Changes in the ecosystem services of the Volta Lake and their impacts on local livelihoods along its catchment areas in Ghana

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Changes in the Ecosystem Services of the Volta Lake and their Impacts on Local Livelihoods along its Catchment Areas in Ghana

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DECLARATION

I, Bright Delali Agodzo, declare that this thesis is a result of my research investigations and findings. Sources of information other than my own have been acknowledged and a reference list has been appended. This work has not been previously submitted to any other university for award of any type of academic degree.

Signature…….....

Date……

DEDICATION

I dedicate this thesis to my lovely wife, Elsie Akorfa Agodzo (Mrs.), my son, Kelvin Senyo Agodzo, and my daughter, Christa Akusika Agodzo.

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ABSTRACT

The Volta Lake in Ghana was created due to the construction of a hydroelectric dam, named the Akosombo dam, over the river Volta in the 1960s. This dam currently generates 1020 megawatts of electricity, which provides a cheaper and relatively non-polluting source of electrical power to communities and industries in the country and neighbouring states.

However, the creation of the Akosombo dam has displaced communities and farmlands along the lake due to the flooding of the lake. The lake has expanded to cover about 8,500 square kilometres of farmlands, forests and cash crop plantations including about 700 communities, who were later resettled into 52 resettlement communities. Consequently, houses and other properties of these communities were lost to the flooding. Also submerged in the lake were trees, and this caused difficulties in fishing and navigation on the lake.

This research work was therefore carried out to investigate the changes that occurred after the construction of the dam, and the impacts on local livelihoods. About 100 respondents made up of fisher folks, resettlement communities, irrigation farmers, local residents, local authorities and other stakeholder institutions were sampled for data collection. The data was collected through semi-structured interviews, focus group discussions, observations and document analysis.

Problems associated with the dam construction included the widespread non-payment, and in some cases inadequate payment, of compensation for land lost, crops, houses and other properties. On the other hand, host communities were either not paid or given a meagre sum for the lands lost to the resettlement programme. This brought about conflicts between the settlers and their hosts. In addition, the local communities have been experiencing low fish catch, and increased boat accidents on the lake. There has also been increase in contamination of the lake due to its stagnant nature, and the prevalence of diseases such as malaria, cholera and bilharzia in the local communities.

In order to reduce these negative impacts, resettlement and compensation schemes should be adequate, prompt, geared towards meeting the needs of the recipients and implemented long before the execution of such dam projects, and the inclusion of the affected local people in decision making at all levels. Submerged trees should be harvested in such a way that it will improve transportation on the lake at the same time help improve aquatic life. Effective education and regulatory measures need to be employed to reduce contamination of the lake.

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Abbreviations and Acronyms

ADB- Asian Development Bank

CEO- Chief Executive Officer

CSRD- Clark Sustainable Resource Developments limited

DANIDA- Danish Department for International Development

DCE- District Chief Executive

DSW- Department of Social Welfare

EPA- Environmental Protection Agency

FCUBE- Free Compulsory Universal Basic Education

GAWU- General Agricultural Workers Union

GBC- Ghana Broadcasting Corporation

IBRD- International Bank for Reconstruction and Development

ILO- International Labour Organisation

LBOA- Local Boat Owners Association

MEA- Millennium Ecosystem Assessment

MOFA- Ministry of Food and Agriculture

NADMO- National Disaster Management Organisation

NGO- Non-Governmental Organisation

VALCO- Volta Aluminium Company

VLTC- Volta Lake Transport Company

VRA- Volta River Authority

VRDA- Volta River Development Act

WB- World Bank

Chapter 1: Introduction

1.1 Introduction

Humans depend on ecosystem services for their livelihood. These ecosystem services support human livelihoods in four main ways. These are provisioning services such as food and water; regulating services such as climate, diseases, waste and water quality; cultural services such as recreation; and supporting services such as nutrient cycling (Lemos and Agrawal, 2006). In some circumstances, the interactions between human beings and ecosystem services have created a trend of non-sustainability and ecosystem degradations due to fisheries collapse, deteriorating water quality, habitat and agricultural problems, and the increased incidence of diseases.

This study explores the relationship between the ecosystem services provided by the Volta Lake and the livelihood activities of the people living along the lake, and the impacts of changes in the services on the people over time and space (the period between the creation of the Akosombo dam and the time of the study in 2012).

The Volta Lake covers an area of about 8,502 square kilometres with several settlements along its banks. The Volta Lake, the largest reservoir in the world today, is a man-made lake as a result of the building of the Akosombo dam in 1960 for the purpose of generating hydroelectric power. This dam covers about 4% of Ghana's land area and presently generates about 1020MW of electricity that serves the country and neighbouring states (International Rivers, 2010).

The people living along the Volta Lake use it for fishing, transportation, irrigation farming, tourism, as a source of drinking water and for other domestic uses. However, the dam creation process and the activities of the people expose the lake to environmental conditions that bring it into decline because of socio-economic and ecological changes taking place around the lake. Pollution of the Volta Lake plays a significant role in the deterioration of the quality of the lake system. Agro-chemical residues, domestic wastes, waste from outboard motors, and waste from animals are major sources of pollution of the Volta Lake. Several activities on the lake and its surroundings cause intentional and unintentional pollution of the lake, including emissions and oil leakage from engines of the boats used for transportation on the lake; plastics and other inorganic wastes dumped from the boats during voyages and from the business activities around the lake shore; and fertilizers and pesticides run-off from the irrigation fields.

The eutrophication and the water level fluctuations of the lake might have contributed to the decline in the fish stock in the lake (Kolding et al. 2008), and in a bid to maintain the size of the daily catch, the local fishermen work more hours on the lake and use sophisticated fishing gears, and the engagement of child slavery. These actions could in turn cause a further dramatic decline in the productivity of the fishing grounds and place pressure on the livelihoods of the people.

The local people also use the lake as their source of drinking water and for other domestic chores such as cooking, washing, cleaning and for their animals. The pollution of the lake could have been one of the factors causing the outbreak of diseases such as diarrhoea, cholera, guinea worm and bilharzia. These, and other sicknesses, and other negative conditions that result from the pollution of the lake will probably bring down the health and productivity of the people, and therefore increase the state of poverty in the area.

Therefore this study intended to investigate the changes taking place in and around the lake since the creation of the Akosombo dam, the activities of the people that are detrimental to the lake and their livelihoods, explore the reasons why they carry out such activities, and find out possible ways of improving the conditions of the ecosystem services provided by the lake and the livelihoods of the people.

The building of a big dam such as the Akosombo Dam involved the blocking and alteration of the flow of the river Volta, which led to the creation of the Volta Lake (the largest reservoir in the world). Blocking of the water flow has affected ecosystems both upstream and downstream over time, and cumulatively. There could be fluctuations in the water levels, which could in turn negatively impact on fisheries and fish stocks in the lake since fish normally use shallow waters as breeding ground. Therefore, the fluctuations may destroy breeding grounds and the overall functioning of the fisheries ecosystem in the lake. Migration of the fish species could also be impeded by the dam.

Also, the process of sedimentation could be blocked by the dam, which could result in excessive erosion downstream. Upstream could experience flooding situations, as downstream could also experience same when flood gates of the dam are opened. However, there might also be loss of water through evaporation. Dams such as this might also alter the temperature of the water, thereby affecting the survival and breeding of some fish species (biodiversity loss). Nutrient loads could also cause algal blooms or plant growth in the lake (eutrophication) thereby affecting the water quality and fish stock.

Furthermore, the creation of a large dam as the Akosombo Dam could involve the relocation or resettlement of the local people and the effects on their livelihoods. Their fishing and agricultural activities could be significantly altered, which could signify a change in their livelihoods. A change in fishing and agricultural activities along the lake could also have an impact on the ecology of the lake such as run-offs. And since the livelihoods of the local people are involved, they could employ strategies such as child labour in order to sustain their livelihoods. This brings about the issue of change in livelihoods of the most vulnerable in the locality, especially that of the children.

1.2 Purpose and Rationale

This study has been carried out in order to bring to light the changes that came with the building of the Akosombo Dam and the activities of the people that cause the deterioration of the conditions of the ecosystem services provided by the Volta Lake. It also explores the effects on the livelihoods of the local people and the possible ways in which the conditions of the services provided by the Volta Lake could be improved to realise improvements in the livelihoods of the people.

Therefore, carrying out this study was aimed at drawing attention to the changes that have been occurring in the Volta Lake over time, and towards helping provide information that could perhaps help in the improvement of the livelihood situation of the local people, especially the poor and the vulnerable.

This study may also contribute towards understanding about the relationship between ecosystem services and human livelihoods in relation to academic pursuits and further research and work in the field of environment and sustainable development.

1.3 Research Questions

The study therefore mainly seeks to answer the question:

What changes have been taking place over time and how do the activities of the local people along the lake affect the conditions and services provided by the Volta Lake and their livelihoods, and in which ways could the conditions of the lake and the people's livelihoods be improved?

The study specifically addresses the following:

1. What ecosystem services does the Volta Lake render to the people living along the lake?

2. How do these services benefit the lives of the local people?
3. What changes have been taking place in the Volta Lake until now (water levels, eutrophication, etc)?
4. How do these changes affect the livelihoods of the local people?
5. What have been the positive and negative impacts of the Akosombo dam on the people (historical and present)?
6. How have resettlement and compensation issues been handled and the impacts on the displaced people and their hosts?
7. How do the activities of child labour affect their livelihoods?
8. What human activities affect the ecology of the Volta Lake, and then what are the effects of these changes?
9. In what ways could these human activities be changed or mitigated to enhance the conditions of the lake and the livelihoods of the local people?

1.4 Background to the Study

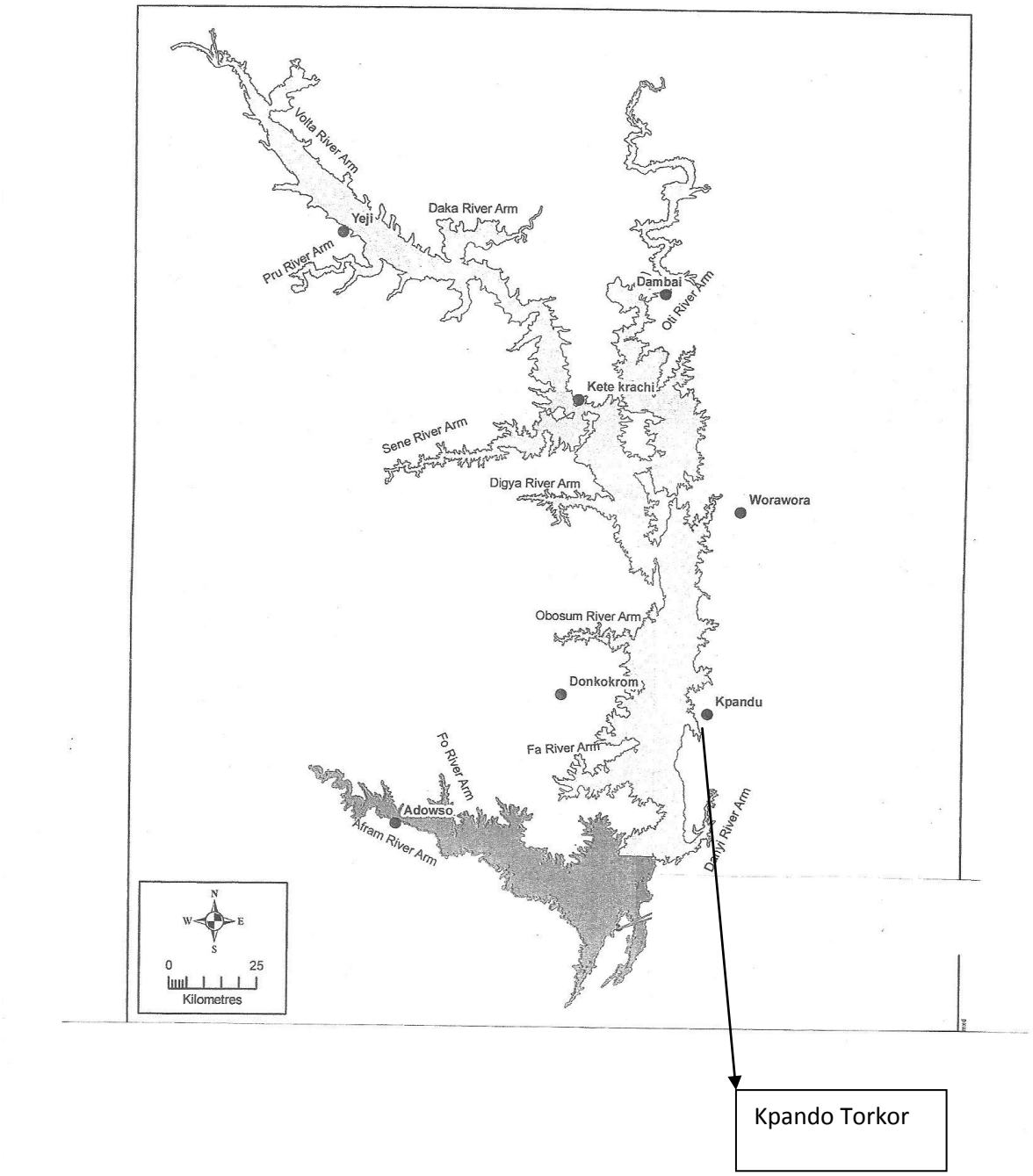


Fig. 1: Map of the Volta Lake: Adapted from Clark Sustainable Resource Developments, 2008

The Volta Lake, which was formed by the construction of the Akosombo hydroelectric dam in 1965 over the Volta River, cuts through almost all the regions in Ghana and takes its source from Burkina Faso (Upper Volta). It covers about 4% of Ghana's total area and serves as a major source of freshwater for the country. It also serves as a relatively cheaper means of transporting goods and people across the country. The Volta Lake is also a major source of freshwater for domestic use in most parts of the country and it is the most important fishing ground for freshwater species (Dzabaku, 2011).

The idea of constructing a hydroelectric dam over the Volta River, to provide a relatively cheap source of electricity to industries, private homes and for export, was conceived as far back as the 1800s where researches began in the Volta Basin for possible commercial exploitations (Moxon, 1984). This was given impetus by the successive governments as it was seen as a significant avenue to open up Ghana (called Gold Coast at the time) to economic and social development.

After independence in 1957, a firm agreement was entered into by the government of Ghana with the International Bank for Reconstruction and Development (IBRD- Now World Bank) and Kaiser Aluminium Company Limited from the United States for the construction of the Akosombo Hydroelectric dam at the total estimated cost of 313.7 million cedis (£130.7 million). Between 1960 and 1965 the actual construction of the Akosombo hydroelectric power dam took place.

