



GRADUATE SCHOOL OF DEVELOPMENT STUDIES

The Volta Dam Project in Ghana:
The Question of Equity, Access and Distribution of Hydro-electric Power?

A RESEARCH PAPER PRESENTED BY

Michael Kwesi Nartey

(Ghana)

In partial fulfillment of the requirements for obtaining the degree of

**MASTERS OF ARTS IN DEVELOPMENT STUDIES
SPECIALIZATION: POPULATION AND DEVELOPMENT**

MEMBERS OF THE EXAMINING COMMITTEE

Dr. Eric Ross
Drs. Kristin Komives

THE HAGUE, DECEMBER 2002

This document represents part of the author's study programme while at the Institute of Social Studies; the views stated therein are those of the authors and not necessarily those of the Institute.

Research papers and theses are not made available for outside circulation by the Institute.

Enquires:

Postal Address:

**Institute of Social Studies
P.O. Box 29776
2502 LT, The Hague
The Netherlands**

Telephone : -31-70-4260460

Telefax: -31-70-4260799

e-mail: postmaster@iss.nl

Location:

**Kortenaerkade 12
2518 AX, The Hague
The Netherlands**

TABLE OF CONTENT

	Page
List of table/Figures.....	iv
List of Abbreviations.....	v
Dedication.....	vi
Acknowledgements.....	vii
CHAPTER ONE : GENERAL INTRODUCTION	
1.1 Introduction.....	1
1.2 Background Information.....	3
1.2.1 Introduction.....	3
1.2.2 General History of Dams Development.....	3
1.2.3 Global and Local Situation.....	4
1.3 Research Problem.....	6
1.4 Research Question.....	7
1.5 Research Objective.....	7
1.6 Research Methodology.....	8
1.7 Scope and Limitations.....	9
1.8 Organization of Research.....	9
CHAPTER TWO: CONCEPTUAL/THEORITICAL FRAME WORK	
2.1 Introduction.....	10
2.2 The Concept of Sustainable Development.....	11
2.2.1 Over-Reliance on Natural Rainfall.....	12
2.3 The Concept of Globalization.....	12

2.4 Conceptual and Analytical Framework.....	13
--	----

CHAPTER THREE: HISTORICAL BACKGROUND AND INSTITUTIONAL ARRANGEMENTS OF THE VOLTA DAM PROJECT.

3.1 Introduction.....	16
3.2 The History of Ghana: Pre-Colonial Era.....	16
3.3 The History of the Volta Dam Project.....	16
3.3.1 The political Geography of the Volta Dam.....	16
3.3.2 Politics of Ideological Expansion.....	17
3.3.3 The Historical Evolution of the Volta Dam.....	18
3.4 The Role of Local Political Actor(s):Dr.Kwame Nkrumah.....	21
3.5 Institutional Arrangements for the Volta Dam: VRA.....	23

CHAPTER FOUR: POWER AND POLITICS OF THE VOLTA DAM PROJECT

4.1 Introduction.....	26
4.2 The Power Contract: GHANA and VALCO.....	26
4.3 Ghana Subsidizing VALCO'S Power.....	27
4.4 VALCO Must Pay More For Power.....	29
4.5 Un-Realistic Power Rate.....	30
4.5.1 Financial Sustainability of the Volta Dam.....	32
4.6 Energy Distribution of the Volta Dam.....	33
4.7 The Development of Local Bauxite Deposit.....	37
4.7.1 The Local Bauxite Current Re-Negotiation.....	38
4.7.2 The Role of VALCO in Local Development.....	40
4.8 Conflict of Interest.....	41

