wide variety of different issues, such as poverty reduction, PA management, HIV/AIDS, and socio-economic development initiatives (Chambers and Conroy, 1992: p. 6; Scoones, 1998; Baird & Dearden, 2003; Turner et al., 2003; Folke et al., 2010; Porter-Bolland et al., 2012). The use of the SL approach to study issues of improving living conditions and reducing poverty is a complex endeavour. This complexity exists because the exploration of

livelihood issues leads to measurement of a mix of capital assets that may be discrete and in some cases overlapping. One important issue that has attracted less scholarly attention is the response of communities to "shocks" to livelihood such as drought, famine, or as discussed in this research, the construction of a dam and associated resettlements.

2.5 Capital Assets

Closely linked to livelihoods research is the concept of capital assets. Capital assets are the stock of assets and capabilities available to households (Carpenter et al., 2006; Green & Haines, 2012). The literature suggests seven types of capital assets: social; natural; human; physical; financial; cultural; and political (Table 3) (Carney, 1995; Rakodi, 1999; Hussein, 2002; Moser, 2008). These assets are discrete in measurement but can sometimes overlap. For example, politics can sometimes apply to both political capital and cultural capital. Assets available to households and communities can be stored, accumulated, exchanged, or depleted, and put to work to generate a flow of income or other benefits (Norris & Stevens, 2006; Folke et al., 2010; Bennett et al., 2012). Following is a review of these forms of capital assets.

Table 3 Description of Community Capital Assets (Dei, 1991; Carney, 1995; Rakodi, 1999; Ashong & Smith, 2001; Hussein, 2002; Carpenter et al., 2006; Moser, 2008: p. 50; Bennett et al., 2012)

Capital Assets	*Description*
Social Capital	Refers to collective rules, norms, use of family networks/connection to secure food, clothing, or shelter, use of social networks (e.g., schools and churches) to secure employment and education, use of community-based organizations such as cooperatives, and cultural troops to gain a living
Human capital	Refers to investments and opportunities in wage labour, fishing, and related business such as drying and smoking of fish, farming, livestock rearing, trading, skills training or education in opportunities that provide occupation to the people
Natural capital	Refers to stocks of environmentally provided assets, such as agricultural land for farming and rearing of animals, access to fishing grounds, forest and forestry products, and wildlife resources, access to tourism opportunities
Physical capital	Refers to produced and man-made capital (e.g., access to housing, land for construction of houses, roads, electricity, and communication outlets like a post office)
Financial capital	Refers to incomes, savings, supplies of credit and insurance, access to banks, microfinance institutions, money transfers from family and friends, access to financial support from co-operatives
Cultural capital	Refers to practices, traditions, and resources that are central to people's identity; opportunities to practice cultural activities such as festivals, drumming, and dancing; the use of traditional knowledge and practices such as local ways of farming and fishing to gain a living; respect of customs, traditions, elders, and traditional leaders
Political capital	Refers to family involvement in decision making, respect and support of local administrative institutions such as the assemblies and traditional leadership, effectiveness of traditional leaders to mobilize people for activities that improve their living conditions

Social capital is important in developing strategies to help cope with stresses in livelihoods (Moser, 2008; Nelson, 2010), and has been linked to improvements in household access to education, indigenous knowledge, cultural values and norms, efforts to secure access to land for rural farmers, increase in farm production, and rural poverty reduction (Besley, 1995; Carney, 1995; Hussein, 2002; Dzodzi, 2006; Folke et al., 2010;

Bennett et al., 2012). Ferragina's (2013) study on the socio-economic determinants of social capital and the mediating effect of history to make democracy work argues for the need for dense networks, since such networks give rise to horizontal ties and collective action to back efforts to seek the collective interest of people to improve household access to education and indigenous knowledge, to secure access to land for rural farmers, and to reduce poverty. Communities are able to manage risks through the application of social capital strategies such as strategic local networks and interactions (Narayan, 1999; Adger, 2003; Monypenny, 2008). The benefits of social capital in this context are not easily quantified, so they are measured through the number and extent of contacts, memberships, and other proxies. For example, in many communities near Bui that have been affected by the Bui Dam construction, it is difficult to measure the contributions of social capital to people's livelihoods because of the complex network of association and reciprocity among families and communities. The need to address issues of capital assets for communities impacted by shocks such as dam construction is critical, as suggested by Tilt & Gerkey's (2016) study on implications of social capital and socio-ecological resilience under dams and population displacement on China's Upper Mekong River. Dam construction can lead to resettlement that diminishes social capital such as inter-household exchange of financial resources and agricultural labour.

Reid & Muruvi (2011) link community capital assets to critical resources needed to cope with and overcome stress that negatively affects community resources such as capital assets. For example, in Madagascar the protection of community natural capital, such as agricultural practices and provision of employment through tourism, reduced poverty, maintained ecosystem services, and supported community livelihoods

(Naughton-Treves et al., 2005). Raven (2012) suggests that natural capital refers to the stock of physical and biological natural resources that consist of renewable (living space and ecosystems), non-renewable (petroleum, coal), replenishing (atmosphere, portable water), and cultivated (crops and forest plantations) natural capital.

However, attempts to protect and possibly enhance national parks sometimes results in a loss of community access to ecological resources that have sustained livelihoods for people in the communities (Andam et al., 2010; Nelson et al., 2010). Communities located close to PAs are often resettled, denied access to park resources, and lose land tenure rights and access to ecosystem resources. Moreover, in Ghana the establishment of parks, urbanization, increased population pressures, unfavourable land tenure arrangements, and worsening climatic conditions led to reduced access to agricultural lands (Korboe, 1998; Ashong & Smith, 2001). It is important to note that the restoration of natural capital is the most direct and effective remedy for addressing the debilitating socio-economic and political effects on livelihoods (Raven, 2012).

Communities around the Volta River in Ghana coped with socio-ecological impacts of the Akosombo Dam through improvements in community human capital, such as the practice of multiple livelihoods, and intensified exploitation of rivers and lands (Dzodzi, 2006). Baez et al. (2010) and Van den Berg (2010) also argue that households that engage in livelihood activities such as non-farm wage employment and livestock farming receive relatively higher incomes that also translate into high welfare strategies to support any changes in livelihoods. For example, the capital assets framework emphasizes the importance of human capital such as skills, education, and knowledge of the tourism industry to the livelihoods of communities near conservation sites (Bennett et

al., 2012). Consequently, Amjath-Babu & Zander (2016) studied the role of capital and capabilities in ensuring economic resilience of land conservation efforts of the Grain For Green Program in China's Loess Hills. Their results indicate an important relationship between livelihood capitals, including human capital, and household economic resilience to shocks that impact livelihood structure. Improvement in human capital is dependent on access and opportunities to combine additional assets, individual attitudes, and specific circumstances.

Enhancement of community physical assets, such as physical buildings and other community infrastructure such as roads, airports, docks, waste disposal and water treatment plants, is central to improving community livelihood opportunities (Bennett et al., 2012). For example, improvements in community physical capital such as better village infrastructure and the introduction of electricity in Kpong, Ghana, reduced labour-intensive tasks traditionally done by women in the pottery industry (Gordon, 1999; IEG, 2012). Physical capital such as transport and infrastructure is relevant to community livelihoods because it provides access to other capital (NRI, 2000). The ability of people to improve livelihoods through enhanced physical capital, such as better houses, is sometimes limited by increasing costs of building and trends in inter-generational housing arrangements that limit non-family members from acquiring houses (Ghana Statistical Service, 1998; Ashong & Smith, 2001). Grabe's (2014) study on land ownership and gender suggests that women own only 2% of world's land even though they represent nearly 80% of the world's agricultural labour. Grabe argues that most women do not hold secure rights to the land they farm and are denied the opportunity to access or own it for their own livelihoods. A study by Daley and Pallas (2014) on

weighing the implications of women and land deals in Africa and Asia indicates that women across the world face systemic discrimination in their access to, ownership of, and control over land, and the income from its productive use, and in the legal protection of their property rights.

Financial capital in the form of wages, savings, access to credit, remittances, or pensions is an important part of community resources (NRI, 2000). The absence of financial capital is a key characteristic of poverty and the poor (Nunan et al., 2001). Flora and Thiboumery's (2016) study that explores community capital from the perspective of reducing poverty and rural development in arid lands, suggests that financial capital is critical to the development of successful efforts to reduce poverty and promote sustainable development in arid lands. In many rural communities in Ghana, for example, the lack of access to financial capital, including wage opportunities and worsening debt burdens on informal loans, is the main reason causing and keeping people in poverty (Korboe, 1998; Nunan et al., 2001). Bardhan et al. (2000) and Barrett et al. (2001) suggest that the development of dams can result in improvements in financial services, such as access to financial resources for impacted communities.

Other forms of community capital assets relevant to efforts to improve livelihoods are cultural and political capital, because they have the potential to positively or negatively impact access to other forms of capital assets, livelihood strategies, and to decision-making bodies and sources of influence (Hussein, 2002). Political capital exists in the form of policies, institutions, and processes that shape livelihoods (Ashong & Smith, 2001: p. 26). In Ghana, the development of political capital has emphasized several government-led policy initiatives implemented over a number of years. For

example, Ghana - Vision 2020 was developed in 1995 to serve as an overarching national development policy framework with the goal of helping the country to achieve a balanced economy and a middle income status by the year 2020 (Vordzorgbe, 2001). The preparation of the vision included a broad array of stakeholder consultations, including district representatives, the private sector, traditional authorities, and non-governmental organizations (NGOs).

Another important resource impacting community livelihood is cultural capital. Cultural capital emphasizes the practices, traditions, and resources that are central to a people's identity. Cultural capital is also considered as the means and processes for the maintenance of livelihoods (Ellis, 2000). Abbink (2012) also argues that the construction of hydro dams can have substantial effects and impacts on the environment, socio-economic systems, livelihoods, and the social organization and culture of the people living near the dam or downstream. Some studies have also identified that the establishment of a Marine Protected Area (MPA) can sometimes undermine the traditional livelihoods and cultural practices of people nearby (Bennett & Dearden, 2014). The integrity of community cultural resources is also undermined by climate change, which results in ecosystem disturbance and the risk of extinction of animal and plant species. In some cases of climate change, cultural capital is closely correlated with the nature of attachment that individuals have with the people and their environments (Adger et al., 2013). For example, attachment can be seen as the sense of pride associated with belonging to a village, town, or city, as well as the sort of friendships related to such associations.

2.6 Other Factors Influencing the Effects of Dams on Nearby Communities

Some studies have highlighted the role of independent variables such as age, gender, ethnicity, education, and livelihoods in mediating the effects of events such as dams on the livelihoods of people. Zakaria (2009) and Mbala (2011), for example, argue that age can particularly influence the ability to reduce shock to livelihoods with older people being more affected. It is further suggested that longer years of working experience can provide opportunities to mediate livelihoods, and that older women are more likely than younger women to have sustainable livelihoods. For example, younger women through the use of savings and assets tend to have more sustainable livelihoods than their older counterparts, because the aged may have exhausted much of their resources during the long periods of living under harsh economic conditions or may have accumulated more resources over the period (Ogwumike & Aboderin, 2005). Age is argued to impact asset sustainability for communities impacted by dams (de Shebinin et al., 2008). A large majority of the people living near BNP who have also been impacted by the Bui Dam and associated resettlement have endured many years of economic hardship - droughts, poor harvest, loss of their land resources to the establishment of the BNP, and lately the Bui Dam and related resettlements.

Education is also argued to proffer some level of influence on stress and shocks in livelihoods. In exploring issues of multidimensional livelihood vulnerability index, Gerlitz et al. (2016) argues that access to social services such as credit, education and health is central to the process to measure livelihood vulnerability to change in the Hindu Kush of India. Palmer (2009) argues that provision of technical and vocational education, including the widening of opportunities for lifelong learning and sustainability is critical

in creating enabling environment for skills utilization through skills development, sustainable employment, and sustained growth in Ghana. In effect, community involvement in skills training activities provides important solutions to address un/underemployment leading to improved livelihoods and poverty reduction for many rural communities (Palmer, 2007). Van der Land and Hummel (2013) in a paper on vulnerability and the role of education in environmentally induced migration in Mali and Senegal identified that formal education can mediate vulnerability to environmental stress because people with higher levels of education are usually less dependent on environmentally sensitive economic activities such as farming. The authors further add that an involvement in agricultural economic activity can therefore present an obstacle to achieving a high level of formal education. In a similar vein Obayelu et al. (2014) in a paper on factors influencing farmers' choices of adaptation to climate change in Ekiti State, Nigeria identified that most widely used climate change adapation method by farmers in Ekiti State are influenced by factors including years of education, and years of farming experience.

Providing education including training: ultimately builds community competence; encourages community participation; promotes collaboration and partnership; and engages people (traditional leadership, local governance institutions, researchers, and livelihood groupings) in livelihood development activities (Kopelman, 1990: p. 327; Carney, 1997; Norris and Stevens, 2006; Mochizuki & Fadeeva, 2010; Possardt & Reid, 2010; Hout et al., 2011; Reid & Muruvi, 2011). For example, providing education that builds community capacity to plan, and implement community projects such as farms and their related organizations is effective in enabling tomato farmers to develop greater roles

and improve their position in tomato chain management, and also effective in building the competences of tomato farmers in the Northern region of Ghana (Clottey, Karbo, & Gyasi, 2008). Some studies however, suggest that the provision of education does not always lead to improvement in people's livelihoods. For example, a study by Jackson (2011) on the role of education in livleihoods in the Somali Region of Ethiopia sugges that that young people both in and out of education were less positive to impact of education on livelihoods, referring to poor-quality teaching and a lack of educational facilities, suitably qualified teachers, and teaching materials in rural areas.

Gender can also affect the ability to cope with stress in livelihoods since men are sometimes better than women at accessing land, but worse in terms of staying in school (Ashong & Smith, 2001; Lasher, 2013). Eysenbach (2011), Harcourt (2012), and FAO (2014) suggest that women can effectively apply knowledge (i.e., plants and medicinal herbs, and irrigation) in subsistence farming, and better harvesting and use of natural resources to address changes in their livelihood.

Some studies have found that the diversity of rural livelihoods is key to measuring factors that impact on livelihoods, as well as the ability of households to cope with such changes (Ellis, 1998; Bryceson, 2002). According to Mutenje et al. (2010), people or communities that practice viable livelihoods, engage in formal employment, and/or practice mixed livelihoods are able to gain additional incomes that help them to meet their livelihood demands and to overcome changes in their livelihoods. Freeman and Ellis (2005) also suggest that diversification of the livelihoods of individuals or communities can affect their ability to withstand shocks and explore additional income sources needed to make adjustments to practice livelihoods. Aasoglenang & Bonye (2013), in their study

exploring rural livelihood diversity as a coping strategy in the Wa West District of Ghana, identified that households living under stressful conditions were able to develop resilience to make ends meet through the diversification of livelihood portfolios to include diversified crop cultivation, livestock rearing, dry season gathering, petty trading, and especially out-migrant remittances.

Ethnicity is also argued to mediate stress such as dam impacts. Ethnicity can influence the school dropout rate (Aluned, 2000; Maramba & Hall, 2002). Ethnicity can provide further basis for effectively negotiating livelihood patterns for communities impacted by changes in their livelihoods (Agyei-Nsiah, 2007). Other studies have identified that ethnicity and livelihood are at times intertwined, and it is therefore sometimes difficult to isolate the unique effects of each. Braathen et al. (2000) argue that the social struggles for power, resources, and identities can sometimes result in fatal casualties for communities associated with forms of governance such as the neo-patrilineal state, where power flow is directly influenced by the leader. In this study, communities impacted by dams may be predisposed to the influence of ethnicity since access to land for farming, and ownership of community resources are linked to kinship and family lineage. In other circumstances, ownership and access to land is influenced by land ownership in the past generations.

The benefits of practicing multi-livelihoods presents a test case for this Bui study since many communities near the Bui Dam are comprised of ethnic groups that practice a mix of livelihoods, in addition to specific community livelihoods such as farming, fishing, or employment with BNP.

Although some literature has explored livelihoods from the context of community capital assets, many have failed to examine them from the perspective of communities impacted by the construction of hydro dams. However, this study adds to the stock of knowledge by exploring the effects of Bui Dam on livelihoods of communities nearby BNP.

2.7 Conclusion

This chapter has explored the effects of the construction of hydro dams on nearby communities and particularly issues relating to the effect of the Bui Dam construction on Bui National Park, Ghana.

The chapter also reviewed the concepts of livelihoods for communities affected by dams. In Ghana, the construction of the Akosombo Dam and associated resettlements have greatly undermined the livelihood opportunities available to nearby communities. Factoring the experiences of Akosombo Dam construction into issues related to the Bui Dam construction will provide better lessons to uphold and improve the integrity of livelihoods for the nearby communities. Some literature suggests that national parks can provide part of the context for understanding how nearby communities have adjusted livelihoods in response to shocks such as dams and related resettlements (Kalitsi, 2004).

The literature also emphasizes that enhancing community capacity to develop viable and sustainable capital assets can positively affect efforts to reduce the adverse effects of hydro dams. The Sustainable Livelihood framework provides an important tool to analyse changes in capital assets and improve access and use of community capital assets. The literature emphasizes the importance of seven main capital assets (social, natural, human, physical, cultural, financial, and political) as resources that can be used to

develop, maintain, or improve the livelihood opportunities available to communities affected by dams. These assets do not exist in isolation, but are linked to and interconnected with the surroundings. Many studies have failed to explore community capital assets from the perspective of communities affected by dams. Some of the literature also highlights the fact that resettlement of communities affected by dams does not always result in negative effects. The literature suggests the need to promote policies ensuring the provision of appropriate compensation packages, and the creation and sustainment of livelihood opportunities to develop, maintain, or improve the integrity of community livelihoods.

Chapter 3

METHODOLOGY

The previous chapter presented a literature review covering key concepts applied in the study, including issues of poverty, livelihoods, capital assets, effects of dams and national parks, and related concepts. This chapter describes the research design, data collection, and analysis.

3.1 Research Design

The study is a case study illustrating how Bui dam has impacted on nearby communities. Case study is an empirical inquiry that investigates a contemporary phenomenon within its real life context, especially if the intention is to provide clarity of phenomenon and context (Woodside, 2010). The use of a case study design is critiqued on the basis of the fact that the data collected cannot necessarily be generalised to the wider population (Yin, 1994), beyond the context of the Bui Dam and surrounding communities. In other words, finding from this study may not resemble finding from similar studies conducted elsewhere. However, the in depth findings from a case study create a platform for subsequent comparative studies.

This study adopted a triangulation approach (Table 4) involving document analysis (Appendix A) interviews with key informants (Appendix B), a household survey (Appendix C), and detailed household case studies (Appendix D).

Table 4 Research Questions and Associated Methods

Research Question	*Method Used*
Q1. How do communities near Bui Dam perceive the effects of the dam on capital assets?	Questionnaire; Key Informant Interviews; In-depth interviews; document analysis
Q2. Are perceived effects of the Bui Dam on capital assets influenced by age, gender, ethnicity, type of livelihood, and whether communities have been relocated?	Questionnaire

Triangulation is applied to check and establish validity in studies by analysing a research question from multiple perspectives in order to arrive at consistency across data sources or approaches, and also provide an opportunity to uncover deeper meaning in the data (Thurmond, 2001; Heale & Forbes, 2013). Information from key informant interviews was used to provide input for the design of the household survey. The use of the survey approach was relevant to this research because it permitted a wider coverage in the sample, increased the level of objectivity, and provided the opportunity for respondents to review their responses (Creswell, 2003). Data was collected between September 2013 and December 2014 (Table 5).

Table 5 Schedule for Data Collection

Research Instrument	*Schedule for data collection*
Key Informant Interview	January-June, 2013
Document analysis	January – June, 2013
Household Survey	September-March, 2014
In depth Interview	July-November, 2014

3.2 Community Selection

There are 45 communities found nearby the Bui Dam (IUCN, 2010). Seven of these have been relocated and were chosen for study. Six other villages that were not relocated were selected as comparison villages due to their similarities with the relocated villages. At the time of data collection, an additional study village, Bui Camp (also called the Wildlife Village), was in the process of relocation to a new resettlement camp. Wildlife Village was created after the establishment of Bui National Park (BNP) to house the staff and families of BNP. The need to include the six non-resettled communities located near the dam (Bui Camp/Wildlife Village, Bongaase, Gyama, Banda Ahenkro, Agbelikame North, and South villages) in the study was critical, in order to make comparisons with communities that were forced to relocate.

Eight out of 13 sampled communities (Figure 2) were selected because they are affected by the Bui Dam through resettlement. The other five are communities that will be affected by the dam through loss of lands to flooding, construction of transmission lines, and most closely located communities (as indicated by an Environmental and Social Impact Assessment report) to be impacted by the dam (ERM, 2007). Generally, the selection of the case studies took into consideration representation for communities in the two districts (Banda and Bole) impacted by the Bui Dam and associated resettlements.

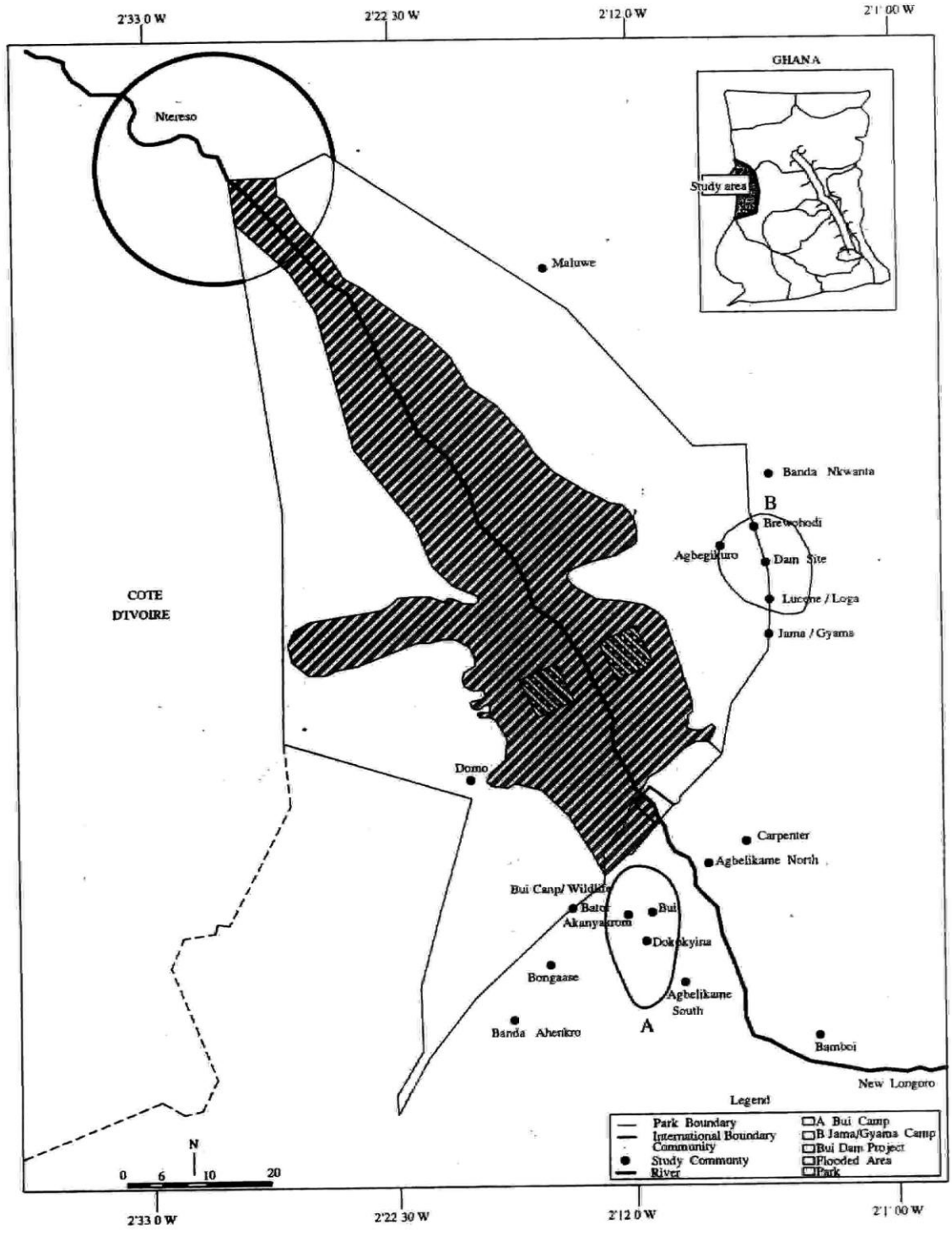

Figure 2 Map of Bui National Park Showing Dam and Resettled Communities (BNP, 2014)

3.3 Key Informant Interviews

Key informants for the study involved a total of 22 people from diverse groups; men and women, family heads, young adults, aged, and researchers that have been involved in some form of livelihood studies. Key informant questions were selected from a mix of options, including consultations with traditional leaders and opinion leaders in the communities, review of literature on community consultation during Bui Dam construction (ERM, 2007), as well as leads provided by people who have researched in the study communities. A key informant interview (use of a semi-structured interview) was incorporated into the research design because it is an effective tool to probe for more information about the topic (Creswell, 2007; Robson, 2011), and it gives the respondents freedom of self-expression and opportunities for more detailed answers (Healey, 1998). Interviewees included eight traditional leaders and elders of the resettled communities, four from the main livelihood groups (that is, traders, fishermen, fishmongers, and farmers), and representatives of BNP, BPA, school, church, District Assembly, and researchers (Table 6).

Research protocols from institutions (see Appendix E) such as the University of Victoria (UVic) Ethics Board, the Wildlife Division (institution responsible for BNP), and Bui Power Authority (institution that coordinated the resettlement process) were sought before conducting interviews. In all of these cases, the confidentiality of respondents' responses was assured. Codes that did not provide a hint to their identity were subsequently used to reference key informants. As a result, the study did not in any way reveal the identity of key informants.

Key informant interviews (Appendix B) provided information on: (1) the effect of Bui Dam construction and resettlement on community capital assets; (2) the effect of Bui Dam construction and resettlement on traditional leadership; and (3) the effect of Bui Dam and resettled communities on the management of Bui National Park (BNP). Responses were used as primary data, and also to inform the development of a household survey.

Key informants were selected based on the specific roles they play in the society, and on judgment that they have some level of knowledge on issues being investigated (Creswell, 2007; Robson, 2011). Snowballing was useful in suggesting other potential respondents through their personal network (such as friends, and people of the same thinking and orientation) (Henslin, 1972; Biernacki & Waldorf, 1981). Biases in snowballing were reduced by obtaining a sizeable sample of potential respondents (Atkinson & Flint, 2001); relying on a variety of indirect sources such as informal meetings at social grounds, including markets, and community meetings to develop the respondents' base (Faugier & Sargeant, 1997); and reaching groups such as women and young adults, and the aged. Questions included how people in the communities made a living before and after the Bui Dam; aspects of capital assets that have been changed by the Bui Dam; whether any new forms of leadership have been developed after the Bui Dam; and whether people have received any training opportunities for adapting to the stresses on livelihoods created after the Bui Dam construction and related resettlements. Key informant interviews served to complement survey findings, and also guide the presentation and interpretation of the results from the study.

Table 6 List of Key Informants for the Study

Respondent's number	*Town*	*Key Characteristics*	*Respondent's number*	*Town*	*Key Characteristics*	*In depth Interviews*
V001	Bui	Male	L013	Bator	Fishing, Male, Youth	√
V002	Bator	Male, Elder	L014	Dokokyina	Farmer, Male, Elder	√
V003	Dokokyina	Male, Elder	S015	Bator	Teacher, Male, Elder	
V004	Bui Camp/ Wildlife	Male, Elder	S016	Bator	Catechist, Male, Elder	
V005	Dam site	Female, Elder	S017	Bongaase	Male, Farmer	√
V006	Brewohodi	Male, Elder	G018	Bui Camp/ Wildlife	BNP, Male, Head	√
V007	Lucene,	Male, Elder	G019	BPA camp	BPA, Male,	
V008	Agbegikro	Male, Elder	G020	Bator	District Assembly, Male, Youth	
L009	Bator	Fisherman, Male, Youth	R021	Sunyani	Researcher A, Male, Lecturer (with years of research experience in communities near BNP)	
L010	Bator	Fish monger, Female, Youth	R022	Sunyani	Researcher B, Female, Lecturer (with years of research experience in communities near BNP)	
L011	Dokokyina	Farmer, Male, Elder				
L012	Bator	Trader, Female, Youth				

After conducting the informant interviews, a follow-up consultation was made with the informants to verify about the accuracy of the interviews. This process allowed for improved validation of the data as well as accuracy of inputs from interviewees.

3.4 Community Survey

The questionnaire was developed from the literature review and the key informant interviews. Questionnaire items focused on the distribution of effects of Bui Dam on household and community assets for dam-affected communities near BNP, addressing the concepts of capital assets and community competence (see Appendix C). The questionnaire contained four sections:

- Demographic information (Section A)
- Perceived effects of the Bui Dam on capital assets (Section B)
- Perceived access to training opportunities (Section C)

The questionnaire was designed to obtain mainly quantitative data, so most questions were presented in a format whereby respondents circled a number indicating the most appropriate response. Perceptions were measured using a five point scale ranging from "conditions much worse" to "conditions much better" (see Appendix F). Demographic questions used fixed response categories. A small number of questions used an open-ended response format. For example, Q14 asked respondents to describe what training opportunities are yet to be provided for you and your family to make a living after construction of the Bui Dam.

A pilot study involving able and willing people was carried out in eight of the study communities. Respondents included six academics who have undertaken some form of research in the study area, and ten people from eight resettled communities around BNP. The respondents reviewed the questions to provide clarity and relevance of questions to the intended participants in the communities. Information from the pre-test helped to modify the household questionnaire to ensure that questions were easily

understood by respondents, and the required information captured. All statements were translated into the Twi language, a common second language in the region. Respondents who could understand English and also preferred to self-respond to the questionnaires were handed paper copies to provide their input. Other respondents who did not understand English had interviewers read the questions aloud for their responses. A translator was engaged to support the interviews, especially where informants could not speak or understand English or Twi (common to the researcher). The responses were recorded by the interviewers. These assistants included two from the communities near the dam (a head master and his assistant who have completed undergraduate programs), and two others who have completed their MBA programs from recognized universities.

The research assistants were taken through six training sections. Issues addressed at the training sessions included the following;

- qualities of an interviewer
- duties of an interviewer
- addressing potential challenges associated with research instrumentation
- review of the objectives of the study
- review of the guide for key informant interviews
- review of household survey instruments

Table 7 List of Villages Around BNP Inundated or Impacted by the Bui Dam (Stahl, 2001; ERM, 2007; Ghana Statistical Service, 2012b)

Banda District						
Village	*Ethnicity*	*Major Livelihood*	*Resettled*	*Population*	*Total Households*	*Sampled Household*
Bui	Mo-Nafana	Farming	Yes	297	42	25
Bator	Ewe	Fishing	Yes	437	63	35
Dokokyina	Mo	Farming	Yes	165	36	20
Wildlife	Multi-ethnic	Mixed (fishing, farming, BNP)	No	100	36	20
Banda Ahenkro	Nafana	Farming	No	3323	Unknown	50
Agbelikame South	Ewe	Fishing	No	209	26	15
Bongaase	Nafana		No	2797	347	50
Bole District						
Lucene/Loga	Dagarti	Farming	Yes	26	4	4
Brewohodi	Dagarti	Farming	Yes	48	10	5
Dam site	Ewe	Fishing	Yes	36	6	5
Agbegikro	Ewe	Fishing	Yes	107	22	15
Jama/Gyama	Mo	Farming	No	1500	154	50
Agbelikame North	Ewe	Fishing	No	702	70	35
Total	-	-	-	9,627	816	329

The revised questionnaire was administered to a sample involving participants representing households, randomly selected from an openly available village register for the eight villages, which indicated housing units and members of households (Groves et

al., 2006). Households for the study represented people forming domestic social units that share resources, such as sharing a meal a day, sharing accommodation, and sharing expenditure (Bender, 1967; Yanagisago, 1979; Wilk & Miller, 1997; Davenport et al., 2000: p. 901; Casimir & Tobi, 2011). The method was relevant for the study because households are organized along residential units (ERM, 2007). The sample was comprised of 339 people (with 100% response rate) who constituted at least 50% of the households in most communities. The sample included adult male and female heads of households, which was a variable noted in the available village register (Table 7).

Since the number of households is known to be 816 for this study (Table 7), with a sample size of 329, the margin of error can be estimated at + or – 5%, at the 95% confidence level (SurveyMonkey, 2016). This means that the findings reported in Chapter 4 are likely to be within 5% of the values had all households been surveyed.

3.5 Qualitative In depth Interviews

For this part of the study, four families were purposively selected for in depth interviews (Seawright & Gerring, 2008). The selection of cases for in depth interviews adopted the most similar and most different methods. This selection procedure requires that sampling be conducted to cover the most similar and most different attributes relating to the research objectives (Seawright & Gerring, 2008). Both methods require the selection of a minimum of two cases for data collection and analysis, as employed in this study (see Przeworski & Teune, 1970; Gerring & McDermontt, 2007; Seawright & Gerring, 2008). The application of the “most similar and most different” choice of cases for in depth interviews involved families that are similar on specified experiences and are broadly representative of the views and experiences of the families affected by the

construction of the Bui Dam. There is the need for caution in not interpreting these findings from the in depth interviews as representative of the study population but, rather the method provides illustrations of the more generalized results found in the chapter four survey findings. Two of the cases for in depth interviews have been relocated and two were not relocated as a result of the dam. The choice of the most different method of in depth interviews selection was also relevant because these families have been affected differently by the Bui Dam construction. The reasons for the different effects included the different sociological backgrounds of the families, such as ethnicity, type of livelihoods, as well as the communities in which the families lived before and after the dam construction. For example, the four cases for in depth interviews came from four communities: Bongaase (Nafana), Bui Camp (Fante), Dokokyina (Mo), and Bator (Ewe). These families also engaged in livelihoods such as farming and fishing. The four families selected for the in depth interviews provided in-depth feedback on how families navigated through the process of the Bui Dam construction.