> *"The Akosombo Dam is a 660m (2170ft) long and 114m (374ft) high rock-fill embankment dam. It has a base width of 366m (1201ft) and a structural volume of 7,900,000m³ (10,330.000 cu yd). The reservoir created by the dam, Lake Volta, has a capacity of 148m³ (120,000,000 acres) and a surface area of 8,502km² (3,283 square miles). The lake is 400km² (150 square miles) long. Maximum lake level is 84.73m (278.0ft) and minimum is 73.15m (240.0ft). On the eastern side of the dam are two adjacent spillways that can discharge approximately 34,000m³/s (1,200,000 cu ft/s) of water. Each spillway contains six 11.5m (38ft) wide and 13.7m (45ft) tall steel floodgates. The dam's power plant contains six 170MW Francis turbines. Each turbine is supplied with water via a 112-116m (367-381ft) long and 7.2m (24ft) diameter penstock with a maximum of 68.8m (226ft) of hydraulic head afforded."* (Dzabaku, 2011:21)

The dam currently generates 1,020 megawatts of power which is the major supplier of electricity to the country and neighbouring countries including Togo, Benin and Ivory Coast (Quain, 2012). Per the agreement, Kaiser Aluminium has been allocated 50% of the power generated to operate its aluminium smelter company situated at Tema, which is currently been run by Volta Aluminium Company (VALCO) (Dzabaku, 2011; Center for Columbia River History). In 1961, prior to the completion of the Akosombo Dam project, the first Parliament of the Republic of Ghana passed an act, the Volta River Development Act (VRDA), that established the Volta River Authority (VRA) as a statutory body solely responsible for the planning, execution and management of the development of the Volta River. This include

> *"the construction and operation of the dam, power station and transmission system. It is also responsible for controlling the 3,275 square mile lake behind the dam, for developing the lake for fishing, transport and communications, and for promoting the health and welfare of the people in the lake area."* (Ghana Home Page)

The aftermath of the construction saw widespread adverse effects which affected both the environment and the local people. Close to 700 communities, made up of about 80,000 people, had to be relocated into 52 resettlement communities due to the inundation of the surroundings by the flooding (Chambers, 1970; Diaw, 1990). About 8,500 square kilometres of farmlands, forests and cash crop plantations were covered up by the flooding of the lake (Dzabaku, 2011:23). However, currently 80% of the power generated from the Akosombo hydroelectric dam is used by expatriate industries while only 20% is used by Ghanaians and its local communities (Freeman, 1974; Hart, 1980).

Chapter 2: Literature Review

2.1 Ecosystem Services

The ecosystem provides humans with various services. These ecosystem services are said to be the derivations made by the people from the ecosystem for their livelihood. These services are utilised by people to meet their livelihood needs. Therefore human life is essentially based or dependent on the services provided by the ecosystem. Ecosystem services are divided into four main categories. These are provisioning services, regulating services, supporting services, and cultural services. According to the MEA 2003 report, the provisioning services include food, freshwater, fuelwood, fiber, biochemicals and genetic resources. The regulating services consist of regulating the climate, disease regulation or control, regulation of floods, land degradation and drought, regulation of water and water purification. The cultural services are made up of recreational, religious, spiritual, inspirational, and aesthetic services. It could also consist of the feeling of sense of place and cultural heritage. This service provided by the ecosystem is regarded as the non-material services that the people derive from the system. Finally, the supporting services, which are regarded as the mother or creator of all the other services provided by the ecosystem, comprised of soil formation, nutrient cycling and primary production (MEA, 2003:5).

2.2 Human Well-being

The well-being of humans normally has to do with meeting their needs. Abraham Maslow categorised the needs of humans into physiological (basic), safety, love/belonging (social), esteem and self-actualization, which he ranked into levels (Abraham Maslow, 2005). Human needs, and for that matter human well-being, is made up of concrete (material) needs as well as abstract (immaterial) needs. The MEA report of 2003 mentioned the requirements of human well-being to include "basic material for a good life, freedom and choice, health, good social relations, and security" (MEA, 2003:3).

Hence in the situation of the deprivation of well-being (poverty), people make conscious efforts to access or achieve the needs mentioned above to be able to realise their well-being. This they normally do through the utilization of the natural resources or the services provided by the ecosystem. However, what constitutes human well-being could be differently perceived by people. It could be dependent on people's experiences, culture, economic and social status. Therefore one would certainly come across varying views on human well-being in the bid to explaining it.

Nonetheless, some general components of human well-being include adequate food and nutrition, a safe environment, avoidance of diseases, secure rights and access to ecosystem services, clean and safe drinking water, clean air, development of social capital, opportunity to observe and learn from nature, and the realization of aesthetic and recreational values (McMichael et al. 2008).

2.3 Linking Ecosystems and Human Well-being

As mentioned earlier, humans have the tendency of influencing the ecosystem through exploiting it in order to meet their well-being. Therefore, changes in the services provided by the ecosystem could adversely affect the well-being of humans. Human exploitation of ecosystem services for their livelihood or well-being comes with a lot of trade-offs. For example, the drawing of water from a lake to irrigate an agricultural field through the use of machines and the creation of irrigation channels would destroy the functioning of the system and the landscape. In the same vein, run-offs from the irrigated fields could contaminate the lake, thereby reducing its ability to function optimally. However, this would not imply the complete abandoning of irrigation farming because it helps to provide food for the people. What is needed to be done is the employment of strategies that will minimise the negative effects of the irrigation on the lake ecosystem.

Climate change and individual choices are also said to contribute significantly to ecosystem changes and change in their services. Examples are severe evaporation due to high temperature, technological changes in fishing activities and waste disposal. This presupposes that the changes could be caused by both natural and human activities.

According to the MEA report of 2003, the reduction in the capacity of the ecosystem to provide its services could be due to, among other things, overexploitation stemming from the growing demand for the ecosystem services and degradation. For example, the world decline in fish resources was due to overfishing. Reduced capacity of the ecosystem to provide services creates a situation of hardship or poverty (deprivation of well-being) for the people. The poor population are the ones who feel the severe impact because they tend to depend on the ecosystem services the most. Changes in the availability of ecosystem services have direct and serious effects on the livelihood or well-being of the local or poor people for the fact that they lack access to substitutes or alternatives (MEA 2003). This leaves them more vulnerable to ecosystem changes.

On the whole, the change in the provisioning, regulating, cultural and supporting services of the ecosystem could have economic, health, safety and other social implications on the lives of the people depending on the particular ecosystem. For example, when there is scarcity of fish in a lake, the people go hungry; when the lake is polluted, the people are denied access to safe and clean water which in turn brings about the incidence of diseases.

2.4 A Conceptual Framework

Following from the above information, it is made known that there is a correlation between ecosystem services and the well-being of humans. Therefore the decisions taken by human beings to safeguard their well-being are in no small ways affecting the conditions of the ecosystem. The MEA report of 2003 states that,

> *"a dynamic interaction exists between people and ecosystems, with the changing human condition serving to both directly and indirectly drive change in ecosystems and with changes in ecosystems causing changes in human well-being. At the same time, many other factors independent of the environment change the human condition, and many natural forces are influencing ecosystems." (MEA 2003:8).*

In as much as human beings have little influence over natural occurrences, activities of humans nonetheless in some ways create the conditions for increase effects of the natural occurrences. Therefore the following framework fits the assessment of ecosystem services and the impacts on the livelihoods of the people depending on them, especially at the local level.

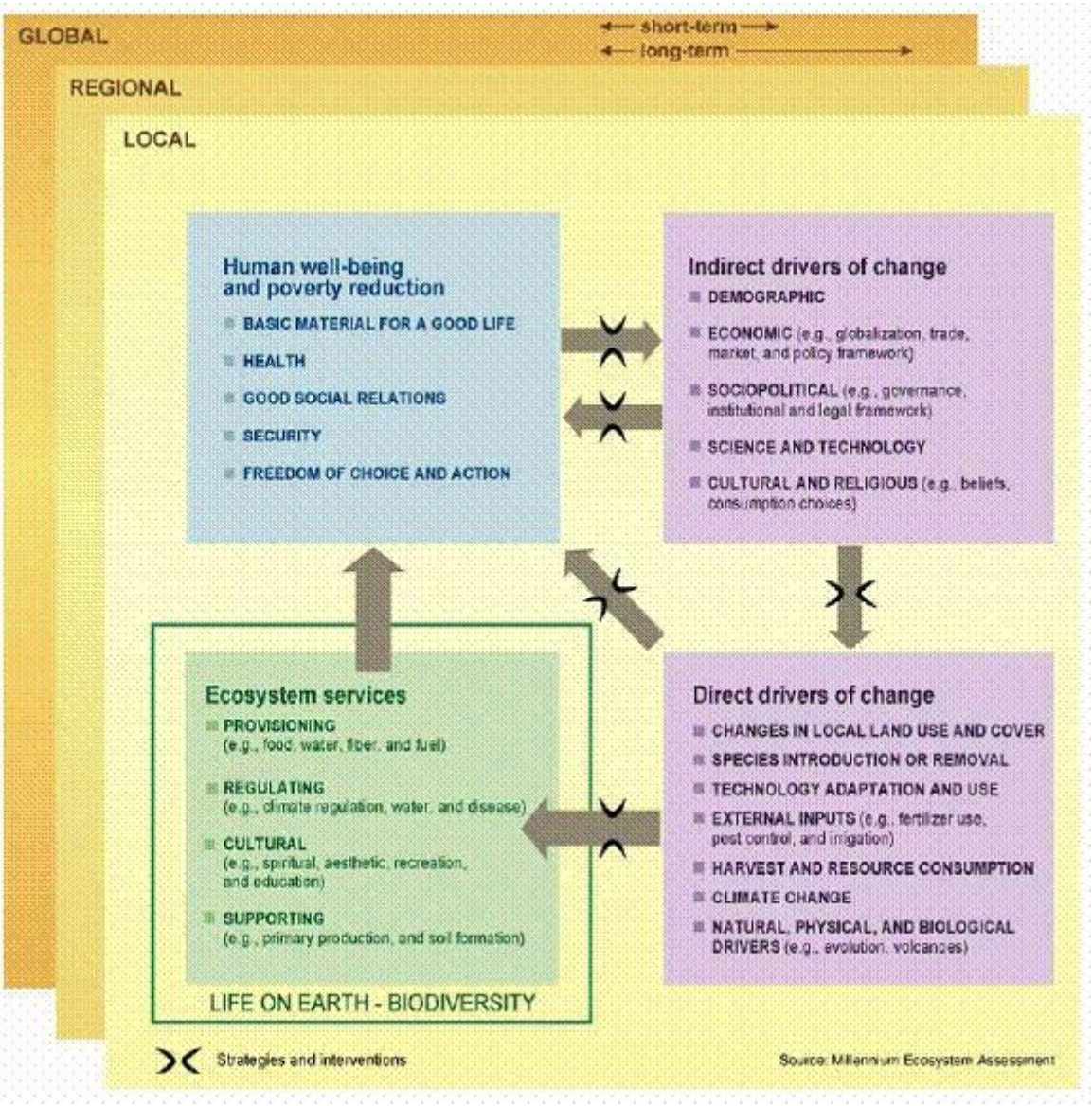


Fig 2: Ecosystem Services and Human Well-being Framework, Source: MEA 2003

In order to effectively assess the interaction between the people and the ecosystem services, one would need to take a critical look at the drivers of change. The factors that drive changes are both internal and external, and both direct and indirect. The actions and inactions of human beings (and also of nature) contribute to the change experienced in the services provided by the ecosystem, which in turn contribute to the changes in the livelihood situations of the people. These changes could either be reversible or irreversible depending on the kind of change and the extent of the change. Putting it differently, the changes could be measured in qualitative and quantitative terms. Also, the change could be based on the carrying capacity of the ecosystem or its resilient capacity to withstand disturbances (Walker and Salt 2006; Chapin et al. 2009).

Therefore, in taking decision on exploiting the ecosystem for human well-being, one needs to take into consideration the possible changes the exploitation could bring to the ecosystem, and the further changes it could bring into their livelihoods. In doing so, conscious efforts would be put in place to safeguard both the ecosystem and the livelihood of the people from severe changes or flip-overs.

Chapter 3: Method

3.1 Study Area

Kpando Torkor was chosen as the pivot community for the data collection because it is located around the middle of the stretch of affected communities along the Volta Lake, and the other communities are easier accessed from this point. In addition, Kpando Torkor is one of the notable communities that has gone through several experiences/transformations due to the construction of the Akosombo Dam, and is inhabited by migrants mostly from other affected communities along the lake. In this community, access to people who have first-hand information about the effects of the dam construction becomes easy. Funded irrigation farming activities go on in this community, animal rearing, fishing expedition and fish trade as the major occupation of the people, and the community is one of the major landing sites for the lake transport. Most of these areas mentioned above are the interests covered in this research, therefore the selection of this location. Dzemeni, another major fishing, trading and lake transport community, was also one of the upstream communities selected for collection of data on the impacts of the Akosombo dam construction.

Akosombo was chosen because that is where the hydroelectric dam is located, and it is the home of VRA where most of the documented information about the dam and its impacts could be retrieved. Both the VRA officials and the residents were easily accessed at this location for the purpose of data collection. Kpong and Akuse were also part of the communities chosen for the data collection exercise, especially for the downstream impacts. Kpong is also a location downstream of Akosombo where another smaller dam is built.

On the issues of resettlement and compensations, Vakpo Dunyo, Aveme Danyigba, Kpando Fesi, Kpeve Tornu and Mpakadam were selected out of the 52 VRA resettlement communities for the data collection. These communities are inhabited by those displaced by the flooding of the lake due to the construction of the Akosombo hydroelectric dam. They were part of the beneficiaries of the resettling scheme put together by the VRA and the government of Ghana for those displaced by the Volta Lake.

3.2 Epistemological and Ontological Considerations

This research seeks to take the inductive approach since outcomes are drawn from the observations and findings made. According to Bryman, "theory is the outcome of research. The process of induction involves drawing generalizable inferences out of observations" (Bryman, 2008:11). The causes of changes in the services of the Volta Lake, its impacts on

the livelihoods of the people living along the lake, and ways of improvements were drawn from the information retrieved from the observations and findings. Therefore the research approach is based on induction.

Research strategy entails the general philosophy or direction of the research, and the choice of a research strategy for this research lends itself to the approach, which is induction, mentioned above. A research strategy is based on both epistemological and ontological considerations (Bryman, 2008). Drawing from the induction approach, the concept of interpretivism under the epistemological philosophy is grounded in the "subjective meaning of social action" in line with or from the viewpoint of the actor (Bryman, 2008:16). However, the constructionist idea under the ontological philosophy suggests that social actions and their significations and consequences are the outcomes of and influenced by social actions (Bryman, 2008:19). By implication, it suggests that people are involved in constructing social reality.

The above considerations gain root in the research strategy namely the qualitative research method. The qualitative method, chosen for this research by virtue of the approach, ascribed to the interpretivist and constructionist ideas which set to interpret and explain human actions and behaviours in order to understand social reality (Bryman, 2008:22). The qualitative method therefore seems to be the most suitable approach for finding answers to the stated research questions.

3.3 Research Design: Case Study

Case study could be explained as the study of a specified or peculiar group or community on a specific topic. It is based on the in-depth scrutiny of the setting that would afford the researcher the opportunity to unearth particular characteristics of the setting (Bryman, 2008:53). Since this study borders on a particular setting, which is mainly a homogenous locality, and on a specified area of study, which is the ecosystem services of the Volta Lake and the livelihoods of the people, the best design in my opinion for the study is the case study design. This design adopted has helped in digging deep into finding out the changes that are occurring in the ecosystem services rendered by the Volta Lake and the impacts it is having on the people in the locality.

3.4 Research Method

The main methods of data collection used are semi-structured interviews, participant observation, focus groups and document analysis. In a qualitative research process, the researcher gets into close contact with the people and the environment (setting). This makes the researcher to get a more understanding of the research area. In the case of participant observation, the researcher is able to link the behaviour of the people to the prevailing conditions/situations or context; the researcher also gets to observe the subjects of study in their state of nature (natural environment); and also see beyond verbal description (Bryman, 2008:466). Also, the focus group strategy has provided a potent avenue to gather and aggregate the people's knowledge and views on the themes/subject matter of the study. Several identifiable groups such as the fisher folks, farmers, fish traders, local authorities and other users of the lake services was adequately drawn on.

On the other hand, interviewing in the qualitative research process affords the opportunity to the researcher to probe issues that are not opened up for observation; delve into issues that have much to do with retrospection and flashback; deal with issues attached to much privacy and need informed consent; and for the researcher to be more focused on the topics being studied (Bryman, 2008:466-468). The above reasons informed the choice of the above qualitative research methods, together with document analysis, for the collection of data.