CHAPTER FIVE: FINDINGS AND CONCLUSION AND RECOMMENDATIONS

5.1	Introduction.....	42
5.2	Major Findings.....	42
5.2.1	Historical inequity in Power Distribution.....	42
5.2.2	Large Dams Development the Question of Equity.....	42
5.2.3	Globalization Disintegrate the Local Economy.....	43
5.2.4	Commitment to Exploit Ghana's Bauxite Deposit.....	44
5.2.5	Financial Capability for the Management of the Volta Dam.....	44
5.2.6	Financial Commitment on the Volta Dam Resettlement.....	44
5.2.7	Lack of Expertise for Power Contract Negotiation.....	44
5.2.8	Conflict of Interest.....	45
5.2.9	Socio-Economic Displacement of the Riparian Communities.....	45
5.2.10	Gainer and Losers of the Volta Dam Project.....	47
5.3	Conclusion.....	48
5.4	Recommendations.....	50
	Bibliography	
	Appendix	

LIST OF TABLES / FIGURES

Table 1	Average Power Rate Charge by VRA and BPA.....
Figure 1	Conceptual/Analytical Frame work.....
Figure 2	Summary of Analytical FrameWork.....
Figure 3	Annual Energy Consumption –KWH.....
Figure 4	Annual Percentage Energy Consumption—KWH.....

LIST OF ABBREVIATIONS

AI	Acres International
BPA	Bonneville Power Administration
IEA	International Energy Agency
IMF	International Monetary Fund
KWH	Kilo Watt Per Hour
MW	Mega watt
NDC	National Democratic Party
NPP	National Patriotic Party
PNDC	Provisional National Defence Council
VALCO	Volta Aluminium Company
VDP	Volta Dam Project
VRA	Volta River Authority
WB	World Bank

DEDICATED

TO my two Children: John Tamatey Nartey and Grace Dede Nartey and my
lovely wife Comfort Nartey

ACKNOWLEDGEMENTS

I am greatly indebted to many personalities who in diverse ways helped me complete this research. First of all, I thank the Almighty God for sustaining me throughout the tedious preparations and activities, which have culminated to this research.

I would like to specially thank my supervisors, Dr. Eric Ross and Dr. Kristin Komives who intelligently and patiently assisted and guided me with their criticism during the entire process of this research paper. I must say that they made this research paper original of my views without any sense of imposition of their ideals.

My sincere gratitude goes to Barbara MacDermott and Nicholas Awortwi (Ph. D Student of ISS) who gave this research a form and structure as well as shaping my thoughts for this research. My sincere appreciation goes to Felix Asante of ARD for taking pain and time to edit this work.

I am also grateful to Mr. George Awudi of Friends of the Earth-Ghana and Mr. George Hommey of Electricity Company of Ghana for providing most of the useful materials and information used for this Research and also shaping the content of this paper. Also, I wish to express my thanks to all staff and administrator of PND for their help and cooperation during the entire programme. This expression is extended to all the library staff for their support and cooperation and their sense of dedication to duty.

I am deeply indebted to the Netherlands Government for awarding me this scholarship to study here in the ISS.

Last but not the least, I would like to render my profound gratitude to my parents Mr. Andrews Tamatey Nartey, a retired Public Servant of Volta River Authority Hospital, Akosombo (Ghana) and Mrs. Grace Dede Nartey, a trader, Whose perseverance, endurance and financial and moral support enabled me to reach this stage of my career.

However, I am solely responsible for all errors, whether in form, content and fact or opinion that may be detected in this research paper.

Michael Kwesi Nartey,
The Hague, December, 2002

CHAPTER ONE: GENERAL INTRODUCTION

1.1 Introduction

Dams have long been viewed as a backbone for economic progress and development-centrepieces of efforts to maintain and develop modern industrial economies (Bocking, 1998). Since the late 1940's the number of large dams globally have increased enormously. They are seen as a means to sustain livelihoods and to maintain human dignity through provision of electric power, water, transportation, irrigation and tourism. Furthermore, Dams play vital roles in asserting national pride, dignity and confidence in economic capability, technical and political power in the nation state. For example the building of the Aswan High Dam in the late 1950s through "damming and harnessing" of the River Nile in Egypt was seen as an affirmation of dignity and self-determination, and capabilities of modern and self-confident Egypt (International Development Studies Network, 1998). Also, in China and United States, development of waterpower have served an important symbolic role in demonstrating competency, capability and efficiency. It is also a symbol of national achievement and served as an instrument of competition in cold war rivalries.