Table 8 Selection of In depth Interviews

In depth Interviews 1-4	*Selection Criteria for families*
Most Similar Characteristics	• Impacted by Bui Dam • Nearby Bui Dam and BNP • Practices at least one of the main livelihoods (e.g., fishing or farming)
Most Different Characteristics	• Relocated/Non-relocated • Different livelihoods • Different dam effects on livelihoods • Different ethnic backgrounds • Different experiences

Selection of the case studies also considered people who have lived many years near BNP, those who have lived through the process of migration to live near BNP, those

who transitioned through the process of construction of the dam, types of livelihoods, those resettled and those not resettled, as well as geographical locations of communities.

These case studies delved into the personal family experiences during the period of the Bui Dam construction. The four families provided details of their experience as they transitioned into a new livelihood as a result of the Bui Dam.

3.6 Analysis of Data

Qualitative data obtained through key informant interviews, household questionnaire surveys, and document analysis were analysed descriptively by the use of themes and categories from the data (Robson, 2011). Themes were developed to guide the analysis of the qualitative data. These themes were built around issues relating to dam effects on community capital assets. The findings were given to other researchers to review to confirm the accuracy of the developed interpretations.

The quantitative data derived from household questionnaire surveys was coded and analysed using of Statistical Package for Social Sciences (SPSS) 17 software. The analysis looked at how community members perceived capital assets had changed as a result of the Bui Dam. The findings are reported with respect to each type of capital asset, with responses to statements coded on a scale ranging from 1 to 5, where 1 = much worse, 2 = somewhat worse, 3 = unchanged, 4 = somewhat better, and 5 = much better. The data was presented in this way to display variability in response to some items.

The tables provide further analysis that explores variability in responses through comparisons of a number of independent variables: (1) communities relocated versus not relocated; 2) ethnicity; and (3) livelihood type. Ethnicity was collapsed from nine groups (Gonja, Akan, Wala, Dagarti, Lobi, Ewe, Nafana, Mo, and others - Bono, Fante, and

Asante) into three main groups (Nafana, Mo, and Ewe) to represent categories that recorded higher responses. These analyses are provided with statistical tests that were used for each type of comparison. Where mean responses are compared between two groups, the Student's T-test was used to determine statistical significance (e.g., when comparing mean responses from relocated communities with responses from communities that have not been relocated). When the analysis required the comparison of mean responses of more than two groups (e.g., between three different ethnic communities), analysis of variance (ANOVA) was used to determine if a statistically significant relationship occurs (the F-test). Whenever the F-test was found to be significant ($p=0.05$ or smaller), the Scheffe test was used to examine each possible pair of groups to determine which pairs were significantly different. Tests of significance for age and gender are also discussed, but are not provided in the tables (because age and gender had little effect on perceptions of capital assets). With each section of this results chapter, a brief discussion of related literature is provided, in order to make preliminary comments on how the Bui data compares with other studies. However, a larger discussion is provided in the final chapter. Where possible, the results are compared with qualitative analysis provided from key informant interviews.

It is important to note that the analysis of findings focused on capital assets as dependent variables; whereas independent variables included gender, age, type of livelihood, ethnicity, and whether communities have been relocated as independent variables. Other possible independent variables were considered, including education, years lived near the dam, type of family before and after the dam, role in the family, and role in the community. However, these variables were not presented in Chapter 4,

because they did not show any significant relationship with the dependent variables (capital assets). As a result only five independent variables showing significance relationships were considered for the analysis.

Similarly, a number of questions that explored the impact of Bui Dam on community competence were not presented in this results because these variables also did not provide statistical significance with other variables in the study.

Chapter 4

EFFECTS OF DAM CONSTRUCTION ON COMMUNITY CAPITAL ASSETS

The results and findings of the study are presented in this chapter and the next chapter. This chapter describes results of survey research and key informant interviews to examine the two research questions:

Question 1: “How do communities near Bui Dam perceive the effects of Bui Dam on capital assets?”

Question 2: “Are perceived effects of the Bui Dam on capital assets influenced by age, gender, ethnicity, livelihood, and whether communities have been relocated?”

The results in this chapter are displayed by reporting how subjects perceived the Bui Dam affected each of the seven capital assets outlined in the literature review: human, social, political, natural, physical, financial, and cultural. For each type of capital asset, a number of statements were provided on the questionnaire that related to conditions that would describe that capital asset. Respondents were asked to indicate if they felt these conditions had changed as a result of the Bui Dam. Were conditions now: (1) much worse; (2) somewhat worse; (3) about the same; (4) somewhat better; or (5) much better? It is important to note that a score of 3 on the 5 point likert scale indicates a positive response (i.e. 3= "conditions about the same"). There is a tendency to see 3 as a low or medium impact score, but actually for this study a score of 3 can indicate a positive score.

This data was organized into tables displaying:

- Descriptive responses and mean response to each statement (mean can range from 1 to 5)
- Comparisons of mean responses of relocated communities with communities not relocated (compared using Student's T-test)
- Comparisons of mean responses by livelihood types: farming, fishing, and mixed livelihoods (compared using ANOVA and Scheffe tests)
- Comparisons of mean responses by ethnic groups: Nafana, Mo, and Ewe (compared using ANOVA and Scheffe tests)

The perceived effects of age and gender on capital assets were measured as well. However, these findings are reported in the narrative, rather than in tables, because few significant relationships existed.

The next stage of analysis used multiple regression to examine the cumulative effect on each capital asset by all independent variables: relocation, livelihood type, ethnicity, age, and gender. This analysis provided the relative strength (beta values) of each independent variable on each type of capital asset. However, it is important to note that ethnicity and livelihoods are at times intertwined, and sometimes difficult to separate. The study results in some cases, present ethnicity as part of the broader discussions on influence of type of livelihood on dam impacts and vice versa.

The chapter concludes with a summary of key findings, provided with four tables: (1) summary of perceived effects of Bui Dam on each capital asset (Table 32); (2) summary of how relocation impacts on perceived effects of Bui Dam on each capital asset (Table 33); (3) summary of how livelihood impacts on perceived effects of Bui

Dam on each capital asset (Table 34); and (4) summary of how ethnicity impacts on perceived effects of Bui Dam on each capital asset (Table 35).

The next chapter (Chapter 5) complements these results by providing findings from case studies of four families examined to determine how communities navigated their livelihoods through the effects of the Bui Dam and associated resettlements.

4.1 Demographic Background of Respondents

The demographic characteristics of respondents are shown in Table 9. A higher number of males participated. Respondents varied in age, years lived near BNP, and ethnicity.

Table 9 shows that a majority of respondents had lived near the dam for a period of more than 20 years. The main ethnic groups are Nafana (33.4%), Mo (29.5%), and Ewe (23.4%). Each of the other ethnic groups (Gonja, Akan-Bono, Fante and Asante, Wala, Dagarti, and Lobi) fell below 5%. These "other" ethnic groups were included in the analysis, except for the tables comparing response by ethnicity (since the respective sample sizes were small). Other variables such as education was not used in the results because the variable was not significantly related to any of the dependent variables (capital assets).

Table 9 Demographic Characteristics of Respondents

Characteristics	*Number (Percent)*
Gender	
Male	187 (56.8%)
Female	142 (43.2%)
Age	
18-25 years old	39 (11.9%)
26-35 years old	68 (20.7%)
36-45 years old	102 (31.0%)
46-55 years old	72 (21.9%)
Over 55 years old	48 (14.6%)
Years lived near BNP	
Less than 11 years	35 (10.6%)
11-20 years	19 (5.8%)
21-30 years	95 (28.9%)
31-40 years	27 (8.2%)
41-50 years	116 (35.2%)
More than 50 years	37 (11.2%)
Ethnicity	
Nafana	33.4%
Mo	29.5%
Ewe	23.4%
Others (Gonja, Akan-Bono, Fante, Asante, Dagarti, Lobi)	13.7%

4.2 Effects of Bui Dam on Human Capital

Human capital refers to investments and opportunities in wage labour, fishing and related business such as drying and smoking of fish, farming, livestock rearing, trading, skills training, or education in opportunities that provide occupation to the people

(Dzodzi, 2006; Bennett et al., 2012). Respondents were asked to rate the impact of the Bui Dam on eight types of human capital (Table 10). All eight were perceived to be worse after the dam construction, with mean scores falling below 3 in each case. The greatest impacts are on access to skills training (mean=2.01 with 65.9% indicating conditions were worse) and lowest in opportunities to trade (mean=2.64, with 47.5% indicating conditions were worse).

Table 10 Impacts of Bui Dam on Human Capital

	Response (%)					
Human Capital	*Much Worse (1)*	*Somewhat Worse (2)*	*About the Same (3)*	*Somewhat Better (4)*	*Much Better (5)*	*Mean*
Opportunities for wage labour	46.2	3.3	19.5	17.6	13.4	2.49
Opportunities to fish	43.2	6.1	10.9	25.8	14.0	2.61
Opportunities to farm	41.3	12.5	25.8	6.1	14.3	2.39
Opportunities to rear livestock	36.5	6.4	37.7	14.3	5.2	2.45
Opportunities to sell charcoal	39.8	13.1	35.0	5.5	6.7	2.26
Opportunities to trade	42.6	4.9	15.5	19.8	17.2	2.64
Opportunities to sell fish	42.6	6.1	21.3	17.9	13.2	2.51
Access to skill training	54.7	11.2	14.9	15.8	3.3	2.01

Comparisons between resettled and non-resettled communities (Table 11) indicate that resettled communities have been more negatively impacted for all aspects of human capital, as indicated by the T-test results:

- The largest difference was opportunities for fishing. This trend was anticipated since the dam was perceived to affect modes of fishing, as well as to create opportunities in fishing that will attract other opportunists into the fishing sector.
- The smallest difference was access to skill training. Affected communities still continue to engage in their previous livelihoods as was conducted in the past. This implied that many of the impacted people will not prioritize the need for any new forms of training.

Table 11 Influence of Resettlement and Ethnicity on Human Capital

		Comparing Mean Responses by Relocated and Not Relocated			*Comparing Mean Responses by Ethnicity*				
Human Capital	Mean	Relocated	Not Relocated	t-test, signif	Nafana (N)	Mo (M)	Ewe (E)	ANOVA F, P	Scheffe Test
Opportunities to engage in wage labour	2.49	1.00	3.22	T=-18.366 P=<0.001	3.08	2.76	1.17	F=56.27, P=<0.001	N – M =0.109 N - E=<0.000 M - E=<0.000
Opportunities to fish	2.61	1.03	3.40	T=-17.029 P=<0.001	3.33	2.76	1.30	F=56.27 P=<0.001	N-M=0.003 N - E=<0.000 M - E=<0.000
Opportunities to farm	2.39	1.04	3.07	T=-16.265 P=<0.001	3.09	2.37	1.49	F=36.67, P=<0.001	N -M=<0.000 N - E=<0.000 M - E=<0.000
Opportunities to rear livestock	2.45	1.06	3.12	T=-22.876 P=<0.001	3.00	2.56	1.53	F=42.41, P=<0.001	N – M=0.007 N – E=<0.000 M - E=<0.000
Opportunities to sell charcoal	2.26	1.05	2.86	T=-17.654 P=<0.001	2.64	2.31	1.43	F=30.99, P=<0.001	N – M=0.045 N - E=<0.000 M - E=<0.000
Opportunities to trade	2.64	1.16	3.56	T=-15.914 P=<0.001	3.30	2.89	1.29	F=17.53, P=<0.001	N –M=0.043 N-E=<0.000 M - E=<0.000
Opportunities to sell fish	2.51	1.04	3.24	T=-17.785 P=<0.001	3.11	2.69	1.30	F=51.71, P=<0.001	N – M=0.029 N – E=<0.000 M - E=<0.000
Access to skill training	2.01	1.05	2.50	T=-11.490 P=<0.001	2.26	1.48	2.40	F=18.28 P=<0.001	N - M=0.005 N – E=<0.000 M - E=0.022

Comparing the effects of ethnicity on human capital assets (ANOVA and Scheffe tests, in Table 11) indicates that:

- Nafana was less negatively impacted (lower mean impact scores) than Ewe for nearly all forms of human capital.
- Nafana was less negatively impacted than Mo for all but one form of human capital
- Mo was less impacted than Ewe for all forms of human capital.
- Many of the Nafana and Mo communities are farmers whose farming livelihoods were less impacted by the dam compared to Ewe communities who mainly engaged in fishing livelihoods. The implication is for increased training and

financial support to promote fishing livelihoods for the Ewe as well as other ethnic groups that plan to engage in fishing as livelihoods.

Table 12 Influence of Livelihood on Human Capital

Human Capital	**Comparing Mean Responses by Livelihood**					
	Mean	*Farming*	*Fishing*	*Mixed*	*ANOVA F, Signif.*	*Scheffe Test*
Opportunities to engage in wage labour	2.49	3.05	1.24	3.25	F=74.791 P=<0.001	Fa-Fi=<0.001 Fa-M=0.805 Fi-M=<0.001
Opportunities to fish	2.61	3.23	1.36	2.95	F=70.170 P=<0.001	Fa-Fi=<0.001 Fa-M=0.671 Fi-M=<0.001
Opportunities to farm	2.39	2.81	1.61	2.30	F=27.980 P=<0.001	Fa-Fi=<0.001 Fa-M=0.263 Fi-M=0.104
Opportunities to rear livestock	2.45	2.79	1.75	2.70	F=30.227 P=<0.001	Fa-Fi=<0.001 Fa-M=0.948 Fi-M=0.004
Opportunities to sell charcoal	2.26	2.54	1.57	3.00	F=67.568 P=<0.001	Fa-Fi=<0.001 Fa-M=0.229 Fi-M=<0.001

Comparing the effects of livelihood type on human capital produced the following findings (Table 12):

- People with farming livelihoods were less negatively impacted for all aspects of human capital than people with fishing livelihoods. The Bui Dam effects on farmers and their livelihoods was less compared to the other forms of livelihoods such as fishing and mixed since farming livelihoods were better able to cope with the effects of the dam.
- People with mixed livelihoods were less affected than people with fishing livelihoods for all but one aspect of human capital. People engaged in mixed

forms of livelihood were less affected by the dam construction than people who are into fishing livelihoods.

- Mixed and farming livelihoods equally affected (no significant differences)

Key informants provided some insights regarding how dam effects are less severe and where livelihoods have been improved (numbers beside each statement refer to an informant):

- Livelihoods have been improved with the expansion of fishing grounds to include the 444 km^2 lake created by the dam (L009). Now there is the possibility to engage in extensive lake fishing, even on a large scale. Moreover, there is a large fishing space to accommodate people who intend to move or adopt new or additional livelihoods such as fishing. This development also makes it possible for an expansion of fishing-related livelihoods such as fish mongering, fish salting, and general trading in fish products.
- There is an increase in formal employment, with teachers and nurses in newly constructed schools and clinic respectively (S013) due to improvement in accommodation, social amenities, and infrastructure in the communities.
- There is a temporal increase in some forms of informal work, such as masons, carpenters, steel benders, drivers, food vendors, and shop owners. A number of people employed by the construction sector of Sinohydro (e.g., masons, carpenters, steel benders, drivers), the Chinese company constructing the Bui Dam (G016) were temporary employees and many of the people were laid off after the completion of construction work (G017).

A community leader from the Wildlife community (V004) noted that people there practiced different livelihoods, including fishing and farming. This community hosts employees and families of BNP, which also helps to provide other forms of additional regular income to support household livelihoods of the people in the community.

These observations suggest that some of the challenges in changes in livelihoods created by the Bui Dam have been absorbed in part by the diversified livelihoods practiced by many of the people in the non-resettled villages. The implication is that diversified livelihoods practiced in the non-resettled communities are more resilient to the shocks of dams, but not characteristic of the resettled communities.

The final aspect of this analysis examined the influence of gender and age on perceived impacts on human capital, but no significant relationships were identified.

4.3 Effects on Social Capital

Social capital refers to collective rules, norms, use of family networks/connection to secure food, clothing, or shelter to gain a living (Moser, 2008). Perceptions of the effects of Bui Dam on social capital are varied between worse and better for many aspects of social capital, with mean scores varying between 2.40 and 3.15 (Table 13). For example, the impact of Bui Dam on the strength of family networks (mean=3.15), the use of schools (mean=2.89), and support of traditional leadership (mean=3.05) is better for many people, but worse for others.

Table 13 Impacts of Bui Dam on Social Capital

	Response (%)					
Social Capital	*Much Worse (1)*	*Somewhat Worse (2)*	*About the Same (3)*	*Somewhat Better (4)*	*Much Better (5)*	*Mean*
Family networks to make a living	15.8	8.5	33.1	30.4	12.2	3.15
Schools to support how you make a living	26.1	7.6	24.6	35.0	7.3	2.89
Access to health clinic	31.3	7.0	14.6	19.1	28.0	3.05
Traditional leadership to support how to make a living	29.5	3.6	21.0	23.7	22.2	3.05
Community-based organization to support how to make a living	34.0	17.0	28.0	16.4	4.6	2.40
Police and Judiciary to support how to make a living	43.5	10.3	16.7	19.5	10.0	2.42

Mean scores for non-relocated communities were higher (less negative) than relocated communities in all six aspects of social capital (t-Test results in Table 14), with the most dramatic differences evident regarding the support of traditional leadership, and access to health clinic. It is apparent that traditional leadership continues to contribute to efforts to make a living in the dam-impacted communities. Traditional leaders in the resettled communities continue to act as conduit for government policies and support to the larger populace. In some cases, negotiations for livelihood support are channeled through the traditional leaders of the various resettled communities. The smallest difference was regarding the use of family networks. After the dam, family networks continue to exhibit a strong level of contribution to the livelihoods of people living near the Bui Dam.

Table 14 Influence of Resettlement and Ethnicity on Social Capital

		Comparing Mean Responses for Relocated vs Not Relocated Communities			*Comparing Mean Responses by Ethnicity*				
Social Capital	*Mean*	*Relocated*	*Not relocated*	*t-test, P*	*Nafana (N)*	*Mo (M)*	*Ewe (E)*	*ANOVA F, P*	*Scheffe Test*
Family networks to make a living	3.15	2.89	3.27	T=-.2.702 P=0.007	3.43	3.22	2.80	F=5.666 P=0.004	N – M=0.524 N - E=0.004 M - E=0.087
Access to schools	2.89	2.13	3.28	T=-8.093 P=<0.001	3.28	3.04	2.16	F=19.025 P=<0.001	N-M=0.331 N -E=<0.001 M - E=<0.001
Access to health clinic	3.05	1.87	3.64	T=-10.824 P=<0.001	3.83	3.35	1.84	F=48.151 P=<0.001	N - M=0.022 N - E=<0.001 M - E=<0.001
Traditional leadership to support how to make a living	3.05	1.73	3.71	T=-13.851 P=<0.001	3.55	3.32	2.16	F=23.733 P=<0.001	N – M=0.511 N – E=<0.001 M - E=<0.001
Community organization to support how to make a living.	2.40	1.51	2.85	T=-10.660 P=<0.001	2.79	2.35	1.83	F=16.953 P=<0.001	N – M=0.012 N – E=<0.001 M - E=0.015
Police and Judiciary to support how to make a living	2.42	1.05	3.10	T=-16.232 P=<0.001	3.02	2.48	1.43	F=35.415 P=<0.001	N – M=0.006 N - E=<0.001 M - E=<0.001

Analysis of age against social capital shows that people between 18 and 35 years of age had worse access to health clinic (mean=2.7; F=3.379, ANOVA signif.=0.052), compared to those between 36 and 45 years of age (mean=3.3). This trend is explained by the fact that the majority of people in the 18-35 year old bracket required the livelihood support services from extended family members such as uncles, aunts, and cousins. In many of the Ewe communities such as Bator, most of the 18-35 year old population are unemployed and still depend on the strength of family networks. However, the situation of most of the age category is worsened by the adverse impacts of Bui Dam on livelihoods of people living near the dam. Gender did not show any significant relationship with social capital.

As to the impact of ethnicity on perceived impacts on social capital (Table 14):

- Nafana were less negatively impacted than Ewe for all aspects of social capital.
- Mo were less negatively impacted than Ewe for five of the six aspects of social capital (use of schools; access to health clinic; support of traditional leadership; use of community-based organizations; and support of police and judiciary). This reflects the important role that capital like strength of social networks plays in the livelihood options of the Ewe compared to the Nafana and Mo communities.
- Nafana were less negatively impacted than Mo with three aspects of social capital (access to health clinic; access to community-based organizations; and support of police and judiciary).

Table 15 Influence of Livelihood on Social Capital

Social Capital	*Comparing Mean Responses by Livelihood*					
	Mean	*Farming*	*Fishing*	*Mixed*	*ANOVA F, Signif.*	*Scheffe Test*
Family networks to support your livelihood	3.15	3.40	2.69	2.90	F=12.919 P=<0.000	Fa-Fi=<0.000 Fa-M=0.193 Fi-M=0.776
Schools to support your livelihood	2.89	3.29	2.09	3.05	F=34.265 P=<0.000	Fa-Fi=<0.000 Fa-M=0.690 Fi-M=0.006
Police and judiciary to support your livelihood	2.42	2.84	1.48	3.10	F=41.062 P=<0.000	Fa-Fi=<0.000 Fa-M=0.702 Fi-M=<0.000
Traditional leadership to support your livelihood	3.05	3.46	2.36	2.55	F=21.369 P=<0.000	Fa-Fi=<0.000 Fa-M=0.028 Fi-M=0.867
Community-based organizations support your livelihood	2.40	2.67	1.82	2.80	F=19.330 P=<0.000	Fa-Fi=<0.000 Fa-M=0.889 Fi-M=0.003
Health clinic to support your livelihood	3.06	3.75	1.75	2.85	F=76.443 P=<0.000	Fa-Fi=<0.000 Fa-M=0.018 Fi-M=0.004

Table 15 provides an analysis of the impact of livelihood type in the way that impacts on social capital are experienced:

- People with farming livelihoods are less negatively impacted than people with fishing livelihoods for all aspects of social capital. People in fishing communities are mostly Ewes, and Mo and Nafana are farming communities. Ewe communities exhibit a higher level of family networking and also communal sharing of livelihood resources, mentoring, and engaging in group fishing expeditions. This is quite different from the farming communities whose level of communalism is lower. Cultivation of farms is conducted by individual families whose farmlands are usually distant from the other, thus limiting the chances of supporting the other in terms of farm labour, and proceeds from farms. This ensures that each farmer and their families work harder since there will be no 'free meals' anywhere. Unlike the farming communities, fishing is more communal in activities since a set of men may together engage in a fishing expedition after which the fish catch is carted, smoked, and sold by the families of the fishermen, thus drawing more on communal benefit. In this kind of communalism there is a higher chance of 'free riders' who also exploit the livelihood gains of other members of the community. The loss of fishing grounds that support river fishing, and the increased cost and risk of fishing in the lake will imply that many people will be denied their sources of livelihood gained through active fishing or by virtue of communalism of the community. This explains the trend of dam impacts on livelihoods, especially the less negative impacts of Bui Dam construction on the farming communities near the dam.

- Farming livelihoods are less negatively impacted than mixed livelihoods for two aspects of social capital (support of traditional leadership; and health clinics). The worse impacts on the fishing communities are also reflected in mixed livelihoods, as compared to farming communities.
- Mixed livelihoods are less negatively impacted than fishing for four aspects of social capital (use of schools; support of police and judiciary; use of community-based organizations, and health clinic). It seems that the farming component of the mixed livelihood scenario contributed to the better response compared to households with a fishing livelihood.

A community leader (V001) noted that changes in residential arrangements for the Bui resettlement process, including clustering different communities together in the Jama resettlement camp near BNP, have made it difficult for some people in resettled communities to identify or gain support from the strength of their family networks. Improving family networks can push communities to improve upon how they overcome social and ecological changes created by dams. This is because the social network is stronger for communities of Ewe descent, but the contribution of the networks has been reduced by the worse impacts of Bui Dam on community livelihoods. Networking opportunities that supported how people lived before the dam have been eroded with attendant challenges for this category of people. Many of the existing networks have been negatively impacted, thus worsening livelihood challenges, and it is envisaged that an anticipated improvement in family networks will be difficult since there are no plans to redefine the current resettlement plan that has lumped different ethnic groups into a mix of housing units.

4.4 Effects on Political Capital

Political capital refers to family involvement in decision making, respect and support of local administrative institutions such as the assemblies and traditional leadership, and effectiveness of traditional leaders to mobilize people for activities that improve their living conditions (Ashong & Smith, 2001: p. 26). Perceptions of the effect of the Bui Dam on political capital is mixed (Table 16), as indicated by the mean scores, and the percent responding that conditions are worse compared to the percent responding that conditions have become better. For example, family involvement in community decision making is better for many households (mean=3.40, 65.4% respond as somewhat better or much better). In other cases, such as respect and support of traditional leaders to access livelihood resources, the findings appear to be mainly worse (mean=2.43, and 50.8% perceive this factor to be slightly worse or much worse). The loss of the authority of traditional leaders partly explains the poor state of support of traditional leadership in how people make a living after the Bui Dam.

Table 16 Impacts of Bui Dam on Political Capital

	Response (%)					
Political Capital	*Much Worse (1)*	*Somewhat Worse (2)*	*About the Same (3)*	*Somewhat Better (4)*	*Much Better (5)*	*Mean*
Family involvement in community decisions	15.8	4.0	24.9	34.7	20.7	3.40
Effectiveness of traditional leaders to mobilize communal activities	19.1	11.6	25.5	18.8	24.9	2.49
Support of BPA for you and your family	30.4	14.9	13.4	36.5	4.9	2.71
Support of traditional leaders for you to contribute to community decisions	25.5	3.6	28.0	26.1	16.7	2.43
Support of District Assembly to practice your culture	41.9	8.2	20.1	18.8	10.9	3.05
Support of District Assembly to access livelihood resources	43.2	7.6	20.1	21.9	7.3	2.43

Mean scores for political capital were comparatively better for non-resettled communities than the resettled communities. T-test scores were significant for all aspects of political capital indicated in Table 17. Differences between relocated and non-relocated communities were most substantial regarding: respect and support of traditional leaders, and the respect and support of the Tain/Banda traditional assembly; maintenance of safe community environments; and provision of educational campaigns for the right to practice one's culture.

The smallest differences were noted regarding respect and support of BPA. This is because BPA was formed during the construction of the Bui Dam, and therefore did not contribute to the political capital of communities before the dam. As a result, it was impossible to compare the contributions of BPA to how they make a living.

Analysis of responses about impact of political capital by ethnicity (ANOVA and Scheffe results) indicated several significant differences (Table 17), mostly with higher mean scores (less negative) for Mo compared to Ewe for most aspects of political capital. Nafana also had higher mean scores (less negative) for most aspects of political capital compared to Ewe. Overall, Ewe communities appear to be more negatively impacted than the other two ethnic groups.

Table 17 Influence of Resettlement and Ethnicity on Political Capital

		Comparing Mean Responses for Relocated vs Not Relocated Communities			*Comparing Mean Responses by Ethnicity*				
Political Capital	*Mean*	*Relocated*	*Not relocated*	*T-test, P*	*Nafana (N)*	*Mo (M)*	*Ewe (E)*	*ANOVA F, Signif*	*Scheffe Test*
Your family's involvement in making decisions in your community	3.40	3.01	3.60	T=-3.970 P=<0.001	3.52	3.69	3.09	F=4.922 P=0.008	N – M=0.551 N - E=0.098 M - E=0.009
Effectiveness of traditional leaders to mobilize communal activities	3.19	3.01	3.28	T=-1.602 P=<0.001	3.24	3.60	2.87	F=7.178 P=0.001	N-M=0.551 N - E=0.098 M - E=0.009
The respect and support of BPA for you and your family	2.71	2.27	2.92	T=-4.235 P=<0.001	2.96	2.89	2.25	F=8.121 P=<0.001	N - M=0.939 N - E=0.001 M - E=<0.001
The respect and support of traditional leaders	3.05	2.07	3.53	T=-10.088 P=<0.001	3.47	3.47	2.08	F=33.464 P=<0.001	N – M=0.974 N – E=<0.001 M - E=<0.001
Support of District Assembly to practice your culture	2.49	1.09	3.18	T=-16.491 P=<0.001	3.24	2.44	1.51	F=42.342 P=<0.001	N – M=<0.001 N - E=<0.001 M - E=<0.001
District assembly's support for your access to livelihood resources	2.43	1.06	3.10	T=-17.004 P=0.109	3.18	2.39	1.46	F=45.573 P=<0.001	N –M=<0.001 N-E=<0.001 M - E=<0.001

The different levels of impacts for the main ethnic groups of Ewe, Mo, and Nafana may be attributed to varying levels of family involvement in decision making, and respect and support of local administrative institutions. For example, the Mo and Nafana ethnic groups were the main custodians of the lands around the dam. These ethnic groups were generally involved in providing direction in terms of decision making and local administration in most of the dam-affected communities. The Ewe communities are by tradition tenants of Bui lands, but were also involved in traditional governance within their communities. A large number of the Mo and Nafana ethnic communities, such as Banda Ahenkro and Bongaase, have not been relocated and still uphold and practice strong traditional levels of governance. For example, Banda Ahenkro has a paramountcy chaired by a Paramount Chief, whose authority is not limited to Banda Ahenkro but also some of the surrounding communities. The Paramount Chief is also supported in his administration by sub chiefs who are in charge of decision making and general leadership

at the community level. It seems, therefore, that the Bui Dam had minimal impact on people bearing Mo or Nafana ethnicity as compared to the Ewe-based communities such as Bator, Agbegikro, and Agbelikame North and South.

Gender showed a marginally significant relationship for involvement in decision making to make a living (p=0.054, df=327, t=1.754), with females (mean=3.3) more negatively impacted than males (mean=3.5).

Age significance was recorded for only 18-35 year olds, 36-45 year olds, and those over 45 years old. The scores of significance were as follows:

- *Family involvement in decision making* (F=4.101, ANOVA signif=0.035, Scheffe =0.035). Mean scores for ages over 45 years were highest (3.6), followed by 3.5 for 36-45 year olds, and 3.1 for 18-35 year olds. Age determines to a larger extent the level of one's involvement in decision making in the community. Age is also a key determining factor in the establishment of a family. This explains the higher means for people over 45 years of age compared to the 36-45 and 18-35 year old groups. The trend in age and related family involvement in decision making provides important opportunities in the near future for the younger generation to be mentored to contribute more effectively to decision making.
- *The respect and support of BPA* (F=4.031, ANOVA signif=0.045, Scheffe =0.045). Mean scores were lower for ages 18-35 years (2.4), compared to ages 36-45 years (2.9), and those over 45 years old (2.9). BPA's relationship with the community is built on a top-down approach, where the elderly such as chiefs and family heads served as a conduit for the respect and support of BPA for people to make a living. For example, it was mainly the elderly who received officials from

BPA to meet and agree on modalities for community consultation, and receive materials for performing sacrifices in the park whenever someone dies within the park boundaries. Such felicitations and benefits received by the traditional leaders later transcend to the other members of the family, who are mostly in the age range of less than 45 years.

- *Effectiveness of traditional leaders to mobilize the people for communal labour* (F=3.2, ANOVA signif=0.007, Scheffe=0.007). Mean scores were higher for those over 45 years of age (mean=3.4) compared to those aged 18-35 years (mean=2.8) and those aged 36-45 years (mean=2.8). Age that translates into experience is an important factor in the effectiveness of traditional leaders to mobilize people for community activities. In most communities around the Bui Dam, age is considered to reflect experience, and therefore the ability to effectively mobilize people for communal activities is skewed in favour of those over 45 years of age compared to leaders below the 45 years group.

Table 18 Influence of Livelihood on Political Capital

Political Capital	Comparing Mean Responses by Livelihood					
	Mean	Farming	Fishing	Mixed	ANOVA F, Signif.	Scheffe Test
Involvement in making decision	3.40	3.68	3.05	2.45	F=15.215 P=<0.001	Fa-Fi=<0.001 Fa-M=<0.001 Fi-M=0.146
Support of the Tain/Banda District Assembly for you and your family's right to practice your culture, history of your ancestors, festivals, funerals, naming ceremony, etc	2.49	3.00	1.54	2.20	F=44.198 P=<0.001	Fa-Fi=<0.001 Fa-M=0.033 Fi-M=0.118
The respect and support of BPA for you and your family	2.71	3.07	2.08	2.25	F=22.519 P=<0.001	Fa-Fi=<0.001 Fa-M=0.024 Fi-M=0.858
The Tain/Banda District assembly's support for your right to have access to livelihood resources such as farmland, fishing grounds, and free forms of nature such as shea butter, snails, firewood, etc.	2.43	2.96	1.46	2.05	F=52.845 P=<0.001	Fa-Fi=<0.001 Fa-M=0.007 Fi-M=0.143
The respect and support of traditional leaders e.g. chiefs, for you and your family's right to contribute to decision making in the community	3.05	3.52	2.26	2.40	F=36.474 P=<0.001	Fa-Fi=<0.001 Fa-M=0.001 Fi-M=0.901
Effectiveness of traditional leaders to mobilize the people for communal activities e.g. clean-up, contributing money and people for community projects	3.12	3.53	2.66	2.45	F=17.546 P=<0.001	Fa-Fi=<0.001 Fa-M=0.003 Fi-M=0.823

Table 18 provides results of how livelihood type affects the way impacts on political capital are experienced. The key findings are:

- People with farming livelihoods are less negatively affected (higher mean scores) than people with fishing livelihoods for all aspects of political capital.
- People with farming livelihoods are less negatively affected (higher mean scores) than people with mixed livelihoods for all aspects of political capital.
- There is no difference when comparing people with fishing to those with mixed livelihoods.