3.5 Sampling

The general target group of this research was mainly the people living along the Volta Lake and other stakeholders. Specific groups such as the local people, fisher-folks, irrigation farmers, fish traders, local authorities, officials of VRA and the Trust Fund, Ministry of Food and Agriculture (MOFA), Department of Social Welfare (DSW), Department of Fisheries, and the Volta Lake Transport Company (VLTC) were sampled and interviewed. A total of about 100 people and groups were interviewed.

For the interviewing process, snowball sampling method was employed so that particular respondents were sought as new issues cropped up in the course of the process. Convenience sampling was also used alongside the snowball sampling method to utilize the services/responses of the people who were available and willing. 10 respondents were interviewed from Kpando Torkor, which was the main location of the research, and 5 respondents each from the other localities visited along the lake (Dzemeni, Akosombo,

Donkorkrom, Krachi, Kpong and Akuse). Also, 5 respondents were interviewed from each of the resettlement communities visited (Vakpo Dunyo, Aveme Danyigba, Mpakadam, Kpando Fesi, and Kpeve Tornu). In addition, between 3 and 5 respondents were interviewed from each of the institutions stated above.

For the focus group, purposive sampling technique was adopted in order to obtain relevant respondents into the various focus groups that were be able to effectively contribute to dealing with the research questions. Discussions were held with 4 different focus groups (irrigation farmers, fisher folks, local authorities, and the local people) each made up of between 4 and 6 respondents.

Moreover, for the purpose of observation samples were acquired through simple random sampling technique where some of the local people were selected at random and observed closely over time to see how changes in the services of the Volta Lake has been impacting on their lives.

3.6 Data Analysis

Interpretation and analysis of the data in this research process was done mostly using the grounded theory approach. The data collected was passed through sorting and classifications to be able to draw out on common themes. Then, comparisons were made together with the exploration of relationships that led to categories, and further into generating theoretical assumptions (Bryman, 2008:544-545). Bryman claims that the above approach to data analysis "is concerned with the development of theory out of data (...) and that data collection and analysis proceed in tandem, repeatedly referring back to each other", and this approach is widely used in qualitative research processes (Bryman, 2008:541). The above process of analysis simply means that the data collected through semi-structured interviews, participant observations, focus groups and document analysis was organised and connected, and the interrelationships of the data analysed to clarify and find answers to the research problem and research questions stated in the earlier section.

3.7 Ethical Concerns and Reflections

Time constraints served as a major limiting factor to this study taking into consideration the time period allocated to this research, especially the time for the data collection (field work). There is not enough time to be able to carry out in-depth field work to be able to collect good and enough relevant data. Human beings cannot be subject to strict laboratory experimental

conditions; therefore time is needed by the researcher to strike the requisite and needed acquaintance with the respondents and the study area to be able to acquire the right data. Also in this type of research, anonymity and confidentiality is highly required from the researcher for the respondents to build the needed trust and open up to give accurate and right responses. For the fear of intimidation and possible reprisals from government, institutions, superiors, colleagues and their communities for being betrayed, respondents tend to withhold important information from researchers or give misleading responses. By so doing, information gathered could not adequately reflect the actual prevailing conditions.

Normally, the case of ethics and human behaviour placed some limitations on the study pertaining to the collection of the right responses. This is because it is unethical to carry out an exercise on someone without his or her knowledge and consent; however when they were made aware, they tend to put up artificial behaviour or give wrong and misleading responses or cover up some pertinent acts in most cases. This went a long way to limit the quality of data collected. On the other hand, it was extremely difficult for the researcher to adequately explain the whole research process to the respondents for them to fully consent to every minute detail. Therefore, consent of the respondents was lacking in some instances.

Also, there happened to be a problem of generalisation as it was difficult to ascertain the adequate representativeness of the sample to the general population; however this does not mean that the outcome would not represent the views of the people. In this case, extra circumspection was exercised in the extent to which some generalisations were made. Moreover, in such research methods as this, the researcher might be carried away and get immersed into the process. This could affect the neutrality/objectivity of the researcher in his interpretations. Therefore extreme carefulness was exercised not to cloud the process with emotions.

Finally, there was a personal experience worth sharing where the researcher was robbed of all his valuables including all the gadgets and documents used for the research. Consequently, the researcher needed to go back into the field to collect data all over again. This raised the eye-brows of the respondents and made them very reluctant to cooperate. Making time for the same process that was carried out earlier became some sort of burden to the respondents.

Chapter 4: Results

4.1 Introduction

Data collection for this research work was carried out between October, 2011 and February, 2012. These four months was spent along the Volta Lake, upstream and downstream, some of the 52 resettlement communities, and with the institutions that have interest in the lake and the hydroelectric project.

The data was collected through individual interviews, focus group discussions, observations and information from documents. Despite the enormous challenges faced, quite substantial volume of data was collected, both relevant and irrelevant. Below is the presentation of the data thought of as relevant for the purpose of this research work.

4.2 Ecosystem Services of the Volta Lake

The Volta Lake provides a wide range of services to plant, animal and human lives. These could be placed into various categories. According to interviews and observations, the Volta Lake harbours a wide variety of fish species. Majority of the people living along the lake engage in fishing expedition for their livelihood. Fishing in the communities along the lake is both for subsistence and commercial purposes. Fishing is also carried out on large scale by institutions and government agencies. Despite not a common practice, fish farming also takes place in parts of the lake. The most farmed species in the lake is the tilapia. Breeding in the lake is said to be very good due to the rich diversity of flora and fauna in the lake.

Also, the lake serves as a major source of water transport across the length and breadth of the country and beyond. Transportation on the lake is said to be the cheapest form of transport, hence its patronage, especially by the less privileged population. The rich also use the lake for pleasure trips and holiday fun making. Some of the local people living along the lake operate transport boats which normally transport passengers and on few occasions, light goods. However, they only ply the neighbouring communities and short distances across the lake due to the nature of their boats and the kinds of motors they use to operate their boats. On the other hand, both government and private institutions operate lake transport services with relatively larger vessels. Such vessels transport both passengers and goods to relatively distant destinations. While the local boats ply almost all the communities along the lake and are more frequent and cheaper, the larger ones operate few destinations and are less frequent. The local people tend to patronise the local boats more because of the above features.

Furthermore, the lake is said to be very important when it comes to agricultural activities. In the first place, it is a major source of water for irrigation farming undertaken by both the local people along the lake and agricultural institutions. The main purpose of these irrigation projects are for exports. Also, the occasional flash floods irrigate farm lands and also deposit dead matter on farm lands which serve as organic manure.

The lake also serves as an important source of water for domestic uses. All the communities along the lake depend on the lake as their source of drinking water, for cooking, washing and other domestic chores. The lake also serves as a source of drinking water for animals.

Some of the local people and institutions also claimed that tourists visit the lake shores and also take trips on the lake. They further claimed that others carry out research activities on the lake.

Some communities along the lake also have some religious attachments to the lake. They claim the lake is the home of some gods, spirits and deities that protect and grant them good wishes, therefore their observing of religious and cultural activities on the shores of the lake to invite the said spirits into their everyday life activities.

4.3 Stakeholders of the Lake

4.3.1 Volta River Authority (VRA)- (mainstream, the trust fund, environment and community development, real estates)

The VRA is the main institution responsible for the maintenance and developments on and along the lake. It is the institution that is responsible for the construction, maintenance and operation of the Akosombo and Kpong dams for the production of hydroelectric power. They are responsible for the generation and sale of hydroelectric power. They are also responsible for the general mitigation of the impacts that come with the construction of the two hydroelectric dams.

The VRA trust fund, on the other hand, was set up to provide social amenities for the 52 VRA resettlement communities. These are communities created by the VRA to resettle the local people who were displaced by the flooding of the lake due to the construction of the two hydroelectric dams on the Volta River. Some of the social amenities provided by the trust fund include schools, clinics, toilets, etc.

Fig. 3: Nursery School built by VRA Trust Fund at Aveme Danyigba

4.3.2 Volta Lake Transport Company (VLTC)

The VLTC operates transport services on the lake. It owns and operates boats and pontoons on the lake for the purpose of transporting goods and passengers to and from their various destinations along the lake and for onward transportation inland. Due to the deplorable nature of some parts of the roads linking the northern parts to the southern parts of Ghana, the lake transport becomes one of the most important alternatives of transporting people and goods between these two parts. Foodstuffs are especially transported in large quantities from the north to the south of Ghana via the Volta Lake. The pontoons carry truckloads of foodstuffs such as yam, beans, maize, etc. and animals such as cattle, goats, sheep, fowl, etc. from the north across the lake into the southern markets. Farm implements, oil and other commodities are also transported from the south across the lake to the north of Ghana.

Also, pleasure trips for both local and international tourists are embarked upon to notable destinations along the lake including Akosombo and Dodi Islands. One of such pleasure boats operated on the Volta Lake is the Dodi Princess on which holiday makers take fun trips to the Dodi Islands to feel the thrilling experiences of nature (birds, animals, plants, landscape, etc.).

Fig. 4: The Dodi Princess preparing to make a trip to the Dodi Islands

4.3.3 Agriculture and Fishing Ministries

On one hand, the Ministry of Food and Agriculture (MOFA) exercises oversight responsibilities over all the farming activities and irrigation projects taking place along the Volta Lake. Researches, pilot projects and NGO work with regards to agricultural activities in Ghana are being supervised and coordinated by MOFA, including the ones along the Volta Lake, for the overall development of agriculture in the country. Also, MOFA assists individual and cooperative farmers with technical and financial supports in the form of extension services, subsidies on agricultural supplies, soft loans and credits, etc. to expand and improve on agricultural technologies. These are geared towards achieving food security, safety and sufficiency in the country. The Volta Lake, being the most important source of water for irrigation purposes in Ghana, has been a very significant avenue for MOFA in carrying out the cultivation of crops all year round.

On the other hand, the Fisheries Ministry is responsible for the fishing activities and fisheries resources in the Volta Lake. The Ministry coordinates researches, group activities, fishing and fish handling processes, and all other activities regarding fish resources in the lake towards achieving the nutritional demands of the country and exports. Therefore, rules and regulations pertaining to fishing and fisheries are made and implemented by the Ministry towards realising the above objectives.

4.3.4 Energy Ministry

The Energy Ministry has the general responsibility of providing energy for the use of the country. For that reason, the ministry is in close collaboration with the VRA for the generation and provision of hydro-electric power from the Akosombo and other dams for the consumption of the people. The smooth operation of the hydro-electric facility at Akosombo for the provision of power is hence part of the responsibilities of the Energy Ministry.

4.3.5 Transport Ministry

Transportation on the Volta Lake is one of the responsibilities of the Transport Ministry. The Ministry is responsible for ensuring safety and security as far as lake transport is concerned. It therefore collaborates with VLTC, Local Boat Owners Association (LBOA), and other stakeholders to make and implement rules and regulations in coordinating transportation activities on the lake towards safeguarding life and property.

4.3.6 Environmental Protection Agency (EPA), Water Resources Commission, Water Research Institute, Volta Basin Research Project

The above institutions carry out similar functions as far as the Volta Lake is concerned. Their main responsibility with the lake is carrying out researches on the conditions of the lake, its resources, changes, and impacts on the people, among others. Their findings are usually made public for the general population to gain knowledge on happenings in and around the lake. This helps the population in making informed decisions and choices. Their findings also help policy makers in making right and informed policies towards the strengthening and improvement of positive effects and mitigation of the negative ones. The EPA also goes a step further to carry out environmental impact assessments on proposed projects, including those to take place in and along the lake, and granting permits for their execution or stoppage.

4.3.7 District Assemblies

All the communities along the Volta Lake fall under the administration of a district assembly, which is the local government administration. Central government decisions, policies, programmes and projects are being implemented in the various communities. They also make by-laws for the administration of the communities under their jurisdiction. Development projects are constructed and supervised by the district assemblies or in collaboration with the district assemblies in the communities in order to improve the standard of life of the people. The communities along the lake are normally of particular importance to the district assemblies because usually these communities experience brisk business activities and the district assemblies make significant income through the collection of fees and levies from such places.

4.3.8 Fisher folks

To the fisher folks, the Volta Lake is their basis of existence. All their lives depend on the lake because that is where they draw their livelihood. Most of them have lived their whole lives on the lake. From their catch on their fishing expeditions, they sustain their livelihoods and that of their families. Most of them stated that they cannot see themselves engaging in any other activity except fishing. That is what has been handed down to them by their ancestors and nature.

A special group of people who are most often been ignored as part of the fisher folks are those who pick oysters downstream. They are normally made up of women and children. The oysters picking serves as a very significant source of income for the women especially who live downstream between Akuse and Ada, where the river meets the sea (estuary).

4.3.9 Farmers

Farmers along the Volta Lake most often depend on the water from the lake for their farming activities. This especially applies to those engaged in irrigation farming. The people take advantage of the availability of the lake water to engage in vegetable cultivation all year round. The lake also influences the soil composition for their agricultural activities in the sense that the occasional flash floods dump soil particles onto the fields, irrigate the fields and help in soil fertility by discharging organic matter it carries along onto the farming lands. The water also absorbs and dilutes excess chemicals from the farms along the lake.

4.3.10 Traders

The group of people regarded to as traders here are fishmongers, buyers and sellers of fish and fish products, equipments for fish processing and fishing, and all other commodities needed by the two parties (buyers and sellers). These traders make a living through the trade in fish caught from the Volta Lake, and fishing and fish processing items.

4.3.11 Resettlement Communities

These were the communities created by the VRA to resettle those displaced by the Volta Lake after the construction of the Akosombo hydro-electric dam. There are 52 communities in all, which accommodates the displaced people. Some of these communities are of reasonable distance from the lake; therefore the people still have easy access to the lake, while others are located far inland without any accessibility whatsoever to the lake.

4.3.12 Local People

The local people as stakeholders refers to all those living in communities along the Volta Lake. These include all those who depend on the lake both directly and indirectly, especially those who use the water from the lake for drinking, bathing, cooking, washing and other domestic chores. Also included here are the people who serve as tour guides on and around the lake.

4.4 Costs and Benefits for Stakeholders

This section has been included here in order to give us a fair idea of the stance and behaviour of the stakeholders.

The construction, maintenance and expansion/development of both the Akosombo and Kpong hydroelectric dams are a significant avenue to boost the political fortunes of successive governments. In this case, the governments would be seen generally in the light of catering for the basic needs of its citizens with the provision of the relatively cheap form of energy. This could translate into improved electoral fortunes for them, therefore the governments, working through their ministries and other institutions involved, would employ all possible means to make sure of the existence and functioning of the dams. To the governments, the positive effects of provision of electrical power to the nation far outweigh the negative ones such as displacements, loss of livelihoods, environmental degradation, etc. which could easily be addressed. On the other hand, it would serve as a source of revenue to the state through the sale of power and the taxes it imposed on the organisations involved in the operation of the facilities.

On the part of the VRA, the construction of the dams is of great benefit considering the financial returns it would bring to them. The VRA, being the sole operator of the two hydroelectric facilities, would rake in a lot of profits through the generation and sale of power to the nation and beyond. To them, it is all about business. Therefore the construction and operation of the two facilities are of immense benefit to the VRA despite the expenses involved in catering for the negative effects.

To the local people, including the farmers, fisher folks, etc. the construction of the two hydroelectric dams could bring some benefits in the form of opening up the locality to business avenues, tourism, irrigation farming, etc. However it could bring enormous negative effects such as flooding upstream, taking over farmlands and settlements. It could also negatively affect their fishing activities which most of them depend on.

Furthermore, the transportation industry would most definitely be affected by the construction of the dams. The VLTC, with bigger boats and engines, would have the opportunity to extend its operations with the expansion of the surface area of the lake. However, the local people will be negatively affected since they have very small boats which could hardly travel across the vast lake with their manual operating systems; and most of them do not have the financial means to purchase outboard motors that could aid their transport business, therefore, the resultant running out of their transport business.