These cold war rivalries did not end at the borders of these two countries but extended to most developing countries with Ghana having its fair share of the international political cake. Paradoxically, development of dams also generates serious social, economic and environmental problems to different groups of people. Beyond their immediate socio-economic and environmental dimensions, dams served as a means by which certain sectors or groups of people in society have been dominated by others. They have been a tool used by governments, multinational corporations to assert political power on the local people. These political, institutional and business interest groups exploit local natural resources to the detriment of the local political ecology. Some of the gains generated from the exploitation of these natural resources served little or no interest to the local political system. It rather impoverished the local people and made them worse-off.

Generally, construction of large dams has become a subject of major controversies in many developing countries. For instance, there has been massive political resistance and intellectual critiques towards the development of large dam in Sardar Sarovar Project in India (Dwivedi, 2001). Large environmental groups, indigenous people and

riparian communities are opposing their construction, questioning the sustainability and demanding that their construction be halted.

In Ghana, the Volta Dam project faced similar problems. The construction of the Volta Dam displaced about 80,000 riparians and rendered their economic activities, which revolve around farming and fishing along the Volta basin, inactive. This has brought about a regime change in the livelihoods of the riparian communities in the Volta Basin. The Volta Dam Project did not only change the livelihoods of the riparians, but also natural production regime of flood plain agriculture of regular deposit of alluvial silt for food production and prawn and clam fishery. The creation of the Volta Dam has regulated the flow of the River Volta. This has led to formation of sandbars between the Volta River outlet and the sea, making it difficult for the creation of saline environment for breeding of vital fish species like clam and prawn. These were the major economic activities that form the economic base and sustenance of the riparian communities. Currently, most of the fish species that existed in the pre-dam era are no more. Continued growth of aquatic weeds in the River Volta has also compounded the problem through reduction of fish stock. Even though the riparian communities in the Volta basin have lost their livelihoods and ancestral lands through the construction of the dam, they are the least group of people benefiting from the hydroelectric power generated by the dam.

Most of the displaced communities whose land and livelihoods were destroyed by the Volta Dam still sleep in darkness without hydroelectric power and safe drinking water. The few riparians who have access to power can not afford to pay for the service because they are unemployed. Bulk of the power generated from the Volta Dam is consumed by multi-national companies like the Volta Aluminium Company (VALCO). This came about as a result of VALCO signing a thirty years power contract and twenty years renewal contract with the Ghana Government in the early 1960's.

Furthermore, a rich bio-diversity (plants, animals and fishery resources) have been destroyed as a result of damming. These resources belonged not only to the present generation but also the unborn, creating intra-generational poverty in the Volta dam basin. The use of political ecology theory questioned the usefulness of large dam project within its local political system and provides better alternatives. Once again,

the local people have been affected with diseases like bilharzia, river blindness and malaria.

As a departure from the traditional way of looking at the impacts of dams; that is, in terms of their socio-economic and environmental consequences, this research focuses on how equitably hydroelectric power generated by the Volta Dam has been distributed and priced in the local economy of Ghana. It examines the power contract between Ghana Government and VALCO on the basis of power distribution and pricing in the local economy. This research also investigates and analyses the causes of this inequity and the role of VALCO to develop Ghana's bauxite deposit.

1.2 Background Information on Dams Development

1.2.1 *Introduction*

This section focuses of evolutionary process of dams development within the local and global political system. This is to show how dams development emerged over time and to ascertain how ideological interest influenced the development of large capital projects like large Dams. This section also focuses on problems related to the Volta Dam project, research question and objective, methodology, scope and limitation as well as organisation of the study.