Interviews with key informants provided some insights on these findings. Traditional leaders have lost support and respect because of (1) loss of land title to government, and (2) new emerging leaders who support their families as breadwinners (V001). This further highlights the challenges that the Bui Dam has created in terms of negatively affecting the authority of leaders in the dam-affected communities. The 'erosion' of the authority of traditional leaders has been an emerging phenomenon since colonial rule. In many communities around the dam, the authority of a head of the family is determined by the ability to fend for the members of the family, and provide leadership and spiritual direction for the members of the family. As a result, some traditional leaders, especially in the Bator, Bui, and Dokokyina communities, who can no longer engage in economic activities to support their families have, in a way, lost a level of authority, become vulnerable compared to the non-resettled communities, and live at the mercy of the rich and affluent in the society, who now wield great authority as a result of their wealth. These people have become affluent due to their capacity, through ownership of motor boats, to engage in the challenging fishing expeditions on the large, stormy Bui Lake. Others have become more affluent through trading of fish, and through illegal small scale gold mining. The implication for political capital is the redistribution of access and control of community resources in favour of the youth. The elders who are affected by this redistribution have lost their authority to govern and control their subjects, including the youth. In addition, some categories of livelihood, such as fishing, have become reserved for the strong and energetic in the society, and in this case for the youth who can endure the strenuous task of steering the fishing boats on the dam to

engage in fishing. This contributes further to the shifting of power to younger people who possess the strength and stamina needed for lake fishing.

4.5 Effects on Natural Capital

Natural capital refers to stocks of physical and biological resources such as living space and ecosystems, petroleum and coal, atmosphere, soils and water, crops and forest plantation, as well as environmental assets such as agricultural land for farming and rearing of animals, access to fishing grounds, forest and forestry products, wildlife resources, access to tourism opportunities, and the socio-economic and political variables shaping access to such resources (Andam et al., 2010; Raven, 2012). Bui Dam has negatively affected all aspects of natural capital (Table 19), with the worst impacted being access to wildlife resources (mean=1.67), and the least impacted being access to tourism resources (mean=2.81).

Table 19 Impacts of Bui Dam on Natural Capital

	Response (%)					
Natural Capital	*Much Worse (1)*	*Somewhat Worse (2)*	*About the Same (3)*	*Somewhat Better (4)*	*Much Better (5)*	*Mean*
Access to fishing grounds and technology	43.5	7.3	20.1	18.2	10.9	2.46
Access to tourism opportunities	37.4	7.6	15.2	16.4	23.4	2.81
Access to agricultural land and technology	37.1	15.5	19.5	10.9	17.0	2.55
Access to forest and forestry	46.2	18.8	28.0	4.9	2.1	1.98
Access to wildlife resources	63.8	11.6	19.5	4.0	1.2	1.67

Examination of the influence of resettlement (Table 20) reveals that resettled communities have been more negatively impacted than non-resettled communities, and the difference was most apparent regarding access to tourism opportunities (including

ecosystems that generate revenue through tourism), and the smallest difference with respect to access to wildlife (all T-test scores were significant).

Table 20 Influence of Resettlement and Ethnicity on Natural Capital

		Comparing Mean Responses For Relocated vs Not Relocated Communities			*Comparing Mean Responses by Ethnicity*				
Natural Capital	*Overall Mean*	*Relocated*	*Not relocated*	*t-test, P*	*Nafana (N)*	*Mo (M)*	*Ewe (E)*	*ANOVA F, Signif*	*Scheffe Test*
Access to fishing grounds and associated technology	2.46	1.02	3.18	T=-16.942 P=<0.001	3.07	2.73	1.30	F=48.898 P=<0.001	N-M=0.080 N - E=<0.001 M - E=<0.001
Access to tourism opportunities	2.81	1.06	3.68	T=-20.472 P=<0.001	3.59	3.01	1.55	F=50.460 P=<0.001	N-M=0.005 N - E=<0.001 M - E=<0.001
Access to agricultural land and technology	2.55	1.05	3.30	T=-17.751 P=<0.001	3.01	2.88	1.62	F=26.382 P=<0.001	N - M=0.657 N - E=<0.001 M - E=<0.001
Access to forest and forestry products living	1.98	1.01	2.46	T=-14.820 P=<0.001	2.21	2.11	1.42	F=15.540 P=<0.001	N –M=0.763 N – E=<0.001 M - E=<0.001
Access to wildlife	1.67	1.00	2.01	T=-9.579 P=<0.001	1.81	1.80	1.30	F=7.445 P=0.001	N –M=0.971 N - E=<0.001 M - E=<0.001

When the effect of ethnicity (Table 20) was examined (ANOVA and Scheffe tests), mean scores were lower (impacts from dam more negative) for Ewe compared to Nafana and Mo for all aspects of natural capital. Nafana mean responses were higher than Mo for just one aspect of natural capital: access to tourism opportunities. This trend is more related to the nature of natural resources impacted by the dam, as well as the ethnic affiliation that greatly depends on the particular resource for livelihood. For example, the Ewe groups such as Bator, Agbelikame North and South, and Agbegikro have lost their main fishing areas in the natural river, as well as the fish stock in such areas. These groups have had to relocate and transition to catching fish in an artificial lake created by the Bui Dam construction. However, a few people in the Ewe communities engaged in the sale of fish to tourists, and to other residents near the dam, gain revenue. The dam

impacts have therefore improved their sources of livelihoods, but for a few. Contrastingly, the Nafana and Mo ethnic groups, who are mainly farmers, have relocated to new farmlands to practice their farming activities. In many cases of such movement, the people continue to practice farming. Returns from their farmlands, though minimal, still provide some harvest and also provide the benefits of some freely available natural resources such as firewood, snails, and edible herbs. The implications of these changes in accessing natural resources for the Ewe community is the struggle to make ends meet, and also adjust to changing trends of fishing, such as from river fishing to lake fishing.

There were no significant relationships between natural capital and age or gender. It is assumed that age and gender do not define the capacity for someone to engage in livelihood activities since both the young and aged are engaged in fishing. Both males and females are actively engaged in various stages of the fishing and farming activities. Although women engage in fish mongering, the men are actively involved in fishing. For farming, both genders are involved at various stages of the economic activity to support family livelihoods.

Key informants confirmed that many aspects of community natural capital assets have become worse, except for at Bui Camp (as noted by a key informant and senior official of BNP, G015), which has seen some improvements in tourism cruising and hippo watching on the 444 km^2 lake. Before the dam, communities nearby BNP were able to freely access some natural resources such as snails, mushrooms, shea butter seeds, and firewood from the forest as well as from their farmlands. But after the dam, access to these wildlife resources to make a living has almost collapsed (nearly all respondents agree that it has worsened). The implication is that access to such resources to support

livelihoods will be jeopardized by the attendant challenge of sourcing money to purchase them. Further, people may be tempted to enter park areas to access these natural resources, something that has started with the issue of illegal logging and mining in the park. According to some key informants, there is now pressure on available but limited farmlands, increased conflicts over land and fishing-related activities, and increased risk (e.g., climbing rocky cliffs) and cost (e.g., cost of outboard motors, and large canoes for people who engage in fishing). Previously, fishing was effectively undertaken in rivers with small dug-out canoes. Flooding caused by the Bui Dam construction has inundated land areas, causing such rivers to flow into a large man-made lake with attendant strong wind action, and with the risks associated with uncleared, submerged tree stumps. As a result, fishing on the lake poses hazards that did not characterize river fishing (winds can whip up quickly and put people in small canoes at risk of being capsized). In order to avoid some of the hazards of lake fishing, many fishermen have secured loans to procure large fishing boats and outboard motors at a very high cost. The attempt to repay such loans and improve their stakes in the fishing industry has also been limited by an influx of more than 5,000 fishermen, and other people in fishing-related activities, who compete vigorously with the indigenous fishers. This development is a conflict in the making, as there is competition for the available resources between the families of the indigenous fishers and other migrant fishers.

Table 21 provides findings that illustrate how natural capital impacts are influenced by livelihood type. Mean scores for farming were higher than fishing for all aspects of natural capital (ANOVA and Scheffe findings). Mean scores were higher for mixed livelihood compared to fishing for two aspects of natural capital: access to fish and

indigenous fishing grounds, and access to tourism opportunities. There was no difference between mixed and farming for any factor.

Table 21 Influence of Livelihood on Natural Capital

	Comparing Mean Responses by Livelihood					
Natural Capital	*Mean*	*Farming*	*Fishing*	*Mixed*	*ANOVA F, Pacc*	*Scheffe Test*
Access to fishing grounds and related technology	2.46	2.99	1.38	2.65	F=65.607 P=<0.001	Fa-Fi=<0.001 Fa-M=0.509 Fi-M=<0.001
Access to tourism opportunities	2.81	3.35	1.77	2.70	F=40.822 P=<0.001	Fa-Fi=<0.001 Fa-M=0.163 Fi-M=0.034
Access to agricultural land and irrigation equipment	2.55	2.89	1.96	2.20	F=15.225 P=<0.001	Fa-Fi=<0.001 Fa-M=0.122 Fi-M=0.794
Access to forestry and forestry products	1.98	2.21	1.51	2.00	F=16.512 P=<0.001	Fa-Fi=<0.001 Fa-M=0.664 Fi-M=0.148

4.6 Effects on Physical Capital

Physical capital refers to produced and man-made capital, such as access to housing, land for construction of houses, roads, fishing ports, landing sites and associated technology, electricity, and communication outlets (e.g., post office) (Bennett et al., 2012). Physical capital after the dam has substantially worsened (Table 22) for access to roads/transport (mean=2.85), access to post office (mean=2.03), access to land for construction (mean=2.78), and access to market stalls (mean=2.11).

Table 22 Impacts of Bui Dam on Physical Capital

	Response (%)					
Physical Capital	Much Worse (1)	Somewhat Worse (2)	About the Same (3)	Somewhat Better (4)	Much Better (5)	Mean
Access to energy/electricity	14.0	3.0	19.8	40.7	22.5	3.55
Access to housing	20.4	7.6	32.5	35.0	4.6	2.96
Access to roads/transport	38.0	8.2	8.2	22.2	23.4	2.85
Access to post office/ communication centre	59.0	7.9	8.8	20.1	4.3	2.03
Access to land for construction	36.5	7.3	17.3	19.5	19.5	2.78
Access to market stalls	45.3	15.2	26.7	9.1	3.6	2.11

People's perceptions of roads after the Bui Dam differ according to the existing states of construction of roads and expansion of existing access routes to the area. For example, there are now better access routes to the Bui area. These include the Wenchi-Nsawkaw-Manji, Wenchi-Nsawkaw-Banda Ahenkro, and also Wenchi-Tingakrom-Banda Ahenkro, and Wenchi-Teselima-Gyama routes both along the Bole road to the Bui area. In some cases, bridges have been expanded (that is along the Wenchi-Nsawkaw and a new one constructed along the Wenchi-Tingakrom-Banda Ahenkro routes), as well as new bridges constructed, and some roads tarred to provide better access routes to the communities near the Bui Dam. In the Bui resettlement camp as well, many access routes such as the one through Bongaase to the BPA offices and the Bui clinic, have been tarred. Perhaps the perception of the communities is built on the fact that some of the most productive routes (shorter routes), such as the Wenchi-Menji and Nsawkaw-Banda Ahenkro to the Bui communities, have still not been tarred, and roads in many communities near the dam have not been tarred.

It is quite important to note that some respondents perceive that access to energy/electricity/power after the dam construction has remained unchanged (20%).

Again, some of the communities nearby the dam have witnessed the construction of market stalls to facilitate trading in fish and related products.

Table 23 Influence of Resettlement and Ethnicity on Physical Capital

		Comparing Mean Responses For Relocated vs Not Relocated Communities			*Comparing Mean Responses by Ethnicity*				
Physical Capital	*Mean*	*Relocated*	*Not relocated*	*t-test, P*	*Nafana (N)*	*Mo (M)*	*Ewe (E)*	*ANOVA F, P*	*Scheffe Test*
Access to energy/electricity	3.55	3.81	3.42	T=2.649 P=<0.001	3.63	3.72	3.42	F=1.109 P=0.331	N – M=0.882 N - E=0.0.583 M - E=0.341
Access to housing	2.96	2.63	3.12	T=-3.580 P=<0.001	3.11	3.10	2.62	F=4.488 P=0.012	N-M=0.851 N - E=0.016 M - E=0.073
Access to roads/transport	2.85	1.83	3.35	T=-8.736 P=<0.001	3.27	3.11	1.96	F=18.694 P=<0.001	N - M=0.611 N- E=<0.001 M - E=<0.001
Access to post office/ communication	2.03	1.16	2.46	T=-9.098 P=<0.001	2.21	2.09	1.55	F=6.129 P=0.002	N – M=0.743 N – E=0.003 M - E=0.034
Access to land for building	2.78	1.01	4.11	T=-6.451 P=<0.001	3.49	3.04	1.55	F=49.121 P=<0.001	N – M=0.028 N- E=<0.001 M- E=<0.001
Access to market stalls	2.11	1.14	2.59	T=12.649 P=<0.001	2.37	2.21	1.49	F=16.051 P=<0.001	N –M=0.453 N-E=<0.001 M -E=<0.001

Non-relocated communities were less negatively affected by the Bui Dam for all aspects of physical capital (T-test findings, in Table 23). When comparing responses between relocated and non-relocated, the largest differences are found with access to land for construction, and access to post office/communication centre.

Regarding ethnicity (ANOVA and Scheffe results in Table 23):

- Impacts are similar between Nafana and Mo, with only one significant difference (access to land for building).
- Nafana less impacted (higher mean scores) than Ewe regarding five of six factors (all but access to electricity).
- Mo less impacted (higher mean scores) than Ewe for four of six factors (access to roads; access to post office; access to land for building; and access to market stalls).

Table 24 Influence of Livelihood on Physical Capital

	Comparing Mean Responses by Livelihood					
Physical Capital	*Mean*	*Farming*	*Fishing*	*Mixed*	*ANOVA F, P*	*Scheffe Test*
Access to energy/electricity	3.55	3.85	2.91	3.80	F=21.724 P=<0.001	Fa-Fi=<0.001 Fa-M=0.985 Fi-M=0.010
Access to housing	2.96	3.18	2.63	2.45	F=9.716 P=<0.001	Fa-Fi=0.001 Fa-M=0.030 Fi-M=0.821
Access to roads/transport	2.85	3.34	1.72	3.75	F=45.948 P=<0.001	Fa-Fi=<0.001 Fa-M=0.489 Fi-M=<0.001
Access to post office/communication centre	2.03	2.19	1.58	2.65	F=9.720 P=<0.001	Fa-Fi=0.001 Fa-M=0.348 Fi-M=0.005
Access to land for construction	2.78	3.22	1.94	2.75	F=26.309 P=<0.001	Fa-Fi=<0.001 Fa-M=0.397 Fi-M=0.079
Access to market stalls	2.11	2.38	1.54	2.30	F=19.410 P=<0.001	Fa-Fi=<0.001 Fa-M=0.958 Fi-M=0.023

When physical capital is analyzed by livelihood (ANOVA and Scheffe tests, Table 24):

- Households focusing on farming were less impacted (higher mean scores) than those with fishing livelihoods, for all items in the table. Farming was not generally affected due to the minimal contribution of physical resources (except for land) to effectiveness of farmers. On the other hand, fishing involves the use of physical resources such as landing sites and associated technology, and because such resources were undermined by the Bui Dam construction, the impact was worse than for farming. For effectiveness in the fishing industry in the Bui area, injection of capital investment in fishing related technology is critical.

- Farming and mixed livelihoods were similarly impacted, with higher scores for mixed livelihoods for just one item (access to housing).
- Mixed livelihood households tended to be less negatively impacted (higher mean scores) compared to those relying mainly on fishing, which is understandable since people in mixed livelihoods are able to cushion the impacts with gains from other forms of livelihood such as farming and trading

Males (mean=2.2) were less negatively impacted than females (mean=2.0) for access to market stalls (p=0.012, df=327, t=1.495) because it is generally women who sell in the market stalls. The failure to provide these stalls immediately after the dam construction was felt to a greater extent by females than males. It is only recently that a few partly completed market stalls have been provided for resettled communities near Jama, and also at the Bui resettlement camp. The implication of the trends in physical assets for gender is that the provision of market stalls at Bui and Jama resettlement camps will enhance economic activities for many women who engage in trading.

Regarding age, mean scores for age were significant only for access to post office/communication centre to make a living against 18-35yrs by 36-45yrs (F=3.134, ANOVA signif.=0.045). However, those 36-45 years old (mean=2.3) were less negatively impacted than 18-35 year olds (mean=1.8). It is assumed that the 18-35 year olds are more interested in accessing physical resources compared to those aged 36-45 years, who are familiar with having minimal access to physical resources. It is implied that the youthful age group will continue to mount pressure on the resettlement committee to ensure that physical resources are improved for current and future generations.

A key informant from the Bator community (V002) noted that availability of electricity as a result of the dam construction is important to the people in the resettled communities (who previously didn't have access to electricity) because electricity has aided the storage of food and fish for domestic and commercial use. However, a key informant from the fishing livelihoods group (L009) noted that the provision of physical resources will not necessarily translate into improvements in how people live. The exception related to people who are educated and empowered to explore and derive income-making opportunities such as cold storage of fish and renting of rooms. Again, improvements in physical resources for resettled communities can generate associated costs, such as electricity bills and regular maintenance of buildings, except where provisions are made to offset the associated cost and also educate the people about these potential additional cost burdens, such as the repair of door locks and replacement of mosquito nets (R022).

4.7 Effects on Financial Capital

Financial capital refers to incomes, savings, supplies of credit and insurance, access to banks and microfinance institutions, money transfers from family and friends, and access to financial support from co-operatives (NRI, 2000; Nunan et al., 2001; Flora and Thiboumery, 2016). Scores for financial capital (Table 25) show a negative effect for many statements, except access to microfinance, which recorded a substantial improvement (mean=3.72, with 73.6% agreeing).

Table 25 Impacts of Bui Dam on Financial Capital

	Response (%)					
Financial Capital	*Much Worse (1)*	*Somewhat Worse (2)*	*About the Same (3)*	*Somewhat Better (4)*	*Much Better (5)*	*Mean*
Access to micro finance	18.2	2.1	6.1	36.8	36.8	3.72
Access to banking services	59.9	8.2	4.0	10.0	17.9	2.18
Access to remittances	42.2	16.1	22.2	13.7	5.8	2.25
Access to credit facilities	59.6	10.3	7.9	7.3	14.9	2.08

Non-relocated communities were less negatively impacted by the Bui Dam and resettlement (T-test findings in Table 26). The biggest gap between relocated and non-relocated communities is found with access to banking services, and access to credit facilities.

After the dam construction and subsequent resettlement of some communities, the Brong Ahafo Catholic Cooperative Society for Development (BACCSOD) continues to mobilize small scale loans for the people and cashew farmers in the Tain and Banda Districts to engage in social and economic activities (G020). Meanwhile, most of the people argue that loans provided by such organizations are very small and therefore not adequate to be used in any large scale livelihood activities. The implication will be the difficulty of servicing such loans since a large portion of such funds will be used to take care of the family's expenses.

Table 26 Influence of Resettlement and Ethnicity on Financial Capital

		Comparing Mean Responses For Relocated vs Not Relocated Communities			*Comparing Mean Responses by Ethnicity*				
Financial Capital	*Mean*	*Relocated*	*Not relocated*	*t-test, P*	*Nafana (N)*	*Mo (M)*	*Ewe (E)*	*ANOVA F, P*	*Scheffe Test*
Access to micro finance	3.72	3.13	4.01	T=10.461 P=<0.001	4.07	3.79	3.29	F=10.749 P=<0.001	N – M=0.123 N - E=<0.001 M - E=<0.001
Access to banking services	2.18	1.03	2.75	T=-5.433 P=<0.001	2.52	2.12	1.49	F=7.607 P=0.001	N-M=0.122 N - E=0.167 M - E=<0.001
Access to remittances	2.25	1.28	2.73	T=11.360 P=<0.001	2.76	2.17	1.57	F=24.184 P=<0.001	N - M=0.001 N - E=<0.001 M - E=0.006
Access to credit facilities	2.08	1.02	2.60	T=10.185 P=<0.001	2.45	2.04	1.51	F=9.775 P=<0.001	N – M=0.100 N – E=<0.001 M - E=0.068

Regarding the influence of ethnicity on financial capital (ANOVA and Scheffe results in Table 26), some differences are evident:

- Ewe tends to be more negatively impacted than Nafana or Mo.
- Nafana and Mo were similar.

Nafana and Mo ethnic groups tend to be less negatively impacted than Ewe regarding financial capital since changes in livelihoods caused by the Bui Dam have resulted in the need for people engaged in fishing (e.g., Ewe) to inject capital into their livelihoods. The absence of such financial resources has therefore worsened the plight of Ewe, who are generally engaged in fishing, compared to Nafana and Mo whose farming activities do not necessarily require huge capital outlays. The need to source and provide accessible funds to support fishers to purchase equipment such as larger fishing boats, outboard motors, and fishing nets is critical for improving livelihoods for the large number of Ewe engaged in fishing.

Table 27 portrays findings concerning how livelihood type influences how people perceive impacts on financial capital. Key findings are:

- Farming livelihood recorded means are higher than fishing livelihoods for all aspects of financial capital.
- Farming livelihood recorded higher mean scores than mixed livelihoods for two aspects: access to microfinance, and access to banking.
- Mixed livelihood recorded higher mean scores than fishing for two aspects: access to banking, and access to credit facilities.

Table 27 Influence of Livelihood on Financial Capital

Financial Capital	*Comparing Mean Responses by Livelihood*					
	Mean	*Farming*	*Fishing*	*Mixed*	*ANOVA F, P*	*Scheffe Test*
Access to microfinance	3.72	4.12	3.08	3.10	F=22.217 P=<0.001	Fa-Fi=<0.001 Fa-M=0.007 Fi-M=0.997
Access to banking services	2.18	2.39	1.52	3.45	F=18.207 P=<0.001	Fa-Fi=<0.001 Fa-M=0.015 Fi-M=<0.001
Access to remittances	2.25	2.61	1.55	2.20	F=27.040 P=<0.001	Fa-Fi=<0.001 Fa-M=0.348 Fi-M=0.087
Access to credit facilities	2.08	2.31	1.55	2.45	F=9.729 P=<0.001	Fa-Fi=<0.001 Fa-M=0.971 Fi-M=0.047

Issues of ethnicity and financial capital are also linked to the types of livelihood of the various ethnic groups. As explained earlier, fishing livelihoods were more negatively impacted than mixed and farming livelihoods. This means that people engaged in fishing-related activities will require more financial assistance to revamp their business than those in mixed and farming livelihoods. Efforts made by BPA in this respect included cash compensation provided for loss of property as a result of the Bui Dam.

Resettled people were also given financial support such as a resettlement grant of GHS 50 (US $34.48) to support starting a new farm, and a monthly supporting grant of GHS 100 (US $68.96), paid to each household for one year. This can be compared to the national monthly minimum wage of GHS 83.97 (US $57.90 at US$1=GHS 1.45) for 2010. The disbursement of these financial resources was to provide financial security for resettled people with the hope that, by the end of one year, they would have more sustainable income-generating sources. However, most of the beneficiaries of the compensation packages reported that the money was insufficient. The financial challenge faced by this group also included the difficulty in accessing financial capital due to poor collateral, as well as the closing of the Ecobank branch at the dam site once construction was completed and the workers departed. This has exacerbated the impact on people engaged in fishing-related livelihood activities.

Gender was significant only for access to micro finance to make a living ($p=0.048$, $df=3327$, $t=1.402$). Females (mean=3.8) perceived themselves to be less negatively impacted than males (mean=3.6). In most of the dam-affected communities, males dominate in the many livelihood activities, and therefore are most eligible to access financial resources such as micro finance opportunities. In some cases, men, who are mostly the head of the families, take loans to support the livelihood activities of their families. Females engaged in livelihood activities such as trading and fish mongering usually form small groups to mobilize and support their members with soft loans. This option helps females to strengthen their livelihoods against any shocks, such as construction of the Bui Dam. The need for males to learn and explore such opportunities

enjoyed by most of the female groups is critical for improving financial capital to support their livelihood activities.

Regarding access to banking services, some key informants (V002, L009) from the Bator community noted that Ecobank, Ghana and Zenith Bank, Ghana have opened branches near the resettled communities. However, many of the people in the dam-affected communities are unable to access forms of micro-credit from these banks because they have a low capital base, have a low savings culture (generally engage in subsistence livelihoods with minimal opportunity to generate excess income for savings), and are mainly categorized as high risk for loan default. However some institutions, such as BACCSOD, show flexibility in the process of providing credit. Although such opportunities exist, the amount of support provided is perceived to be inadequate to support the development of large scale livelihood activities.

A community leader (V001) noted that access to remittances is worse (even after the dam) because many families have few relations in gainful employment who are able to remit to their families in the resettled communities. Over the years, communities have mobilized their own micro-credits through cooperatives. An informant from Dam Site (V005) noted that, as part of the resettlement process, some forms of micro-credits were provided by the Ministry of Food and Agriculture (MOFA) to support the activities of farmers and traders in Agbegikro, one of the resettled communities at Jama camp (V008). However, this support was limited since the majority of the people in the other communities did not access such support.

4.8 Effects on Cultural Capital

Cultural capital refers to practices, traditions, and resources that are central to people's identities. This includes opportunities to practice cultural activities such as festivals, drumming and dancing, the use of traditional knowledge and practices such as local ways of farming and fishing, and respect for customs, traditions, elders, and traditional leaders (Ashong & Smith, 2001: p. 26; Hussein, 2002). The effect of Bui Dam on cultural capital is perceived as significantly better in most aspects reported in Table 28, specifically regarding respect of customs and traditions (mean=3.47), and respect for elders (mean=3.77). However, reports from key informants indicate that respect for elders has decreased due to the emergence of new and youthful leaders, loss of livelihoods for some elders, and shifts in some livelihood stakes such as fishing from the elderly to the young adults who possess the strength, endurance, and capital to engage in lake fishing.

Table 28 Impacts of Bui Dam on Cultural Capital

	Response (%)					
Cultural Capital	*Much Worse (1)*	*Somewhat Worse (2)*	*About the Same (3)*	*Somewhat Better (4)*	*Much Better (5)*	*Mean*
Respect for elders and traditional leaders	9.7	4.6	22.2	26.4	37.1	3.77
Practice of cultural activities	15.8	4.9	38.6	26.4	14.3	3.19
Respect of customs and traditions	16.4	6.1	21.6	27.7	28.3	3.45
Use of traditional knowledge and practices	21.6	7.0	41.9	20.1	9.4	2.89

Non-relocated communities were less negatively impacted by the Bui Dam for most aspects of cultural capital (T-test scores in Table 29 were significant for all aspects of cultural capital except for respect for elders). The biggest gaps between relocated and non-relocated communities were:

- Use of traditional knowledge
- Respect of customs and traditions

Table 29 Influence of Resettlement and Ethnicity on Cultural Capital

		Comparing Mean Responses For Relocated vs Not Relocated Communities			*Comparing Mean Responses by Ethnicity*				
Cultural Capital	*Mean*	*Relocated*	*Not relocated*	*t-test, P*	*Nafana (N)*	*Mo (M)*	*Ewe (E)*	*ANOVA F, P*	*Scheffe Test*
Respect for elders and traditional leaders	3.77	3.59	3.85	T=1.811 P=<0.071	3.97	3.91	3.49	F=4.539 P=0.011	N – M=0.980 N - E=0.022 M - E=0.042
Practice of cultural activities	3.19	2.77	3.39	T=4.466 P=<0.001	3.43	3.22	2.97	F=3.599 P=0.029	N-M=0.488 N - E=0.029 M - E=0.318
Respect of customs and traditions	3.45	2.55	3.90	T=9.329 P=<0.001	3.82	3.65	2.87	F=13.330 P=<0.001	N – M=0.760 N – E=<0.001 M - E=<0.001
Use of traditional knowledge and practices	2.89	1.92	3.37	T=12.157 P=<0.001	3.34	3.09	2.11	F=29.255 P=<0.001	N - M=0.409 N - E=<0.001 M - E=<0.001

Regarding ethnicity, the main findings (ANOVA and Scheffe results in Table 29) were:

- No difference between Nafana and Mo for any aspect of cultural capital (high in all cases).
- Nafana were less highly impacted (higher mean scores) compared to Ewe for all aspects of cultural capital.
- Mo were less highly impacted compared to Ewe for all aspects except for the practice of cultural activities.

In many of the non-relocated communities, including Banda Ahenkro, the people continue to revere customs and traditions, and also derive great benefits from the council and support of traditional leadership in making decisions, and general governance at the local level. Places such as Banda Ahenkro have a Paramount Chief who is assisted in the discharge of his traditional roles by sub-chiefs and family heads called “Abusuapanin” in Twi. The implication is peace, good governance, and general respect of laws and traditions in these communities such as Bongaase and Banda Ahenkro.

Regarding gender, there were no significant relationships for any aspects of cultural capital. When examining the impact of age, only respect of elders and traditional leaders (F=6.715, ANOVA signif=0.002) had a significant relationship to age, with people over 45 years old (mean=4.0) less negatively impacted than people 18-35 years old (mean=3.4).

Some key informants were of the view that worsened livelihoods after the dam made it difficult for people to attend funerals and other social functions, or donate at such functions. Other informants also agree that improvements in attributes of cultural capital, such as the practice of cultural activities and indigenous ways of farming, is the result of the opening up of communities to cultural inflows and the effect of capacity building activities provided by various stakeholders such as BNP, BPA, and MoFA. In some cases, festivals are postponed for lack of community interest (V002). Moreover, the introduction of city lifestyles (e.g., western styles of music) has undermined practices that formerly characterized village life, such as drumming and dancing (G020).

Table 30 The Effect of Livelihood Type on How Cultural Capital Assets are Perceived

Financial Capital	*Comparing Mean Responses by Livelihood*					
	Mean	*Farming*	*Fishing*	*Mixed*	*ANOVA F, P*	*Scheffe Test*
Respect for elders and traditional leaders	3.77	3.93	3.63	2.80	F=8.571 P=<0.001	Fa-Fi=0.127 Fa-M=0.001 Fi-M=0.024
Practice of cultural activities	3.19	3.32	3.03	2.65	F=4.090 P=<0.001	Fa-Fi=0.137 Fa-M=0.063 Fi-M=0.439
Respect of customs and traditions	3.45	3.68	3.13	2.80	F=8.100 P=<0.001	Fa-Fi=0.004 Fa-M=0.023 Fi-M=0.604
Use of traditional knowledge and practices	2.89	3.20	2.33	2.60	F=20.035 P=<0.001	Fa-Fi<0.001 Fa-M=0.088 Fi-M=0.642

Table 30 portrays findings concerning how livelihood affects how people perceive impacts on cultural capital. Farming was less impacted (mean scores were higher) than fishing two items:

- Respect of customs and traditions to make a living
- Use of traditional knowledge and practices

Farming livelihoods were less impacted than mixed livelihoods for two items:

- Respect for elders and traditional leader to make s living.
- Respect of customs and traditions to make a living.

Fishing livelihoods were less impacted than mixed for all but one item: respect for elder and traditional leaders to make a living. This is explained by the fact that in the Ewe communities, people still respect and take council from their leadership.

Many aspects of cultural capital showed resilience to socio-ecological changes and continue to create and support community efforts to provide assets for households of

resettled communities. For example, respect for elders and traditional leaders showed the strongest resilience to dam effects. This result contrasts slightly with Table 30 since, in this case, the Ewe communities which are mainly engaged in farming scored better than fishing livelihoods. The most plausible explanation is that currently a large majority of the youth rather than the aged are engaged in active lake fishing as a result of the vigorous activities required for fishing on the lake created by the Bui Dam construction. The youth, many of whom now control the economic power in the Ewe communities, have emerged as new leaders and do not submit to the authority of traditional leaders and the elderly in general. The implication is the possibility of poor mentoring from the older generation.

4.9 Multiple Regression Analysis

As outlined in the above analyses, this research examined a number of independent variables to determine the possible effect on each type of capital asset. In order to understand the relative effect of each independent variable (relocation, ethnicity, livelihood type, gender, and age), multiple regression was used.

First, a total score was computed for each capital asset by summing the mean scores reported in each of the above tables. For example, a total score for human capital was computed by summing the mean responses of each of the items reported in Table 10 above. This total score for human capital was the dependent variable used in the multiple regression analysis reported in the first row of Table 31.