4.5 Resettlement and Compensation (Crops and Land) Issues

This section deals with the results of data collected from the field pertaining to issues of resettlements and compensations after the construction of the hydroelectric facilities over the Volta River that led to the creation of the Volta Lake. The people seem to attach so much importance to these particular issues since they claim there are several grievances between then, the VRA and government yet to be addressed. They are more particular about it due to the constant shifting of responsibilities by government, VRA and the local people themselves. Below are the presentations of results on resettlement and compensation issues.

4.5.1 The Local People

We were resettled here at our present location around 1962 by the VRA when our original homes were taken over by the lake due to the construction of the Akosombo dam. We are settled here with several other displaced communities, for example in Vakpo Dunyo, there are 11 communities resettled there. Initially, the information we got from the authorities was that they were dredging the Volta River for more water to come, so if they were dredging, there was no need for us to be relocated. It was when they were building the dam and the first flood came, those living in low lying areas got their houses and farmlands covered by the water. So the problem was about education. It might be because of the kind of people used for the education, since they did not adequately understand the damming process. So in trying to translate the programme to the local people, they became confused. When it became evident that we are losing our settlements, we agreed on a resettlement.

VRA told us that they will replicate the types of buildings we had at our original settlement for us at the resettlement sites. But when we came, we were given single rooms with a roof structure that could accommodate a second room, whether we had a 10-room house at our original location. Even those of us who had storey buildings were allocated just one of these structures.

Fig. 5: VRA Houses at Aveme Danyigba Resettlement Community

a. Resettlement house dilapidated

b. Resettlement house quite in shape

Materials were given to some of us to complete the second room, but because of the poverty situation we found ourselves in, most of us had to sell out those materials to feed; hence most of the buildings were left uncompleted. As time went on, the buildings started falling apart and we asked VRA to assist us renovate them. The response from VRA was that if we were living in our original buildings and it is falling apart, will they be responsible for its renovation; the buildings were replacements for the ones we lost to the lake, therefore we should go ahead and renovate them ourselves. This is a painful, heart-breaking and insulting response from the VRA to us because we have lost our source of livelihood to the hydroelectric project. So how do we raise money to feed ourselves, even to talk of renovating houses we live in?

Lands were also acquired at the resettlement sites for us to continue farming. These lands were acquired for the use of both the land owners and the settlers with the mind that the land owners should not be completely deprived of their source of livelihood. According to VRA and the government, compensations were paid to the affected land owners for both crops and land. However, the hosts claimed that some of them received very little compensations for crops lost and not land. Others claimed they received nothing at all. Further investigations revealed that some amounts of compensations were paid (for example, compensation paid for crops and land at Vakpo- see appendix 1); however, the process was heavily flawed. Payments were made to organisations, entities and individuals (lawyers, politicians and

traditional leaders who were educated then) that fronted for the land owners for onward distribution to the affected individuals, but most of them were short-circuited by these organisations and individuals. Due to the high rate of illiteracy, these land owners were made to thumbprint several times against their names, written differently, but were paid for only a parcel of land. Their children and grandchildren grew up to realise the fraud, therefore claiming that compensations were not paid, hence preventing the settlers access to the land. This has been the case in most of the 52 resettlement communities. In some of the communities, compensations were not paid at all because the hosts could not put in claims.

Therefore, this has created a lot of conflicts between the hosts and settlers. The settlers could no longer continue with their farming activities in peace. Since the hosts outnumber the settlers and also have more influence in their respective areas, they have encroached the land to the extent that the settlers are left with no space to expand. This has brought untold hardship to the settlers since they have no alternative sources of livelihood. Most of the youths from the resettlement communities had to migrate to other places in search for non-existing jobs.

A typical case could be stated about Vakpo Dunyo, where the researcher dug a bit deeper into this issue of land conflicts between the hosts and settlers. Because of the heavy fraud that characterised the process of compensation payments, the hosts still claimed ownership of the farmlands allocated to the settlers, part of which was leased to Kingdom Fruits, an agricultural and food processing company, by the hosts to grow fruits (see appendix 2). The settlers pursuing the reclaim of their land, with some of them making derogatory statements against the hosts, degenerated into violent conflict which resulted in the burning of some houses in the resettlement community and the death of one of the settlers. A committee was formed by the government, after this incident, to investigate and present a report to it. The report, after years of its presentation to government, has still not been made public, probably because the findings could start a new conflict between the land owners and the descendants of those who perpetrated the compensation fraud.

However, there were social dimensions to these petty conflicts between the hosts and settlers. Prominent among them was the issue of chieftaincy. Chiefs from the displaced communities continued to exercise their authority in their new resettlement communities. Their activities normally conflict with that of their hosts. Chiefs from the resettlement communities pay allegiance to paramountcies of their original locations and celebrate their own festivals

different from their hosts. The hosts could not come to terms with the issue of the settlers living on their soil and exercising parallel authorities. Some of the hosts therefore insisted the settlers were subordinate to their traditional authority since they are located within their jurisdiction. The settlers on the other hand were not ready to give up their authority. This has therefore been causing various degrees of misunderstandings between the hosts and settlers.

In the case of compensations for those displaced by the lake, this has been a painful struggle. Some compensation has been paid to farmers who lost their crops, despite how little it was. Those who chose not to settle in the VRA resettlement communities were also paid some compensation. The area of fierce contention between the VRA, government and the displaced people has been the land taken over by the water (lake). The people who had been affected have since 1964 been fighting through all possible means to get compensated. Some have even gone ahead to take VRA to court on several occasions to get them do the right thing. However, due to financial constraints, they could not pursue the case further. The reason for the government and VRA for the delay in the payment of this compensation is that they are unable to identify who owns what under the water, and how big. It was in 2011, after several protests from the displaced people, that the government and VRA have asked for the survey of land taken over by the lake. As at now, the people are still waiting for the outcome of the survey.

The people claimed VRA promised them free electricity since they had to lose their source of livelihood to the hydroelectric project, but that never materialised up till today. It was until recently that electricity was extended to the resettlement communities, and they pay for the use of the electricity just as the other citizens of the country. Most of them had been disconnected due to default in payment, and they could not raise enough funds to secure reconnection.

Residents of Aveme Danyigba, one of the resettlement communities, claimed they were informed by VRA that a silver (aluminium) factory will be established in their community because it is part of the reasons why the hydroelectric project is been constructed. But until today, nothing of such sort has been put up.

Some of the settlers also mentioned that VRA promised to employ them and also give some of their children educational scholarships. The settlers claimed they have been waiting since 1962 to redeem their promises for the first settler to be employed by VRA and the first child to be awarded a scholarship to study. According to the settlers, even the basic amenities to be

provided were not forthcoming until recently when they had to petition VRA. Settlers in Aveme Danyigba for instance claimed that 5 toilets were supposed to be built in the community according to the master plan, but only two have been built. The houses built at the resettlement communities are without toilet facilities, therefore the whole community and some of the hosts depend on the public toilets. As the population has been increasing over the years, there has been so much pressure on these facilities. The settlers also pointed out that portable water had not been provided them by VRA as promised. The settlers had to depend on streams and other water bodies in the surroundings, which were unsafe and contributed to the diseases like bilharzias, cholera, diarrhoea, etc. It was few years ago that the Danish Department for International Development (DANIDA) provided boreholes in some of the resettlement communities as their contribution in bringing safe drinking water to rural areas.

Local government authorities, according to the settlers, have turned their back to the resettlement communities. There is a common saying that goes, "children who belong to two homes end up becoming homeless". This seems to be the case with the settlers. As the settlers and their leaders approached the local government authorities to demand their fair share of development projects, they were most often told that the settlements belong to VRA, hence development projects in these areas is the responsibility of the VRA. However, the VRA also insists that they could not take care of the resettlement communities forever. Since these communities are located within the jurisdiction of local government administrations, it is their (local authorities) responsibility to cater for the resettlements. The settlers were quick to mention that the local authorities have marked their houses and collect property rates from them. They also come around to collect revenue taxes from their markets and other rates and fees; therefore they could not understand why these local authorities have refused to fund development projects in the resettlement communities. The local authorities, when contacted, explained that since the resettlement communities have been provided some basic amenities by the VRA, it was justifiable enough for them to turn their attention to other communities under their jurisdiction that lack those amenities. The settlers claimed it has been very frustrating demanding development projects from the authorities that matter, in the face of these games of shifting responsibilities.

The settlers lamented over the insensitivity of both the government and VRA to their plight. Some of them are of the view that they feel totally neglected after they have sacrificed their livelihoods for the benefit of the country.

4.5.2 VRA and Government Officials

The 52 resettlement communities were created to resettle the local people who were displaced by the flooding of the lake due to the construction of the Akosombo hydroelectric dam. This is because their farms and houses were been taken over by the spreading water. Initially, the committee that was set up to draw up a plan for resettlement and compensations for those communities that would be affected, recommended that there should not be organised resettlement, instead the people should be given cash so that the people resettle themselves. However, the valuation delayed and the water had started taking peoples' lives and properties, so we needed to act at the spur of the time to save lives and property. So these resettlement packages were quickly put together, in consultation with the local people, to salvage the situation. Hence the resettlement communities we see today were a crush programme, and this was the background of the people's complaints about the kind and quality of houses provided for them at the various sites.

Most of the houses the people were living in at their original locations were thatched and mud houses, therefore it was thought that the cement block and aluminium roofing houses provided them at the resettlement sites were a way of raising their standards. The only problem was that consideration was not given to the number of rooms each family/household had from their original place. Each of them was allocated a two-bedroom facility because of the crush programme. Also, the people were brought from their scattered hamlets into bigger communities, which is why when you get into the resettlement communities you would realise that the people are made up of several communities brought together. However, not all the houses allocated to the people were completed due to time constraints. For the uncompleted ones, building materials and money were given out to the people to complete it themselves.

Later on, the VRA Resettlement Trust Fund was established to cater for the inadequacies in the resettlement communities by providing basic amenities such as portable water, schools, clinics, toilets, etc. But the issue of renovation of their various houses, as demanded by the re-settlers, can never take place. This is because the houses were given to them as replacements to the ones they lost to the flooding of the lake. If they were in their original houses, would the VRA come to renovate their houses? VRA has played its role by building replacement houses for them; therefore they need to carry out renovations on their own.

In addition, the government and VRA gave each farmer two-acre land, seedlings and implements to start with. The settlers were also taken care of by the government and VRA through food aid for the period of about three to five years since they have been introduced to a new environment which will take them some time to adapt. This land given to them is not for keeps. They were supposed to cultivate the land for some years until they are fully settled and have acquired their own with the compensations paid them. Compensations were supposed to be paid to everyone who owned land that was taken over by the lake, according to the size. This was dependent on the presentation of enough evidence of ownership. Some were paid; others were not because they did not put in claims.

For the fisher folks, most of them decided to migrate to other communities along the lake instead of settling in the VRA resettlement communities. This is because they wanted to have easy access to the lake so they could continue with their occupation.

Turning attention to the host communities, the lands were acquired by the government from the host communities using state power. The state uses its legal power (State Lands Act 1962, Act 125), which was later on enshrined in the 1992 4th Republican Constitution of Ghana, Article 20, to acquire land compulsorily for use in the interest of the state without the consent of the land owners. This was what took place in this situation. However, compensations were paid to the land owners. The hosts who were farming on their lands at that time were also allocated three acres each, so that they could continue with their livelihood activities.

The land problems being experienced recently in the resettlement communities stem from the non-respect of the legal implications of the government's acquisition of the lands. Also, the host, using their numbers and influence, intimidate the settlers mostly because the host thought they have been cheated by the government allocating their fertile lands to aliens. But compensations were paid for both the lands and the crops. Those who did not receive compensations did not put in claims; and some only put in claims for crops and not land, probably due to illiteracy/ignorance. However, all is not lost. Aggrieved hosts could still approach the land valuation board to put in claims. Another issue is that the past generation that collected the compensations did not make it known to their children. Therefore the next generations claim they have not been paid compensations, which is not true. In addition, some legal personnel fronted for the host land owners, who were largely illiterates, hence defrauding them.

There are also social dimensions to the conflicts between the hosts and settlers. Jealousy plays a role in this case as the hosts think that the settlers, who are aliens, are provided with better housing (quarters) and other basic facilities, while they are living worse off. Also, government made chiefs from the displaced communities retain their status in the resettlement communities. These chiefs however pay allegiance to paramountcies other than the hosts, which the hosts vehemently opposed. Furthermore, people from several displaced communities settled in a resettlement community, hence making traditional authority very difficult due to problems of loyalty.

4.6 Impacts Upstream

Since the construction of the Akosombo Dam, there has been varying degrees of changes that had occurred in and along the Volta Lake, which was hitherto the Volta River. Accounts of some notable changes, among others, have been presented below.

4.6.1 Changes in Fishing- Contradictions

Fisher folks and the officials working with fishing activities on the lake have confirmed that there have been some changes in the fishing activities since the river became a lake. Some of these include decrease in fish catch, the size of the fish caught, scarcity of some of the species, etc.

The fisher folks mentioned that species like ‘dzidzri’ (electric fish), ‘agada’ (polypterus senegalus- gray bichir), ‘lixe’ (hepsetus odoe- kafue pike), ‘eyor’ (gymnarchus nilotius- aba), and ‘agbogbo’ (labeo senegalensis- West African carp) are very difficult to come by in the lake. Even the ones that they catch nowadays are smaller in size compared to those caught some decades ago.

a. Assorted lake species b. Electric fish

Fig. 6: Some of the fish species that are scarce.

This particular species (the perch), according to the fisher folks, used to be common and could be five times as big as it is now.

Tilapia still remains the commonest catch in the lake.

A section of the fisher folks are of the view that the persistent decline in the fish catch and the decrease in the size of the fishes is due to the increasing number of fishermen and fishing activities on the lake. They explained that fisher folks from the communities displaced by the floods relocated to join them at the places that are less affected to continue with their occupation. Others who were earlier on into other occupations have also decided to venture into fishing as they have lost their occupations to the floods. This, according to them, has given rise to a sharp increase in fishing activities, thereby leading to overfishing.

The above phenomenon has led to the fisher folks spending longer time on the lake in order to make some significant catches. This, in their view, is preventing the fish species to multiply and mature. Hence the depletion of the fish stock in the lake.

Fig. 7: The day's catch for one of the landing canoes

But another group of fisher folks posits that the decline in the fish catch is due to the flooding and the submerged trees in the lake. Some of the explanations given to this are that most of the fishes take refuge at the base of the trees and when they cast their nets, they get hooked onto the trees. Most often, their nets are either destroyed or lost in the lake. Some of them argued that they end up spending much more time in mending their nets. Yet others said that

with the event of the flooding, some of the fish species have moved further inwards and their canoes are not strong enough to travel long distances on the lake for their fishing expedition.

Fig. 8: Interview with some fisher folks

Furthermore, some fisher folks blame the decline in their catch on the illegal activities of some of their unscrupulous members. They mentioned that the unscrupulous ones use prohibited nets to catch both the young and mature fishes in the bid to increase their catch. By so doing, they prevent the young ones from maturing before harvesting, and fast depleting the fish population in the lake. Another reason given is the use of chemicals such as dynamite in fishing. This, they say, kills the fishes.

The fishing authorities and executives of the fishing committee are present to monitor the activities on the lake, but mostly these negative activities take place at their blind side. Sometimes, it becomes political where in the event of strict implementation of the fishing rules, some of the fishing communities threaten the withdrawal of their support. This makes government and other political entities, for political expediency, relax the laws.

4.6.2 Flooding- Trees in the Water

After the construction of the Akosombo Dam, the lake has expanded over the years. The flooding of the lake has gone beyond what was envisaged, according to some local residents along the lake. As at now, the exact measurement of land taken over by the lake is not known. What is known is that whole communities, farm plantations, forests and wildlife about 10 miles radius are under the water. The most important impact to focus on in this section is the trees that are submerged as a result of the flooding of the lake.