1.2.2 *General History of Dams Development*

Damming of the world's water resources have resulted in a profound change of watersheds and flows (McCully, 1996). Damming rivers alters their efficiency, potentialities and natural regime that sustain it. The earliest dams date back to around 3,000 BC as part of a water system canal for the town of Jawa in the modern day Jordan. The system included a 200-metre wide weir that diverted water through canals into 10 reservoirs held by rock and dams. Four hundred years later, the Egyptian masons built the Sadd el-Kafra across a seasonal river closer to Cairo. By the late first millennium BC, stone and earth dams had been built around the Mediterranean, in the Middle East, China and Central America.

The South Asians also have a long-standing history of dam building. In the fourth century BC earthen embankments were built to serve as a reservoir for water in the

cities across Sri Lanka. One of these early embankments was built in AD 460 with a height of 34 metres, which was the World's highest dam for more than a millennium.

In the nineteenth-century, Britain alone built about 200 dams, which are higher than the conventional height of 15 meters during the industrialisation period. The main purpose was to store water for its growing cities. The technology adopted in the nineteenth century for dams construction was mainly earth embankment based on trial and errors. It was in the 1930s that more scientific and sophisticated ways of building dams emerged. Thus the study of soils, rock behaviours and hydrological data became crucial components in the development of dams. Though technological advancement created more efficient ways for dam development, it has also produced the worse outcome in the area of socio-economic displacement and biological diversity losses.

The United States in particular has a bad safety records regarding overflowing of dams and loss of life. Nearly one out of ten embankments built before 1930 failed. Over two thousand –two hundred people lost their lives when the dam above the town of Johnstown, Pennsylvania collapsed in 1889.

After the turn of the century, capacity for dam development and turbine design progressed. It height changed from 30 metres in the 1900 to over 200 metres in the 1930s. This evolutionary process brought about a huge impact on the ecological systems and human life through flooding and inundation. The next two sections of this chapter focus on dam development at the global and local levels and historical processes and political arrangements surrounding the Volta Dam project.

1.2.3 Global and Local Situation

The world debate about large dams is at once overwhelmingly complex and fundamentally simple. Its complexity is traced from the fact that dams impacts are not confined to the design, construction and operation of the dams themselves but cut across all sectors of human geography and political system (World Commission On Dams Report, 2000). These include the following: socio-economic, environmental and political choice that determines the qualitative and quantitative well being of humans especially the riparian communities. Dams in general changes the natural regime of rivers and the use of natural resources, frequently through reallocation of benefits

from local riparian users to new groups of beneficiaries at a regional or national level (World Commission on Dams Report, 2000).

Large hydrodams such as Itaipu (installed capacity 12,600 MW), Guri in Venezuela (10,300MW), Sayano-Shushensk in Siberia (6,400 and Grand Coulee (6,180 MW) constitutes the largest single sources of power generation (McCully; 1996). World industrial countries like the US, Japan and Canada have each developed over 70 percent of their water resources for large hydro-dams, with Europe about 50 per cent, whiles Africa, China, and Latin America have exploited only one-tenth of their potential.

According to John Besant-Jones of the World Bank, about three-fifths of economically potential water resources for large dams are sited in countries that have less demand for electricity. For example in more than 100 countries, the World Bank projected energy demand has fell short of one-fifth of the projected demand. In 1980's the World Bank assessed the economic performance of Argentina and was convinced that it needed the 3,100 MW Yacyreta Dam. The basic assumption was that, the hydro-power demand will grow over the years between 8-10 per cent but after the dam construction, the demand for power fell short to 2 per cent, far below the World Bank expected projection (McCully, 1996:135). The excess power surpluses are mostly created by the World Bank as a calculated effort to win in expatriate companies for cheap power supply.