Table 31 Influence on Capital Assets from Predictor Variables: Relocation, Ethnicity, Age, Gender, and Livelihood

	Relative Strength of Prediction of Each Independent Variable: Beta Weights (B) and Significance (P) of Each					*Strength of Relationships*
Capital Asset	*Relocate*	*Ethnicity*	*Age*	*Gender*	*Livelihood*	*R* *R signif (P)* *R squared*
Human Capital	B=0.744 P=<0.001	B=0.021 P=0.599	B=-0.010 P=0.736	B=-0.025 P=0.405	B=-0.372 P=<0.001	R=0.872 P=<0.001 Rsq=0.761
Social Capital	B=0.630 P= <0.001	B=0.055 P=<0.001	B=-0.008 P=0.833	B=-0.084 P=0.028	B=-0.431 P=<0.001	R=0.785 P=<0.001 Rsq=0.617
Political Capital	B=0.518 P=<0.001	B=0.133 P=<0.001	B=0.068 P=0.107	B=-0.119 P=0.005	B=-0.520 P=<0.001	R=0.727 P=<0.001 Rsq=0.529
Natural Capital	B=0.826 P=<0.001	B=0.121 P=0.001	B=0.030 P=0.275	B=-0.033 P=0.235	B=-0.370 P=<0.001	R=0.892 P=<0.001 Rsq=0.795
Physical Capital	B=0.556 P=<0.001	B=-0.076 P=<0.001	B=0.028 P= 0.541	B=-0.042 P=0.359	B=-0.367 P=<0.001	R=0.672 P=<0.001 Rsq=0.452
Financial Capital	B=0.575 P=<0.001	B=-0.114 P=0.080	B=-0.027 P=0.578	B=-0.036 P=0.445	B=-0.299 P=<0.001	R=0.623 P=<0.001 Rsq=0.388
Cultural Capital	B=0.418 P=<0.001	B=-0.038 P=0.589	B=0.147 P=0.005	B=-0.080 P=0.125	B=_0.231 P=<0.001	R=0.527 P=<0.001 Rsq=0.264

The multiple regression findings were strong for each analysis shown in Table 31 as indicated by the R squared results, which were particularly high (see discussion of effect size in Vaske, 2007) for natural capital (=0.795), human capital (=0.761), and social capital (=0.617). The relative strength of each predictor variable is indicated by the beta values provided in Table 31. Clearly, the influence of relocation is the strongest

predictor of change in all capital assets, with beta values ranging from 0.418 (for cultural capital) to 0.826 (for natural capital).

Livelihood is the second most important predictor of capital assets, with a highest beta score of 0.520 for political capital and the lowest beta score of 0.231 for cultural capital. Ethnicity is the next most important predictor variable, with a high beta value of 0.133 for political capital. However, ethnicity is a significant predictor variable for just three capital assets: social capital, political capital, and natural capital (as noted from the significance values for the beta scores in Table 31). In contrast, relocation and livelihood were significant predictor variables for each of the seven types of capital assets.

Age is a weak predictor, with beta values significant only for cultural capital. Gender was also a weak predictor variable for capital assets reported in Table 31, with significant beta values occurring in just two forms of capital asset: political and social.

4.10 Summary

This chapter examines the differential experience of Bui Dam and related resettlement effects on community capital assets, including human, natural, social, political, physical, financial, and cultural capitals, as summarized in Table 32. This is one of only a few studies to examine the distribution of dam effects on capital assets of resettled communities.

Overall, people perceive capital assets to be decreasing in most aspects (Table 32), particularly natural capital. Dams negatively impact natural capital. In resettled communities near BNP, natural capital was the worst impacted among the capital assets. On the other hand, cultural capital, such as respect for elders and traditional leaders, was the least impacted by the dam.

Table 32 Summary of Effects of Bui Dam on Capital Assets

Capital Asset	*Summary of Impact*	*Mean*
Cultural Capital (Table 28)	Effects of Bui Dam on cultural capital is generally negative, but not as negative as with other capital assets. Impacts were mainly positive for: • Respect of customs and traditions • Respect for elders	3.35
Political Capital (Table 16)	Overall, perceptions of the effect of Bui Dam on political capital are worse, but with some variability in: • Family involvement in decision making • Support of District Assembly to access livelihoods	2.88
Social Capital (Table 13)	Overall, perceptions of the effects of Bui Dam on social capital are worse, but varied with some factors: • Most severe impacts were on use of community-based organizations • Least severe impacts were on use of family networks	2.83
Physical Capital (Table 22)	Perceptions of the effects of Bui Dam on physical capital have worsened, particularly: • Access to post office/communication centre • Access to market stalls	2.71
Financial Capital (Table 25)	Perceptions of the effects of Bui Dam on financial capital show negative impact scores for many statements, except access to microfinance, which recorded a substantial improvement.	2.56
Human Capital (Table 10)	All items show a situation that is worse after the dam, compared to the situation prior to dam construction. • Most severe effect was on access to skills training • Least severe effect was on opportunities for trade	2.42
Natural Capital (Table 19)	Worst impacted of all capital assets, particularly for: • Access to wildlife resources • Access to forestry and forestry resources	2.29

The Bui Dam created new opportunities in human capital (e.g., possibility of improving fishing if one has access to financial capital needed to invest in large boats and outboard motors). The dam had mixed effects on political capital for nearby

communities. It has created new opportunities in human capital (e.g., improved fishing, and other related forms of capital). The Bui Dam has mixed effects on political capital for nearby communities. In some cases, the effects of dams, as well as resettlements, are better for the effectiveness of traditional leaders to mobilize the people for different community work, but worse for support from District Assemblies to access community livelihoods, and customs and traditions of nearby communities.

The Bui Dam has created some positive effects on the physical capital of many nearby communities. Improvements in physical capital provide some important insights regarding the ability of people in dam-affected communities to build and sustain livelihoods, and the capacity of other assets such as electricity and freezers for storage of food stuffs, but the potential to improve household revenues is also limited by the factors such as the rising cost of electricity, and the cost of freezers.

Communities affected by dams cannot necessarily gain improvements in financial capital if they lack a strong foundation in banking, such as established banks and viable and sustainable incomes. The Bui study suggests that communities affected by dams tend to rely on banking services such as deposits, savings, and loans mobilized from banks to improve the asset base of rural and resource-deprived communities. The study provides further insights into the findings of Korboe (1998) and Nunan et al. (2001), which examined knowledge of livelihoods affected by urban transitions in Kumasi, Ghana and indicated that the lack of financial capital, and worsening debt burdens on informal loans, can keep people in poverty.

Table 33 Summary of Influence of Relocation on How Bui Dam Affects Capital Assets

Capital Assets	*Influence of Relocation*
Human (Table 11)	Relocated communities have been more negatively affected for all aspects of human capital with: • Largest difference in opportunities for fishing • Smallest difference in access to skill training
Social (Table 14)	Non-relocated communities were less negatively affected for all aspects of social capital, with: • Largest difference in support of traditional leadership • Smallest difference in use of family networks
Political Capital (Table 17)	Non-relocated communities were less negatively affected for all aspects of political capital, with: • Largest difference in support of traditional leaders • Smallest difference in respect and support of BPA
Natural Capital (Table 20)	Non-relocated communities were less negatively affected for all aspects of natural capital, with: • Largest difference regarding access to tourism opportunities • Smallest difference with respect to access to wildlife
Physical Capital (Table 23)	Non-relocated communities were less negatively affected for all aspects of physical capital, with largest differences regarding: • Access to land for construction • Access to post office/communication centre
Financial Capital (Table 24)	Non-relocated communities were less negatively affected for all aspects of financial capital. The biggest gap between relocated and non-relocated communities is found with: • Access to banking services • Access to credit facilities
Cultural Capital (Table 29)	Non-relocated communities were less negatively affected by the Bui Dam for most aspects of cultural capital. The biggest gaps between relocated and non-relocated communities were: • Use of traditional knowledge • Respect of customs and traditions

However, results indicated that perceptions of dam impacts on capital assets varied across households. For this reason, variability was explored by examining the

impact of relocation, ethnicity, livelihood, age, and gender on perceived impacts of the Bui Dam.

Table 34 Summary on Influence of Livelihood on How Bui Dam Affects Capital Assets

Capital Assets	*Intervention Provided by Livelihood*
Human Capital (Table 12)	(1) Farming less affected than fishing livelihoods for all factors (2) Mixed less affected than fishing for most factors (3) Mixed and farming equally affected on all factors
Social Capital (Table 15)	(1) Farming less affected than fishing for all factors (2) Farming less negatively affected than mixed for 2 factors (3) Mixed less affected than fishing for 3 factors
Political Capital (Table 18)	(1) Farming less affected than fishing for all factors (2) Farming less affected than mixed for all factors (3) No difference between fishing and mixed on any factor
Natural Capital (Table 21)	(1) Farming less affected than fishing for all factors (2) Mixed less affected than fishing for 2 factors (3) No difference between mixed and farming for any factor
Physical Capital (Table 24)	(1) Farming less affected than fishing and mixed for all factors (2) Farming and mixed similarly affected, differing on 1 factor (3) Mixed less affected than fishing for 5 factors
Financial Capital (Table 27)	(1) Farming households were less affected than fishing households with all factors (2) Farming households were less affected regarding access to microfinance, but mixed households were less affected regarding access to banking service (3) Mixed households were less affected (higher mean scores) than households with fishing livelihood for 2 aspects: access to banking, and access to credit facilities
Cultural Capital (Table 30)	(1) Farming was less affected than fishing and mixed for 2 factors (2) Farming was less affected than mixed for 2 factors (3) Fishing was less affected than mixed for 1 factor

The strongest associations were evident with relocation, ethnicity, and livelihood, and so these findings are summarized in the following tables. Age and gender were weak

predictors of perceived effects. The strongest predictor of variability in effects was relocation, with relocated communities perceiving effects more severely for all forms of capital asset (see the summary presented in Table 31).

Livelihood was also a strong predictor of the variability in dam impacts for the different types of capital assets (see summary presented in Table 31). Overall, it appears that people practicing farming livelihoods are less impacted by the Bui Dam and associated resettlement, followed by fishing and mixed livelihoods. Households classified as farming tended to be more resilient to dam impacts, compared to mixed of fishing. For households practicing farming, the understanding is that such households have continued after the dam, to engage in the same farming practices applied before the dam. In many of such cases, tools of their livelihood activity such as cutlasses and hoes are still applied. As a results such household are less impacted by the Bui dam. Fishing households on the other hand, have been impacted through shifts from river to lake fishing with attendant associated difficulties such as high cost of lake fishing, increased risk in lake fishing, and the need to improve fishing skills to meet the now changing terrain in fishing. Generally, it will be assumed that mixed livelihood would have performed better as suggested by the numerous literature. The case of the Bui study differed because mixed farming for this study mainly involved farming, fishing and its allied livelihoods such as fish mongering, an trading. The worse performance of the fishing livelihoods adversely impacted the overall stakes of the mixed livelihoods.

Table 35 Summary on Influence of Ethnicity on How Bui Dam Affects Capital Assets

Capital Assets	*Intervention Provided by Ethnicity*
Human Capital (Table 11)	(1) Nafana was less negatively affected than Ewe for nearly all factors (2) Nafana was less negatively affected than Mo for all but 1 factor (3) Mo was less affected than Ewe for all factors
Social Capital (Table 14)	(1) Nafana was less affected than Ewe for all 6 factors (2) Mo was less affected than Ewe for 5 of 6 factors (3) Nafana was less affected than Mo for 3 of 6 factors
Political Capital (Table 17)	(1) Nafana was less affected than Mo for 2 of 6 factors (2) Nafana was less affected than Ewe for 4 of 6 factors (3) Mo was less affected than Ewe for 6 of 6 factors
Natural Capital (Table 20)	(1) Nafana was less affected than Mo for 1 of 5 factors (2) Nafana was less affected than Ewe for 5 of 5 factors (3) Mo was less affected than Ewe for 5 of 5 factors
Physical Capital (Table 23)	(1) Nafana was less affected than Mo for 1 of 6 factors (2) Nafana was less affected than Ewe for 5 of 6 factors (3) Mo was less affected than Ewe for 4 of 6 factors
Financial Capital (Table 26)	(1) Nafana was less affected than Mo for 1 of 4 factors (2) Nafana was less affected than Ewe for 3 of 4 factors (3) Mo was less affected than Ewe for 3 of 4 factors
Cultural Capital (Table 29)	(1) No difference between Nafana and Mo for any aspect of cultural capital (high in all cases) (2) Nafana was less highly affected (higher mean scores) compared to Ewe for all aspects of cultural capital (3) Mo was less highly affected compared to Ewe for all aspects except for the practice of cultural activities

Regarding ethnicity, it appears that people from the Ewe ethnic group perceive impacts on capital assets to be worse than do people from the Nafana or Mo ethnic groups (Table 35). In many cases, people from the Mo ethnic group perceive impacts more than do people from Nafana groups.

The results from Table 35 are explained by the fact that many ethnic groups are aligned along the different livelihood activities engaged by people in the dam-impacted areas. It is important to note that ethnicity and livelihood may be somewhat intertwined and difficult to isolate from each other as causal variables affecting how impacts are experienced. For example, the Ewe communities are more into fishing livelihoods, whilst Nafana and Mo are more into farming, and in some cases into mixed livelihoods. Table 35 also confirms the influence of livelihood types on the dam and resettlement impacted communities.

Gender was a weak factor in mediating dam impacts basically because males are the dominant group in the impacted communities. In many of these communities, ownership of household resources including houses, farmlands, and fishing boats are vested in the males who exercise control over such resources in trust of the entire household. It must be echoed also that, males dominate in many forms of community engagement such as stakeholder consultations, community groups such as traditional council, and most importantly in negotiations for the livelihoods stakes of members of their households. It is therefore not out of place that gender had very minimal effect on mediating dam impacts for communities impacted by the Bui Dam construction.

Chapter 5

IN DEPTH INTERVIEWS OF FOUR FAMILIES AFFECTED BY BUI DAM

5.1 Introduction

This chapter focuses on the use of in-depth interviews with four families (two families from relocated communities, and two families from communities not relocated) in order to provide a more nuanced understanding of the complexities experienced by households as they navigate through impacts imposed by construction of the Bui Dam. The use of in depth interviews facilitated the collection of information relating to how people in a particular context understand scenarios such as dam and resettlement effects, and develop strategies for managing it (Lederach, 1995). In depth interviews were developed in part on reflections from key informant interviews and survey questionnaire findings with an aim of exploring and documenting the real life experiences for navigating the effects of Bui Dam. The questions used to guide the in depth interview interviews are provided in Appendix D.

The in depth interviews examined how communities located near Bui National Park (BNP) have developed livelihoods that relate to the park; how the recent construction of the Bui Dam has affected community livelihoods; and how these communities have attempted to respond to dam-induced shocks to livelihoods.

Table 36 Provisions and Promises Made/Implemented

Provisions/Promises Made	*Provisions/Promises Fulfilled (√) or Not (X)*
Housing Units	
Compensation for loss of rooms 4 rooms before for 3 rooms after, and so on...	√
Kitchens in new housing units	√
Bathrooms (with toilets) in new housing units	√
Community Infrastructure	
KVIP toilet facilities	√ in school
Hand pump boreholes	√
Support to build new place	√ in the form of cash compensation
Infrastructure for Entire Township	
School (Primary and Junior High School)	√ With kindergarten
Street lights	√ 2-4 units
Clinic	√ including Community-Based Health and Planning Services (CHPS) for treating minor ailments
Market stall	√
Police station	X
Lorry park	X
Community centre	√
Religious building (one mosque and one non-denominational church)	√ in the form of cash compensation provided - devalued due to delay in payment
Financial Support	
One-time resettlement grant of ₵100	√
Land development grant of ₵50 (payment after 2010 since people will have access to old farmlands until 2010)	√ ₵70 - one-time payment...to clear 1 acre of land
Compensation for loss of economic assets - payment determined by assessment of Land Valuation Board	X
Household income of ₵100 per month for one year (payment starts after relocation)	√ May 2011-Apr 2012
Livelihood Improvement	
Livelihood improvement programs by Faculty of Human Settlement, KNUST-Ghana	√ covered only the identification of livelihood groups
Others requests made by Bui Chief and accepted by BPA	
Football park	√ but in school
Library	X
Fish pond	√ ₵6,500 cash support
Visitors centre	√ ₵8,500 cash support
Irrigation dam	X
Other voluntary provisions by BPA	
Traffic light	√
Integrated water system	√

The presentation of results includes details on family history; description of life before the dam, during the early days of dam construction; promises made (Table 36 and Appendix G); levels of community involvement incorporated into the resettlement process); other factors mediating the effects of the dam (such as access to training); and description of life after the dam with attention to assets and livelihoods. In most cases, the experiences of the respective families were compared between families since each family has somewhat different experiences.

The results from the case studies are also compared with the results from the survey. The names used to refer to each family are fictional in order to respect confidentiality protocols.

5.2 In Depth Interview #1 – Opanin Kwasi's Family

5.2.1 Introduction

Opanin Kwasi's extended family formed part of the Dokokyina community that migrated from Kakala in La Cote d'Ivoire to settle approximately 200 years ago near the area that is now BNP. Opanin Kwasi is a Mo with the main source of livelihood for his family being farming, and sale of farm produce. Farming was mainly conducted using traditional cutlass and hoe. His family did not engage in any formal employment with the government.

Opanin Kwasi's extended family (of more than eight) before the dam construction was very united and collectively undertook many household activities, such as farming, cooking, and mentoring of the youth, as one big family. Extended family covers an extension of the nuclear family to include other family members such as uncles and aunts, cousins, nieces and nephews, as well as grandparents. They cooked, shared food and work, and supported each other. His family, which was instrumental in the formation

and activities of a local youth association, helped to liaise with the chiefs and constructed a school for the youth, helped in the payment of the wages of the teachers in the school, and also provided free accommodation to support the teachers.

This family resides in Dokokyina (see Figure 2). Opanin Kwasi is male, 46-55 years old, and has lived most of his life near to the dam site. His family was resettled as part of the dam construction process. He was selected because of the significant effect farming has on the livelihood opportunities available to his family.

Some prior consultations with opinion leaders in the community, such as the Assemblyman and chiefs, agreed that Opanin Kwasi has been resettled by the Bui Dam and also has an in-depth knowledge and experience about life before and after the Bui Dam. His family has also been significantly affected by the dam in the form of loss of farmlands, and displacement from his village.

5.2.2 Description of Life Before the Dam, with Attention to Assets and Livelihoods

Before the dam, Opanin Kwasi's family cultivated yam, maize, cassava, and vegetables. Farmlands, which were usually freely acquired from the indigenous owners, Bui Chief, ranged from 8 to 15 acres (3.24-6.07 ha) per person in the village, but his family was able to farm about 30 acres (12.14 ha) of yams compared to the average farm size of about 10 acres (4.45 ha) cultivated by other farmers. Tenant farmers (farmers whose farmland was allocated by the Banda Chief), such as his family, contributed a token of 20-30 tubers of yam, one cockerel, and 20 Ghana Cedis to the indigenous landowners (the Banda Chief) per year or for each farming season.

Cultivation of food crops was active in the rainy season, and generally for subsistence use. In the case of Opanin Kwasi, his large cultivated land allowed for the

surplus produce to be sold in nearby markets, such as Wenchi and Techiman, to generate revenue for his family. The heavy rainfall with fairly warm temperatures provided appropriate weather conditions to support the cultivation of both food and cash crops. Drinking water for his family was accessed through streams near his community.

In the Dokokyina community in which Opanin Kwasi lived there were carpenters, masons, drivers, three teachers (with two staying in nearby towns), more farmers and fishermen, but no health care worker. The diversity of people in the community provided the needed support to the larger community because the people lived as one big family of 165 people in 36 households (see Table 7), supporting each other in terms of providing free apprenticeship for the youth, and ensuring that the needs of other members of the community are met.

Prior to the construction of the Bui Dam, several consultations relating to livelihoods were organized by stakeholders such as Bui Power Authority (BPA), the Tain District Assembly, and Bui National Park (BNP). Many of the issues discussed centred on compensation for relocation, preparations needed to support the new resettlement arrangement, and the need to address the concerns of people to be affected by the relocation. Many promises were made, such as providing comfortable living conditions for the people, to motivate them to relocate. Such promises included the provision of fertilizer, and irrigation to support farming, especially because the land in the new settlement was less fertile. Additional livelihood resources, such as the provision of a fish pond to support fishing, fertile lands for farming, schools, clinic, and better housing facilities were pledged by BPA, but these were never provided. In other cases of consultation, BPA asked the people, including his family, to cease construction of

additional houses starting from 2005 (later changed by BPA to 2008) since their village was to be relocated and so any new houses would not receive any compensation. BPA confirms that some of these projects, such as the provision of a fish pond to support fishing and fertile lands for farming, are still part of their plans, but the clinic has been constructed and has been operational since 2013.

5.2.3 Effects of the Dam, Including other Factors that Mediated Effects of the Dam

According to Opanin Kwasi, the construction of the Bui Dam has caused some major changes to the livelihoods of his family. As a result of the dam, he and his family have been moved from their ancestral home and resettled in a camp. Although his family has been provided with a new block house, this can never replace the attachment to his ancestral home lost to the whole process leading to their resettlement.

His family has experienced a major shake-up in their livelihoods. Their old farmland has been destroyed, and replaced with a smaller 4 to 5 acre farm (1.78-2.225 ha). Unfortunately, the fertility of the current farmland is far worse than what prevailed in the old Dokokyina settlement. Moreover, the aftermath of the changes in his family's livelihood as a result of the construction of the Bui Dam has negatively affected the income of his family, and limited his ability to properly and adequately provide for his family. This has resulted in some hardships for his family, especially in relation to making a decent living.

The state of hardship faced by his family is also worsened by the fact that they were not provided with proper training to help them prepare for and overcome the potential effects of the construction of the Bui Dam. The limited training support entailed some agricultural extension services provided by the Ministry of Food and Agriculture

(MoFA) prior to the relocation. The training included how to apply improved farming technologies in their back yard gardens, as well as how to effectively till new farmlands that may not be as fertile as the old farmlands. As a result, his family is challenged with a lack of skills to deal with the small farm size and the poor fertility of farmlands allocated to them. Previously, his family's farmland was large and allowed for shifting cultivation practices that allowed exhausted farmlands to fallow. The small farm size (about 4 acres) allocated to his family does not allow for such a farming practice. Again, he has had to contend with pressure from his children who must share in his allocated land as they begin to be faced with the challenge of starting and fending for their own families. The lack of adequate preparation towards the resettlement has resulted in a dire situation for the livelihoods of his family.

5.2.4 Description of Life After the Dam, with Attention to Assets and Livelihoods

After the dam, livelihoods have become complicated (having to live in a small, new living environment, being unable to fend for his family due to allocation of small farmland that has lost its fertility, and dealing with the inability to adequately provide for his family). As a result, he struggles to meet the livelihood needs of his family, a situation similar to the majority of people living in the new Dokokyina community. Most families in the community, including his, have been allocated farmlands near the resettlement camps A and B (see Figure 2) that have lost their fertility because they were left barren after over-cultivation, as well as the practice of shifting cultivation by other farmers (including farmers from Bongaase and Jama). Currently, his family and many other families have to resort to the use of fertilizers to improve soil fertility and yield from the allocated farmlands. The challenge, however, is how to access unavailable funds to

purchase the fertilizer to support his farming activities. Unfortunately, BPA does not provide support in this regard.

Information from other key informants indicated that other people in the community, aside from Opanin Kwasi's family, have gained revenue and employment with Sinohydro (the Chinese company that constructed the Bui Dam) as masons, carpenters, steel benders, drivers, foremen, and cooks (S013). Some key informants also revealed that at the peak period of the dam construction, more than 4,000 people were employed by Sinohydro and 50 by BPA. Informants added that, at the close of construction, the majority of people who were engaged with Sinohydro were laid off, but those engaged by BPA have increased to more than 150 people. Opanin Kwasi stated that his family did not benefit from such employment opportunities because (unlike the large number of employees of Sinohydro who were not from the local community) they are mainly farmers, and also did not have the requisite skills to access employment from Sinohydro.

A challenge faced by Opanin Kwasi's family centres on the limited availability of farmland in resettled villages. Currently, his family has access to about 4 acres of land for farming, which is a reduction from 20-30 acres before his family was resettled. This pattern was consistent with trends in the wider Dokokyina community. According to respondent L011, average farm size has decreased from 8-15 acres (3.24-6.07 ha) before the dam to less than 3 acres (1.215 ha) per family. Opanin Kwasi revealed that the initial plan was to allocate farmlands based on a community's previous involvement in farming activities. As a result of the plan, farming communities such as Dokokyina and Bui were targeted to receive larger allocations of farming land than Bator, which is mainly a

fishing community, but this did not materialize. He stated that another factor (besides the scarcity of farmlands) that has affected his family's livelihood is the difficulty of accessing farmlands due to their distance from the community. Available farmland is now farther away than before the dam construction when they lived near the Black Volta (also corroborated by V006). As a way to compensate for the scarcity of farmlands, Opanin Kwasi's family have had to consult with leaders of some distant communities, such as Jama and surrounding communities (over 10 km away) to secure additional farmlands for cultivation. These lands are secured by making a request to people such as the Jama Chief. In some instances, the farmers have to consult the owners to access the land for farming. Sometimes, they have to part with some of their harvest to settle with the land owners.

Opanin Kwasi reiterated that major challenges were created for many of the people who engaged in farming because the resettlement process failed to provide opportunities for farmers to plan and cultivate new lands, prior to their relocation. He noted, for example, how several truck-loads of yam sets (whole tubers or tuber pieces used for planting) transported to the new settlement for planting rotted because the farmland allocated to his family in the resettlement camp was small. The farmlands allocated to him as well as other farmers were mostly lands that have been abandoned by previous farmers due to a loss of fertility (V004). He adds:

> "Our livelihoods have changed after the Bui Dam. In our old village, food was abundant and livelihoods were good except for our poor roads. Farmlands were unlimited and even settlers were given enough land to farm at virtually no cost. I could farm 30 acres and sometimes engage some farm labourers to expand my

> farmlands to cultivate more. I can say that I was rich and did not need any support from anybody, including the government. But, now I have access to a mere 4-5 acres of farmland to cultivate. I cannot cultivate much and even yam sets I brought from my old Dokokyina village got rotten because of limited and poor fertility of farmlands allocated to me. How do you expect me to farm and gain any appreciable yield when I am allocated farmlands that have been heavily cultivated and abandoned after it had lost its fertility? Indeed this resettlement has cost us a lot, and made many of we farmers poor. How do you say you have made life better for us? This is never true." (L011)

For his part and that of his family, the resettlement has made life difficult for Opanin Kwasi due to worsened livelihoods. He blamed this on poor planning associated with the resettlement process. Opanin Kwasi added that BPA failed to ensure that farmers were allocated adequate and fertile farmlands to complement farmlands lost to the displacement and subsequent resettlement. This, therefore, culminated in low harvest and the general shortage of foodstuff just after their relocation in 2011. As a result of these challenges created by the dam, an unknown number of indigenous farmers from some communities have abandoned farming to engage in other competitive livelihood opportunities, such as fishing, trading, and also illegal small-scale mining in places located deep within the park enclave (L011). Opanin Kwasi has diversified his livelihood opportunities to include the sale of pre-mix fuel (for outboard motors), and the construction and rental of housing facilities for visitors who come to the communities. This approach to sourcing livelihood has helped his family to mobilize additional resources to improve their livelihood stakes.

On the social front, Opanin Kwasi added that his family was previously very united, but is now bedevilled with conflict that has left its toll of disunity in the bigger Dokokyina family. For example, a misunderstanding that ensued about whether to relocate during the dam construction has resulted in a divided community, with a few families refusing to relocate and remaining behind in the old Dokokyina village. Others have had to return to their kinsmen in neighbouring Cote d'Iviore.

In the resettlement, Opanin Kwasi's family has been provided with a new house constructed with blocks and aluminum roofing sheets (an improvement over the earthen houses with thatched roofs they occupied in the old settlement). He has also expanded his house with the construction of additional rooms to rent out for an additional source of income that helps meet the costs of maintenance, such as painting, replacement of locks, and window nets for his new accommodation.

Although Opanin Kwasi agrees that the Bui Dam has brought some improvement in their livelihoods, he also believes that the Dam and its resettlement process has resulted in many untold hardships, such as weakening his family farming business due to the scarcity and poor fertility of farmlands, as well as the failure on the part of the resettlement process to provide better livelihoods for his family.

Some improvements have included the provision of a decent block house, access to roads, a community centre, and a clinic by the BPA (although many of the community roads are not tarred, and the fact that shorter routes to other communities such as Banda Ahenkro-Manji could have served their interest better than routes along Wenchi-Tingakrom and Wenchi-Tesilima). His family has explored other income-generating

opportunities, such as renting rooms and retailing in pre-mix fuel, to lessen the dire implications of the Bui Dam and its associated resettlements.

Table 37 . Summary Comparing In Depth Interview #1 Results with Survey Results Regarding Effects of Bui Dam on Capital Assets

Capital Asset	*Summary of Survey Findings*	*Summary of In depth interview #1 - farmer, male, 46-55 years old, resettled*
Natural Capital	• Worse for all aspects of asset • Worse for relocated • Farmers least affected; fishers most • Ewe most affected; Nafana least	• Worse on many fronts • Worse for relocation due to loss of farmlands and current infertile lands
Financial Capital	• Worse for many aspects • Worse for relocated • Farmers least affected; fishers most • Ewe most affected; Nafana least	• Worse due to loss of revenue from previously cultivated large farmlands • Inability to source financial support from family members who refused to relocated
Social Capital	• Mixed effects • Worse for relocated • Farmers least affected; fishers most • Ewe most affected; Nafana least	• Family fragmented with part left in old Dokokyina settlement • Increased family conflict due to disagreements on whether to relocate before the resettlement • Farming worst affected due to inability to secure support from other family members
Political Capital	• Mixed effects • Worse for relocated • Farmer least affected; fishers most • Ewe most affected; Nafana least	• Worse due to loss of income • Loss of indigenous ownership and control of farmlands because lands have been relocated to other communities
Human Capital	• Resilient for many aspects including improvement in fishing and farming • Worse for relocated • Farmers least affected; fishing most • Ewe most affected; Nafana least	• Mixed impact • Diversified livelihoods to include fishing • Farming is no longer lucrative due to small size and poor fertility of allocated farmlands
Physical Capital	• Resilient with improvements in housing, electricity, roads, and clinic and school buildings • Worse for relocated • Farmers least affected; fishing most • Ewe most affected; Nafana least	• Resilient with improvements in housing, electricity, school • Worse for relocated • Livelihood: worsened due to absence of skills training before relocation, farming worst affected
Cultural Capital	• Resilient for many variables • Worse for relocated • Farmers least affected; mixed most • Ewe most affected; Nafana least	• Worse for many aspects • Worse for relocated since they have lost the cultural support from part of the community that did not relocate

In the view of Opanin Kwasi, the Bui Dam construction has not been a bad idea, but the effects on his family have been negative due to the loss of their farmlands, as well as the small size and poor fertility of the newly allocated farmlands. He believes that the situation of their livelihood can be improved if appropriate measures, including the provision of farming inputs such as seeds and fertilizer, improvement in agricultural extension services, and allocation of additional farmlands to the farmers are implemented by BPA in their role as the resettlement organization. Table 37 provides a summary of the experiences of Opanin Kwasi's family regarding the effects of Bui Dam on capital assets.

5.3 In Depth Interview #2: Yaw Adjei

5.3.1 Introduction

Yaw Adjei a Fante, from Winneba, is a male and 36-45 years old. He has resided near the Bui area for less than 10 years, and currently lives in Bui Camp (Figure 2), which was resettled quite recently, with his four member family (his wife and two children). His village is scheduled to be relocated, but at the time of the interview this had not as yet happened. As of 2016, the Bui Camp was relocated to a new resettlement camp purposefully constructed to house the workers and family of BNP. Yaw Adjei was selected to be interviewed because he has lived through the period of planning, development, and construction of the Bui Dam and related resettlements. Other reasons for selecting Yaw Adjei included: he has a youthful family and therefore provides a different perspective regarding dam effects; his family is relatively small (which is generally about six in the community); and he works with BNP and can therefore provide in-depth information about the living conditions in the park and the effects of the Bui Dam on the park. He also adds that he among the elders responsible for the interest of a

large majority of the people in Bui Camp by virtue of his work with Wildlife Village (Bui Park) and the park, which falls under BNP.

5.3.2 Description of Life Before the Dam, with Attention to Assets and Livelihoods

Before the dam, Yaw Adjei lived in the Bui Camp, but was born in the central region of Ghana and was transferred to the community to work with BNP. Yaw Adjei holds a university degree and also participated in a number of training programs organized by the Ghana Government. He joined Wildlife Division after going through a successful application and selection process.

The Bui Camp (also known as the Wildlife Village) was constructed in the early 1960s for Soviet workers under President Dr. Kwame Nkrumah during a failed attempt to construct the Bui Dam. The camp has been left for decades, without any proper maintenance, and is almost tumbling down. The area of the camp where Yaw Adjei lived had no electricity or running water, but was served by a bore hole and an old public toilet. His main source of livelihood and that of his family was income derived from working for the park (under the Division of Game and Wildlife), the governmental agency responsible for managing the park. Although Yaw Adjei could not disclose his earnings from BNP for the said-period, he was quick to add that his earnings were significant in providing some level of decent livelihood for his family. He added that his family, along with many others in Bui Camp, engaged in farming, animal rearing, trading, and hairdressing to support the livelihoods of their family. The people of Bui Camp obtained their livelihoods mainly through employment with BNP, and through mixed livelihoods involving farming, fishing, and charcoal burning (V004).

Another form of resource that supported the livelihoods of Yaw Adjei's family was the type of accommodation provided by BNP. The management of BNP provided a three bedroom apartment for him and his family, because he was employed by BNP. The house contained a kitchen, living room, and washroom. However, he and his family shared a common public toilet with the Wildlife community. Other colleagues in BNP who were at lower ranks than him were housed in two bedroom apartments. Although his family did not have electricity, they enjoyed decent accommodation compared to the kind of accommodation available to the majority of the people in the villages near the park. The provision of decent accommodation by BNP provided his family the needed peace to go about their daily activities without worrying about where his family would live.