As forests and plantations were taken over by the rising level of the water, trees got submerged and are causing significant effects on the activities on the lake. Firstly, these trees serve a positive purpose, according to the fisher folks. Most of the fish species use the roots of the trees as habitat and breeding grounds. These grounds become safer areas for procreation as the fishes hide from preys. This helps in increasing their population in the lake. According to the accounts given by the fisher folks, a lot of termites feed on the trees in the water. These termites in turn serve as food for the fishes in the lake. Therefore some of the fisher folks are of the view that the trees should remain in the lake to improve aquatic life.

Also, the transport operators posited that the flooding has opened access to several other communities along the lake, which was hitherto not accessible. This, they claimed, has improved their businesses as they are now plying more destinations.

However, others hold opposing opinions about the submerged trees. Some fisher folks claimed that the trees destroy their fishing nets. Also, the trees cause extreme difficulties in navigation, and sometimes when the level of the water goes up, the trees become fully submerged and invisible; this results in their canoes hitting such trees and getting damaged. Sometimes they get drowned in the process. Another group is the transport operators on the lake. Officials of the VLTC and the local boat owners interviewed claimed that over 50% of the accidents on the lake are caused by the submerged trees. This is because the boats hit the trees and get damaged.

There have therefore been persistent demands for the harvesting of the trees in the water, but some fisher folks have been against the way it is done. The local people mentioned that because government and VRA have not been forthcoming on the harvesting of the trees in the lake, some of the local communities have taken up the challenge to harvest those trees in their catchment areas. However, due to the non-availability of the required sophisticated equipments for such exercises, they could only cut the trees in the middle to prevent

themselves from drowning. This way of cutting the trees has posed yet a more dangerous situation. When the level of the water normally goes down between November and April, these tree trunks protrude and the boats crush into it most of the time, because they are usually not seen. Some of the localities have therefore developed a system where they tie pieces of coloured cloth and plastic lines on the trees to enhance their visibility.

What the government has done was to cut the tree stumps along the routes of the bigger boats, but this is only between few major towns along the lake. Therefore local transportation system still has to struggle with the trees.

4.6.3 Farming Activities- Traditional and Irrigation

Despite the taking over of huge farmlands and crops by the flooding of the lake, there have been some positive effects of the rise in water level to agricultural activities, according to the local people and some officials from the Ministry of Food and Agriculture (MOFA). One area mentioned by the farmers to have been impacted positively is the farmlands along the lake. Organic matter is deposited on these lands in the event of flooding, and this replenishes the land by improving its fertility.

Another area of importance is irrigation agriculture. The lake serves as a water reservoir for irrigation activities in some parts of the communities along the lake. One of the notable locations for this irrigation farming is Kpando Torkor. According to information gathered from focus group discussions and individual interviews, the irrigation programme started in 1974 as an avenue to put the expanding lake into profitable use, create occupation for the displaced people, and to ensure cultivation all year round, among others. The project began with rice cultivation, then moved into okra cultivation after some years, and then currently cultivation chilli pepper.

The land was acquired by government and distributed to the local people who were interested in the irrigation project. The distribution was done by a committee formed by the local government authorities, and it constituted representatives of the local people, traditional rulers and a government representative as the project manager. Allocation of land for irrigation farming was opened to all residents of Kpando Torkor, but one needs to register as a member of the irrigation farmers association to qualify.

The irrigation system is normally used during the dry season, between October and April, while the farmers depend on the rainfall for the rest of the year. Water is drawn from the lake onto the farms through pipelines and pumping stations. Water is distributed to the various

farmers twice a week, Tuesdays and Thursdays, between two and four hours per area. All the farmers are now into chilli pepper cultivation with the reason that it is cost effective compared to okra, and it has a higher demand on the international market.

But one pertinent issue observed and also mentioned by some respondents about this irrigation project is that, chemicals including insecticides/pesticides and weedicides are used in the farming process. These chemicals, when it rains, drain into the lake since the irrigation farmlands slightly slant towards the lake.

Fig. 9: Part of the irrigation farm at Kpando Torkor

Some of the local people felt that these chemicals could have been part of the causes of their sicknesses since they use the water for all their household chores. However, responses from the irrigation committee executives and MOFA officials stated that the project engineers carried out adequate research and found out that what gets into the lake is extremely insignificant to cause any serious negative effects. Also, they think that the distance of at least 500 metres between the lake and the farm is long enough to minimise adverse effects on the lake. They further explained that one important reason for changing from okra cultivation to that of chilli pepper is that the later requires less use of chemicals, therefore more

environmentally friendly to cultivate. Finally, the irrigation authorities posited that they all reside in the community so they will never consciously embark on any activity that will destroy the environment and the people of which they are part.

Fig. 10: Focus group discussion with some irrigation farmers and committee executives

4.6.4 Sanitation Issues

Some respondents observed that before the damming of the Volta River, the water runs fast; therefore waste deposited in and along the river was carried away. But now it has become a lake so it no longer runs; hence waste dumped into it remains and poses a lot of health danger to the community. Others are of the view that the brisk business that goes on along some parts of the lake accounts for the poor sanitation. It has to do more with the attitude where people who come to the shores to transact one business or the other throw out rubbish anywhere. Sometimes, the bins provided are seen overflowing, so the people claim to be justified to leave their waste outside of the bins. However, it has been observed that even when the bins are standing empty, most of the people do throw rubbish around in the open.

Fig. 11: Shores of the lake choked with waste

Some of the local people and health officials working in the communities claimed that malaria, cholera, diarrhoea/dysentery and bilharzias are prevalent in the communities along the lake. The officials explained that most of the local people depend on the water from the lake for their domestic chores and drinking, and also swimming and bathing in it; therefore the people get in contact with the bacteria and other vectors deposited in the lake by the waste. There has been periodic education by the health officers in the various communities as to how to handle the water before drinking, such as boiling and application of alum. But most of the respondents claim that boiling the water requires more expenses which they could not afford. Also, some of them do not have the time to be boiling water, leaving it to cool down before they use.

The local government authorities have provided few boreholes in the communities for the local people to have access to clean water, but the local people claimed that access to the borehole water is for a fee and they could not always afford it. So a better alternative for them is to continue depending on the lake water which is for free. When contacted, the local government officials claimed that they are charged insignificant amounts for the maintenance of the facilities. The local government does not have enough funds for such works because they needed money for other development projects in the communities under their jurisdiction, according to the officials.

It has also been observed that animals share the shores of the lake with the local people. These animals compete with the people for access to the water. These animals, according to some respondents, contaminate the water with their droppings and other sicknesses they carry. Especially at Kpando Torkor, it has been observed that huge herds of cattle are led to the shores of the lake to drink water. These cattle step into the water and make it unsafe for domestic use. When the local government authorities were contacted, they claimed to have warned the cattle owners, but they are adamant.

Fig. 12: Some children fetching water from the lake for domestic use

4.6.5 Child Labour Issues

The issue of child labour along the lake started around the 1970s when children between the ages of 7 and 15 years, both males and females, were brought from Ada, Sege, Ningo, and other parts of southern Volta to come and work for their masters, opined by the child labour committee members. This phenomenon started on the backdrop of the increasing difficulty in fishing due to the increasing population of fishermen and the presence of trees in the water. Therefore, according to the respondents, the children were acquired as helping hands to perform duties including sitting on the edge of the canoes as guides to locate tree stumps in the water to prevent the canoe hitting it; diving into the water to set traps around the trees and

dislodging nets that are hooked onto the trees in the water; scooping water from the canoes in the event of perforations; mending of torn nets; taking part in the fishing expedition; fish processing and sale, among others. It is also mentioned that some of the females are made to babysit and take care of the home while their masters/mistresses routine occupation.

This situation of child labour was very common at Kpando Torkor, Krachi, Dambai, Dzemeni, Kpeve, Donkorkrom, and other parts of the Afram plains along the lake which served as the receiving ends. Most of the children were sold out by their parents or middlemen who are into such businesses, for a one-time fee ranging between Ghc200 and 400 ($100-200) depending on the age and physical appearance while others were rented out and paid for on monthly basis between Ghc5 and 8 ($2.5-4). Some of the children also decide themselves to get into such work to help their parents financially. In most cases, the children live with their masters. According to the respondents, usually these children were made to overwork themselves as their masters claimed to have fully paid for their services. None of these children had access to formal education.

In the 1990s, government in collaboration with the General Agricultural Workers Union (GAWU) and NGOs embarked on child labour advocacy along the lake to curb the menace. Child labour committees were formed in the various communities by GAWU and tasked to educate parents and 'child slave' owners on the rights of children and preventing the child labour activities. In the case of Kpando Torkor, the District Assembly worked in collaboration with the International Labour Organisation (ILO) and the local committee rolled out a programme in 2000 to tackle the child labour menace. The aim was to get the child slaves out of their current situations and settle them into the formal educational system and meaningful vocational training that will beneficial to them in the future.

By the end of the first phase of the programme in 2009, about 340 children ranging between 10 and 15 years were enrolled into formal education and other vocational training. All of them are been catered for by the programme. Some are been reunited with their parents as they go about their new life while others have decided to live with their masters as they go to school and learn their vocation. Since the Free Compulsory Universal Basic Education (FCUBE) programme is in operation in Ghana, what the programme provided for the children in the formal educational system were books, school uniforms, bags, shoes, pens and pencils, etc.

The second phase of the programme has been re-oriented to concentrate on the sending locations. This means that for about 2 years the programme has been running in the

communities that send the children out for the child labour activities. The modus operandi of the programme is assisting both the parents and children in their livelihood activities to improve their financial status. This accounts for the drastic reduction in the presence of new child labourers been spotted along the lake.

4.7 Impacts Downstream

The water that flows downstream after the inundation is only the water that is let out of the hydro plant, and this is uni-directional. This water flows into the sea around the Ada area. The flow of the water is also very slow, hence making room for the thriving of aquatic weeds. It allows the weeds to take root in the bed of the river, and others are able to float on the water body. The weeds have spread so fast that when one travel along the river, they could be seen everywhere. Some of the local people had to cut through the weeds in order to access the water. One of the most dangerous among these weeds is the water hyacinth. It is a very dangerous species in the sense that it absorbs so much water and it grows and spreads at a very fast rate thereby significantly contributing to the drying of the river. It produces a very fine lily-like flower, so people think that it is an ornamental flower, so they picked and spread the flowers, thereby contributing to the widespread of it.

Fig. 13: The Water Hyacinth

These aquatic weeds serve as a safe haven/habitat for small snails which serve as vectors for bilharzias. This explains why bilharzias disease is prevalent in the communities along the river downstream.

Another major impact is the blocking of the estuary. Formerly, the sea carrying sand up into the estuary and the floods from the river opening it up again due to rainfall, was a natural phenomenon. Now because of the inundation of the river, the flooding system no longer exists. Hence sand from the sea has blocked the estuary and this has reduced the sea water ingress, and so requires human intervention to open it up. So species like oyster which thrives in slightly saline water have almost disappeared, and the industry has collapsed. These oysters can now only be found very close to the sea around the Ada area. Therefore, communities along the stretch of the river such as Akuse and Amedeka who depend on oysters picking and fishing have, as a matter of fact, lost their source of livelihood.

In addition, formerly when the river floods, it takes the farmlands of those communities near the river and so the dead vegetation provided humus for the soil. So the soil is always rich in organic content, thereby improving agricultural yields. Now because that flooding does not take place again due to the damming process, farming in these areas is purely dependent on rain and whenever the rain failed, then agricultural activities also fail.

One other impact worth mentioning is the incident flooding taking over houses and farmlands when water is spilled out from the dam. When the water in the dam rises above the maximum level, it has the tendency of destroying the dam walls; therefore VRA spills the excess water from the dam by opening the flood gates for it flow into the river downstream (see appendix 3). This occurs normally during raining seasons and when Burkina Faso spills its Bagre Dam, which flows into the Volta Lake. Because of the inundation of the river at Akosombo and Kpong, the river downstream has shrunk in size and settlements and farming activities have moved close to the banks of the river. Therefore, in the event of spillage, the flooding that occurs result in massive destruction of lives and properties, especially houses, farms (crops) and fishing gears.

However, VRA claims it collaborates with the National Disaster Management Organisation (NADMO) to disseminate adequate information before the spillage, and engage in relief activities. The VRA mentioned that most of the casualties recorded are due to the adamant nature and disregard for warnings/alternative offers by the local people.

On interventions, VRA claimed it has spent about US$1,000,000.00 so far in trying to reduce the impact of the hydroelectric project on the people living downstream. The first area of intervention was helping to open up the estuary to allow the sea ingress. Monitoring is also been done on monthly basis to see the extent of sea ingress so that 6ppt salinity level could be achieved in which bilharzias vectors would not be able to thrive.

VRA has also been administering bilharzias drugs to the affected communities, schools, etc. A team from the Environment and Sustainable Development of VRA carry out screening in

the various communities and administering the bilharzias drugs. They also embark on environmental health education as to how to relate with the water. These activities are been carried out in close collaboration with the ministry of health as they have their health facilities on the ground. Portable water is been provided in the affected communities, but the people would still bath in the river, drink and use it for other domestic chores. So since they still have contact with the water, re-infection continues to take place. It is argued that the paltry amount charged for the portable water is not beyond the local people, so there is no excuse continuing to have contact with the river. It is an issue of behavioural change.

The aquatic weeds are been managed by clearing and burning. They are been harvested and brought onshore for burning. The VRA has employed some of the local people to carry out this assignment. However, the problem here is about lack of land to store the harvested weeds until they are dry. Quite a sizeable plot of land is needed because the weeds need to be spread in order to get dry easily and fast. On the other hand, the VRA thought of compositing it for organic manure, but for lack of resources this has not yet been implemented. Nevertheless, it has been observed that the fish species use the aquatic weeds as hiding place from the fisher folks. Therefore when the weeds are harvested, it exposes the fishes and the fisher folks make bumper harvests. This process, however, seem unsustainable since the fisher folks noted that their catch decreases sharply within few days.

In addition to the clearing and burning, the research department of VRA has developed a strategy of destroying these aquatic weeds by breeding special species of weevils that are known to feed on the weeds, especially the water hyacinth. These weevils, when introduced to the weeds, feed on both the leaves and roots of the weeds, thereby killing them (the weeds) in the process.

Fig. 14: The weevils used to destroy the water hyacinth

Chapter 5: Discussions

"the story of the Volta River Projects will not be completed without reference to the 80,000 people who had to be moved from their villages and resettled in other areas because of the formation of the Volta Lake"

– Kwame Nkrumah, 1966

5.1 Compensations and Resettlements

Several studies on dams around the world have shown that this activity comes with massive displacements of local communities that are to be inundated with the floods or in the identified flood zones. Therefore, resettlements and compensations come with such projects and are mostly included in the feasibility studies and assessment reports. Most government reports on dams normally underestimate the number of displaced people. For example, the government of China in its assessment report estimated displaced people due to dam constructions between 1950 and 1989 at 10.2 million. However, researches have placed the number of displaced people within the stated period between 40 and 60 million (Gutman, 1993; World Bank, 1993a). In the case of the Akosombo dam, official government statistics pegged the number of displaced people at 62,500 in 1956 and 84,000 in 1965 (Cernea and Guggenheim, 1993; World Bank, 1994). But figures from institutions that have carried out some studies on this project have estimated between 300,000 and 400,000 displaced people. Several reasons could be assigned to the significant variations in the figures. One of them could be deliberate attempt by the government to cut down on the figures in order to minimise the seeming negative effects of the project so as to attract financial resources. Some governments, knowing the requirements of international donors for such projects, would manipulate the figures in order for the proposed project to portray minimal negative effects, or for the positive effects to far outweigh the negative ones. It is interesting to read World Bank reports that praise the success of resettlements of people displaced by the building of dams in developing countries while studies on most of these projects have shown the further impoverishment of the people (Asian Development Bank-ADB, 1995; McDonald and Webber, 2002).