Similarly, the construction of the Volta Dam at Akosombo in Ghana (covering a surface area of 8515 sq.km) created the largest man made lake in the world (Diaw and Schmidt-Kallert, 1990:1). Being the biggest and most ambitious single development project ever implemented in Ghana since independence in 1957, the Volta Dam project was seen as a symbol of economic development and political strength in a newly independent Africa. Ghana's first president, Dr. Kwame Nkrumah was certain that cheap hydroelectric power from the Volta Dam could form a corner stone of Ghana's industrialisation strategy.

The Volta Dam was made to serve as a multi-purpose project. Beside power generation to meet the energy needs of the industrial sector as well as urban and rural

households, there was to be wide scale irrigation, the promotion of the fisheries industry, tourism, river transportation, agriculture modernisation and the promotion of aluminium smelting industry (Hart, cited in Diaw, 1990:5).

However, many critics suggest that the Volta Dam project is not serving the interest of the people of Ghana. It is rather serving the international market and business interest at the expense of the local people and riparian communities whose land, homes, cultural heritage and natural ecosystems and livelihoods have been destroyed by the dam. For example the Volta Dam was originally meant to provide a backbone for Ghana's industrialisation strategy, but serves primarily as a power source for the Volta Aluminium Company (VALCO), owned by U.S Multi-national Kaiser Corporation and backed by the American Government. VALCO consumes more than 60 per cent of power generated from the Volta Dam for smelting of aluminium, while expatriate mining companies also consume additional 10% (Volta River Authority Annual Report, 2000). In order to legitimise its position, Kaiser Engineers signed a 30-year power contract with the Ghana Government and an additional 20 years renewal option. Though, " Nkrumah saw clearly that Ghana would benefit less from the project, he was not prepared to lose the dam" (McCully, 1996:240). The original justification for promoting local industrialisation was torn to shreds. Far from bringing Ghana riches and prestige, the Volta dam rather brought impoverishment into the local political system and made Ghana worse off.

1.3 Research Problem

Ghana's first president, Dr. Kwame Nkrumah, an African nationalist and an avowed anti-imperialist, was convinced that European (or American) development path and model of industrialisation could be repeated in Africa, with Ghana serving as a metropolitan example (Diaw, 1990:1). Cheap hydroelectric power from the Volta Dam Project was to form a corner stone of his industrialisation strategy.

However, there is lack of equity in the use and distribution of hydroelectric power generated from the Volta Dam. Large portions of the power generated from the dam goes to multinational companies with VALCO constituting the largest consumer. This situation was created as a result of a power contract signed with the Ghana government for a long period of time. This gave VALCO the legal right for a

guaranteed power supply at the expense of domestic consumption for industrialisation.

There was inequity in the power contract signed. The local people and the riparian communities displaced by the Volta Dam have little or no access to the power generated from the Volta Dam. This was expressed in the 2002 Earth Summit on Sustainable Development held in Johannesburg, South Africa. According to a new report by the International Energy Agency (IEA), some 1.6 billion people have no access to modern energy supplies such as electricity (The Economist, 2002: 59).

Beside the high power consumption, VALCO pays one of the lowest power rates in the world (Tsikata, 1986). The low power rate paid by VALCO is not only affecting the sustenance of the Volta Dam project, but also shifting cost to local consumers and increasing budgetary support of government through subsidies for managing the power plant. This means that financial resources that need to be used for socio-economic development are shifted to maintain the power at the expense local development.

1.4 Research Question

The following specific questions raised need answers:

1 (a) Who are the major beneficiaries and losers of the Volta Dam Project in terms of access and distribution of hydroelectric power, financial benefit and other pecuniary gains?

(b) What factors might have accounted for differences in stakeholders interest?

2 What lessons can be learned from the Volta Dam Project? Can this lesson influence the construction of the proposed Bui Dam?

1.5 Research Objective

The overall objective of this research is to analyse the access, distribution and pricing of hydroelectric power generated by the Volta Dam Project within the political economy of Ghana. The research also explores to answer the question of how and

why there is inequity in the use and distribution of hydroelectric power from the Volta Dam Project. At the end of the research, findings and workable policy recommendations are given.