Before the dam construction, Yaw Adjei's family relied on the cordial relationship they had with people living near the park as a means to promote a high level of cooperation in addressing issues relating to park management - the source of his livelihood. Although Yaw Adjei's family resided in a nuclear household (like most families in Bui Camp), they found the opportunity to cooperate and share the pains and happiness of the extended family members. This practice helped his family to obtain support they may have required from other members of Bui Camp.

5.3.3 Effects of the Dam, Including Other Factors that Mediated Effects of the Dam

In the view of Yaw Adjei, the construction of the Bui Dam has had both positive and negative effects on his family. The effects have included the relocation of his community, livelihoods, and incomes of his family, as well as opportunities to develop resilience towards the potential challenges of the Bui Dam construction.

According to Yaw Adjei, the Bui Camp is in the process of relocating because his community forms part of the communities to be either cut off or inundated by the flooding of the Bui Dam. As a result of the planned relocation, his housing in Bui Camp has not received any form of renovation or expansion. This has worsened the previous poor state of the accommodation facilities provided for him and his family, although such accommodation was considered better in the eyes of people in the nearby communities. But the family has some good hope "at the end of the tunnel" because he has witnessed and inspected the new accommodation in the resettlement camp to be provided for his people by the BPA. His family will receive a 3-bedroom apartment with a kitchen, living room, and proper toilets (water closets linked to septic tanks), something that eludes them at the present resettlement or park camp.

Although he maintains his employment with BNP after the construction of the Bui Dam, his family's livelihood has still been affected by the dam due to losses suffered to incomes from other forms of additional livelihoods, such as farming. This happened because people living in the Bui Camp were asked by BPA not to expand any existing construction activities, or the scope and size of additional forms of livelihood, such as farms. This directive was intended to reduce any future claims for compensation for additional lands to be cultivated or new houses to be constructed. The delays in relocating the community also means that the people cannot start to develop some of these additional and alternative sources of livelihoods in the to-be-allocated resettlement camp.

On the eve of the flooding of nearly a quarter of BNP by the Bui Dam construction process in June 2011, some training opportunities in areas such as animal rescue were conducted for workers of BNP. This training was particularly important in

helping to rescue some animal species, such as some monkey species that ordinarily would have drowned in the floods. But it is also important to note that some species of animals were lost because of the low capacity of the park staff and institutional capacity to save all animals that faced a risk. The training opportunities received also improved the capacity of staff of the park to explore and use other opportunities in tourism created by the Bui Dam. This included the purchase of a new boat powered by an outboard motor to support boat cruising that is gradually developing tourism in the park, a development Yaw Adjei believes has positively contributed to the sustainability of the park, as well as the security of his employment with BNP.

5.3.4 Description of Life After the Dam, with Attention to Assets and Livelihoods

After the dam, Yaw Adjei continues to support his family with his income from working with BNP. He revealed that currently the park has witnessed an improvement in tourism opportunities, and this is boosting the morale and work engagement of many in his village who work in the park. This is because the visit of tourists provides opportunities to offer services as tour guides, and also educate people about BNP. Services currently improved by BNP, and also having a positive effect on his livelihood outcomes, include increases in the frequency of tourist activities to watch hippos (now relocated upstream of the Bui Dam). Tour activities also include boat cruises along the 444 km^2 lake created by the Bui Dam. Yaw Adjei adds that a few people in the Bui Camp, including his family, are currently engaged in the fishing industry, especially in the areas of smoking and sale of fish caught in the lake. This is helping to generate some income to support what is gained from formal employment with the park. As a result of his formal employment with BNP, he is able to mobilize some financial capital to help

the family engage in the fishing business. In this regard, the park and the dam are providing an improved fishing livelihood for Yaw Adjei's family.

Yaw Adjei adds that access roads are virtually absent, and he and his family have had to collect water from a borehole located at some distance from their residence. Although there are plans to provide new accommodation for Yaw Adjei's family and that of the many families in the Wildlife village, at the time of this study people remained in the old accommodation at the Wildlife village. The new Wildlife quarters had been constructed but some infrastructure remained to be completed, including sinking of boreholes, improvement of access roads, and landscaping of the site. Yaw Adjei reiterated that the Bui Dam and its attendant relocation process has had a marginal effect on his family, because his family continues to gain income from employment with BNP. The dam has introduced some livelihood opportunities in the areas of fishing, and it makes a lot of sense if his family can diversify livelihood opportunities to explore the benefits perceived to have been introduced by improvements in fishing. However, this has become challenging because his family does not have the requisite skills to engage in the available fishing opportunities. The experiences of Yaw Adjei regarding the effects of Bui Dam on capital assets for his family are summarized in Table 38.

Table 38 Summary Comparing In Depth Interview #2 Results with Survey Results Regarding Effects of Bui Dam on Capital Assets

Capital Asset	*Summary of Survey Findings*	*Summary of In depth interview #2 - farmer, male, 36-45 years old, not resettled*
Natural Capital	• Worse for all aspects of asset • Worse for relocated • Farmers least affected; fishing most • Ewe most affected; Nafana least	• Worse for many aspects • Part of park has been inundated • Worse for farming since the people were prevented from expanding farmlands
Financial Capital	• Worse for many aspects • Worse for relocated • Farming least affected; fishing most • Ewe most affected; Nafana least	• Less affected • Able to access bank credit as a result of the formal employment with BNP • Receive stable incomes from government • Improved revenue from lake cruising • Lost revenue from hippo watching
Social Capital	• Mixed effects • Worse for relocated • Farmers least affected; fishing most • Ewe most affected; Nafana least	• Mixed effects • Community has not yet been relocated • Lost some family networks with nearby communities that were relocated
Political Capital	• Mixed effects • Worse for relocated • Farmers least affected; fishing most • Ewe most affected; Nafana least	• Less affected • Still under the control and management of BNP
Human Capital	• Resilient for many aspects including improvement in fishing and farming. • Worse for relocated • Farmers least affected; fishing most • Ewe most affected; Nafana least	• Less affected • Still employed by BNP • Less impacted because not relocated • Worst for mixed livelihoods • Directed by BPA to halt any expansion of farmlands due to impending relocation
Physical Capital	• Resilient with improvements in housing, electricity, roads, clinic and school buildings • Worse for relocated • Farmers least affected; fishing most • Ewe most affected; Nafana least	• Worse effects • Cannot expand/construct new settlements in the old settlement • Worse because housing units have not been renovated over a long period • Hopeful of moving to new and better residences
Cultural Capital	• Resilient for many variables • Worse for relocated • Farmers least affected; mixed most • Ewe most affected; Nafana least	• Less affected

5.4 In Depth Interview #3: Kwame Fosu

5.4.1 Introduction

Kwame Fosu is a male, 36-45 years old, who has lived near BNP for 37 years. He indicated that for the past 98 years his extended family and the Bator community have settled around BNP. He is Ewe born in the old Bator village of Akaiyakrom and is a member of the resettled Bator community (see Figure 2). He has a family of six made up of his wife and two children, and two siblings. He has some secondary level of education and is currently seeking the opportunity to pursue his education at the tertiary level.

Kwame Fosu's family was selected because of their engagement in fishing, one of the key livelihood activities in the community. He is also an opinion leader who coordinates activities between governmental institutions and their local counterparts such as traditional leaders, clan and family heads. He is very knowledgeable in issues of community livelihoods, and also quite instrumental in the processes leading to the development and construction of Bui Dam and the general resettlement process. He is influential and also interacts substantially with government officials and institutions such as the District Assembly, BPA and BNP, traditional leadership, and community-based organizations. His input stands to enrich the documentation of experiences towards navigating livelihoods before, during, and after the Bui Dam.

Kwame Fosu's ancestors migrated from the Volta region of Ghana to the Bui area to engage in their fishing livelihoods. The migration happened many years before the establishment of BNP in 1971. Their movement was motivated by the search for areas of abundant fish to support their main source of livelihood. Kwame's wife also engages in the fishing business by drying and smoking fish for sale to retailers from cities such as

Accra and Kumasi. He lives with two of his paternal brothers, who also support themselves through fishing and transport service- carrying goods and sometimes passengers.

The selection of Kwame Ofosu was critical to the in depth interview because he is popular amongst the people, and works in nearly all facets of community engagement, especially in areas affecting the sustenance and welfare of people in the community.

5.4.2 Description of Life Before the Dam, with Attention to Assets and Livelihoods

Before the dam, Kwame Fosu's family was engaged in fishing in a natural river. Although he could not easily provide figures, he indicated that the river (Black Volta) was a key source of livelihood for his family because it provided them with adequate fish, money from the sale of fish, and generally made life comfortable for his family. The fishing grounds provided enough food for the fish through the decay of plant parts that fell into the river. These conditions provided a sustained livelihood for his family, as well as for those people of the main Bator community of Akaiyakrom that lived very close to the river and actively engaged in fishing. Other activities supporting the livelihoods of Kwame Fosu's family were similar to that of the majority of people in the Bator village: fishing and fish mongering, and brewing of local gin called "akpeteshie."

Methods of fishing applied by his family were simple and involved little capital and equipment, but yields were adequate for consumption and processing for sale at nearby markets. The basic equipment was a canoe, a set of paddles, and a fishing net. The fish the family caught was mainly large in size and high in quantity, and included mudfish (*Protopterus spp*), tiger fish (*Hydrocynus spp*), and tilapia (*Coptodon rendalli*). In addition, his family and other members of the Bator community gained livelihoods

through the provision of boat services and rest stops for tourists, acting as tour guides to ferry people to watch hippos, and patrolling the park in exchange for periodic access to fish in park areas.

His family has never owned land. However, land for purposes of settlement was accessed through collaboration with Banda Traditional Council and the District Assembly. Kwame Fosu added that farmlands were freely provided for his family as a member of the Bator community. In contributing to the growth and development of the broader Banda community, Bator people were entitled to allocations of land by the Paramount Chief. Kwame Fosu reported enjoying strong family ties in the pre-dam period, which ensured that people brought together food to share and availed themselves to discuss and share experiences which indirectly sustained his family's livelihood. His family cooked food that included a variety of fish and that benefited all, including those who could not engage in fishing due to ill health or failure to secure a better catch during their fishing expeditions.

5.4.3 Effects of the Dam, Including Other Factors that Mediated Effects of the Dam

The effect of Bui Dam on the family of Kwame Fosu is both positive and negative (Table 39). The effects include the relocation of their village, employment incomes, and opportunities to engage in additional and alternative livelihoods.

His village of Akaiyakrom was flooded and its people relocated to the Bui Resettlement Camp (labelled as A in Figure 2). As a result, he and his family and some paternal relatives, have been resettled in a new block house. The quality of the building is far better than their accommodation in the old settlement. The Bui Dam has affected the livelihoods of his family through the destruction of their fishing grounds and landing sites

that provided opportunities for bumper fishing harvest and safe landing, respectively. Positive effects have included the creation of a wider fishing ground in the lake formed by the dam, and the opportunity to use bigger boats to conduct fishing in the dam. However, he is challenged by the difficulty of mobilizing financial resources to secure a bigger boat and outboard motor to fully explore the current opportunities in fishing livelihoods.

Other alternative livelihoods, such as selling of fish, trading, and provision of some unregulated forms of boat services for tourists have been enhanced by the construction of the Bui Dam. However, this has also come with some challenges, such as competition from migrants to the Bui area.

The failure on the part of the BPA and other relevant stakeholders to provide training opportunities to prepare his family for the effects of the Bui Dam has made it difficult to develop resilience against the effects of the dam. His family could have been provided with training in alternative livelihoods, as well as the other potential opportunities in livelihoods to be created by the Bui Dam. For example, currently it has become quite difficult for his family to adequately explore some of the potential opportunities in fishing to improve the livelihood stakes of his family. His family could have been supplied equipment such as outboard motors and fishing nets on credit. Further, some low interest credit facilities could have been mobilized for fishermen including his family to help them to meet the challenges associated with lake fishing.

5.4.4 Description of Life after the Dam, with attention to Assets and Livelihoods

The experience of Kwame Fosu's family after the dam is summed up as:

> "People were comfortable with the simple livelihoods and uncomplicated rural lifestyles in their mud houses with thatched roofs, because they enjoyed the

> peace within their own compounds. Nobody paid for utility bills, but people conducted their livelihoods activities at their pleasure, had enough to eat and even spare, and stream water was clean and freely available at all times. But after the dam, we have lost everything and what has been given to the community has brought along the high cost to maintain houses, extreme hot weather conditions during the day, no trees to provide shade, dusty roads…" (L013)

Kwame Fosu argued that the dam has increased fish stocks for the fishing industry but the industry is unable to adequately provide for the livelihood needs of his family as well as the main fishing communities of Bator, Dam Site, and Agbegikro because of competition from other settler fishermen. He adds that, currently, there is a free-for-all (unregulated) type of fishing industry practiced in the Bui area. However, the indigenous fishers are disadvantaged because of the in-migration of other fishers who seem far better equipped to take advantage of the new conditions in that they have the larger boats and outboard motors needed to cope with lake conditions. Further, the sudden weather changes on the lake, as he describes the situation, can make the small canoes adapted to river fishing subject to capsizing in the lake.

Immediately after the dam construction, Kwame Fosu's family, as well as the majority of the over 200 indigenous fishermen in the resettled area, could earn more than 1,000 Ghana Cedis from fishing per month, but this has currently decreased to 520-780 Ghana Cedis per month. His family's current low income from fishing is the result of the low fish catch experienced by some of the fishermen from the dam-affected communities. This is basically related to the challenge of accessing larger boats and outboard motors that can help such fishermen to increase their fishing activities to harvest more fish, as

evident with the in-migrant fishermen who enjoy a booming fish business due to their resourcefulness to engage in robust fishing trade with merchants from Kumasi and Accra.

These changes in earning from fishing have greatly affected the livelihoods of Kwame Fosu's family, and the majority of people from the Bator community, which has a total fishermen population of about 120 people. Currently, his family's fishing livelihood is undermined by an aggressive competition from migrant fishermen and their families from Ghana and the West African sub-region. Kwame Fosu added that there is currently a large illegal settlement close to Jama (and at the embankment of the Bui Lake) where in-migrants from downstream on the Volta, and other places such as Nigeria, Mali, and Cote d'Ivoire, have settled and actively engaged in the booming fishing business. The negative effects of the activities of the migrant fishers on his family occur in tandem with other direct effects from the hydro dam. Unlike Kwame Fosu's family that still engages in subsistence and low capital intensive type of fishing, some people from the communities have improved revenue from the fishing industry by purchasing large outboard motors to increase their fishing expeditions, and also selling fish in the community and other large markets in Kumasi and Accra. His inability to enjoy the potential opportunities in the fishing industry is related to his lack of skills in fishing, and the poor financial capacity of his family to invest in the fishing related industry.

Currently, Kwame Fosu's family has shifted from river to lake fishing, and this takes place a short distance from the dam. According to Kwame Fosu, lake fishing does not provide a favourable alternative to river fishing for his family. Lake fishing has differential effects; the poor are unable to cope with the increased cost of fishing; and the

aged and less physically active are unable to access fishing activities because communities are located far from the lake, and need to commute over rocky cliffs to access fishing sites. Further, fishing is threatened by competition from migrant fishers from Ghana and the West African sub-region. At the time of interviewing, Kwame Fosu was exploring an opportunity to secure 7,500-8,000 Ghana Cedis to purchase an outboard motor, aside from the purchase of additional equipment such as fishing nets to fish in the lake created by the Bui Dam.

Further undermining his fishing livelihood is increased competition in fishing due to the absence of any effective regulations in the fishing business. In all, over 20,000 migrant fishermen located in about 53 illegal communities are engaged in active fishing, and therefore compete against his family and other indigenous fishermen for the available opportunities in fishing livelihoods. The only assurance his family has in arresting the challenge is the completion of fishing regulations that will include specifications about access (who can conduct fishing).

Kwame Fosu's family has lost the small but important additional income previously gained from tourism in BNP. These lost livelihoods from BNP included boat services, provision of a rest stop, sale of fish, and sale of some cultural artefacts such as beads to tourists. These services are now provided by BNP because BNP has improved its capacity to provide such services whilst the family is unable to benefit from tourism as a result of being located further away from the park.

Kwame Fosu's family, along with a host of other families from the Bator resettlement, feel that the relocation process has been disappointing. Kwame Fosu adds that his family is unhappy because they believe that BPA has deceived them by failing to

honour promises made during the relocation process (see Appendix G). He noted that "my family is no longer interested in honouring meetings with stakeholders such as BPA since we do not hope to receive any good assurance for our diminishing livelihoods."

Unlike in the old Bator Village, where participation in social events such as naming ceremonies attracted a compulsory contribution of 5 Ghana Cedis (less than US $2) to support the affected family, Kwame Fosu and his family have difficulty in supporting or gaining support from other families due to the increased difficulty in accessing livelihoods for his families as a result of the adverse dam effects on their fishing livelihoods.

Kwame Fosu's extended family no longer enjoy the pleasures of the past, such as sitting to chat and enjoy folk stories after fishing expeditions, due to the adverse changes that the Bui Dam has caused to the livelihoods of his family. This has left in its wake a large number of families who are perceived to have become more selfish and self-centred due to their struggle to meet the needs of their nuclear families. Many people, including the heads of families such as Kwame Fosu's, have had to share authority with the youth, because many of them are now breadwinners for the larger families. According to Kwame Fosu, Bui Dam has failed to provide the required alternatives to the adverse changes in his livelihood caused by the dam. Overall, Kwame Fosu thinks that some people have benefited from improvements in fish stocks and a wider lake, but the perceived benefits have been negated by the influx of an aggressive migrant population who compete vigorously for the few opportunities in the fishing livelihood. Unfortunately, the few over-competed fishing resources also serve as the only source of livelihood available to support the life of his family.

Table 39 Summary Comparing In depth interview #3 Results with Survey Results Regarding Effects of Bui Dam on Capital Assets

Capital Asset	*Summary of Survey Findings*	*Summary of In depth interview #3 - fisherman, male, 36-45 years old, resettled*
Natural Capital	• Worse for all aspects of asset • Worse for relocated • Farming least affected; fishing most • Ewe most affected; Nafana least	• Worse for many aspects • Lost access to old fishing grounds • Worse for fishing livelihood • Worse for relocated
Financial Capital	• Worse for many aspects • Worse for relocated • Farming least affected; fishing most • Ewe most affected; Nafana least	• Worse for many aspects • Lost access to financial support from tourism opportunities
Social Capital	• Mixed • Worse for relocated • Farmers least affected; fishing most • Ewe most affected; Nafana least	• Worse for many aspects • Fragmented family network • Lost livelihoods gained from networks
Political Capital	• Mixed effects • Worse for relocated • Farmers least affected; fishing most • Ewe most affected; Nafana least	• Mixed effects • Weakened traditional governance structures • New leaders have emerged due to the control of livelihoods resources, such as fishing
Human Capital	• Resilient for many aspects including improvement in fishing and farming • Worse for relocated • Farmers least affected; fishing most • Ewe most affected; Nafana least	• Mixed effects for many aspects • Improved fishing grounds-wider lake • Large boats are used for fishing on lake • Increased cost of fishing • Loss in fish catch • Reduced income from fishing • Loss of tourism opportunities • Increased competition in fishing in the Lake created by the dam • Encourage diversification of livelihoods
Physical Capital	• Resilient with improvements in housing, electricity, roads, and clinic and school buildings • Worse for relocated • Farmers least affected; fishing most • Ewe most affected; Nafana least	• Resilient with improvements in housing, roads, clinic, school, community centre • Worse because relocated • Worse for his community who rely on fishing and who are mainly Ewe who practice patrilineal inheritance
Cultural Capital	• Resilient for many variables • Worse for relocated • Farmers least affected; mixed most • Ewe most affected; Nafana least	• Worse for many aspects • Livelihood challenges have weakened cultural norms and practices • Worse because relocation has fragmented his resettlement

5.5 In depth interview #4: Agya Koo Kusi

5.5.1 Introduction

Agya Koo Kusi is a male, aged between 46-55 years, and of Nafana ethnicity. He has lived near BNP for 21-30 years, and his village - Bongaase - will not be resettled. He has a family of seven, made up of a wife and five children. Agya Koo Kusi sources the livelihood of his family through his farming activities. He and the family have lived in Bongaase for the entire period of the development, construction, and aftermath of the construction of Bui Dam and related resettlements. They live in a decent accommodation and regulate their livelihoods along with the family's farming activity.

Agya Koo Kusi's family was selected as part of the case studies because they have witnessed most of the events associated with construction of the Bui Dam, including blasting of rocks and other excavation works, construction of a saddle dam, flooding of some communities by the dam, and the dam-related resettlement process. However, his community will not be resettled. The family lives at the fringe of the dam, where effects are perceived to include loss of farmlands to construction of settlements, roads, and transmission lines. Agya Koo Kusi was selected for the in depth interview because he is knowledgeable about his community's history, and also serves as an elder and is a family head. His inclusion is particularly significant to the study as he provides information for a comparative study of dam effects for communities that will not be resettled.

5.5.2 Description of Life Before the Dam, with Attention to Assets and Livelihoods

Agya Koo Kusi and his family have witnessed the majority of events leading to the construction of the Bui Dam. Before the dam, the family's cashew plantation provided the majority of the family income. In addition to cashew farming, his family also engaged in cultivation of food crops such as yams and cassava for both household

consumption and for sale as cash crops. These forms of income were instrumental in funding his children's education, as well as providing for the daily sustenance of his family. His family was, however, unable to engage in other forms of livelihood such as fishing due to limited skills in practicing these livelihoods. But other members of his community engaged in a variety of livelihoods and professions, including teachers, masons, carpenters, butchers, hairdressers, and traders. Although Agya Koo Kusi's livelihood activities were simple, it was relevant in providing for the livelihoods of his family and those of the majority of people in the Bongaase community.

Before (and after) dam construction, Agya Koo Kusi's family lived in an extended family household that included his nuclear family and a mixture of other nuclear families related by matrilineal kinship (primarily through the mother's line). The extended family provided support in a variety of ways: practicing their livelihoods, adulthood initiation rites, naming ceremonies, and funerals. After a day's work activities, the extended family cooks and shares meals. Agya Koo Kusi's family was instrumental in providing for the needs of other family members who could not adequately provide for the needs of their nuclear families. Livelihood support provided by his family included feeding the children of other extended family members, and supplying some food stuffs for other family members in need.

Before the dam, the flow of authority and decision making was swift, well organized, and effective in supporting the livelihoods of his family and that of the larger family. The youth looked up to the direction and guidance of the elderly in the family and this helped in preparing his children for adult life, including how to provide and fend for themselves. Respect and discipline were the hallmark of his family since the authority of

the elderly, such as family heads, was greatly revered. As a result, Agya Koo Kusi's children, including a large number of the youth from the community, grew up to become responsible people with some having completed their education, and others also engaged in different forms of income generating activities. Agya Koo Kusi's family, like many in his village, lived in block houses and shared a public toilet facility.

5.5.3 Effects of the Dam, Including Other Factors that Mediated Effects of Dam

The effect of the Bui Dam on Agya Koo Kusi's family is a mix of positive and negative (See Table 40). Agya Koo Kusi's family and their community will not be affected through resettlement, but rather through road construction and loss of some community lands (144 km^2 of land, including parts of BNP) to flooding by the dam.

The scope of his livelihood has not changed since his family still practices farming. However, his income options have been reduced by the flooding of part of the communal lands that served as part of his farmland. His family has also been negatively affected by the dam because of lack of preparedness in the form of the failure of BPA to provide training in alternative livelihood opportunities. This meant that his family could not properly exploit new livelihood opportunities such as trading, and the potential in fishing livelihoods.

5.5.4 Description of Life After the Dam, with Attention to Assets and Livelihoods

The coming of the Bui Dam has had less effect on the livelihood of Agya Koo Kusi's family, compared to many other families in his community (see Table 40). He continues to practice his profession, and still depends on his cashew farms (which was not inundated), as well as his subsistence cultivation of food crops. However, he is now limited in his farm labour due to his old age and occasional ill health. As a result, he has

had to sometimes depend on hired labour to support his cash crop farming, which comes with cost.

After the dam, his family has benefited from improvement in infrastructure, which includes construction of roads and expansion of existing road networks, extension of electricity to his house and the community at large, and construction and rehabilitation of new schools and existing school infrastructure, respectively. Improvements in infrastructure have positively contributed to his livelihood because he can now easily cart his farm produce to sell in nearby markets. Nonetheless, he is disappointed with the number of failed promises relating to his family's livelihood, particularly the promise by BPA to provide alternative livelihood support programs, and create local jobs to absorb the ever increasing number of the unemployed youth.

According to Agya Koo Kusi, many of the promises with the Banda Chief and including those of the resettled communities (some of which were documented with the Chief and people of Bui - see Table 36 and Appendix G) have been left unfulfilled. These include provision of an irrigation dam, a community zoo (an example of a Community Resource Management Area, or CREMA), a mausoleum, and funds to start small businesses. Specifically before the Bui Dam construction, BPA reached an agreement with the communities to provide support to develop a community zoo to keep some of the wildlife threatened by the flooding of the Bui Dam. The animals will be kept to serve as a tourist site and to generate revenue for the communities. Moreover, the CREMA will protect wildlife resources and serve as a legacy to be bequeathed to the younger generation who may not be privileged to have witnessed the park before the intended impoundment and flooding of nearly a quarter of BNP. Other unfulfilled promises

include: support for a tie and dye business; a vehicle to transport traders to and from the market; training in alternative livelihoods; construction of tarred roads within the resettled communities; and providing supplies of fertilizer (see Appendix G). Therefore, his hope of securing livelihood for his family has been dashed and this has made it difficult for him to adequately provide for the sustenance of his family.

Among the implications of these unfulfilled promises is the loss of expectations. According to Agya Koo Kusi, a number of the youth as well as other families have migrated and relocated from the Bongaase community to seek greener pastures in nearby large towns such as Wenchi and Nsawkaw. Others have also pitched camp in places near Jama where settlements have sprung up. These settlements are mainly for migrants engaged in fishing livelihoods. He adds that these people are mainly involved in fish mongering, and in a few cases in actual fishing in the large lake created by the Bui Dam. As outlined in Table 40, the impact of the dam on Agya Koo Kusi's capital asset situation resembles, in many ways, the impact experienced by many other people, even though his family has not been relocated.

Agya Koo Kusi's family is not happy about the Bui Dam and related resettlement processes because it has failed to initiate any significant changes in their livelihoods. He believes there are major opportunities created, such as improved access to fishing, that can enhance the livelihood options. Unfortunately, Agya Koo Kusi and his family are badly placed to secure any significant benefit from the opportunities in fishing because they lack the requisite fishing skills and capital required for fishing.

Table 40 Summary Comparing In depth Interview #4Results with Survey Results Regarding Effects of Bui Dam on Capital Assets

Capital Asset	*Summary of Survey Findings*	*Summary of In Depth interview #4 - farmer, male, 46-55 years old, not resettled*
Natural Capital	• Worse for all aspects of asset • Worse for relocated • Farmers least affected; fishing most • Ewe most affected; Nafana least	• Mixed effects • Lost access of farmlands to flooding, and construction of access roads
Financial Capital	• Worse for many aspects • Worse for relocated • Farmers least affected; fishing most • Ewe most affected; Nafana least	• Mixed effects • Difficulty in accessing bank credits
Social Capital	• Mixed • Worse for relocated • Farmers least affected; fishing most • Ewe most affected; Nafana least	• Less affected • Family networks still support livelihoods of his family
Political Capital	• Mixed effects • Worse for relocated • Farmers least affected; fishing most • Ewe most affected; Nafana least	• Mixed • Failed promises from local governance institutions such as BPA
Human Capital	• Resilient for many aspects including improvement in fishing and farming • Worse for relocated • Farmers least affected; fishing most • Ewe most affected; Nafana least	• Mixed effects • Improvement in fishing livelihoods • Inability to access fishing livelihood due to poor skills • Migration of youth for employment in nearby communities
Physical Capital	• Resilient with improvements in housing, electricity, roads, and clinic and school buildings • Worse for relocated • Farmers least affected; fishing most • Ewe most affected; Nafana least	• Resilient with improvements in existing road networks, electricity, new and rehabilitated schools
Cultural Capital	• Resilient for many variables • Worse for relocated • Farmers least affected; mixed most • Ewe most affected; Nafana least	• Resilient for many aspects • Cultural practices are still held

5.6 Summary

This chapter examined how four households perceived changes in community livelihoods after the Bui Dam, and described what constituted livelihood before the dam.

These findings add to a small literature that uses case studies to provide a better understanding of issues people face when navigating through shocks such as dam effects and resettlement. Generally, the in depth interview results provided a better understanding of the Bui study by giving in-depth information about the issues raised in the results of the survey, such as the "which and how" of the aspects of community capital assets affected by the construction of the Bui Dam. It also offered a diverse lens for studying Bui Dam effects on community livelihoods, and especially on how families perceive the effects of the Bui Dam.

Before the construction of the Bui Dam, the people were self-sufficient, augmented in some cases by the income from selling excess food stuff and fish. This is confirmed by responses from key informants who also indicated that livelihoods before Bui Dam construction was more by cultivation of crops for food (L015), and fishing to provide for the nutritional needs of the families (L013, L014). In many cases, the livelihood options that people engaged in were capable of providing the general livelihood needs of the people (G022).

The in depth interviews demonstrated that effects were mixed according to how people perceive their livelihoods before and after the dam. Key informant interviews indicated that the Bui Dam's effects have been negative, for the most part. The in depth interview results, however, corroborate that of the household survey to suggest that the construction of the Bui Dam has resulted in both negative and positive effects, with the exception of natural capital. Some positive effects include an improvement in housing facilities for the resettled communities, expansion of access routes to Bui communities and its environs, access to a clinic (although generally worse as indicated in Table 13),

and expansion of water sources. Some adverse effects of the Bui Dam include loss of community lands such as farmlands, loss of both food and cash crops, an increase in the cost of conducting some livelihood activities such as fishing, and the influx of migrants who compete for available opportunities in community livelihoods.

The results of the case studies show that effects of the dam involved issues of resettlement, loss of farmlands for farmers, loss of fishing grounds and changes in the needed methods for fishing in a lake environment, as well as worsening livelihood options. These results are also corroborated by many of the key informants, who indicated the following: few villages (compared to the Akosombo Dam resettlement) have been inundated by the Bui Dam and resettled in Bui and Jama camps (V001-V008 except V004); and communities have generally lost their fertile farmlands to the flooding and subsequent relocation. Moreover, the newly allocated farmlands are small in size and poor in fertility (V003, L015, G018); fishing communities oriented toward river fishing have lost their fishing grounds to flooding, and fishing cost has increased due to the need to purchase the large boats and outboard motors needed for lake fishing, as well as the need to commute long distances on-land and on-lake to engage in fishing. The in depth interviews further show that dams can undermine livelihoods of people through reduced access and size of farmlands, and create changes in access to opportunities in new livelihoods such as fishing. However, dams can also positively affect fishing livelihoods such as improved marketing opportunities, and lake-caught fish for people with the requisite fishing skills and equipment. The few people who have the capacity to explore the opportunities in fishing have improved livelihoods for their families.

Results of the Bui study are similar to those described by Dzodzi (2006: p. 144-146), because the study suggests that dam construction can increase access and opportunities in fishing-related livelihoods for people who live near dams. However, the study provides some differing results to Dzodzi (2006), in part because people around Bui Dam are unable to explore other promising livelihoods such as fishing (due to the inability to access lake-appropriate equipment and the requisite capital outlays), unlike the case of communities near Akosombo Dam who gladly embraced fishing livelihood through the process of diversification of livelihoods. The Bui study also confirms the results of WCD (2000), Galipean et al. (2013), and Nusser (2014), by showing that dams can negatively affect livelihoods of people and families living near dams, and those who in some cases have gone through resettlements.

Some key informants (G020, L010-L014) provided similar views as found in the in depth interview scenarios by noting the failure of BPA (the main resettlement body) to provide adequate training in livelihood options, including alternative livelihoods. This has negatively affected the capacity of the dam-affected communities to develop some form of resilience in their livelihoods after the Bui Dam. The outcome of the case studies is also supported by the survey (see Tables 10, 22), which shows a worsening of human and natural capital after the dam construction. The results of the Bui study suggest that future resettlement of communities nearby dams should be based on a commitment to deliver on promises that integrate policies and programs to build the capacity of communities to develop, sustain, or improve community livelihoods. Generally, one can infer that policy makers and dam-affected communities have not adequately explored lessons of the Akosombo Dam, but repeated the many mistakes of the processes

associated with that project. The lessons learned revolve around the need for people affected by dams and related settlements to proactively source and engage in new and emerging livelihood opportunities as a way to absolve the weaknesses in other livelihoods. Individuals can organize themselves into cooperatives to improve the capacity to source bigger loans to invest in such livelihoods, whilst the government and contractors also step up and fulfil their promises to the people. These cooperatives can also support a process of pulling resources together to generate a revolving fund to be accessed by members who may be in need of capital for their business. Training in multiple livelihoods will therefore be an important step to maintain or secure improved livelihoods and effectively navigate people through the potential adverse effects of dams and related resettlements on community livelihoods. However, there is hope for the people since BPA asserts that they are in the process of sourcing funds and an institution to conduct training to build the capacity of the people in the development of alternative livelihoods.