In another case, assessments on such projects are poorly carried out and mostly in a hurry (Kinsey and Binswanger, 1993). By so doing, several important effects are overlooked or ignored. Findings from studies on effects of large dam constructions have shown that in most cases, it is only those who have been directly affected by the inundation are normally captured for compensation, such as loss of farmlands and houses to the floods (McCully, 2001). Others

who have lost their sources of livelihood are normally been ignored. With the building of the Akosombo and Kpong dams on the Volta River, documentations have proved that compensations were paid for loss of houses, crops and the lands acquired from host communities for the resettlements (World Bank, 1993b). Conspicuously missing in the compensation packages are what are regarded as the loss of the commons (McCully, 2001). This refers to the resources commonly shared by the people and heavily depended on for livelihood.

Most of the local people used to pick firewood from the forests along the river that has now been inundated by the lake. Others also used to pick wild fruits and food (such as wild yams, snails and mushrooms) for domestic use and for sale; there also used to hunt in the forests, pick herbs for medicinal purposes and draw timber from these same forests. In addition, pastures or fodder for the grazing of the animals of the local people have been lost to the floods, not forgetting the loss of access to clean water both upstream and downstream. Also, the local folks who draw wood from the forests for artefacts, fisher folks resettled far away from the lake, and other service providers that serviced the local communities have all lost their source of livelihood. Furthermore, the local communities living downstream have also lost their major source of livelihood which was the oyster picking due to the drying up of the river and the invasion of aquatic weeds. These common resources have been captured in the principles governing payment of compensations in the government white paper presented on the Volta River Project in 1952 (Government of Gold Coast, 1952; Shapiro, 2003), but this particular major loss has interestingly not been captured in the compensation packages actually paid to the locals after the project. These are important resources provided by the ecosystem to support the livelihood of the local folks.

Therefore the taking away of these ecosystem resources have in diverse ways destroyed their food and security need for their wellbeing as mentioned in the theoretical framework above. The worst affected population by the loss of these 'common' resources were the women and children, because they tend to depend more on such resources (McCully, 2001). Since these loses are not been compensated for, the women and children are left more disadvantaged and more vulnerable to poverty conditions.

Another recurring action that has been attributed to the process of resettlement of the displaced people is the misleading promises made to the displaced in order to entice them into accepting the resettlement. Most of the respondents in the resettlement communities have

mentioned that promises made to them by the government and officials of the VRA that made them to accept to relocate have largely not been redeemed until now. Such promises include providing them with free electricity from the project as their reward for the loss of their livelihood to the dam construction, setting up industries in their new communities for them to have access to employment, giving scholarship to their children, etc. These promises were never met because the officials claimed these were too expensive to be borne by VRA, and also they were not privy to such promises since no documentations showed such promises were made. It might have been misrepresentations from the officers who were engaged in the dialogue with the displaced communities. These actions were not peculiar to this resettlement process. Studies have shown that some other resettlement processes around the world due to dam constructions have experienced such unfulfilled promises. The Sardar Sarovar Dam project in India and the Chixoy Dam project in Guatemala were cited by McCully (2001) as projects guilty of unfulfilled promises to the displaced population. When such things occur, it degrades the credibility of the authorities and takes away the trust of the displaced people for the government. Such actions also paint a picture of a deliberate action of government and other stakeholders to mislead the already vulnerable displaced population into a more severe state of emotional and physical deprivations.

Normally, the houses provided and lands on which the displaced were resettled were less in both quantity and quality. It has been a pertinent concern expressed by most of the displaced people interviewed. Other studies cited by McCully (2001) also pointed to this assertion. It has been a normal feature with most of the resettlement communities visited that the houses built for them were claimed to be smaller and poorer in structure compared to their original houses they lived in before the inundation. Despite some of the displaced people might have been living in mud and thatched houses, they had several rooms and spacious compounds. Others claimed they owned and lived in storey buildings, some with 10 rooms or more. However, these houses have been replaced with very small bed-sitter units (pictured in the previous chapter) with practically no space for future expansion. Huge families had no other alternatives but to squeeze themselves into their ‘new homes’. In addition, most of the houses provided the displaced were uncompleted due to the crash nature of the resettlement programme. The settlers were provided with some funds and materials to complete these houses themselves, but reasons given by the settlers for their inability to complete these houses are cogent enough. While been brought to an entirely new environment without any

resources to depend on immediately for their livelihood, it was just understandable to sell off those materials in order to provide for themselves and their families such basic needs as food.

On the other hand, studies have shown that the higher grounds on which the displaced have been settled are of lower quality to support plant growth in comparison to the nutrient-rich lower grounds and valleys they hitherto occupied. Their original lands were normally enriched with organic matter on regular basis by the annual floods of the river Volta. Also, due to the small number of the people in their various communities and their large land holdings, shifting cultivation and simple agricultural processes were practiced, that retained the soil nutrients. However, having been crowded in the resettled communities and allocated small patches of land (two acres per household), these lands has seen continuous cultivation and persistent application of chemicals to boost productivity. By so doing, the lands have degraded in quality over the years.

Also, the settlers do not hold title to the lands allocated to them. This has brought a situation where the hosts still claim ownership to these lands. Being aliens, the settlers play subordinate to the hosts when it comes to issues of land, therefore handing over the allocated lands back to the hosts in most cases. In some cases, these land issues bring about misunderstandings and conflicts between the hosts and the settlers which sometimes turn violent. And findings are that the hosts always carry the day because of their number and influence.

Another dimension to this claim over the allocated lands by the hosts stems from the very poor process of compensation payments for the acquired lands. Instead of dealing directly with the land owners, government and VRA dealt with supposed lawyers and traditional leaders who served as representatives of the land owners. Because of the high illiteracy of the land owners, these middlemen took the opportunity to defraud them by making them sign for large tracks of land given away, but been paid for just a parcel or two. Therefore, when the children and grandchildren of these land owners, being more enlightened, came to realise the fraud, decided to fight for justice by claiming back their lands. This has resulted in most of the land disputes surrounding the lands cultivated by the settlers.

The above situation has placed these displaced people in a condition of worsening poverty situations where some of the settlers have to accept to be farm labourers and domestic ‘slaves’ to their hosts and other well to do families in order to sustain their lives and that of their families; a situation that degrades their honour and integrity.

One other important impact of the inundation and subsequent displacement worth discussing is the religious and cultural loss. The data collected and findings from other studies have proved that religious and cultural sites and monuments that served as the history and traditions of the local people were taken over by the floods resulting from the construction of the dam. Places of worship such as the traditional shrines that housed the supernatural beliefs and practices of the local people have been wiped off by the floods. These sacred places served as the foundation of the people's beliefs, norms, traditions, festivals and practices that set their moral standards and defined them as a group of people unique from others (Behura and Nayak, 1993; Esman and Herring, 2006). Tombs of friends, relatives, prominent personalities and loved ones have also been taken over by the floods. This has certainly wiped out a significant part of the people's past and deprived the young generation of learning about the history and traditions of their previous generation.

The effect of the above impacts is social breakdown. The theoretical framework pointed out the link between provisioning and cultural services of ecosystems and the features of human wellbeing such as basic materials for good life, security and good social relations. The loss of fertile land for cultivation, fishing grounds and common resources to the Akosombo and Kpong dam constructions has deprived the displaced locals of their basic materials for a good life. In addition, the resettlement of the locals from different communities together, and onto an entirely new environment, and the loss of their spiritual and cultural heritage has also deprived them of their good social relations. This is because the members of the extended family which used to help one another no longer functions due to the current individual struggle for survival. Therefore, that strong family support is now reduced to the nuclear family considerations (McCully, 2001). Traditions and practices of the host communities tend to suppress that of the settlers and even alien cultures from workers at the project site adulterate that of the locals, thereby rendering their practices and norms less effective (Behura and Nayak, 1993). Parents and community leaders tend to lose the respect and social influence due to their inability to provide the basic needs and security for their children and community members respectively as they used to before the displacement.

A trend of possible neglect of the resettlement communities has also been identified one of the situations facing the displaced people. Data collected show local government authorities and VRA have been shifting responsibilities in the course of attending to the wellbeing of the resettlement communities. While the VRA claimed the communities fall under the jurisdiction of the local government authorities and hence needed to be provided for by them, the local

government authorities argued that the said communities were created by the VRA and therefore should take responsibility. This responsibility shifting game has left the communities disadvantaged and deprived of the necessary attention.

It becomes imperative to question the institutions that financially support these constructions in the face of widespread failures of resettlements, especially the World Bank. The World Bank's policy on involuntary resettlement states that "the fundamental goal of the Bank's policy is to restore the living standards and earning capacities of displaced people- and when possible to improve them" (cited in McCully, 2001:82). However, the World Bank's appraisal reports on resettlement of displaced people due to dam constructions either funded by the World Bank or not, have stated the deteriorating conditions of the affected people due to unsatisfactory income restorations (McCully, 2001; World Bank, 1994). This portrays the failure of the World Bank to achieve its aim of decent resettlement. If this is so, why then should the World Bank and other institutions continue to support dam constructions at the detriment of the locals? Does that mean the local interests are not significant enough to be safeguarded?

Other multinational organisations fund dam constructions for various reasons. Significant among them is the avenue to establish businesses that will use the dam resources at a cheaper rate. Kaiser Aluminium had been a major financial supporter of the Akosombo Dam construction, according to available information. The result of the financial agreement had been the 80% allocation of electricity generated from the project to power the aluminium smelting company owned by Kaiser Aluminium. That means only 20% of is left for the use of the whole country. This could be seen as injustice perpetrated on the ordinary people by multinationals that control huge financial resources. Normally, these multinationals collaborate with international organisations like the World Bank in financing such projects. It therefore leaves us with the moral question of why welfare seeking organisations such as World Bank would be a party to projects that adversely affect and deprive the ordinary citizens, notwithstanding the development avenues it brings to the various countries.

5.2 Fish Life and Fishing

The life processes of fish species and fishing activities have no doubt been affected by the construction of the Akosombo and Kpong dams that changed the river ecosystem into a lake ecosystem. The responses given by the fisher folks indicate the rapid decline in the population of most of the fish species in the lake. The complain of the fisher folks about lower catches in

recent times as compared to that of decades ago could be linked to the changes that have occurred since the dam constructions. Studies have outlined varying reasons for the changes that have been experienced.

To begin with, the flooding that took place after the constructions has expanded fishing grounds and given the fisher folks more space to operate on the new formed lake. Some of the older fisher folks recounted how they had had bumper harvest soon after the inundation, which to them was a positive sign of greater things to come. However, their hopes of great expectations dwindled in the face of sustained decline in fish catch until today. One important observation made by the fisher folks themselves was that the bumper harvest was due to the trapping of the fishes upstream by the dam walls. Therefore, excessive harvesting of the fishes made it non-sustainable, according to them. But could that be the only reason? What about the changes in the complexity of the ecosystem as a whole?

The emergence of trees in the new lake ecosystem after the inundation is one impact worth discussing. The flooding that occurred after the construction took over vast forests and farmlands as mentioned in the presentation of data above; the resultant effect being the presence of trees in the lake. These trees served as limiting factors to fishing expedition as it prevented the fisher folks access to the fishes in the lake. Their nets got hooked onto the trees, got damaged and even their canoes and other fishing gears got destroyed by the trees. These conditions brought about extra efforts and longer time spent on the lake in making some reasonable catches to sustain their livelihoods. This was one of the excuses given for the engagement in child labour. Local efforts to cut down the trees did not yield the desired results because they did not have the requisite equipments. Hence, they ended up just breaking the neck of the trees and when the level of the water decreases, it results in the protruding of the tree stumps that mostly are invisible to the fishermen and become more dangerous than before. However, as mentioned in the data, the trees serve as habitat for the fishes and the termites that feed on the trees in the water also serve as food for the fishes. So cutting the trees from the lake would negatively affect aquatic life. This in no doubt leaves government and the local people in a dilemma. Clark Sustainable Resource Developments Ltd. (CSRD) is recently involved in the harvesting of the submerged trees in the Afram arm of the Volta Lake for its wood manufacturing and processing facility. No studies have yet been conducted to ascertain the effects of this activity on aquatic life and the local fisher folks are also not so sure on any significant effects since the activity is new.

In addition, dredging activities on the lake to open up the lake for improved transportation have also contributed significantly to the decline in fish population and fishing activities. A report by Envirosound Associates (2001) clearly outlined in their findings the effects of dredging activities between Buipe and Debre sections of the Volta Lake to include the destruction of fishing nets by sharp edges of residual rocks after blasting, destruction of fish habitats, destruction of fishing grounds during the dredging activities, destruction of fishing nets by the vessels working on the lake and other bigger transport vessels, among other things. Therefore, in the bid to improve transportation on the lake, the local fishing communities along the lake are negatively affected.

Furthermore, we cannot lose sight of the ever-increasing population of the fisher folks on the lake. Due to the displacements, fisher folks moved to more conducive fishing communities to continue with their occupation. Other locals who hitherto were farmers and other workers have transformed into fishermen as the available alternative for survival. These have caused concentrations in the surviving fishing communities and the resulting act of overfishing in these areas.

McCully (2001) has also cited studies that have shown regular temperature rise on surfaces of lakes and the oxygen depletion in the cooler deeper waters that negatively affect the life processes of some of the lake fish species. This might be one of the reasons for the fisher folks concern on the decrease in fish catch in the Volta Lake.

Yet another argument advanced by some researches for decrease in fish catch is the drying up of the estuary downstream the Volta Lake that used to support the reproductive life cycle of many of the fish species (Dzabaku, 2011). Estuaries play very important role in the reproductive life of many fish species as it serves as nurseries for the young ones (Nybakken and Bertness, 2004; Carle, 1994), because they thrive best in a mixture of fresh and sea water, before they migrate either into the river or the sea. Hence the drying up of the estuary due to the dam constructions has contributed to the decline in the productivity of fish in the lake.

The dam construction has blocked the free movement of fishes in the lake, especially escape of some species from predatory fishes, this therefore makes the species more vulnerable to the predators and causes their rapid decline (White, 1992). This may also explain the decline in the population of some species in the lake.

Eutrophication cannot be ruled out in the decline in fish population in the lake. Before the dam construction, river Volta used to be a fast flowing one, therefore it normally washes away impurities and foreign materials. However, in the advent of the dam construction, the resultant lake virtually stands stagnant. Daily contamination of the lake by the communities living along it has cumulatively degraded the water quality in the lake. Activities such as dumping of domestic waste in the lake by the local communities, discharge of used oil in the lake by vessels, chemicals used in fishing expeditions, chemicals draining into the lake from irrigation fields along the lake, etc might seem to be insignificant in contaminating the lake, but the cumulative effects could be far reaching. These activities contribute in no small ways to the depletion of oxygen in the lake, the trapping of fishes by plastics, and the choking of the digestive and respiratory systems of the fishes by the non-decomposable wastes (Harrison, 1995; Boyle, 1994). These effects increase fish mortality rate in the lake and hence the rapid decrease in fish population.

One important factor to consider in the non-sustainability in fish catch on the lake is the methods in fishing. Fishing down the web is a major issue in sustainable fishing activities (Ocean Issue Briefs, 2008). Aquatic life in the lake is made up of a complex web of interdependence for sustenance. However, due to the simple equipments used by the fisher folks in fishing expedition on the lake, fishing normally takes place on the surface (littoral and limnetic zones). Therefore when the species in these zones get over-exploited, life and survival of the species in the lower zones (profundal and benthic zones) get negatively affected since they depend on the upper zones for survival. When this happens, it brings about a collapse of the entire food web in the lake. This process might also explain the reported rapid decline in fish catch by the fisher folks.