1.6 Methodology

The study explores the interplay of factors that influenced the building and operation of the Volta Dam Project, from its inception to the present day. This includes political, socio-economic, and institutional arrangements. There are no single method that could explain this dynamics perfectly. The research methodology framework is multi-disciplinary which makes use of tools and techniques drawn from development planning, project analysis, political ecology/economy and sociology. The methodology of the research also includes internal analysis of the Volta Dam Project

The study follows all the stages in the entire project cycle of the Volta Dam Project. Thus, the dam formulation, construction/ implementation, impacts (positives and negatives) and distribution and pricing of the hydroelectric power generated from the Dam. As a process, this research explores the underlying political driving force for the Volta Dam Project. It also studies historical and political arrangement embedded in the project.

The analytical approach to the development intervention is overly political (Dwivedi, 2001:11). One explores how political actors' (local and foreign) decisions making have destabilised the riparian communities in the lower Volta basin. Here, the use and distribution of Volta Dam resources specifically hydroelectric power and economic instability are investigated. The study compares two regimes: pre and post Volta Dam periods to ascertain the level of the dam impact over time. The research is based on qualitative methods, although in some instances quantitative data are used as evidence to support the arguments. Descriptive and explanatory tools are used to generate and give deeper meaning to the research study. These tools give an answer to what is happening to the Volta dam project, how it happened and why.

Much of the information and data collected on the Volta Dam project are secondary from published and unpublished sources. Apart from government sources, data were collected from documentation centres manned by academic institutions and civil

society groups. Internet sources were also used. Personal Observation technique was also used to complement the secondary data sources. As a citizen in the riparian communities for thirty-six years, has also given the researcher a rich experience and knowledge of the Volta Dam Project as a tool for the analysis.

1.7 Scope and Limitations of the Study

The scope of the research focuses on hydroelectric power resources generated from the Volta Dam Project. It studies the access distribution and pricing of hydroelectric power between the local consumers and multi-national companies with VALCO forming the centre of discussion. The reason being that, VALCO constitute largest power consumer in Ghana. This research does not delve into socio-economic and environmental impacts created by the Volta dam construction. This is because great deals of researches have already been conducted in this area.

The major deficient and limitation to this research is getting current information and data on power distribution and pricing on the Volta Dam project. All efforts through my local representative in Ghana to get current information from Volta River Authority (VRA) and Volta Aluminium Company (VALCO) proved fruitless. The information is treated as confidential and not open for general public.

1.8 Organization of the Research

This research is divided into five chapters. Chapter two provides the conceptual framework based on which causalities of the variables in the research questions are studied and examined. Chapter three gives the historical context within which the Volta Dam project was built. The fourth Chapter analyses how hydroelectric power resource is distributed among various actors in Ghana. The fifth Chapter is the conclusion. It summarises the main findings of the research and concludes with recommendations.

CHAPTER TWO: CONCEPTUAL / THEORETICAL FRAMEWORK

2.1 Introduction

This study uses the theory of political ecology/economy, which defines the relationship between human society, economy and nature as multi-disciplinary. It identifies certain multi-actors (Governments, multi-national corporations, civil society, international financial institutions) and some multi-factors (Social, economic, political and environmental) that governs the development and operations of capital project. It questions large capital projects on the basis of ecological stability, equity, sustainability, efficiency and effectiveness, and social acceptability. Political ecology defines how these actors are interrelated and established. The approach "focuses on the dynamic relationship between human productive activity and the physical resource base. The nature of this activity is shaped by the social determination of what constitute critical natural resources at a particular time and place, the distribution of access to these resources, and the nature of the institutional arrangements mediating that access"(Ross, 2000:1).