The resettlement process focuses on the provision of facilities (such as houses, electricity, boreholes, schools, and clinic) to stimulate growth and improvements in community livelihoods, whilst resettled communities suggest that improvements have to move beyond mere provision of facilities. The case studies suggested the need to also provide opportunities in livelihoods (such as training in alternative livelihoods, provision of fishing and farming equipment, various forms of financial support, and farmlands and fishing grounds to support day-to-day survival). More so, BPA provided a resettlement grant of GHS 50 (US $34.48) to support the resettlers starting a new farm, and a monthly supporting grant of GHS 100 (US $68.96) paid to each household for one year compared

to Ghana's monthly minimum wage of GHS 83.97 (US $57.90 at US $1 = GHS 1.45) per day for 2010. The provision of the monthly support was intended to provide financial security for the resettlers with the hope that, by the end of one year, they would have more sustainable income-generating sources, but this was insufficient according to the resettlers who participated in this research.

Chapter 6

CONCLUSION

6.1 Introduction

The overarching objective of this study was to develop an understanding of the effects of the construction of a hydro dam on nearby communities. Specifically, this study examined how capital assets and the presence of a nearby national park shape the effects of dam construction.

The study was undertaken in the Bui area of the Brong Ahafo Region of Ghana, specifically within the Banda and Bole districts. The Bui Dam was commissioned in 2007, with construction started in 2009. It displaced seven communities totalling 1,116 people, and also affected a range of capital resources, such as inundated farmlands and reconfigured fishing grounds. The dam has also reduced community farmlands through road upgrading, creation of saddle dams, construction of electricity transmission lines, and other large tracts of land set aside for future development.

The dam inundated nearly a quarter of Bui National Park (BNP). As a result, habitats for IUCN red-listed and protected hippopotamus and other critical wildlife and wilderness resources have been destroyed. Tourism revenues have been lost (with the loss of visitor opportunities being 280 in 2008) for BNP (about $1 per park entry), as well as for a number of communities such as Bator (which provided ferry services at $2 for a boat with $2.50 tip in the park). To a larger extent, the ecological integrity and existence of the national park is being threatened by the Bui Dam, especially with the inundation of nearly a quarter of BNP, destruction of key biological resources and wilderness, and the displacement of the important tourist attraction offered by hippos.

The study collected data from 13 communities; seven of these communities were relocated as a result of dam construction. Communities in the study area also differed in livelihood types (farming, fishing, or mixed) and ethnicity (Nafana, Mo, and Ewe). The study explored how these variables, as well as age and gender, have influenced the way people perceive changes brought about by the construction of the Bui Dam. The study was guided by two main research questions:

Q1. How do communities near Bui Dam perceive the effects of the dam on their capital assets?

Q2. How are perceived effects of the Bui Dam on capital assets influenced by age, gender, ethnicity, type of livelihood, and whether communities have been relocated?

Data was collected through a survey of 355 households, key informant interviews, and in-depth qualitative studies conducted in four households. All three approaches included households that had been relocated due to dam construction, and households that had not been relocated. The study applied a case study approach at the household level. Analysis was undertaken through a conceptual lens that builds on the sustainable livelihood framework, specifically focusing on capital assets, which are linked to the stock of assets and capabilities available to households to make a living, as outlined in the summary below.

This chapter presents a summary of key findings based on the main research questions, contributions to the research literature, as well as suggestions for management, policy, and planning. Finally, the chapter outlines some of the limitations and weaknesses of the study and also provides suggestions for future research.

6.2 Summary of Key Findings

Overall, the Bui Dam was perceived to have decreased many of the capital assets of the communities affected, but variability exists between households, with some households indicating improved conditions and others indicating worsened conditions. This variability was explored through analysis with a number of predictor variables: relocation, ethnicity, livelihood type, age, and gender.

6.2.1 Perceived Effects of Bui Dam on Financial Capital Assets

Community financial capital was resilient to dam construction in many ways, including access to micro finance, but negatively affected in other ways, including banking services such as deposits, savings, and loans to make a living. The Bui study supports arguments (NRI, 2000; Flora and Thiboumery, 2016) that financial resources relevant to the development of community livelihoods are wages, savings, supplies of credit, and remittances. The Bui study also indicated the importance of financial capital to the development of community livelihoods, emphasizing the critical roles of supplies of credit and loans to the development of community livelihoods. The study provides a similar perspective to assertions by Korboe (1998) and Nunan et al. (2001), who describe how the absence of financial capital such as wage opportunities, and worsening debt have a major impact on livelihoods of affected people or communities. A differing perspective from Korboe and Nunan is that the Bui study argues that rural communities in the Bui study largely depend on group savings, in-kind-support from livelihood groups, and small cash mobilization schemes such as BACCSOD.

When financial capital was examined with predictor variables through multiple regression analysis, the overall relationship was moderately strong as indicated by (R

squared=.388), and financial capital was significantly related to relocation (beta=.575) and livelihood (beta=.299), but not significantly related to ethnicity, age, or gender. Non-relocated communities were less affected for all aspects of financial capital. This is partly explained by the fact that many of the resettled communities who lost some economic value in terms of their livelihood could not gain any support through the established financial institutions to secure loans and other financial support to revamp their livelihood activities.

Regarding the influence of livelihood type on financial capital, the study found that farming was less negatively affected than fishing or mixed for most aspects since the cost involved in engaging in farming, such as purchase of cutlass or hoe, fertilizer, and hiring wage labour, is less compared to fishing and mixed livelihoods.

In relation to the influence of age on financial capital, the Bui results differ from Ogwumike & Aboderin's (2005) study exploring the links between old age and poverty in Nigeria and Ghana, which found that older ages (at individual or family levels) have a positive relationship with access to savings and assets under worsening economic strain such as underemployment. On the other hand, the Bui study indicated that younger adults, especially those engaged in the fishing industry, are financially better off than older adults because of the former's ability to engage in the physically demanding fishing in the lake created by the Bui Dam.

6.2.2 Perceived Effects of Bui Dam on Political Capital Assets

The study results indicated that all seven forms of capital, including political capital, are useful in developing and improving community livelihoods. The Bui study adds to findings of other studies, such as Hussein (2002) and Ashong & Smith (2001),

who argue that political and cultural capital have the potential to positively or negatively affect the development of community capital assets. The contribution of aspects of political capital to the development of community capital assets were mixed. There were perceived improvements in family involvement in making decisions, but negative results for effectiveness of traditional leaders to mobilize the people for communal activities, and respect and support of traditional leaders for the right to contribute to decision making. The Bui study supports the arguments by Hussein (2002) and Ashong & Smith (2001) by indicating that political capital such as forms of policies, institutions, and processes can shape access to and development of other key community capital assets. This includes governmental policies that appropriate resources to the various sectors of Ghana (Vordzorgbe, 2001), and make decisions on the allocation of national projects (e.g., construction of Bui Dam).

The Bui study further suggests that the Bui Dam may be impacting on traditions regarding the authority of chiefs, but it seems that some of these changes are occurring throughout modern Ghana. In the vein of the evolution of the "modern chief", the Bui study suggest that the changing roles of chiefs such as subtle involvement of chiefs in party politics and indulgence of some chieftaincy institutions in land disputes can negatively impact on the authority of chiefs and the respect and reverence that chiefs and traditional leadership should command in the Ghanaian society, including the Bui communities.

When political capital was examined with predictor variables through multiple regression analysis, the overall relationship was strong (R squared=.529), and significantly related to relocation (beta=.518), livelihood (beta=.520), ethnicity

(beta=.133), and gender (beta=.199), but not significantly related to age. For example, non-relocated communities were less affected for all aspects of political capital. This is explained by the fact that relocation has made it possible for other settlers (other than the Bui village) to own land. Ownership of lands previously owned by the Banda Chief has been lost by the government decision to also allocate lands to the other tenant communities. In addition, the Bui Chief has lost power as a result of the appropriation of some land areas previously under his control, as well as the power to be the sole authority on issues such as pouring of libation at community-related events. Moreover, new leaders have emerged outside the traditional leadership domains (a development common to other communities in Ghana), and as a result are creating challenges in governance and leadership within the resettled communities.

Regarding the effect of ethnicity on political capital, the Nafana and Mo were less negatively affected for most aspects. The worse performance of Ewe people is partly explained by the fact that the youth, who are strong and engage more than others in strenuous lake fishing, now have access to economic resources and are therefore difficult to control since they see themselves as new emerging leaders.

Concerning the influence of livelihood type on political capital, farming was less negatively affected than fishing or mixed livelihoods for most aspects. This is probably related to the fact that the Ewes, who are challenged by emerging leaders, are mainly into fishing livelihoods.

The Bui study found that age and gender had little effect for all aspects of political capital. This is probably because traditional leadership is generally the purview of adult males of the society. Women may perform roles as Queen Mothers (“old wise

lady"), but their numbers do not match those of the men who dominate the traditional leadership in communities near the Bui Dam. However, little is known about the role of gender in mediating political capital for communities affected by dam construction.

6.2.3 Perceived Effects of Bui Dam on Cultural Capital Assets

Community cultural capital was found to be generally resilient to the effects of the Bui Dam and related resettlements for many aspects related to that asset, such as use of traditional knowledge and practices (for example, fishing methods, and respect of customs and traditions such as respect for elders). Other cultural capital, such as burial sites and ancestral homes, have been worsened by the Bui Dam through inundation.

When cultural capital was examined through multiple regression analysis, the overall relationship with predictor variables was not as strong as with other forms of capital assets in this study (R squared=.264). Cultural capital was significantly related to a number of predictor variables: relocated (beta=.418), livelihood (beta=-.231), and age (beta=.147), but not to ethnicity or gender.

These results are consistent with other literature, such as Abbink (2012), which studied dam controversies under contested governance and developmental discourse on the Omo River Dam in Ethiopia. In this case study, dam construction had substantial irreparable damage to the environment, socio-economic systems, social and culture organization, and socio-cultural structures of the people living near the dam or downstream. Similarly, Gordon & Amatekpor's (1999) assertion of dam construction having the potential to deprive people of access to cultural resources such as sacred groves is consistent with the Bui study results that highlight the destruction of community cultural capital such as sacred groves and burial sites. However, the Bui study differs

from Hussein (2002), who found that the destruction of some forms of community cultural capital (e.g., ancestral heritage sites) adversely affected community efforts to generate income relating to tourism activities.

6.2.4 Perceived Effects of Bui Dam on Natural Capital Assets

One of the most negatively affected forms of community capital identified in this study was natural capital, as illustrated in the shift from river to lake fishing (requiring more financial capital). However, the least affected aspect of natural capital was access to tourism opportunities.

When natural capital was examined through multiple regression analysis, the overall relationship was strong (R squared=.795), and natural capital was significantly related to relocation (beta=.826), livelihood (beta=.370), and ethnicity (beta=.121), but not significantly related to age or gender.

The Bui study compares to much of the conservation literature (such as Naughton-Treves et al., 2005; CBD, 2010; Raven, 2012; Pereira et al., 2013; Agyare, 2014; CBD, 2014), which describes the positive contributions of conservation efforts such as the establishment of PAs to the conservation of biodiversity, protection of water resources, and creation of opportunities to explore tourism potential related to their natural resources. The Bui study also corroborates the assertions of Dudley (2008) and CBD (2010) that conservation of biodiversity in Ghana can provide vulnerable societies with opportunities for livelihood, water, food, cultural values, and visitor opportunities. The presence of parks such as BNP can support livelihood development for people in the nearby community. For example, the vegetative cover of the conserved area (BNP) can improve the general weather conditions in the region, and in many cases is instrumental

in improving conditions for rainfall and the possibility of irrigation to support livelihood activities such as the cultivation of both food and cash crops. Officials from the park can expand their support to the livelihood development of nearby communities through the provision of periodic educational campaigns on livelihoods, community involvement in the management of BNP, and such efforts that tend to improve the knowledge and competencies in accessing appropriate livelihoods for park communities such as tourism. The Bui study provides further corroboration to Acquah's (2013) study on human-wildlife interactions, nature-based tourism, and protected area management in Mole National Park, which argued that the success of PAs as a conservation strategy depends to some extent on the support (including valuation of wildlife and perceptions of concerns and benefits) of the nearby communities. In some cases of conservation, a few people living near a park become gainfully employed in parks and also have the opportunity to practice some level of livelihoods outside their engagement with the park. The Bui study identifies the need to develop relevant community-based resource management projects outside of the park since such projects will tend to improve conservation as well as community access to revenue generation from conservation of natural resources. The results corroborate Agyare's (2013) study on polycentric governance and socio-ecological performance of Community Resource Management Areas (CREMA) in Ghana that suggested the need to consider the specific conservation and development perspectives of actors in different contexts, in order to develop CREMA strategies to suit the expected need of communities near conservation sites such as a PAs.

However, the Bui study also reveals that the development of dams can exacerbate the adverse effects of establishing conservation sites, including denying further access to

natural resources within a park. In some cases, the promotion of parks can be associated with costs, such as undermining community access to natural resources to support their livelihood (Nelson, 2010; Ferraro et al., 2011; UNDP, 2011a). Conservation efforts that included the establishment of parks such as BNP can result in the confiscation of community lands that served as farmlands for the people (Curran et al., 2004; Ferraro et al., 2011). As a result, people have to compete for limited farmland. Challenges created by the presence of parks near communities also include the inability to hunt for game in the PA, because such a practice is prohibited by law. The Bui study further corroborates works by Woinarski et al. (2015) and Lindenmayer (2015) that argue that issues of conservation continue to remain a global challenge because, in some cases, PAs deny nearby communities access to ecological resources. As a result, resources that could have provided for the sustenance of communities are sometimes lost to biodiversity conservation efforts associated with the management of parks such as BNP. This argument is articulated in many studies (Gordon and Ametekpor, 1999; Halpern et al., 2008; Convention on Biological Diversity, 2010; Klein et al., 2011; UNDP, 2011; Dornelas et al., 2014) that indicate the establishment of PAs can sometimes undermine community access to natural resources that sustain their livelihood.

The Bui study supports the views of Korboe (1998) and Ashong & Smith (2001) that predict declining natural resources such as farmlands for communities affected by shocks, and that there is an increasing fragility and declining productivity of certain land as a result of the effects of resettlement, economic development, and construction of roads and dams. The Bui study results indicate that the construction of the dam led to an increase in fish stock available to fishermen with the financial capacity to engage in lake

fishing, and this lines up with Ashong & Smith (2001), who found that the capacity to improve an individual's livelihood is dependent on opportunities to use additional assets, individual attitudes, and specific circumstances. Similarly, the Bui study results confirm the difficulty for many people to explore opportunities in fishing due to the challenges associated with lake fishing, such as purchase of larger boats, outboard motors, and pre-mix fuels. Further, the Bui data indicates that older adults lack the physical strength to engage in lake fishing.

The Bui study shows livelihood differences for ethnic groups, such as fishing for Ewes. This further corroborates Aluned (2000) and Agyei-Nsiah (2007), who found that ethnic-based livelihoods can influence social struggle for resources and identities in Sub-Saharan Africa. For example, issues of ethnicity can exacerbate resource tensions along ethnic lines for many communities, including issues surrounding diamond mining in DR Congo and Sierra Leone, where the level of natural resource control exerted by particular ethnic group(s) has potentially heightened ethnic conflicts for many generations.

The Bui study indicates that people who are able to diversify their livelihoods (such as combining farming and fishing) have emerged to be less impacted by the effects of Bui Dam on natural resources. The Bui study supports Bryceson (2002), Mutenje et al. (2010), and Aasoglenang & Bonye (2013), who identified that the application of diversified livelihoods is relevant to livelihoods and also critical to the ability of households to cope with changes in their livelihoods.

6.2.5 Perceived Effects of Bui Dam on Human Capital Assets

Regarding human capital, results indicated that the effects of Bui Dam are positive for some aspects and negative for others. For example, some new opportunities

were created, such as improved fishing. The most severe effects were on access to skills training, but least affected were opportunities in livestock rearing. Respondents felt conditions were worse in terms of support from District Assemblies to access community livelihoods, as well as for customs and traditions of nearby communities. When human capital was examined through multiple regression analysis, the overall relationship with predictor variables was strong (R squared=.761), and human capital was significantly related to relocation (beta=.744), and livelihood (beta=.372), but not significantly related to ethnicity, age, or gender. This implies that issues of ethnicity, age, or gender will not necessarily mitigate the effects of Bui Dam.

Non-relocated communities were less affected for all aspects of human capital. This is basically because several changes have applied to the livelihood options for those communities that were relocated. These changes included loss of farmlands and fishing grounds. Although the dam created a large lake which potentially could have enhanced fishing opportunities, this opportunity was largely negated by the influx of migrant fishermen who vigorously competed with the indigenes for their fishing livelihood. Moreover, the migrants have large fishing boats fitted with outboard motors, something generally beyond the capacity of the indigenous fishermen, to support their fishing activities.

The results here compare with those of a study by Agyei-Nsiah et al. (2007) that explored diversity among farmers on cropping system management in Wenchi, Ghana, and found that historical, ethnic, and gender dimensions of diversity of livelihoods provide additional insights into livelihood patterns and negotiating livelihood patterns for communities affected by changes in their livelihoods.

Regarding the influence of livelihood type on human capital effects, farming and mixed livelihoods were less negatively affected than fishing for all aspects. This result was likely due to the general worsening fishing for communities near Bui Dam that practice lake fishing-related livelihoods as their main source of living.

The results of the Bui study on practicing lake fishing-related livelihoods supports those of Freeman and Ellis (2005), who identified a closer link between practicing the diversification of livelihoods of individuals or communities and their ability to withstand shocks, as well as to access financial capital needed to make adjustments to practice livelihoods, such as purchasing large fishing boats and outboard motors.

The Bui study found that age and gender had little effect on all aspects. This result differs from Zakaria's (2009) socio-economic analysis of livelihood strategies of rural women in the Tolon/Kumbungu District of Ghana, which found that age can provide opportunities such as longer years of working experience for older women to improve their livelihoods. In a similar vein, the Bui study differs from Ashong & Smith's (2001) contextual review of trends of poverty and the poor with those of peri-urban Kumasi, Ghana, which identified that men are sometimes better than women at accessing land, but worse in terms of staying in school. Studies by FAO (2014) on "Gender in Agriculture; Closing the Knowledge Gap" also provides further differing results to the Bui study because FAO (2014) suggests that women can effectively apply knowledge in plants and medicinal plants, irrigation, and subsistence farming, better harvesting, and wise use of natural resources to address changes in their livelihoods. This is because the experiences of life, including the ability to adjust to livelihood changes and opportunities as seen with many adults, do not exist for the younger generation, who are less experienced.

The Bui study corroborates some literature on human capital (Dzodzi, 2006; Baez et al., 2010; Van den Berg, 2010; Bennett et al., 2012) that suggests that livelihood activities such as non-farm wage employment and livestock farming result in relatively higher incomes, that also translate into high welfare strategies to support any changes in the livelihoods of people. Similarly, the Bui study indicated that communities that engage in mixed livelihoods (such as a combination of farming, fishing, tourism, and/or trading as well as intensified exploitation of rivers and land) are better able to cope with socio-ecological effects of dams. These findings compare with Amjath-Babu & Zander (2016), who studied the role of capitals and capabilities in ensuring economic resilience of land conservation efforts of the Grain for Green Program in China's Loess Hills. In this Chinese study, household capacity to address economic resilience to livelihood shocks is linked to the quality of livelihood capitals, including human capital. For the Bui study, many people were unable to exploit the opportunities in fishing because of lack of the requisite skills and/or tools in fishing and tourism livelihoods, but also people were unable to access the financial capital needed to acquire larger fishing boats and outboard motors needed for lake fishing.

6.2.6 Perceived Effects of Bui Dam on Social Capital Assets

This research suggested mixed effects on social capital assets, with some aspects showing levels of higher resilience. For example, the most severe effects were on use of community-based organizations, such as livelihood associations, to make a living, but were less severe for the use of social institutions (e.g., schools) and strength of family networks and connections to cope with the effects of dams and associated resettlements.

However, dam effects on the strength of family networks were argued by some informants to be worse after the dam.

When social capital was examined through multiple regression analysis, the overall relationship with predictor variables was strong (R squared=.617), and social capital was significantly related to relocation (beta=.630), livelihood (beta=.431), gender (beta=.084), and ethnicity (beta=.055), but not significantly related to age. This implies that using age as a threshold for providing livelihood support services that affect social capital will not necessarily yield stronger effects for people's livelihood.

The Bui study adds to arguments that suggest that communities are better able to strategize to manage risks when the people are able to apply strategic local networks and interactions (Adger, 2003; Moser, 2008; Monypenny, 2008; Nelson, 2010). Ferragina (2013) examined how the existence of dense networks gives rise to horizontal ties and collective action to back efforts to seek the collective interest of people to improve household access to education, indigenous knowledge, secure access to land for rural farmers, and reduce poverty (see also Besley, 1995; Carney, 1995; and Dzodzi, 2006). The need to improve community social capital as suggested by the Bui study is similar to Tilt & Gerkey's (2016) study on implications of social capital and socio-ecological resilience under dams and population displacement on China's Upper Mekong River. Here, it was argued that dam construction can lead to resettlement that diminished social capital such as inter-household exchange of financial resources and inter-household exchange of agricultural labour.

The Bui study also found that people who practiced mixed livelihoods were less affected than people practicing fishing livelihoods. The study corroborates Agyei-Nsiah

et al. (2007), who concluded that historical and ethnic diversity in livelihoods provides additional support to improve livelihood patterns and opportunities. The Bui findings resemble Mutenje et al. (2010), who found that overcoming challenges in livelihoods is related to the ability to practice diversified livelihoods. Similarly, the Bui results compare to those of Aasoglenang & Bonye (2013), who examined rural livelihoods in Wa West District of Ghana and found that many communities living under difficult economic conditions are able to develop resilience to make ends meet when people diversify livelihood portfolios to include diversified crop cultivation, livestock rearing, dry season gathering, petty trading, and especially out-migrant remittances.

6.2.7 Perceived Effects of Bui Dam on Physical Capital Assets

Physical capital showed positive effects for many nearby communities. Physical capital provides some important lessons regarding the ability to build the capacity of other assets such as electricity for storage of food stuffs, and improve household revenue. The Bui results indicated that effects were worse for access to post office/communication centre, and access to market stalls and lands for farming, but better for aspects of physical capital such as access to land for construction (Chapter 4).

The results of the Bui study indicate that the introduction of electricity in the Bui communities has supported the preservation of fish and fish products, a finding that reflects the findings of Gordon (1999) and Bennett et al. (2012), who found that physical capital such as better village infrastructure can improve community livelihoods.

The Bui study results show that improvement in access to roads and transport does not always translate into an overall improvement in physical capital since physical capital is the fourth worst affected capital assets. For example, key road networks such as

the Wenchi-Nsawkaw-Manji-Banda Ahenkro-Bui road have received less attention compared to the longer winding routes along the Bole road. This might be due to a shift in government development focus, especially after the change of government during the process leading to the completion of the Bui Dam. The failure to develop the Wenchi-Nsawkaw-Manji-Bnda Ahenkro-Bui route has negatively affected inter-community trade and revenue for many people such as farmers, fishermen, fishmongers, and traders within the dam areas. However, expansion of physical infrastructure along the longer routes of Wenchi- Tingakron-Nui and Wenchi-Teselima-Bui provides useful trading routes for traders from Kumasi and Accra who enter the Bui area to trade in fish and related products. These findings are similar to other studies (Ghana Statistical Service, 1998; Ashong & Smith, 2001) that found that the inability to own physical capital such as houses is linked to government policy that forbade people putting up new homes for many years prior to dam construction. In the case of the Bui community, people could not own houses in the resettlement camps for reasons that included non-ownership of a house in the previous settlement, as well as, in most cases, the impact of government policy that forbade construction of new homes some years before the Bui Dam construction.

When physical capital was examined with predictor variables through multiple regression analysis, the overall relationship was strong (R squared = .452), and physical capital was significantly related to relocation (beta=.556), livelihood (beta= .370), and ethnicity (beta=.121) but not significantly related to age or gender. This implies that efforts to develop community physical capital should not necessarily incorporate biases of age and gender since the use of such variables in the development of community physical capital will not necessarily mediate the progress and translate into better results.

Regarding the influence of ethnicity on physical capital, Nafana and Mo were less negatively affected for all aspects of physical capital. This is also partly explained by the fact that the main Ewe community-Bator Akaiyakrom previously had a school, and other physical structures, but now has been made to share a common school facility with the whole community. For Nafana and Mo ethnic groups their association with farming livelihoods provides some form of resilience since these ethnic groups continue to practice their farming livelihoods with nearly the same farm labour, skills and tools except, for a change in the location of their farmlands. This implies that the impacts of the Bui Dam construction will be minimal forNafana and Mo, because of their farming livelihoods. The use of family networks to gain a living is prominent among the Ewe than the Nafana and Mo ethnic groups. The Ewes practice more communalism with their joint fishing expeditions, share meals, and mentor their extended family systems. The loss of benefits from their family networks due to changes in livelihood opportunities after the dam, means Ewe-based households will be worse affected than the Mo and Nafana ethnic groups which are mainly nuclear and less involved in the use of family networks to source a living, before and after the Bui Dam construction.

Regarding the influence of livelihood type on physical capital, farming was less negatively affected than fishing or mixed for most aspects of physical capital. Some possible reasons for this is the fact that a shift from river to lake fishing requires substantial financial capital for the purchase of bigger boats, and outboard motors. This is something beyond the capability of most fishermen. Also, fishing activities require the construction of a landing site.

The Bui study results showed that age and gender had little effect on all aspects of community physical capital. This is explained by the fact that allocation of housing units in the resettlement camp was based on previous ownership of houses and this practice generally did not favour the young people and women in the community who in most cases, were prohibited from constructing their accommodation. More so, at the time of the allocation of houses in the new resettlement camp, some young people married and had children, and women who did not own houses in the intervening periods of the resettlement process did not have the option of receiving a house during the allocation of houses.

In this vein, the Bui study corroborates other research, such as Grabe's (2014) study on land ownership and gender that identified that women own only 2% of the world's land even though women represent nearly 80% of the world's agricultural labour. Grabe's argument is further supported by the Bui study when the former suggested that most women do not hold secure rights to the land they farm and are denied the opportunity to access or own it for their own livelihoods. Similarly the Bui study corroborates Daley and Pallas (2014)'s study on weighing the implications of women and land deals in Africa and Asia, and states that women across the world face systemic discrimination in their access to, ownership of, control over land and the income from its productive use, and in the legal protection of their property rights.

6.2.8 Perceived Influence of BNP on how Communities Experience Dam Impacts

Construction of the Bui Dam corroborates some studies (ERM, 2007) because the dam has negatively impacted the park through flooding of nearly a quarter of the park.

Flora and fauna including the habitats of the IUCN red listed hippopotamus has been displaced and as well created management challenges for already less resourced park.

The Bui study also suggests that the presence of BNP can influence dam impacts for impacted communities. Park communities are able to develop resilience to shocks due to the sustained incomes they receive from the park. The results of the Bui study is similar to some studies (ERM, 2007; CBD, 2010; Reid & Muruvi, 2011; Porter-Bolland et al., 2012) because the Bui study identified that park staff were resilient to the shock of Bui Dam since park staff continue to receive regular incomes from the park. Such regular incomes can also serve an important collaterals needed to access financial resources from banks, a key opportunity to develop important livelihood opportunities such as fishing and its related industry.

The potential of BNP to influence dam impacts for the Bui Dam impacted communities provides further corroboration to Bennett et al. (2012) and Appiah-Opoku (2011) because Bui dam construction has led to an improvement in stock of assets (e.g. provision of good houses, infrastructure, and equipment) for staff of Bui Park. This development as argued by this study, can positively improve community efforts to overcome Bui Dam effects through improvements in livelihoods and tourism opportunities for park staff.

The Bui study further argues that the relocation of communities to places further away from the park is able to better influence dam impacts because such actions can lead to an improvement in park management. The relocation of such communities have the potential to reduce human-wildlife conflicts in places that have had to confront wildlife destruction to community resources such as farmlands, an outcome that corroborates of

Acquah (2013), who examined how communities near to Mole National Park in Ghana were impacted by park wildlife.

6.3 How Families Navigated the Effect of Bui Dam revealed through In-depth Case Studies

In depth interviews were conducted with four families: two families that had been relocated, and two families that had not been relocated. Results were similar to the findings from the household survey described above, and indicated that dams and resettlement can undermine livelihoods of people through reduced access and size of farmlands, and create both positive and negative changes in access to opportunities in new livelihoods such as fishing. Nevertheless, dams and associated resettlements can result in positive effects on fishing livelihoods for people and families who have the requisite financial resources to invest in larger boats, outboard motors, and premix fuel to engage in the newly emerging opportunities in lake fishing and its associated processing activities.

The results also suggest a failure on the part of the government to actively integrate policies and programmes that could build the capacity of communities to mitigate the effects of dam construction and associated resettlement process. The intended programmes (see Appendix G) were planned by the Bui Power Authority, Bui National Park, and representatives of the affected communities. Reasons for the unfulfilled promises were mainly lack of funds to execute the promises. Other reasons relating to the uncompleted projects for the communities centred on the fact that many of the 'failures' are based on failure in planning and commitment and failure to learn from past experiences.

The Bui study revealed that the resettlement process focused on the provision of facilities (such as electricity, boreholes, schools and clinic) to stimulate growth and improve community livelihoods. However, little emphasis was laid on providing some of the key needs of the affected communities: training in alternative livelihood opportunities, provision of fishing and farming equipment, provision of various forms of financial support, and provision of fertile farmlands and fishing grounds.

Conservation efforts, including the establishment of Bui National Park, were not always manifested into positive effects on people's livelihoods, because conservation efforts limited community access to livelihood resources such as fishing grounds, arable land for farming, and game. However, the findings also drew attention to the fact that effective PA management should tie in with processes that seek to provide other options for communities to receive compensation options for livelihood resources lost to PA management. Such options can include the provision of effective compensation for loss of community resources, and the provision of alternative livelihood resources that can build on community livelihoods.

This finding is similar to Dzodzi's (2006) study into the long term responses of downstream and lakeside communities of Ghana's Volta River Project that suggested that dams and associated resettlement can positively affect fishing livelihoods by increasing fish catch and revenue generated from fishing for people and families who have the requisite skills and financial resources to purchase larger boats and outboard motors for lake fishing. Communities near Akosombo Dam gladly embraced fishing livelihoods through the process of diversification of livelihoods. In a similar vein, the Bui study suggested that dam construction has increased access and opportunities in fishing

livelihoods for people who live near the Bui dam. The Bui study however, differs from Dzodzi (2006) because people living nearby the Bui dam are unable to take advantage of the fishing opportunities given the financial limitation of accessing financial resources to purchase outboard motors and boats to facilitate fishing on the rather large but stormy lake created by the Bui Dam. In some cases, some people are unable to explore fishing opportunities due to their personal or cultural disposition against doing so.

On the issue of establishing conservation sites nearby or on community lands, the Bui study reaffirms studies such as Nelson & Agrawal (2008) and Naughton-Treves (2010) that advocate for the need to improve community benefits such as revenue from conservation sites. This argument is also supported by Agyare's (2014) study on polycentric governance and socio-ecological performance of community resource areas in Ghana that suggests that Community Resource Managed Areas, also known as CREMAs (a variant of community-based natural resource management), influence communities to have positive attitudes towards parks and tolerate wildlife because of the benefits they gain, or perceive they will potentially gain. Similar to these studies, the Bui study calls for the need to improve livelihoods of communities near parks, and create opportunities to compensate for lost community resources through an increased community involvement in the ownership and management of community conservation sites such as CREMAs. The Bui study also suggests dams can worsen the effects of PAs in rural communities by further restricting community access to resources that have sustained their livelihoods.

6.4 Contributions to the Research Literature

6.4.1 Livelihood Analysis

The Bui finding contribute to the understanding of livelihood analysis as outlined by Carney (1998), Hussein (2002), and Krueger (2009). Carney (1998) and Hussein (2002) suggest the need to develop sustainable community livelihoods including the provision of financial support that can help people to cope with changes caused by dams and associated resettlement. Similarly Krueger's (2009) study explored protected areas and human displacement from the perspective of improving the interface between policy and practice, and emphasized the need to access financial capital in order to improve livelihoods including transition from river to lake fishing. Krueger (2009) argues that measures to resolve displacement issues should emphasise resettlement planning that provides the means to mitigate displacement's adverse effects and to create opportunities including access to financial resources for project-affected people. These measures can lead to an increase in opportunities for dam affected people to develop, improve and sustain household livelihoods.

The sustainable livelihood concept as applied in the Bui study contributes to the discussion provided by Chambers (1981; 1984; 1987) and Scoones (2009) who centred on incorporating poverty reduction, focusing on households, and sustainability of livelihood strategies. The Bui study provides support to the benefits of political and cultural capitals to community livelihoods, and the need to apply political and cultural capital in studies that assess the strength of community livelihoods after a shock such as, the construction of a hydro dam. This builds on the research of Rakodi (1999), who emphasises the need for some evidence of beneficial effects of policies to increase the

assets available to poor households and relieve constraints on their ability to cope with impoverishment or take advantage of opportunities to enhance their well-being. The process to arrive at the beneficial policies relating to dam affected community livelihoods will therefore require the need to incorporate cost effectiveness, political feasibility and fit policies with the expressed priorities of affected communities.

The Bui study draws on the six (6) underlying principles of the Sustainable Livelihood (SL) framework (Chambers and Conray, 1992; Conway, 1999), as outlined in the following:

- People centred. The Bui study emphasizes the need to explore livelihoods from the perspective of what matters to the people such as the effects of Bui Dam on community livelihoods.

- Response and participatory principle. The Bui study describes responses to the expressed priorities of people and allows the people who have been disadvantaged to participate through this study, in decisions that impact their livelihood stakes as well as participate in the implementation of such policies.