When change in conditions of ecosystem services, especially the provisioning services as outlined in the above discussions, negatively affect the local people, it tends to push the local people into adopting and using other methods or technologies, which are mostly unacceptable, in order to derive the maximum benefits from the changing ecosystem services. Such methods may seem to elicit positive results in the beginning, but becomes dangerous and unsustainable in the long run. This applies specially to the use of tiny nets and unapproved chemicals in fishing. It might lead to improvement in fish catch, but will destroy aquatic life processes in the future, leading to a further breakdown of the services provided by the Volta Lake.

5.3 Irrigation Agriculture along the Lake

Irrigation farms are been supported by successive governments along the lake as a means of assistance to reduce the poverty situations especially created by the displacements and loss of livelihoods caused by the flooding of the lake. One of such notable irrigation fields is located in Kpando Torkor. Irrigation farming in itself is a positive alternative that helps to bring regular income to the local farmers even in the lean season. It minimises the dependence on rain-fed agriculture which is normally unpredictable, and assures provision of food all year round. Irrigation farming along the Volta Lake as a major alternative for the displaced and affected locals by the dam constructions is obviously a positive move by government and other organisations to alleviate poverty in the said areas.

However, in the bid to arrest the endemic poverty situations among the local people along the lake, when the right steps are not taken to safeguard the environment, the end result will be a more severe poverty and disease. Distances from the lake to the irrigation fields are very close depending on the flooding levels of the lake at different points in time. Some of the farmers admitted that parts of their farms get flooded in the event of heavy flooding of the lake. It suggests the nearness of the irrigation lands to the lake. Reasons for the nearness may include fewer expenses in the technology in drawing of water onto the irrigation fields. It sounds cogent, but on the other hand, it increases the rate of drainage of chemicals used in the farming into the lake. This is because it has been established through the data collection that pesticides, insecticides, weedicides and other chemical fertilizers are used in the irrigation farming process.

Ecosystem of the Volta Lake supports aquatic life and also provides the local people with food and water as explained in the framework above. Therefore its contamination will lead to the decrease and possible inability in supporting aquatic life and providing safe drinking water and other food sources to the local people. Thus this condition would in turn negatively affect the livelihood and wellbeing of the locals.

Therefore if irrigation farms are situated further away from the lake, it would reduce the amount of drainage into the lake. It is better to invest more into pumping water from the lake over a longer distance to the irrigation fields than to be cutting down expenses and end up contaminating the lake.

As much as possible, it would be prudent to use organic manure in place of chemical fertilizers in the irrigation projects so as to reduce the chemicals that run into the lake. On the

other hand, irrigation farms could be situated at locations where the land is relatively flat or with very gentle slope so as to reduce run-offs into the lake. This might not be possible in many cases due to the scarcity of land, but as much as possible where there are available lands, this strategy could be used in safeguarding the environment.

5.4 Sanitation

The nature of the river system prior to the dam construction with the feature of a fast flowing water helped in its regulating services by cleaning up the waste dumped into it by carrying them into the sea. This has helped in reducing the level of contamination in it. After the dam construction, the lake formed behind the dam walls has become relatively stagnant and therefore could not dispose of waste as it used to. That regulating service rendered by the lake has hence been impeded. Brisk business goes on along most of the landing sites on the shores of the lake, and this generates a lot of garbage. Normally, animals being reared in the communities along the lake are on free range. Therefore they are found loitering on the shores of the lake either drinking water or washing in it.

Also, the data collected shows that the local communities draw water from this same lake that they swim and take their bath in, and also wash their clothes in and along the shores. A cleaning company, ZOIL, has been employed to take care of the cleanliness of the shores of the lake. However, how effective could they be if the local people continually contaminate the lake? Their services will make little impact under current conditions. The most important remedy should be the change of attitude of the local people. This could be done, among other ways, through education. Ignorance may be a reason for the behaviour of the local people. Therefore, when they are well sensitized, they might change their behaviour patterns which will help reduce the contamination of the shores.

Some of the health facilities visited around the communities and the respondents themselves stated the prevalence of sicknesses such as cholera, malaria, diarrhoea, bilharziasis, etc. And such diseases are normally linked to communities along water bodies and contaminated environments. Also, the contamination of the lake could lead to nutrient overload which will in turn lead to algal bloom, and because of the stagnant nature of the lake, render the water highly unsafe for the use of the local people (Petts, 1985; Lemeshev, 1990). Usage of such water, which is the only source of water for the communities in most cases, exposes them to the above-mentioned diseases.

In another vein, the contamination of the lake could account for variation of temperature in the lake, which in turn affects aquatic life. There is documented evidence that suggest the negative effects of temperature variation on breeding, hatching and metamorphosing of larvae (Petts, 1985). This might be a factor for the decline of fish stock in the lake, coupled with the trapping of fish by plastic garbage floating in the lake.

5.5 Child Labour

The issue of child labour along the Volta Lake has been a case of successful implementation of policies. This is because of the change of focus from the receiving communities to the sending communities. While the 'child slaves' are been integrated and settled into dignified life, attention on the sending communities has helped to reduce its incidence. By empowering the communities that 'sell' out their children into the fishing expedition, the result has shown to have reduced the intensity.

Since the underlying factor of this trade is extreme poverty, the support of NGOs and government to provide the people with livelihood skills and financial support have turned out to work positively to a large extent.

However, sustainability of such programmes has been an albatross on the neck of governments. These NGOs have specified time limits of working in these communities. What happens when the NGOs are gone? To answer this question, sustainable livelihood alternatives need to be handed down the local folks. Also, those child labourers retrieved should be assisted to establish themselves after their training in the respective vocational skills.

Conclusion

Certainly, there is dependence and interdependence between humans and the environment for survival. Human actions affect the environment and the effects in turn affect the human lives. There is no doubt human exploitation of the environment for survival negatively affects the environment. But the environmental exploitation can never be completely halted in order to preserve the environment, because human beings need it for their livelihood. What is expected to be done is for great circumspection to be exercised in the exploitation of the environment in order to protect the ecosystem services it provides to humans. That is why in building large hydroelectric dams such as the Akosombo dam, more attention need to be paid to the effects on the environment and the subsequent effects on human livelihoods. Sustainable mitigation measures need to be implemented to reduce negative measures to the barest minimum.

The information available has shown the resettlement and compensation schemes have failed to a large extent. The 'top-down' approach adopted by the authorities in dealing with resettlements and compensations to the displaced locals has shown not to be effective enough. Displacements and resettlement issues could have been better resolved if in the first place the local people who were to be affected by the dam project were effectively consulted and even made part of the decision-making and implementation process. When the local people were actively involved in the process, they would have contributed some better alternatives that they deemed a better way out of their situation. They would also have identified themselves with the programme and hence posed less resistance to it.

In addition, it has been established that the resettlement scheme was put together in a rush after the floods have started destroying lives and properties. This suggests that the resettlement scheme was implemented after the dam construction began, which is an unacceptable procedure. People and properties earmarked to be displaced by dam projects have to be resettled long before the commencement of the projects. Also, the local people to be affected by projects had to be educated well enough to understand the effects that come along with it. This will help in courting the consent of the local people. Furthermore, issues emanating from the resettlement and compensation process have to be effectively addressed before the commencement of the project so as to eradicate the notion of the interest of the local people being ignored.

A neutral commission need to be established with the responsibility of making sure resettlement and compensation programmes and policies are effectively executed and

concerns are effectively resolved. This recommendation stems from the fact that VRA and the government agencies have interest in the project, hence the suspicion of feet dragging in the implementation of the resettlement and the compensation schemes, especially when it is to their disadvantage.

Most of the local people, hitherto their displacement, had their occupation which was their source of livelihood. Therefore, governments and other authorities responsible for the displacement of the local people should not only resettle them in physical structures and think that is enough. They need to go a step further to support these displaced people in either getting back their lost sources of livelihood or getting on to other ones.

Incentives such as scholarship schemes, employment quotas, subsidies in utilities, etc. could be made available and accessible to the locals who were affected by the project as other means of compensating for their loss in order for others to have access to better and cheaper facilities. These locals have sacrificed their livelihoods for the benefit of the larger population; therefore they need to be adequately compensated.

Yet another important issue to be seriously considered under resettlement and compensations is the interest of host communities. The government needed to adequately compensate communities whose lands were taken by the state under the State Lands Act 1962, Act 125 to settle the displaced people. In trying to solve a situation by settling those who were displaced, another problem need not to be created by taking away the source of livelihoods of others- in this case the hosts.

Government and other authorities responsible for projects such as this should not employ crude strategies such as promising local residents at project areas with promises they are very much aware they could not redeem, in order to get them agree to their terms. This is naked betrayal of trust and tantamount to crime against humanity. Profits and political expediency should not override the interest of the people. It is classical hypocrisy to overlook the interest of the citizens, especially those of the minority, the very state claims to protect.

Furthermore, the government should move beyond protecting votes in the communities along the lake and activate its political will to strictly implement fishing regulations to save the lake and aquatic life in it. Fisher folks who use dynamite in fishing, unapproved nets in fishing, activities that contaminate the lake, among others should be punished to make such negative practices on the lake unattractive. In addition, the underwater harvesting of tree stumps in the

Volta Lake (Nyarko, 2011; GNA, 2010) should be done in such a way that the interest of both lake transportation and fishing expedition and fish life will be secured. One suggestion is that the tree stumps could be harvested on transport routes and special routes for fishing expedition, and the rest left to help in protecting aquatic life, especially as habitat, source of food and breeding points for the fish species in the lake.

Finally, if the government is able to acquire the fibre glass boats it seeks to provide for transport and fishing expedition on the lake since September 2011 (Deccan Herald, 2012), accidents caused by destruction of the wooden boats by stumps in the lake will reduce. The provision of an average of 10 live jackets in a transport boat that carries an average of 90 people is seriously unacceptable. In the event of an accident, who uses the live jackets? Individual boat owners, NGOs working on safety on the lake and government agencies could assist in providing enough safety equipments in the boats that ply the lake. The fishery ministry, immigration and customs officials working at the ports along the lake should be up to their tasks by strictly checking overloading, boat health, safety measures and other conditions for safe transport before boats set sail on the lake. By so doing, accidents will be reduced to a large extent on the lake.

References

Abraham Maslow (2005), *Maslow's Hierarchy of Needs* http://www.abraham-maslow.com/m_motivation/Hierarchy_of_Needs.asp (accessed 23.03.2011)

Asian Development Bank (1995), *Involuntary Resettlement Policy* http://old.cseindia.org/programme/industry/mining/pdf/ADB-Involuntary.pdf (accessed 02.11.2012)

Behura, N. K. and Nayak, P. K. (1993), *Involuntary Displacement and the Changing Frontiers of Kinship: A Study of Resettlement in Orissa*, Boulder: Westview

Boyle, R. H. (1994), *The Coast of Caviar*, Amicus Journal, p.23

Bryman, A. (2008), *Social Research Methods*, 3rd Edition, Oxford University Press

Carle, D. N. (1994), *Restore the Endangered Wild Atlantic Salmon*, RESTORE: The North Woods

Center for Columbia River History, *The Volta River Basin and the Akosombo Dam* http://www.ccrh.org/images/resources/akosombo_revised_ds.pdf (accessed 21.08.2012)

Cernea, M. M. and Guggenheim, S. E. (eds), (1993), *Anthropological Approaches to Resettlement: Policy, Practice and Theory*, Westview Press, Boulder

Chambers, R. (ed.) (1970), *The Volta Resettlement Experience*, Pall Mall Press, London

Chapin, F. et al. (2009), *Principles of Ecosystem Stewardship: Resilience-Based Natural Resource Management in a Changing World*, Springer Inc., New York

Clark Sustainable Resource Developments (2008), *Environmental and Social Impact Assessment: Proposed Harvesting of Submerged Trees in the Volta Lake (Afram Arm),* Volume 1- Main Report, ERM

Deccan Herald (2012), *Ghana Fishes for Fibre Glass Boats from India* http://www.deccanherald.com/content/190136/content/216934/ipl-2012.html (accessed 10.04.2013)

Diaw, K. (1990), *Effects of Volta Lake Resettlement in Ghana: a Reappraisal after 25 years*, Institute fur Afrika-Kunde, Hamburg

Dzabaku, E. (2011), *The Volta River: Electric Power Generation and Poverty at the Crossroads*, Global Family Care, Ghana

Envirosound Associates (2001), *Environmental Impacts Assessment: Volta Lake Debre Shoals Removal and Maintenance Dredging Project*, Report, Volta River Authority, Ghana

Esman, M. J. and Herring, R. J. (2006) (ed.), *Carrots, Sticks and Ethnic Conflict: Rethinking Development Assistance*, University of Michigan Press, USA

Freeman, P. (1974), *The Environmental Impact of a Large Tropical Reservoir; guidelines for impact assessment based upon a case study of Volta Lake, Ghana in 1973 and 1974*, Smithsonian Institute, Washington D. C.

Ghana Home Page, *History of Akosombo dam* http://www.ghanaweb.com/GhanaHomePage/history/akosombo_dam.php (accessed 20.09.2012)

Ghana News Agency- GNA (2010), *Parliament Approves Harvesting of Stumps in the Volta Lake* http://www.ghanaweb.com/GhanaHomePage/NewsArchive/artikel.php?ID=198611 (accessed 10.04.2013)

Government of Gold Coast (1952), *White Paper on the Volta River Aluminium Scheme*, Statement by the Gold Coast Government on Her Majesty's Government's White Paper on the Volta River Project

Gutman, P. (1993), *Involuntary Resettlement in the Hydro Power Projects: A Review of the Bank Performance during 1978-1992*, World Bank, Washington D. C.

Harrison, H. (1995), *The Forgotten Fish*, Northwest Energy News

Hart, D. (1980), *The Volta River Project: a Case Study in Politics and Technology*, Edinburgh University Press, Edinburgh

International Rivers (2010), *African Dams Briefing 2010* http://www.internationalrivers.org/files/AfrDamsBriefingJune2010.pdf (accessed 28.05.2011)

Kinsey, B. H. and Binswanger, H. P. (1993), *Characteristics and Performance of Resettlement Programs: A Review*, World Bank, Washington D. C.

Kolding, J. et al. (2008), *The Ecosystem Approach to Fisheries*, (Chapter 19), CAB International, UK

Lemeshev, M. (1990), *Bureaucrats in Power: Ecological Collapse*, Progress Publishers, Moscow

Lemos, M. and Agrawal, A. (2006), *Environmental Governance*, Annual Reviews of Environmental resources, 2006.31:279-325

McCully, P. (2001), *Silenced Rivers: The Ecology and Politics of Large Dams*, Zed Books Ltd., London

McDonald, B. and Webber, M. (2002), *Involuntary Resettlement in China: a Model of Good Practice?*, FMR. 14, July 2002
http://www.fmreview.org/FMRpdfs/FMR14/fmr14.16.pdf (accessed 20.11.2012)

McMichael, A. et al. (2008), *Linking Ecosystem Services and Human Well-being*
http://www.maweb.org/documents/document341.aspx.pdf (accessed 24.03.2011)

Millennium Ecosystem Assessment Report (MEA) (2003), *Ecosystems and Human Well-being: A Framework for Assessment*, Island Press, Washington D. C.