According to Peet and Watts (1996), political ecology is the most important and recent social science thinking that gives deeper meaning to the relationship between environment and development. However, Peet and Watts failed to recognise political ecology as a system. Political ecology is not limited only to environment and development relationships, but defines the local situation with the global system and vice versa. For example in the 1960's the injection of financial capital by the World Bank and U.S and British governments into Ghana's economy for the construction of the Volta Dam opened the window of dependency of the local political system to the global system. This dependency led to the creation of external monopoly over local power resource and consequently impoverished the local economy. The use of political ecology theory investigates and questioned how these inequities occurred in the use of local resources and provide answers to them.

The term can be traced with certainty to the 1970s as a response to the theoretical needs to integrate land resource use with local –global economy (Wolf, cited in Peet and Watts, 1996) as a reaction to politicisation of the environment. According to Blaikie (1985) and Blaikie and Brookfield (1987), political ecology is the "land manager" whose relationship to nature must be viewed in a broader perspective to include historical,

political and economic context. This means that for example, the developmental and environmental problems in the Third World countries should not be seen solely as the problem of poor management, overpopulation, social and economic constraints but a broader historical perception and global economic system should be assessed.

This gives a general overview on how local problems could be viewed as a system influenced by external capital injection and political power. This study borrows the theory of political ecology in the light of the Volta Dam Project to see how historical manipulations and global political forces have impacted on the local political economy regarding power distribution and access.

In explaining the theory of political ecology/economy, the concepts of sustainable development and globalisation are used. It must be noted that the two concepts are discussed separately in the conceptual framework. This gives a broader understanding, but in a coherent manner. The latter part of this chapter provides the conceptual basis of determining causalities in the questions.

2.2 The Concept of Sustainable Development

The interest behind the use of this concept is to question the Volta Dam Project on the basis of sustainability. This is to ascertain how the question of sustainability has aggravated inequity in the use of hydroelectric power resource within the local political economy of Ghana.

The term sustainable development means wise use of resources having in mind the future generation. The term is also defined as "economic development and standard of living which do not impair the future ability of the environment to provide sustenance and life support for the population"(Muschett, 1997:1). This means that any development intervention that satisfies sustainability must not compromise for the living, dead and the unborn generation. This definition placed the Volta Dam project into a difficult task of answering the question of wellbeing and equity in the use of local resources within the local political system.

To satisfy this section, the following issue discusses how unreliable rainfall has compounded the problem of inequity in power distribution:

- (i) Over-reliance on natural rainfall

2.2.1 Over-reliance on natural rainfall

Again the Volta Dam Project depends on a natural rainfall for generation of hydroelectric power. This means that, in drought seasons, continuous supply of rainwater for power generation and other uses can not be sustained. Since 1983, the Volta Dam project has functioned under half of its capacity due to intermittent drought in Ghana.

Currently, three out of six turbines are in use for power generation. This means that in the period of drought the Volta dam capacity to generate more power is thwarted. This affects local power supply and distribution and consequently impacts on local industrialisation efforts.

The question one may ask is whether the Volta Dam Project is sustainable and capable of meeting the needs of the present and future generation. The production capacity of the Volta dam is gradually reducing, making it very difficult for the local economy to get access to and have a fair share of the hydroelectric power generate. This brings to bear political manoeuvres used by the elite's and the powerful in society to influence decisions concerning power distribution and pricing. These affects the less privileged in society regarding an equal opportunities for equitable use of power generated from the Volta Dam. The question of who gets what is left in the hands of the more privileged in society. This means that in times of power scarcity, multi-national corporations like VALCO will continue to consume appreciable amount of power at the expense of local development. Therefore, the principle of equity in the use and distribution of power resource within the local economy can not be guaranteed. The concept of sustainable development is embedded in the theory of political ecology or economy that viewed huge capital injection into local economy as a threat to local survival and stability of the local economy. The next concept of globalisation also explains how global interactions and external influences impacts on local development and economy.