- The “multi-level” principle. This principle ensures that micro-level priorities such as community capital assets inform macro-level institutions such as BNP, BPA and traditional leadership. The Bui study further acknowledges the critical importance of issues of how negative shifts in community livelihood can be effectively addressed and overcome by working at multiple levels as suggested by the findings of Agyare's (2013) study. Agyare explored polycentric governance and socio-ecological performance of CREMAs in Ghana, and argues for the need to ensure that the macro and micro level activities inform the development of

policy and an effective enabling environment to develop, improve or sustain community livelihoods.

- The "Applying the framework in partnership" principle. The Bui study encouraged policy implementation with both the public and private sector. The study advocates for the need to involve a mix of stakeholders from governmental institutions such as BPA and district assemblies as well as social institutions such as churches, CBOs, and research institutions to provide support in the areas of community education on dam effects. The Bui study also argues for development and training in community livelihoods including alternative forms of livelihoods, and provision of opportunities to get the people's voice heard. Stakeholder involvement and participation in issues that concern the community should encompass policy development and implementation conducted in partnership with both the public and private sectors. For example dam issues have the capacity to affect various segments and stakeholders, including traditional and governmental institutions, Non-governmental Organizations (NGOs) and Community Based Organizations (CBOs). The need to incorporate policy at both the public and private sectors is critical to deriving an effective implementation of policy.

- The principle of striking a balance between economic, institutional, social, and environmental sustainability. The exploration of the seven capital assets to encompass the key attributes of sustainability is a development towards meeting an objective of providing an understanding of how these assets affect community livelihoods.

- The principle of “being dynamic” being process-oriented and responding to changing livelihoods. The Bui study recognized the dynamic nature of livelihoods strategies and options for addressing people's livelihood changes, and assisting in the development of longer term commitments.

There has been a diverse application of livelihood studies, including those addressing poverty reduction and socio-economic development (Chamber and Conroy, 1992; Scoones, 1998; Baird & Dearden, 2003; Turner et al., 2003; Porter-Bolland et al., 2012). Contributions of the Bui study to the available literature on dam effects on livelihoods can be summarized as follows:

- By presenting an example of an application of the livelihoods approach with emphases on dam effects, changes in community capital assets and the perception of communities on how the construction of a dam and associated resettlement are perceived to affect the livelihoods of communities nearby the dam;
- By identifying variability in the way that households experience dam effects, and exploring this variability by ethnicity, age, gender, type of livelihood, and whether a community has been relocated or not;
- By using a quantitative approach (household survey) as well as qualitative approaches (in depth studies and key informant interviews) to data collection. The use of the mixed approaches provide an opportunity to explore people's perception on the effects of the Bui Dam construction on community livelihoods.

6.4.2 Effects of Dams and Resettlement on Community Livelihoods

The literature on dams and their effects echoes the alarming upsurge of dam construction globally (Khagram, 2004: p. 270; Richter et al., 2010; Tollefson, 2011; ICOLD, 2014; Fernside, 2015). The Bui study suggests the following:

- The minimal contribution that dam construction can play in improving income levels at the construction stage of the dam (Kalitsi, 2004; Galipean et al., 2013; Nusser, 2014) through new wage labour during dam construction, as well as through improved fishing livelihoods.
- Dam construction can result in improvements in government involvement and support in development infrastructure such as the construction of roads, housing, access to electricity, improved health, and education. These findings corroborate some literature (Kalitsi, 2004; Energy Commission, 2005; Rosen & Houser, 2007; Bennett & McDowell, 2012; Kyei-Dompreh, 2012). Such infrastructure developments as often the case, 'opens' areas, putting additional pressure on land and fishing areas, accommodation, and erosion of social values.
- The Bui study provides a caution by suggesting the importance of some forms of education and support to aid the development, improvement, and sustenance of potential opportunities in capital assets, especially prior to dam construction. For example, concerns raised through key informants and in depth interviews of families in the Bui study suggested that people affected by dams should be provided adequate training in emerging livelihood opportunities such as fishing, financial capital required to engage in lake fishing, and access to new forms of capital resources such as electricity.

- The provision of competence training as suggested by the Bui study is relevant for developing measures to overcome shocks from dams. This was also suggested by Kyei-Dompreh (2012) and others (eg ERM, 2007; Dzodzi, 2006; Ansar et al., 2014; Miine, 2014; Fernside, 2015) who showed that the provision of electricity is sometimes not affordable for intended communities. Training in the anticipated effects of the dam will apply to the large number of the resettled communities especially in the phase of the current nationwide government policy of installing pre-paid electric meters for both domestic and industrial users of electricity (Klogo & Gadze, 2014).
- The Bui study criticizes dam construction from the context of the potential of dams to sometimes undermine community livelihoods, destroy infrastructure, and inundate communities and its resources (Kalitsi, 2004; Dzodzi, 2006; Egre, 2007; Bennett & McDowell, 2012; Biswas, 2012; Peter, 2013; Fratkin, 2014).
- The Bui study highlights that dam and related resettlement affect community resources, including community capital assets, but these effects vary between communities and between households (Gordon & Amatekpor, 1999; Andam et al., 2010; Ferraro et al., 2011; UNDP, 2011a; International Rivers, 2013).
- The Bui study supports the findings of Narayan (1999) and Ferragina's (2013) relating social capital and poverty in developing bonds and bridges, supporting the importance of family networks to the sustenance of community livelihoods, and promoting collective action to back community efforts to seek the collective interest of people to improve access to education, and land for farming. The Bui study suggested that through social capital (such as social networks and close-knit

families) households are able to gain support such as food, necessary labour, and some forms of family support from association with their family networks. This effort aids in the development of resilience to overcome shocks from dams and resettlement. The Bui results, however, differ from ERM (2007) that found that community networks stand to worsen with the construction of the Bui Dam. In contrast, the effects of the Bui dam on community networks was minimal. The reasoning here is that, families are close knit with many practicing the extended family systems, a practice that tends to provide livelihood support to other disadvantaged members of the household and communities. This study adds to other literature (see Appiah-Opoku, 2011; Bennett et al., 2012), because the Bui study suggests dams will negatively affect the natural capital including the ecological resources and integrity of park resources, from which dam affected communities nearby parks can derive tangible benefits such as ecotourism.

- The results of the Bui study resemble, in part, other studies (e.g. Bardhan et al., 2000; Barrett et al., 2001; Flora and Thiboumery, 2016) who suggest the development of dams can result in improvements in financial services for communities affected by shocks such as a dam. However, in the case of the Bui dam, improvement in financial capital such as access to banking services (provided by the Ecobank Gh. branch) was temporary and as a result could not provide much meaningful and long term financial support and improvement in livelihoods for the dam affected communities.
- Teemacane Trust (2002) and International Rivers (2013) suggest that shocks such as dams can overshadow the voice of people in the community. In the Bui study,

dam construction and related resettlement tended to create new and emerging leaders who competed for the leadership roles of existing traditional leadership. As a result of the loss of voices of people in the community such as family heads, elders, and opinion leaders, the capacity to provide the needed leadership and local governance in the affected communities has become weak for many of the families and the communities. The emerging leaders are usually youthful, do not possess the requisite experience and acumen to command the needed respect to represent the interest of the larger society. The need for the new but youthful leaders to team up with the experienced leaders will better advance the interest of the people rather than for the emerging leaders to go solo in the effort to get the voices of the people heard.

- The study described the influence of livelihoods, ethnicity, gender, age, and whether communities are relocated in mitigating the effects of dams and associated resettlement on community livelihoods. However, the outcome of the study suggested that for most aspects of capital assets gender and age did not influence the effect of Bui Dam on community livelihoods. It is rather intriguing that the Bui study deviates from similar studies such as Harcourt (2012) and FAO (2014) that suggests a closer relationship of age and gender with access to community livelihoods. However, gender shows a significant representation in the types of livelihood practiced (such a women in fish mongering and men in fishing) by communities nearby the Bui Dam.
- In the Bui study, relocation was the strongest predictor of change in all community capital assets. The Bui dam led to the loss of community farmlands and

fishing grounds in the natural river that impact access to livelihood opportunities to support household livelihoods. The strong influence of livelihoods in mediating dam effects resonates with other studies (e.g. Egre, 2007; Bennett & McDowell, 2012; Peter 2012; Franklin, 2014).

- The outcome of the Bui study is in line with literature on land tenure arrangements after resettlement or relocation of communities (Ding, 2007; Cave et al., 2010) because the Bui study revealed challenges such as difficulty in accessing additional farmlands, conflicts emanating from loss of land tenure rights, and compensation rights as key issues that occur from the effects of dams, and relocation of communities. These issues include lands being contested by both Banda and Bui Chiefs as well as community lands acquired by the government (such as community lands between the Bui Dam and the community taken over by BPA) for the construction of the Bui Dam. In a similar vein, the study further supports findings on forced land acquisition and the adverse effects it can have on community access to lands for farming and generating incomes (Syagga & Olima, 1996; Han & Vu, 2009). This is because the Bui study identified that the compulsory acquisition of community lands for dam construction, conservation of biodiversity (e.g. BNP), and for resettlement lead to the loss of income, job opportunities, and livelihood access, and consequently weakening of the resistance of communities to the effects of Bui Dam.
- The Bui study is consistent with Ellis (1998) and Mutenje et al., (2010) indicating that the type of livelihood practiced by communities can predict the effects of Bui Dam and related resettlement on capital assets. It is evident from the Bui Study that

the failure to deliver on promises (see Appendix G) regarding training and assistance negatively affect the livelihoods of relocated communities.

- The Bui study corroborates other studies (eg Aluned, 2000; Braathen et al., 2000; Agyei-Nsiah et al., 2007) that argue for the role of ethnicity in providing additional insights into livelihood patterns and soil fertility management, and negotiating alternative land tenure arrangements for people. The Bui study results describe links between ethnicity and livelihoods types practiced by communities nearby the Bui Dam. For example many of the Ewe people in the area are linked to fishing, whilst the majority of the people of Nafana descent pursue farming.
- The Bui study results fail to support the role of gender to influence dam effects, as suggested by other studies (Harcourt, 2010; Eysenbach, 2011; FAO, 2014) that describe how women can effectively apply knowledge (i.e. plants and medicinal herbs, and irrigation) in relation to subsistence farming and better harvesting and wise use of natural resources. The Bui study results did not identify any key role that gender can play in mediating dam effects on livelihoods for nearby communities.
- Some authors were clear about the ability of age to reduce shocks and improve livelihoods and affect asset sustainability for communities affected by dams and related resettlement (Ogwumike & Aboderin, 2005; de Shebinin et al., 2008; Zacharia, 2009; Mbala, 2011). However, the Bui study had differing results since age did not mediate the effect of dam construction on capital assets.

6.5 Suggestions for Management, Policy, and Planning

A number of implications can be extrapolated from the research findings on improving livelihoods (community capital assets) for communities affected by dam construction and related resettlements. Implementing these considerations should improve household livelihoods for communities nearby Bui National Park (BNP) but, particularly for those affected through dam construction.

Dam construction in Bui has generally created negative effects on community access and use of capital assets. As a result, households nearby the dam are unable to develop and sustain livelihoods to support their families. These communities have also received minimal training in how to develop, improve, and sustain their livelihoods. The government through the Bui Power Authority (BPA) failed to provide alternative livelihood support systems to meet the needs of the communities nearby BNP. However, BPA has indicated though without specific timelines, that plans are far advanced to provide training in alternative livelihood support systems for communities affected by the Bui Dam. These plans will be carried out by expert institutions that BPA will contract for the purpose. A challenge, however, is that people involved in this study have developed a lack of faith in the assurance by BPA to deliver on a promise to provide training in livelihood support systems for the affected communities.

As a matter of urgency, BPA should actively engage with the leadership and members of affected communities to identify, develop, and improve livelihood opportunities, some of which took place before and in the early days of the dam construction. Several other engagements have been ongoing, including plans to mechanize a number of boreholes in the resettled communities as well as the borehole at

the Bui clinic, but there is a need to speed up the implementation to demonstrate good faith. The government, in collaboration with key stakeholders such as the Wildlife Division, Tain and Bole District Assemblies, community livelihood groups, and the Ministry of Food and Agriculture (MoFA) will need to add on to their previous training provided (Appendix G) and to provide the necessary financial resources to support the development of livelihood options. Rather than only concentrating on the generation of electricity, the government through BPA and its appendages should provide livelihood enhancement training and also provide tools and financial support for households affected by the dam to develop strong and resilient community capital assets. Training should cover alternative livelihood support options such as livestock rearing, soap making, skills in making tie and type, and engaging in lake fishing. In addition to the training, the government should provide start-up capitals, sample animals, and outboard motors on hire purchase to enable the people develop, improve or sustain their livelihoods.

The development of similar projects such as dams that also affect community resources through flooding of farmlands, should be given critical attention. In this respect, extensive stakeholder consultations should be incorporated into the project phases. For example, consultation before the Bui Dam was highly skewed in favour of the BPA that represented the government and not the project impacted communities since many of the communities did not have expert representation to protect their interest in the community consultations. In effect, the dam and its effects were handed down to the communities who unfortunately, did not possess the expertise to critically examine the implications of the dam, and to seek better leverage in the share of the costs and benefits

of the dam. Moving into the future, it is recommended that the communities to be impacted by dam organize themselves to recruit expert such as lawyers, land valuers, and sociologists to argue and defend the course and interest of the people in the affected communities. Therefore, this study suggests that BPA should support the dam affected communities to hire and secure the services of experts who will provide advisory roles to the communities. Such experts will also guide the communities in the supervision and implementation of local development projects such as the development of alternative livelihoods, and provision of infrastructure such as roads to support the dam affected communities. An informed and better supported community who receive expert inputs in processes of community negotiations will help reduce the unnecessary government appropriation of community resources such as 'condemned' lands extending far out from the dam site and particularly affecting Bongaasi and Fawoman, among other villages.

The District Assemblies are the governmental agencies responsible for the management of the local communities. Many such assemblies are under-resourced to provide meaningful evaluation of community projects such as dam construction that impact community livelihoods. Many assemblies do not have the compliments of vehicles and needed logistics to support an effective monitoring and implementation of community projects. Stakeholder support from the private sector such as CBOs, NGOs, and other international development partner are few since many of such support are routed through the national level which in many cases, fail to effectively compliment the financial requirements of the District Assemblies (DAs). It is therefore recommended that government increases funding to support the activities of the Assemblies.

District Assemblies are challenged by an almost non-existent institutional structure and requisite technical staff to effectively contribute to issues relating to community development such as dam construction that impacts community livelihoods. The need to have informed experts in the District Assembly structure to contribute effectively to the development discourse of their communities echoes Agyare's (2013) findings that suggest that the form and content of multi-actor linkages as presently constructed in Ghana have gaps and weaknesses such as inadequate funding, trained experts in areas such as impact assessment, conservation, and development.

As a matter of urgency, the central government should enhance the training of staff of the assemblies, scale up levels of funding to the District Assemblies, and provide effective monitoring to ensure that the needs and aspirations of local communities such as the development of community capital resources and competence training are upheld.

The need for knowledge mobilization now and in the future, is also critical to improving the adverse shock of dams on community livelihoods. A well devised and executed knowledge mobilization process that involves programmes such as workshops, research activity, and community engagements can help improve the livelihoods of communities and other stakeholders impacted by the Bui Dam. The researcher's position as a faculty member of the Sunyani Technical University (previously Sunyani Polytechnic), Ghana creates a unique opportunity to communicate the findings of the Bui study in a multitude of academic and non academic forums, as well as community forums. Over time this action may contribute to real change in Ghana regarding dam construction and other resource developments that affect communities.

6.6 Limitations and Weaknesses of the Study

Although some key informants were still in the youthful age bracket of under 35 years, it would have been beneficial to include more of the new 'youth' leaders (other than the assembly man, and Queen Mother of the fishmongers group) in the interviews. Unfortunately only a few youthful (new) leaders were willing and accessible to contribute as informant to the study.

Another limitation of the study is the measurement of "perceived effects," rather than "real impacts." Although the study of perceptions is important, relying on perceptions alone can sometimes pose a challenge of introducing more subjectivity into the study results. The reliance on perception became necessary since some empirical data was not accessible, although such data may be available in the future. More so, the results of the study might differ if viewed in a few years time, because it is assumed that the real impacts of the Bui Dam construction may be difficult to assess so close to the completion stage of the project. This is also explained by the research focus that measured "perceived effects", rather than "real effects."

The issue of possible interviewer bias (particularly with key informant interviews and in depth interview interviews) is a potential weakness of the study. Other data collection sources such as the use of community survey and sourcing clarifications from secondary source helped address this limitation.

Another possible issue is respondents not understanding the questionnaire, or how to respond to the questionnaire as a result of language difficulties. Language in some cases was a weakness particularly where translations needed to be done for different languages (such as English, Twi, Nafaanra, Ewe, and Mo). Some words that do not

translate well between languages can potentially distort meaning. The possible challenges include poor interpretation of questions to respondents, and the misinterpretation and misreporting of data. In addressing some of the possible challenges associated with collecting data when different languages are involved, the selection of research assistants took into consideration people who could understand at least one of the local dialects, as well as being able to write and speak English and Twi fluently. Research assistants were trained and taken through the questions to guide their interpretation to the respondents. On the issue of difficult questions, the research undertook a pilot study covering experts from academia and representatives from the communities to help address issues of the reliability and validity of questions, resulting in the use of more familiar terms for people in the communities.

Another possible limitation is the "halo effect," where some respondents may provide responses that the respondent feels the interviewer would like to receive. This was addressed by the use of the mixed method and interviews with the resettlement officer of BPA who helped in complementing data from other forms of data collection such as case studies, and key informant interviews.

Another limitation of the study relates to the fact that perceived effects of Bui Dam construction on culture may be difficult to measure on a questionnaire. The findings of the Bui study suggests that culture is the east impacted capital assets, but this may be a factor of how well changes in culture can be measured on a questionnaire.

6.7 Suggestions for Future Research

- The study was conducted using expert opinion (key informants), local knowledge (survey instruments and in depth interview), and document analysis. Validity of

findings is based on the aggregation and convergence of data, but more empirical evidence such as the measurement of "real impacts" instead of "perceived effects" is needed to fine tune the patterns demonstrated in this study. This is because the results of the study might differ some few years from now since real impacts may be difficult to assess at a period so close to the completion of the Bui Dam construction.

- The study indicated that only a few local people participated in the management of events before and after the Bui Dam construction and related resettlements. This study suggests the need to undertake further studies on the evaluation of processes and procedures for resettlement in light of the experiences of the Bui and Jama resettlement.

- The study described the contribution of communities nearby BNP in the management of the Park, but there are no plans to incorporate community roles in the management of the park. Further study is needed in BNP and nearby environments to explore better ways for the development of a management plan for BNP and as well as the implication of a development plan for the effective management of BNP.

- Development of alternative livelihoods is amongst the key recommendation provided for improving livelihoods for communities whose forms of livelihood have been affected by shocks such as dams and resettlement. There is therefore the need to undertake further research into the nature and content of alternative

livelihoods that will be resilience to shocks such as dam construction and related resettlement.

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Appendix

Appendix A: Key Questions Used in Document Analysis

Q1. How do communities near Bui dam perceive the effects of Bui Dam on capital assets?

Q2. Are perceived effects of the Bui Dam on capital assets influenced by age, gender, ethnicity, type of livelihood, and whether communities have been relocated?

Q3. What are the effects of Bui Dam on the relationship between Bui National park and nearby communities?

Q4. How is the effect of Bui Dam on communities revealed through in-depth interviews of four families (two families from relocated communities; and two families from communities not relocated)?

Appendix B: Key questions for Community Key Informant

Recruitment-In person/Phone Script

Group 1, 2, 3, 4, 5, 7, 8 – Key informant interviews
Dear _____

The study is entitled "**Living with the Bui Dam: Implications for Livelihoods of resettled communities around Bui National Park, Ghana".**
The purpose of the research is to **understand the effects of Bui dam on how resettled communities around Bui National Park (BNP), Ghana make a living. This research is being funded by the Protected Areas and Poverty Reduction (PAPR) project. More information can be found at: http://www.viu.ca/icura/, http://www.papr.org**
This communication serves to invite you to participate in the research I am conducting on Living with the Bui Dam: Implications for livelihoods of resettled communities around Bui National Park, Ghana. I have decided to contact you and request your participation in this study as a member of key informants because you have been identified as among the people who are knowledgeable about Bui dam effects on how resettled park communities around Bui National Park make a living. This is because you have advance experience with both Bui dam and how resettled communities around Bui National Park (BNP), Ghana make a living. Again, information on your demographic and social characteristics such as marital status, ethnic background, education received, etc will be sought. Your participation in this research is totally voluntary and feel free to decide to participate or not, by following your inner decision for this case.
Your participation which is expected to last 45 minutes-1 hour, will involve being part of a face to face interview with a research assistant. The interview will involve issues concerning Bui dam effects, household livelihoods, community competence, and local governance of resettled communities around BNP. With your consent we would like to audio record the discussions and interviews so that they will be followed up right after by the research, to transcribe them. Interviews and discussions between you and the researcher will be recorded and written notes will be taken depending on your consent for these. Again we will like to seek your consent for other PAPR researchers who make like to use the data collected from this study.
I thank you in advance for your positive consideration.

Invitation to interview

Dear participant,

Welcome to the Bui dam effects on community livelihoods interview for stakeholders of communities around Bui National Park. This interview, administered by a researcher from the University of Victoria, Canada, aims to gather information from various actors, on "Living with the Bui Dam: Implications for livelihoods of resettled communities around Bui National Park, Ghana". This interview will thus, seek your views on the effects of Bui dam on how communities and households make a living, development of ways and opportunities for park communities to cope with dam effects, and effect of skills and training opportunities on how resettled communities, BNP, BPA, and District Assemblies govern and manage activities among these groups or institutions. Participation to this study is entirely voluntary and by no means should it put your wellbeing at risk. Thank you for participating in this important research by sharing your experiences, knowledge and time. We estimate that it will take about 45 minutes-1 hour to complete this survey. With your consent we would like to audio record the discussions and interviews so that they will be followed up right after by the research, to transcribe them. Interviews and discussions between you and the researcher will be recorded and written notes will be taken depending on your consent for these.

Part A. ABOUT YOU

In order to help me analyse the results of this study, please describe a few things about yourself (circle number of best response)

Q1. In which community do you live?

1 Bui	4 Bator	7 Dam site
2 Brewohodi	5 Dokokyina	8 Other
3 Lucene/Loga	6 Agbegikro	

Q2. Your sex: 1 Male
2 Female

Q3. Your age
1 18-25years
2 26 – 35 years
3 36- 45 years
4 46- 55 years
5 Over 55 years

Q4. About how many years have you lived near Bui National Park?

Q5. Which of the following best describes your ethnic background?

1 Ewe
2 Nafana
3 Dagarti
4 Lobi
5 Akan
6 Mo
7 Other (please state: _____)

Q.6 Please describe your position or role in the community (e.g. teacher, chief, head of youth group, District Assembly member).
Role: _____

Part B: The effect of the Bui dam on household livelihoods of resettled communities around BNP.

Q7. a. How did your family make a living (earn a livelihood) before the Bui Dam was constructed? please mention the sources/materials that supported how your family made a living? Can you mention the amount of money gained from these sources to support how your family make a living?
b. please mention the sources that supported how your family made a living, After the dam,? Can you mention the amount of money gained from these sources to support how your family make a living?
c. Which aspects of your sources of livelihood has been changed by the Bui dam? Can you quantity (in Cedis) what source of income you have lost to the Bui dam? Please, quantify (in Cedis) the additional incomes you have gained from each of these additional (improved) sources)?
Q8. Are there any other factors that may be affecting livelihoods since the Bui Dam (if required use follow up probing questions referring to the possible influence of weather, nature of landscape, family networks, ethnic backgrounds etc)? How big or small were the value of what you have lost to the effect of these factors?
Q9. How did the dam effect on the land, wildlife and other natural features of this area? what items were destroyed by the dam. How big or small were the value of the natural resources destroyed by the dam.
Q10. How have land tenure (ownership, usage, and transfer of land) arrangements been affected by the dam? How has this affected how people earn a livelihood? Can you indicate the magnitude of the changes to land tenure arrangement created by the Dam. How big or small did it affect how people make a living?
Q11. How has previous house ownership before dam construction affect livelihoods today? please, mention the changes that have applied to your new housing arrangements (e.g. numbers, sizes, and quality of room, size of compound, value of housing property) at the resettled camps. Please quantity changes (if any) to the cost of maintaining new housing units.

Part C: Adaptive capacity of park resettled communities to cope with socio-ecological changes created by the Bui dam?

Q12. What NATURAL RESOURCES (e.g. land, water, flora and fauna, wilderness, ecosystem services) are important for making a living and how have these been affected by the construction of the Bui dam? Please comment. Can you quantity (number, value in Ghana Cedis, etc) the contribution of natural resources that support your livelihoods?
Q13. What skills for earning a livelihood (HUMAN RESOURCES) such as trading, fishing, teaching, etc are important for making a living in the community? How have these skills been affected by the construction of the Bui dam? Please comment.
Q14. Have any new training opportunities been provided after the dam? How effective were they? Please comment. How big or small has training improved how you make a living?

Q15. How has construction of the Bui Dam influenced decision making in the community (POLITICAL RESOURCES)? (if needed, probe for discussion of effects on functioning of District Assembly, traditional leadership, etc) How has the change affected the he process for taking decision, frequency of meetings, effectiveness of carrying out decisions, etc?
Q16. How has construction of the Bui Dam influenced SOCIAL RESOURCES, such as family networks, schools, clinics, police and judiciary)? Has any of these changes affected the ability of people to make a living? How big or small has it affected how you make a living?
Q17. How has the construction of the Bui Dam influenced CULTURAL RESOURCES, such as festivals, Indigenous skills and knowledge), drumming and dancing, funerals, and naming and marriage ceremonies? Has any of these changes affected the ability of people to earn a living? How big or small has the changes in cultural capital affected how you make a living?
Q18. What PHYSICAL RESOURCES (such as housing, roads/transport, energy/electricity, post office/communication, etc) are important for making a living? How has the construction of the Bui Dam influenced these physical resources? How big or small has any of these changes affected the ability of people to earn a living?
Q20. What FINANCIAL RESOURCES (e.g. access to credit, insurance, remittances, etc.) are important for making a living? How has the construction of the Bui Dam influenced these resources? How important is financial resources to how you make a living today? How big or small has any of these changes affected the ability of people to earn a living?
Q21. What forms of assistance were organized for households of resettled park communities to deal with any social and ecological changes created by the Bui dam (before and after the dam was constructed)? Has big or small has any of these changes affected on the ability of people to earn a living? Are they any training programmes yet to be conducted for your family? How big or small do you think that if such training are provided can help you to make a living?

Part D: The effect of community competence on governance mechanisms at BNP.
Q23. Are there any new forms of leadership after the Bui dam construction? If so, please comment on the effectiveness of the new leadership. How big or small has any of these changes affected on the ability of people to earn a living?
Q.24. What role do people living in resettled communities have in how Bui National Park is managed today. How big or small does this role affect the ability of people to earn a living?
Q25. what training opportunities have your family received to prepare you for adapting to the Bui Dam construction. Can you indicate how big or small any of the following can have on how you can adapt to Bui dam effects?

Appendix C: Questionnaire for Household Survey

Recruitment-In person/Phone Script

Dear participant,

The study is entitled "**Living with the Bui Dam: Implications for Livelihoods of resettled community around Bui National Park, Ghana".**
The purpose of the research is to **understand the effects of Bui dam on ~~livelihoods of~~ how resettled communities around Bui National Park (BNP), Ghana make a living. This research is being funded by the Protected Areas and Poverty Reduction (PAPR) project. More information can be found at: http://www.viu.ca/icura/, http://www.papr.org**
This communication serves to invite you to participate in the research I am conducting on Living with the Bui Dam: Implications for livelihoods of resettled communities around Bui National Park, Ghana. I have decided to contact you and request your participation in this study as a member of key informants because you have been identified as among the people who are knowledgeable about Bui dam effects on how resettled park communities ~~of~~ around Bui National Park make a living. This is because you have advance experience with both Bui dam and how resettled communities around Bui National Park (BNP), Ghana make a living. Again, information on your demographic and social characteristics such as marital status, ethnic background, education received, etc will be sought. Your participation in this research is totally voluntary and feel free to decide to participate or not, by following your inner decision for this case.
Your participation which is expected to last up to 45 minutes, will involve being part of a face to face interview with a research assistant. Questions will cover issues of Bui dam effects, household livelihoods, community competence, and local governance of resettled communities around BNP. With your consent we would like to audio record the discussions and interviews so that they will be followed up right after by the research, to transcribe them. Interviews and discussions between you and the researcher will be recorded and written notes will be taken depending on your consent for these. Again we will like to seek your consent for other PAPR researchers who make like to use the data collected from this study.
I thank you in advance for your positive consideration.

Invitation for interview

Living with Bui dam: Implications for community livelihoods in Bui National Park, Ghana
Household questionnaire

2013

Invitation to survey
Dear participant,
Welcome to the Bui dam effects on community livelihoods interview for stakeholders of communities around Bui National Park. This survey, administered by a researcher from the University of Victoria, Canada, aims to gather the views of various actors about living with the Bui Dam: It is important to have your views on the effects of Bui dam on how communities and households make a living, development of ways and opportunities for park communities to cope with dam effects, and the effectiveness of skills and training opportunities for resettled communities. Participation to this study is entirely voluntary and by no means should it put your wellbeing at risk. We estimate that it will take about 45 minutes to complete this survey. Interviews and discussions between you and the researcher will be recorded on the questionnaire depending on your consent. May we begin?

SECTION A. ABOUT YOU (Heads of Households/Adult representatives of the household)

In order to help me analyse the results of this study, please describe a few things about you. Please circle number of best response

Q1. In which community do you live?

1 Bongaase 3 Gyama
2 Banda Ahenkro 4 Banda Nkwanta

Q2. Your sex: 1 Male
2 Female

Q3. Your age 1 18-25years 3 36- 45 years 5 Over 55 years
2 26 – 35 years 4 46- 55 years

Q4. Presently, what is your type of household e.g. family relationship or cooperativenss e.g. sharing/performing some activities together?

1 Nuclear e.g. staying with parents, brothers and sisters

2 Extended e.g. staying with parents, brother and sisters, cousins, grandparents, uncles, etc.
3. Non-kinship e.g. not related by blood but sharing similar activities e.g. renting the same house
4. Other (please state:_____)

Q5. Household type before resettlement

1 Nuclear e.g. staying with parents, brothers and sisters

2 Extended e.g. staying with parents, brother and sisters, cousins, grandparents, uncles, etc.
3. Non-kinship e.g. not related by blood but sharing similar activities e.g. renting the same house
4. Other (please state:_____)

Q6. About how many years have you lived near Bui National Park/Game?

1 less than 11 years 3 21 – 30 years 5 41 – 50 years
2 11 – 20 years 4 31 – 40 years 6 More than 50 years

Q7. Which of the following best describes your ethnic background?

1 Gonja 3 Mo
2 Nafana 4 Other (please state: _____)

Q8. Which of the following best describes your highest level of education?

1 No formal education 3 Some Secondary School 5 Vocational training
2 Primary school 4 Completed Secondary School 6 College or University
7 Other (please state: _____)

Q9. Please describe your position in the household e.g. father, mother, daughter, guardian, etc: _____

Q10. Please describe your role in the community-cooperative(s), church, e.g. Abusuapanin, Assemblyman, etc:_____

SECTION B: Your opinions about the effect of the Bui dam on household livelihoods

Q11. In the following questions, we would like you to describe how access to resources may have changed since the construction of the Bui Dam, by indicating if conditions have become much worse (1/5), somewhat worse (2/5), stayed about the same (3/3), somewhat better (4/5), or much better (5/5).