Moxon, J. (1984), *Volta, Man's Greatest Lake*, Andre Deutsch, London

Nyarko, S. (2011), *Volta Lake Underwater Timber Harvesting by Triton Begins*
http://www.ghanaweb.com/GhanaHomePage/NewsArchive/photo.day.php?ID=265412
(accessed 20.03.2013)

Nybakken, J. W. and Bertness, M. D. (2004), *Marine Biology: An Ecological Approach*, 6th Edition, Benjamin Cummings

Ocean Issue Briefs (2008), *Fishing Down the Food Web*
http://www.seaweb.org/resources/briefings/fishdownweb.php (accessed 21.11.2012)

Petts, G. E. (1985), *Impounded Rivers: Perspectives for Ecological Management (Environmental Monographs and Symposia: A Series in Environmental Sciences)*, John Wiley & Sons

Quain, S. (2012), *About the Akosombo Dam* http://www.ehow.com/info_8545953_akosombo-dam.html (accessed 20.09.2012)

Shapiro, J. E. (2003), *Settling Refugees, Unsettling the Nation: Ghana's Volta River Project Resettlement Scheme and the Ambiguities of Development Planning, 1952-1970*, University of Michigan

State Lands Act, 1962- Act 125, *State Lands Regulations, Ghana* http://fao.org/docs/pdf/gha3107.pdf (accessed 10.08.2012)

Walker, B. and Salt, D. (2006), *Resilience Thinking: Sustaining Ecosystems and People in a Changing World*, Island Press, Washington DC

White, R. I. (1992), *Why wild fish Matter: Balancing Ecological and Aquacultural Fishery Management,* Trout

World Bank (1993a), *Early Experience with Involuntary Resettlement: Overview*, World Bank, Operations Evaluation Department, Washington D. C.

World Bank (1993b), *Early Experience with Involuntary Resettlement: Impact Evaluation on Ghana Kpong Hydroelectric Project (Loan 1380-GH)*, World Bank, Operations Evaluation Department, Washington D. C.

World Bank (1994), *Resettlement and Development: The Bankwide Review of Projects Involving Resettlement,* World Bank, Washington D. C.

APPENDICES

Appendix 1- Compensation of Hosts in Vakpo

In case of reply the number and date of this letter should be quoted.

My Ref. No. LVB.3484/3
Your Ref. No

Telephone No. 773221/773218

REPUBLIC OF GHANA

LAND VALUATION BOARD
P. O. BOX C. 794
CANTONMENTS
ACCRA, GHANA

2nd FEBRUARY, 2005

THE CHIEF EXECUTIVE
V.R.A.
P.O. BOX M.77
MINISTRIES
ACCRA.

ATTN: DIRECTOR, REAL ESTATE

VAKPO – V.R.A. RESETTLEMENT SITE AND FARMLAND – E.I.129 OF 1969

Your letter Ref. No.014/35 dated 7th January, 2005 refers.

In response to your request we provide the following details from our records:

A. THE BARE LAND

Compensation for the bare land covering a total area of 4,495.641 acres and assessed in the sum of ¢200,000.00 (Two Hundred Thousand Cedis) was paid in October, 1980 to Messrs. Amoako Ababio and Company, a firm of Valuers, for and on behalf of W.K. Kpiptitse and Others.

In addition a professional statutory fee of ¢2,154.60 was paid to the Consultant.

Attached hereto is a copy of the payment voucher for your records.

B. THE CROPS

A total compensation sum of ¢221,791.91 (Two Hundred and Twenty-One Thousand, Seven Hundred and Ninety-One Cedis, Ninety-Two Pesewas) was paid in two equal instalments to claimants from the underlisted towns/villages between October and December, 1977.

TOWN/VILLAGE			ASSESSED COMPENSATION
1.	Konda	-	5,009.02
2.	Atɑibi	-	11,407.07
3.	Fodome	-	8,853.24
4.	Kpema	-	14,217.12
5.	Ademba	-	18,119.90
6.	Kpodzi	-	9,488.33
7.	Todzi	-	13,387.16
8.	Afeye	-	20,354.45
9.	Dzosgbati	-	27,115.02
10.	Gbozome	-	14,055.67
11.	Adomi	-	9,014.07
12.	Kpo (Efu)	-	31,216.83
13.	Awleme	-	19,751.04
14.	Gbedive	-	8,873.23
15.	Dedove	-	10,928.77
		TOTAL:	221,791.92

However payment was made through the following consultants :

1. Messrs George Dei & Co. a firm of Valuers of P.O. Box X'borg, Osu-Accra.

2. Messrs. G.K. Apee Agyeman – Legal Practitioner of P.O. Box 2158, Accra.

3. Messrs. K.A. Awadzie – Legal Practitioner of P.O. Box 573 Osu (Ako Adjei) Accra.

Please find attached hereto the payrolls listing the claimants and their individual entitlements.

for: EXECUTIVE SECRETARY
(N. BAFFOUR-DANQUAH)

Appendix 2- Conflict between Hosts and Settlers in Vakpo

Daily Graphic, Wednesday, March 23, 2005

Vakpo-Dunyo farmers protest over encroachment

Story: Tim Dzamboe, Kpando

THE people of Vakpo-Dunyo, a Volta Lake resettlement community in the Kpando District of the Volta Region have protested over the encroachment on their farmlands.

They said although the government had acquired the resettlement site and duly paid compensation under Executive Instrument E.I 129 of 1969, a company known as KTS had entered a portion of the land at Dzogbega and started planting mangoes.

Last Tuesday, a large number of residents of the resettlement community besieged the Kpando District Assembly Hall at the invitation of the District Security Council with the view to clearing the air on the matter with their neighbours at Vakpo.

According to their spokesmen, Messrs John Anyomi and Alphonse Atieku, there had been growing mistrust between them and a section of the people of Vakpo, who were also claiming the land after more than 40 years of their resettlement.

They said with the unfortunate development, the people could not cultivate the land as the rainy season had set in.

In a reply to their petition, the VRA said it was not aware of the activities being carried out by the KTS or any other company on the resettlement land at Vakpo and promised to investigate the alleged encroachment.

However, in a reply to their petition, the Vakpo Traditional Council claimed ownership of the land and said it had entered into a partnership agreement with

KTS/VIAD as an out-grower to plant mangoes on their own land at Dzogbega.

A letter dated October 27, 2004 and signed by the secretary to the paramount chief of Vakpo, Mr A.B.K. Kobi stated that this piece of land approximately 10 miles square was retrieved from the paramount chief of Anfoega in the year 1947.

The letter claimed that somebody's land could not be adjudged as an acquired land whereas compensation was not paid to the land owner.

The VRA in a letter dated November 30, 2004 to the president of the Vakpo Traditional Council stated that the authority would not want to challenge the assertion that the land at Dzogbega was retrieved from the paramount chief of Anfoega in 1947.

It is however pertinent to state that under the Akosombo project, the Government by Executive Instrument (EI) 129 of 1969 acquired portions of Vakpo land for resettlement and farmland purposes. The acquired land measures an area of 8.26 square miles", the letter stated.

It stated that the VRA wished to ensure peace and tranquillity amongst people of towns and villages affected by its operations and urged the people to exercise restraint towards the resolution of misunderstanding in the resettlement area amicably.

According to records available at the Land Valuation Board a compensation of ¢200, 000 was paid for a total area of 4, 495.641 acres for the Vakpo-VRA Resettlement Site and Farmland- E.I 129 of 1969.

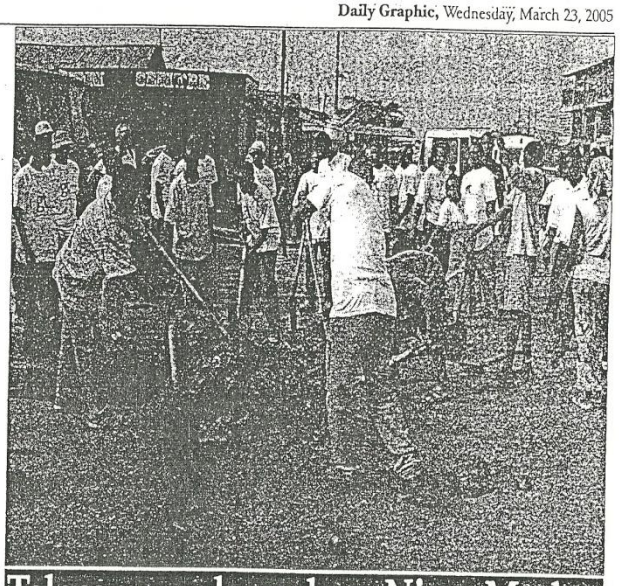
The records show that the money was paid to Messrs Amoako Ababio and Company, a firm of valuers for and behalf of W.K Kpikpitse and others.

Further records show that a total compensation sum of ¢221, 791.91 was paid in two equal instalments to 232 claimants of landowners between October and December 1977.

The claimants were from Konda, Atoibi, Fodome, Kpema, Ademba, Kpodzi, Tidzi, Afeye, Dzogbati, Gbozome, Adomi, Kpo(Efu), Awleme, Gbedive and Dedove.

The payments were made through Messrs George Dei & Co, Messrs. G.K Apee Agyeman and Messrs K.A. Awadzie all Accra-based consultants.

Meanwhile, the Kpando District Chief Executive, Mr Pius Adanuti has said a meeting was to be convened among all parties to brief them on valid documents made available by the VRA in order to resolve the impasse.



Telecom workers clean Nima Market

IN line with its commitment to support community activities, Ghana Telecom (GT) has organised a clean-up exercise at the Nima Market and its environs.

A combined team of GT workers drawn from the Greater Accra Region and residents of Nima numbering about 300 participated in the clean-up programme.

The exercise, which started at 7.30am and lasted for over six hours, basically involved the sweeping of the market and its environs, the de-silting of choked gutters and the disposal of rubbish collected from the market and parts of the township.

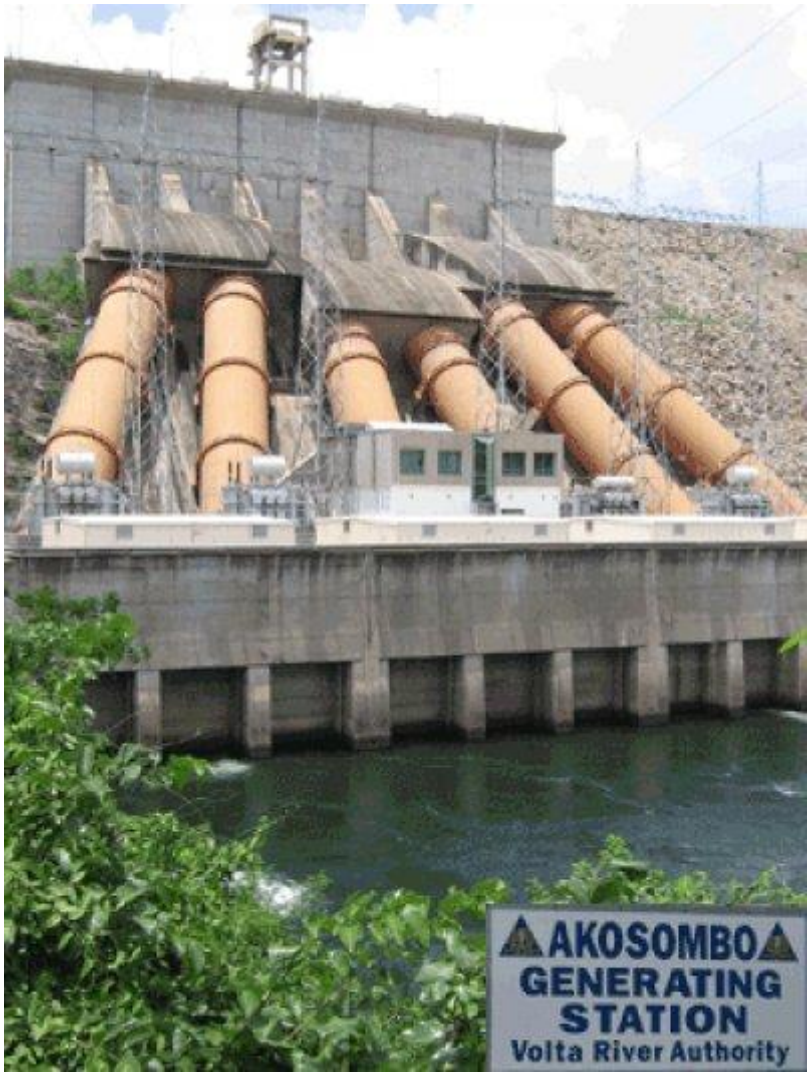
GT supported the clean-up exercise with corporate banners made to publicise the event, 300 corporate branded T-shirts and logistics running into millions of cedis.

An official of GT, Mrs Florence Onny, Assistant Manager of Corporate Communications, Greater Accra, stated that GT's choice of a clean-up exercise was in support of the campaign initiated by the Mayor of Accra, asking corporate organisations to help keep the city clean.

According to her, the choice of Nima, and the market in particular was strategic, as available information indicated that no corporate organisation had undertaken any such exercise there.

Appendix 3- Spillage of water from the Akosombo Dam

Spillage of Ghana's Akosombo Dam Begins



The Volta River Authority, VRA, has begun spilling water from the reservoir of the Akosombo Dam in the Eastern Region. Speaking to Radio Ghana, the Director of Hydro, K.B. Amoako, said the water will be spilled gradually to reduce the level. He said the water level in the dam is now 277.7 feet close to the maximum level of 278 feet. Four out of the six spill ways of the Volta Lake have been opened by the VRA in an attempt to reduce the high rise in the level of the dam.

According to Radio Ghana's correspondent, some fishermen have flouted the calls to move away and are still fishing. In view of this, NADMO's Rescue Team is preparing to move to the area to talk to the fishermen. 650 people in seventy communities in the Asuogyaman District of the Eastern Region have been affected by floods. Speaking to Radio Ghana, the Asuogyaman District Co-ordinator of NADMO, Lovejoy Dusi, said the affected people have been moved up hill while relief items are being made available to them.
Meanwhile, the DCE for Asuogyaman, Johnson Ahiakpor, told Radio Ghana that the Assembly is monitoring the water spill from the Akosombo Dam as already some communities have been affected by the floods.

Ghana Broadcasting Corporation, 02.11.2010
(http://www.gbcghana.com/index.php?id=1.166483)

General News of Wednesday, 20 October 2010
(http://www.ghanaweb.com/GhanaHomePage/NewsArchive/artikel.php?ID=195563**)**
Source: Peacefmonline

VRA To Spill Akosombo Dam Today

The Volta River Authority has warned residents along the banks of the Volta Lake to start moving further upstream and away from the lake as the Akosombo Dam has almost reached its maximum capacity and the excess water needs to be spilled.
The VRA says all the flow-in points into the Akosombo Dam will be closed down today, Wednesday, October 20.

For the first time in 20 years, the dam has exceeded its maximum capacity; hence the need for communities to move to higher ground to allow the opening which will save the dam from collapse. Currently, the level of the dam is at 274.80 feet, close to the maximum level of 278 feet. The dam provides electricity to Ghana and its neighboring West African countries, including Togo and Benin. The dam is 660 Metres wide and 114 Metres high. It cost £130 million to build.

CEO of the VRA, Kweku Awotwi Andoh, speaking in an interview on PeaceFM, said checks by his outfit for the past week indicates that the water is not reducing but rather keeps rising up hence the need to open up the spillage points tomorrow so that some of the water can flow out. According to Mr. Awotwi, notification letters have been sent out and meetings held with NADMO and District Assemblies officials for the past two weeks in relation to the possible spillage, adding that the Environmental, Engineering and other departments of the VRA have prepared adequately and are ready for the exercise.

The National Disaster Management Organisation (NADMO) estimates that the spillage is likely to affect more than 150, 000 people nationwide. Regions which have communities either close to the Volta River or lying along the path of the river towards the South of Hydroelectric power generation in the country are the Northern, Greater Accra, Brong Ahafo, Ashanti, Eastern and Volta.

The following towns are in danger of being flooded or most likely to be affected: Damongo, Kwame Danso, Salaga, Bimbilla, Kpando, Jasikan, Keta Krachi, Dodowa, Effiduase, Konongo Odumase, Atimpoku, Adidome, Atebubu, Nkwanta, Hohoe, Donkorkrom, Mpraeso, Begoro, Odumase-Krobo, Kintampo, etc