	Much worse	Somewhat Worse	About the same	Somewhat Better	Much better
	1/5	**2/5**	**3/5**	**4/5**	**5/5**
Human resources					
A. Opportunities for wage labour (employment)	1	2	3	4	5
B. Opportunities for fishing	1	2	3	4	5
C. Opportunities for farming	1	2	3	4	5

D. Opportunities for livestock rearing	1	2	3	4	5
E. Opportunities for charcoal burning	1	2	3	4	5
F. Opportunities for trading	1	2	3	4	5
G. Opportunities for drying/smoking/selling fish	1	2	3	4	5
H. Access to skills training or education e.g. livestock, snail and mushroom farming, brick moulding, trading, nursing, teaching.	1	2	3	4	5
Social Resources					
A. The use of family networks/connections/linkages to help you and your family make a living (e.g. sharing a meal)	1	2	3	4	5
B The use of schools to support you and your family in making a living e.g. employment, educating children.	1	2	3	4	5
C. The support of the police and Judiciary	1	2	3	4	5
D. The support of traditional leadership e.g Chiefs, Queenmothers, abusuapanin, etc.	1	2	3	4	5
E. The use of community-based organization such as farmers/fishermen/traders/fishmongers cooperatives, and cultural troops to help you make a living.	1	2	3	4	5
F. Access to a health clinic	1	2	3	4	5
Political Resources					
A. Your family's involvement in making decision in your community.	1	2	3	4	5
B. The respect and support of the Tain/Banda District Assembly for you and your family's right to practice your culture, history of your ancestors, festivals, funerals, naming ceremony, etc	1	2	3	4	5
C. The respect and support of BPA for you and your family in how you make a living.	1	2	3	4	5
D. The Tain/Banda District assembly's support for your right to have access to livelihood resources such as farmland, fishing grounds, and free forms of nature such as sheabutter, snails, firewood, etc.	1	2	3	4	5
E. The respect and support of traditional leaders e.g. chiefs, for you and your	1	2	3	4	5

family's right to contribute to decision making in the community					
F. Effectiveness of traditional leaders to mobilize the people for communal activities e.g. clean-up, contributing money and people for community projects	1	2	3	4	5
Natural Resources					
A Access to agricultural land and irrigation equipment (for farming and livestock rearing, charcoal burning) for you and your family to make a living,	1	2	3	4	5
B. Access to fishing grounds and associated technology for you and your family to make a living	1	2	3	4	5
C. Access to forest and forestry products (e.g. water, firewood, snails, and herbal medicine), for you and your family to make a living	1	2	3	4	5
D. Access to wildlife resources for you and your family to make a living	1	2	3	4	5
E. Access to tourism opportunities e.g. canoeing, transport, tour guiding for you and your family	1	2	3	4	5
Physical resources					
A. Access to housing (including new homes)	1	2	3	4	5
B. Access to land for construction (e.g. for houses)	1	2	3	4	5
C. Access to market sheds to support how you and your family make a living	1	2	3	4	5
D. Access to roads/transport for you and your family	1	2	3	4	5
E. Access to energy/electricity/power, for you and your family to make a living.	1	2	3	4	5
F. You and your family's access to post office/communication centre to make a living.	1	2	3	4	5
Financial resources					
A. Access to banking services (deposits, savings, loans, etc) to help you and your family make a living.	1	2	3	4	5
B. Access to micro finance (e.g. SUSU) for you and your family to make a living.	1	2	3	4	5
C. Access to remittances (money from friends and family living outside the	1	2	3	4	5

community e.g. abroad, big towns) to help you and your family make a living					
D. Access to credit facilities/availability of banks to you and your family to make a living	1	2	3	4	5
Cultural resources					
A. The practice of cultural activities such as festivals, drumming and dancing, funerals, naming ceremonies, and marriage ceremonies by you and your family.	1	2	3	4	5
B. The use of traditional knowledge and practices, such as protecting sacred grooves, local ways of farming and fishing, etc	1	2	3	4	5
C. Respect of customs and traditions	1	2	3	4	5
D. Respect for elders and traditional leaders	1	2	3	4	5

Section C. Your Access to Training Opportunities since the Bui Dam

The following questions refer to training opportunities you or your household may have received from the resettlement package of Bui Power Authority (BPA) to prepare you for adapting to the Bui Dam construction.

Q12. Which group/institution provided any training opportunities for you or your family, before the dam?

1. Bui National Park
2. Bui Power Authority
3. Tain District Assembly
4. Banda Ahenkro District Assembly
5. Cooperatives
6. Others (please state: _____)

Q13. Which group/institution has provided any training opportunities for you or your family, after the dam?

1. Bui National Park
2. Bui Power Authority
3. Tain District Assembly
4. Banda Ahenkro District Assembly
5. Cooperatives
6. Others (please state: _____)

Q14. What training opportunities are YET to be provided for you and your family to make a living?

_____
_____
_____
_____
_____

15. Any other comments

_____
_____
_____
_____

Appendix D: Interview Guide for In depth interview

Invitation to survey
Dear participant,
Welcome to the Bui dam effects on community livelihoods interview for stakeholders of communities around Bui National Park. This in depth interview administered by a researcher from the University of Victoria, Canada, aims to gather the views of various actors about living with the Bui Dam: It is important to have your views on the effects of Bui dam on how communities and households make a living, development of ways and opportunities for park communities to cope with dam effects, and the effectiveness of skills and training opportunities for resettled communities. Participation to this study is entirely voluntary and by no means should it put your wellbeing at risk. We estimate that it will take about 1 hour to complete this interview. Interviews and discussions between you and the researcher will be recorded depending on your consent. May we begin?

1. Please can you introduce yourself and your family background?

A. In which community do you live?

1 Bongaase 3 Gyama
2 Banda Ahenkro 4 Banda Nkwanta

B. Your sex: 1 Male
2 Female

C. Your age 1 18-25years 3 36- 45 years 5 Over 55 years
2 26 – 35 years 4 46- 55 years

D. Presently, what is your type of household e.g. family relationship or cooperativenss e.g. sharing/performing some activities together?

1 Nuclear e.g. staying with parents, brothers and sisters

2 Extended e.g. staying with parents, brother and sisters, cousins, grandparents, uncles, etc.

3. Non-kinship e.g. not related by blood but sharing similar activities e.g. renting the same house

4. Other (please state:_____)

E. Household type before resettlement

1 Nuclear e.g. staying with parents, brothers and sisters

2 Extended e.g. staying with parents, brother and sisters, cousins, grandparents, uncles, etc.

3. Non-kinship e.g. not related by blood but sharing similar activities e.g. renting the same house

4. Other (please state:_____)

F. About how many years have you lived near Bui National Park/Game?

1 less than 11 years 3 21 – 30 years 5 41 – 50 years

2	11 – 20 years	4	31 – 40 years	6	More than 50 years

G. Which of the following best describes your ethnic background?

1	Gonja	3	Mo
2	Nafana	4	Other (please state: _____)

H. Which of the following best describes your highest level of education?

1	No formal education	3	Some Secondary School	5	Vocational training
2	Primary school	4	Completed Secondary School	6	College or University
7	Other (please state: _____)				

I. Please describe your position in the household e.g. father, mother, daughter, guardian, etc: _____

J. Please describe your role in the community-cooperative(s), church, e.g. Abusuapanin, Assemblyman, etc:_____

2. Please provide some description of Life before the Dam, with attention to the assets and livelihoods of your family.

3. What are the effects your family experienced from the Dam, including other factors that mediated effects of dam.

4. Please describe the life of your family after the Dam, with attention to assets and livelihoods.

Appendix E:Research Approval and Permits

University of Victoria

Human Research Ethics Board
Office of Research Services
Administrative Services Building
PO Box 1700 STN CSC
Victoria, British Columbia V8W 2Y2 Canada
Tel 250-472-4545, Fax 250-721-8960
ethics@uvic.ca www.research.uvic.ca

Certificate of Approval

PRINCIPAL INVESTIGATOR:	Jones Arthur
UVic STATUS:	Ph.D. Student
UVic DEPARTMENT:	GEOG
SUPERVISOR:	Dr. Phil Dearden

ETHICS PROTOCOL NUMBER Minimal Risk - Board members	13-310
ORIGINAL APPROVAL DATE:	19-Sep-13
APPROVED ON:	19-Sep-13
APPROVAL EXPIRY DATE:	18-Sep-14

PROJECT TITLE: **Living with the Bui Dam: Implications for livelihoods of resettled communities around Bui National Park, Ghana**

RESEARCH TEAM MEMBER: Committee Members: Phil Dearden (Supervisor, UVic), Grant Murray (VIU), Rick Rollins (VIU), Ann Stahl (UVic)
Students/Research assistants: Irene Akuyaa Yeboah, Charles A. Boateng

DECLARED PROJECT FUNDING: **IDRC**

CONDITIONS OF APPROVAL

This Certificate of Approval is valid for the above term provided there is no change in the protocol.

Modifications
To make any changes to the approved research procedures in your study, please submit a "Request for Modification" form. You must receive ethics approval before proceeding with your modified protocol.

Renewals
Your ethics approval must be current for the period during which you are recruiting participants or collecting data. To renew your protocol, please submit a "Request for Renewal" form before the expiry date on your certificate. You will be sent an emailed reminder prompting you to renew your protocol about six weeks before your expiry date.

Project Closures
When you have completed all data collection activities and will have no further contact with participants, please notify the Human Research Ethics Board by submitting a "Notice of Project Completion" form.

Certification

This certifies that the UVic Human Research Ethics Board has examined this research protocol and concluded that, in all respects, the proposed research meets the appropriate standards of ethics as outlined by the University of Victoria Research Regulations Involving Human Participants.

Dr. Rachael Scarth
Associate Vice-President, Research

Certificate Issued On: 19-Sep-13

13-310 Arthur, Jones

BUI POWER AUTHORITY

Our Ref: BPA/MISC/018/6109/ADM/13 October 22, 2013

S.D.A Church
P.O Box 615
Sunyani

Attn: Jones Lewis Arthur

Dear Sir

Re: Request to Undertake Research at Resettled Communities around Bui National Park

We acknowledge receipt of your letter dated October 02, 2013 on the above subject matter and wish to make the following comments on your proposed research on "Bui dam impacts on community livelihoods in Bui National Park, Ghana".

We do not have any objection to your request, however we wish to advise on the following:

- Portions of your questionnaire would have to be amended. The Bui National Park (BNP) was gazetted in 1971 by Legislative Instrument (LI) 710 as a Protected Area (PA). Hence, obtaining livelihood by way of poaching animals or cultivating farmlands is prohibited within the BNP. The Game and Wildlife Division of the Forestry Commission has the responsibility of protecting the BNP.
- Some interviewee in the communities may not give you accurate answers or a true reflection of their situation, as their thinking might be, their answers to you, may improve their lot. You must therefore, be circumspect with the answers given you.
- The Authority will also like to have a final copy of your thesis that deals with our project.

Your request to visit the Project Site is hereby approved for **November 1, 2013**. Please contact, our Resettlement Officer, Mr. Wumbilla Salifu on 0263050012, when you get to the site and you will be given all the necessary assistance.

Please read the form for Visitors' Pass carefully before completing it.

We hope you find your field trip insightful and fruitful.

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

FORESTRY COMMISSION
(WILDLIFE DIVISION)
P. O. BOX MB 239 ACCRA, GHANA
TEL: (233- 21) 401210/ 401227/ 401216/ 401231/ 401249
FAX: (233- 21) 401179
E-MAIL: info_wd@hq.fcghana.com

WD/A.30/VOL.7/ 444 OCTOBER 9, 2013

Jones Lewis Arthur
S. D. A. Church
P. O. Box 613
Sunyani

REQUEST TO UNDERTAKE RESEARCH AT BUI NATIONAL PARK

Reference is made to your letter dated 2nd October, 2013 on the above mentioned subject.

This is to kindly inform you that approval has been granted you to interview some staff of the Division in Bui in carrying out your PhD. research on **'Bui Dam impacts on community livelihoods in Bui National Park'.**

Though this permission is gratis, you will be required to pay for park entry fees.

You are also required to submit two (2) copies of the report to this office as well as any publication(s) resulting from this research.

By a copy of this letter, the Manager in-charge of the park is directed to give you the needed assistance to make your study successful while ensuring that all regulations regarding wildlife protected areas are observed.

Thank you.

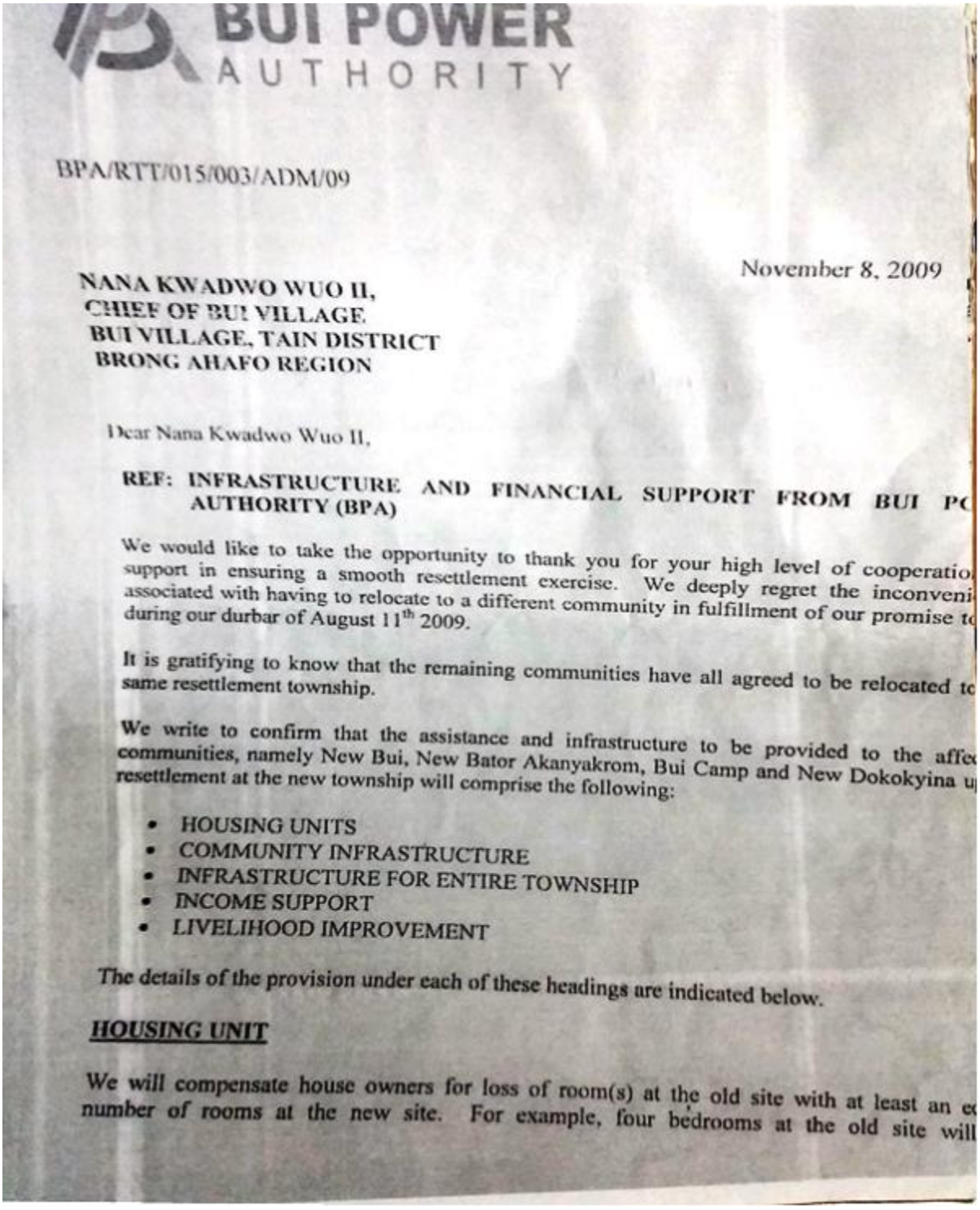
ABIGAIL KURANCHIE
ASSISTANT WILDLIFE OFFICER
***For*: EXECUTIVE DIRECTOR**

CC. THE PARK MANAGER
BUI NATIONAL PARK

Appendix F: Questionnaire Instrument Guide (Likert Scale)

Much worse/Strongly Disagree	Somewhat Worse/ Disagree	About the same/ Uncertain	Somewhat better/ Agree	Better/ Strongly Agree
1/5	2/5	3/5	4/5	5/6

Appendix G: Documents on Some Provisions and Promises for Bui Resettled Communities



BUI POWER AUTHORITY

BPA/RTT/015/003/ADM/09

November 8, 2009

NANA KWADWO WUO II,
CHIEF OF BUI VILLAGE
BUI VILLAGE, TAIN DISTRICT
BRONG AHAFO REGION

Dear Nana Kwadwo Wuo II,

REF: INFRASTRUCTURE AND FINANCIAL SUPPORT FROM BUI PO AUTHORITY (BPA)

We would like to take the opportunity to thank you for your high level of cooperatio support in ensuring a smooth resettlement exercise. We deeply regret the inconveni associated with having to relocate to a different community in fulfillment of our promise t during our durbar of August 11th 2009.

It is gratifying to know that the remaining communities have all agreed to be relocated t same resettlement township.

We write to confirm that the assistance and infrastructure to be provided to the affe communities, namely New Bui, New Bator Akanyakrom, Bui Camp and New Dokokyina u resettlement at the new township will comprise the following:

- HOUSING UNITS
- COMMUNITY INFRASTRUCTURE
- INFRASTRUCTURE FOR ENTIRE TOWNSHIP
- INCOME SUPPORT
- LIVELIHOOD IMPROVEMENT

The details of the provision under each of these headings are indicated below.

HOUSING UNIT

We will compensate house owners for loss of room(s) at the old site with at least an e number of rooms at the new site. For example, four bedrooms at the old site will

ompensated for by giving the affected house owner a [illegible]
itchen and bathroom at the new township (new site)

INFRASTRUCTURE PER COMMUNITY AT NEW TOWNSHIP

In addition to the housing units at the new township (as aforementioned), BPA wishes to confi that the following infrastructure will be provided at the new township:

- KVIP toilette facilities
- Hand pump boreholes

BPA is aware that the Bui community was in the process of building a palace at your curre location, and that the relocation of your community halted that process. In consideration of tha fact, BPA will provide you with some support for the construction of a palace at the nev location.

INFRASTRUCTURE FOR ENTIRE NEW TOWNSHIP

We also wish to confirm the following infrastructure which will be centrally located for the use of the four communities that will make up the new township:

- School (Primary and Junior High School)
- Street light
- Clinic
- Market stall
- Police station
- Lorry park
- Community center
- Religious building (One Mosque and One non-denominational Church)

FINANCIAL SUPPORT

We confirm that we will offer financial support to be used specifically towards the tilling of ne farmland and financial support for one year.

- A one-time resettlement grant of **GH¢ 100.00** will be paid to each member of t household to offset their relocation expenses. We confirm that the cut-off date for census and records of existing infrastructure and members of the household within affected communities was November 2008.
- A Land Development Grant of **GH¢ 50.00** will be paid to the head of each household the development of the newly acquired farmland land. The community will continu have access to their old farmlands until 2010, after which the formation of the rese will begin.
- Compensation for loss of economic assets will be paid based on rates determined b Land Valuation Board.
- Each household will receive an additional **GH¢ 100.00** per month for a **one year** p to alleviate any reduction in household income

COMPENSATION PACKAGE FOR ACQUIRED LANDS

Provided due compensation has not already been paid for the land under a previous acquisitio BPA will make every effort to expedite the payment of compensation based on rates determine by the Land Valuation Board to the appropriate recognised custodial owners for acquired lands.

LIVELIHOOD IMPROVEMENT

In addition, BPA, in consultation with the Faculty of Human Settlement, KNUST and other relevant institutions, will arrange for alternative livelihood improvement programmes for the affected communities.

The BPA, like all other well-meaning citizens of Ghana, is anxious to manage this project to bring positive impact on the communities within the project area. It is our hope that in creating a new urban center, the basic needs of the people in the communities and their aspirations will be realized.

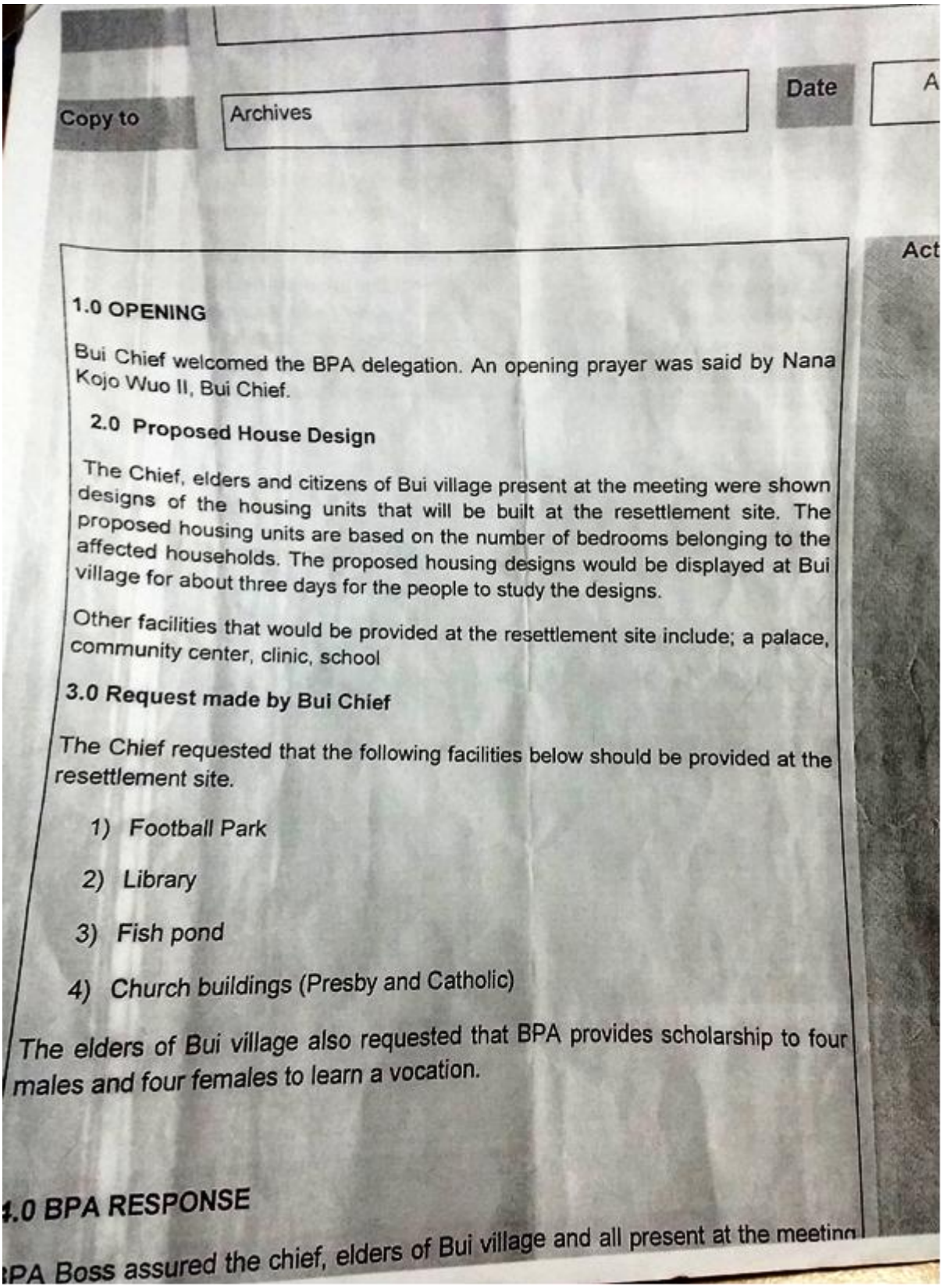
We entreat the affected communities to continue to address their concerns to the BPA and seek clarification whenever they are in doubt of any issue relating to the implementation of the project.

Thank you for the warm reception and candid interactions at the durbar held on August 11th 2009. We trust that, through such collaboration between BPA and the affected communities, the project will bring maximum benefits to all of Ghana.

Yours faithfully.

CHIEF EXECUTIVE OFFICER
(Jabesh AMISSAH–ARTHUR)

cc: Park Manager, Bui National Park
District Chief Executive, Tain District
Sinohydro Corporation Ltd
Ghana Police Service, Divisional Commander, Wenchi



Copy to Archives

Date A

Act

1.0 OPENING

Bui Chief welcomed the BPA delegation. An opening prayer was said by Nana Kojo Wuo II, Bui Chief.

2.0 Proposed House Design

The Chief, elders and citizens of Bui village present at the meeting were shown designs of the housing units that will be built at the resettlement site. The proposed housing units are based on the number of bedrooms belonging to the affected households. The proposed housing designs would be displayed at Bui village for about three days for the people to study the designs.

Other facilities that would be provided at the resettlement site include; a palace, community center, clinic, school

3.0 Request made by Bui Chief

The Chief requested that the following facilities below should be provided at the resettlement site.

1) Football Park
2) Library
3) Fish pond
4) Church buildings (Presby and Catholic)

The elders of Bui village also requested that BPA provides scholarship to four males and four females to learn a vocation.

4.0 BPA RESPONSE

BPA Boss assured the chief, elders of Bui village and all present at the meeting

The quality of housing units and the other facilities that will be provided at the resettlement will definitely be a marked improvement upon their present conditions.

The Bui Chief was assured that the extra facilities he requested for will be provided at the resettlement site. The scholarship will also be provided for five females and five males. The Chief was asked to submit the names of the scholarship beneficiaries to BPA.

BPA CEO explained that there are three kinds of compensation that is compensation or replacement of destroyed houses, compensation for economic trees/farmlands and compensation to landowners for the acquired lands. Bui village is entitled to land compensation since they are landowners. Other affected communities that are settlers will not be entitled to land compensation but will be compensation for their destroyed houses and farmlands/economic trees.

5.0 CLOSING

The meeting ended at 4:20pm with a closing prayer said by the Bui Chief.

[redacted]

Recorded by Wumbilla Salifu

23rd April, 2009.

Sign: Nana Yaw Fori (Abushapayin)

[redacted]

Appendix H: Acronyms

BNP	-	Bui National Park
BPA	-	Bui Power Authority
PA	-	Protected Area
CPI	-	Capacity to Plan and Implement
PES	-	Participatory Enabling Strategies
SL	-	Sustainable Livelihood

Appendix I: Overview of Ghana

Ghana, a country in West Africa is bounded on the east by Togo, west by La Cote d'ivoire, the north by Burkina Faso, and the south by the Gulf of Guinea (Ghanaweb, 2014). Ghana, a country of the size of 239,460 km^2 is located at 8° 00^{I} N of the Equator and 2° 00^{I} W of Greenwich Meridian (Ayer & Fosu, 2008) .

The proximity of Ghana to the equator results in a generally high temperatures throughout the year. Annual mean temperatures range between 26.1°C to 28.8° C. (Appiah-Opoku, 1997). The hottest months of the year falls for March and April (period before the rainy season) whilst the coolest month is in August. Rainfall patterns are erratic with dry season between December and February (Dickson & Benneh, 1977). The country is divided into four main climatic zones: (a) January to March-the main dry season; (b) April-June-minor harvest season; (c) July-September-pre-harvest or minor rainy season, and (d) October-December-main harvest season. The annual rainfall is heavy and that allows for a high level of leaching and loss of soil nutrients. Plants therefore adapt and attempt to preserve nutrients in their leaf growth and evergreen species (Amanor, 1994).

Ghana a developing country located in West African, has a population of 24.6 million that grows at a rate of 2.5% (Ghana Statistical Service, 2012a). Mean household size is four (4) with male to female ratio being 48.2% and 51.2% respectively. Thirty-one percent of all adults have never being to school, 17.1% attended but with no qualification, 39% junior high or vocational level certificate, and 13.6% with secondary or higher education (Ghana Statistical Service, 2008).

Territorial boundary of the Kingdom of Ghana shifted more to the south after series of wars and conquest leading to breakaways that resulted in the formation of other small and large Kingdoms. The successive wars led to the mixing of tribes and clans over the passing centuries, as well as the issues of keeping or selling of prisoners of wars as slaves to Europeans merchants in North Africa and sometimes in Europe (Rediker, 2007; Moradi, 2008). The history of Ghana between 1471-1661 is intertwined with the arrival of European merchants and missionaries who engaged in activities such propagating Christianity, and trading in gold, ivory, timber and most especially in human life.

It was not until 1874 when the Gold Coast was officially proclaimed a British crown colony, that efforts were made to expand the ecology beyond the 100 km through incursions into the Ashanti kingdom. In 1902 the Asante Kingdom fell and surrendered to the pressure from England, to become a British Protectorate (Boahen, 1989). Ghana gained independence from the British in 1957 and later became a Republic in 1960 with Osagyefo Dr. Kwame Nkrumah as the first Prime Minister (Gocking, 2005).

Ghana in the development context is classified as a developing country, as a result of factors including comparatively low levels of economic growth and development, rising public debs as against the national income, and increasing levels of poverty (Szirmai, 2005). The drive to development that has eluded many developing countries including Ghana, include upholding the ideals of modernization. For example, many developing countries lack in policies that positively impact development: failing to plan for development; declining levels of production per capita per week; worsening general standards of living of people; declining social and economic equality; weak institutions and attitudes non-conducive for improving productivity and failure to consolidate state

and national integration (Szirmai, 2005). Many of such indicators are consistent with Ghana's developing country status.

In Ghana, seven out of 10 adults population aged 15-64 years are economically active but males (54.9%) are higher than females (53.4%). Nearly 13% of children (7-14 years) are economically active. Economic activity in rural areas is higher (58.6%) than urban communities (47.3%) (Ghana Statistical Service, 2000; 2008). Most households (79%) either live in rooms in compound houses or other types of rooms with either male or female adults being heads of households.

The category of employment is 55% for own account workers, 20% in family employment, and 18% employees but in rural areas, 59.4% are in own account employment, and 27.5% working in family enterprises. Generally, 58.8% of the people are in agriculture, 15.2% in trading, and 10% in manufacturing. Non-farm enterprises (mainly trading and manufacturing) operation is 52% in urban and 48% in rural areas. The main sources of funding for non-farming enterprises is household savings (60%) and assistance from relatives and friends (20%). Average annual household income is GH₵ 1,217 constituting 35% from agriculture, 29% self employment, and 10% remittance. In all 27% of all households owe some form of money or goods to other persons, institutions or business (Ghana Statistical Service, 2008). This is compared to an average annual household expenditure of GH₵ 1918 spread along 20% on food (including other beverages), 70% on non-food, and 16.7% on transport.

Ghana compared to other low income countries in Africa, has an advanced infrastructure. The country's infrastructure coverage for rural water, electricity, and connectivity in community is impressive. It is significant to note that a large share of

Ghana's road network is in good shape (Foster & Pushak, 2011). The country has undertaken significant institutional reforms in infrastructure in Information Communication Technology (ICT), ports and harbours, roads, and water supply sectors. But, the country continues to battle with challenges in the power sector partly as a result of the use of outmoded transmission and distribution assets, rapid population growth with attendant high demands for electricity, and period hydrologic shocks that leaves the country with the option of applying high-cost oil based generation such as thermal power generation (Obeng-Odoom, 2012). Water supply to consumers is intermittent due to the exceptionally high distribution losses. Ghana, will need a total of $ 2.3 billion to address the challenges of infrastructure, but currently funding to the sector is limited to $ 1.2 billion (7.5% of Gross Domestic Product) with an additional $ 1.1 billion lost to inefficiencies, notable related to under-pricing of electricity.

Politically, Ghana is divided into ten (10) administrative regions: Brong-Ahafo, Central, Eastern, Ashanti, Greater Accra, Upper East, Upper West, Volta, Northern and Western. The regions are headed by Regional Ministers who are appointed by the President of the nation as political heads but, Regional Coordinating Directors serve as Administrative heads at the regional levels (Government of Ghana, 1992). The regions are subdivided into Assemblies headed by a Metropolitan/Municipal/District Chief Executives who are also appointed by the government but, confirmed by at least 2/3 majority of members of the particular Assembly. The District Assembly concept was the result of a decentralization policy to allow for majority participation in local, regional and national affairs. Other sub-bodies also operate within the District Assemblies; these are Urban/Town/Zonal/Area Councils and the Unit Committees. The District Assembly

concepts works through the Executive Committee that includes Services Sub-Committee, Works Sub-Committee, Finance Administration, and the Development Planning Sub-Committee (Government of Ghana, 1992).

Ghana as a nation, has been consistent in designing and implementing policies that seek to protect the ecological integrity of biological resources. These policies include the protection of wildlife and wilderness through conservation efforts such as establishment of Wild Animals Preservation Act of 1961 (Government of Ghana, 1961). The ACT (ACT 43) seeks to consolidate and amend law relating to wild animals, birds and fish in order to continue to observe the Convention signed in 1900 in London (Government of Ghana, 1992: p. VII-4352). Ghana became a signatory to the Convention on Biological Diversity (CBD) in 1992 and other related Multinational International Environmental Agreement to support efforts to develop strategies for the conservation and sustainability of biodiversity (Attuquayefio & Fobil, 2005). Other policies regarding conservation in Ghana include the 1948 Forest Policy adopted to control forestry activities through; (1) the creation and management of permanent forest, (2) research into all branches of scientific forestry, (iii) maximum utilization of areas not dedicated to permanent forestry, and (iv) provision of technical advice and co-operation in schemes for the prevention of soil erosion and in land use areas (Attuquayefio & Fobil, 2005). In 1997 Ghana enacted a Timber Resource Management Act (Act 547 and Act 571) for the grant of timber rights in ways that ensures the sustainable management and use of Ghana timber resources (Government of Ghana, 1998; Government of Ghana, 1999a, 1999b). Wildlife protection initiatives in Ghana can be traced to 1901 when as a result of the London Convention, colonial government engaged in measures to ensure the sustainable

exploitation and management of game. The effort materialized in 1909 after the establishment of the Department of Game and Wildlife and with support from the Wildlife Protection Act of 1961 (Government of Ghana, 1961; Ntiamoa-Baidu & Gordon, 2001). As a result of these conservation efforts in Ghana, currently there are 280 forest reserves covering 23,729 km^2 with 75% designated as production reserves (category VI-Managed Resource) and 25% as protection reserves (Category II-National parks) (Attuquayefio & Fobil, 2005; Dudley, 2008). Currently, there are 21 legally-constituted wildlife conservations areas in Ghana; notable six are national parks including Bui National Park (BNP), three wildlife sanctuaries, and one strict nature reserve (CBD, 2010). Other sites include six Ramsar sites, as well new site created as a result of some innovations in biodiversity conservation such as the introduction of Globally Significant Biodiversity Areas (GCSBAs), Important Bird Areas (IBAs), and Community Resource Management Areas (CREMA). Currently Ghana has designated 29 Forest Reserves as GSBAs, and a proposed 36 IBAs covering about 11,494 km^2 (MEA, 2005). The CREMA concept initiated by the Wildlife Division under its Protected Areas Development Programme (PADP) to encourage community nearby protected areas to manage and suitably utilize wildlife resources in a defined area through the application of a Community Participatory Approach to conservation (Government of Ghana, 1998; see also Agyare, 2014). Conservation efforts in Ghana are sometimes challenged by encroachment by local communities for farming, hunting, and settlement, funding challenges on the part of government, and staffing challenges but, generally attempt at conservation has seen some success.