2.3....The Concept of Globalisation

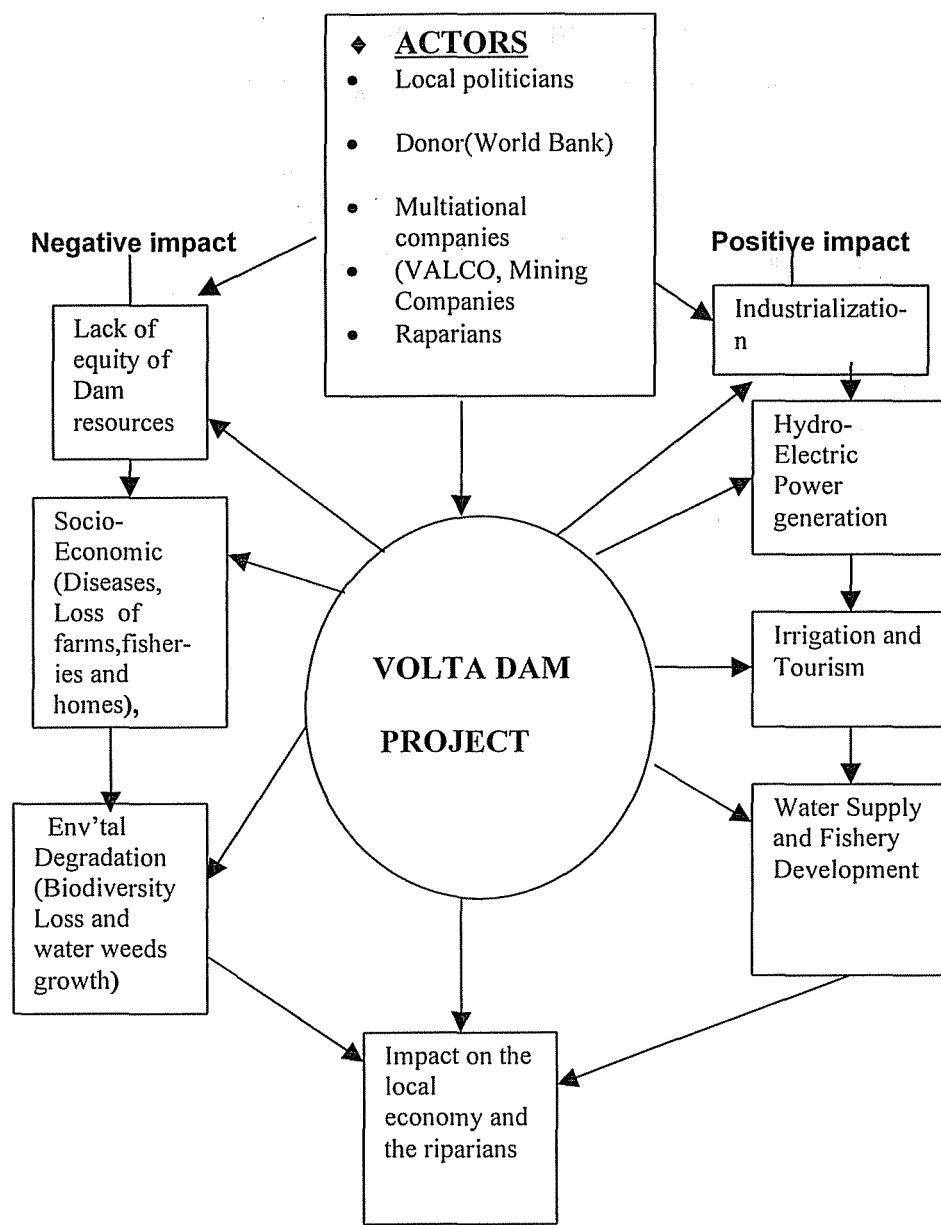
Globalisation is a concept of integrating local economy into a global system. The genre of this integration could be capital, financial injection, trade, technological transfer and so on and so forth into a local economy. The concept of globalisation implies "stretching of social, political, and economic activities across frontiers such

that events, decisions and activities in one region of the world can come to have significance for individuals and communities in a distant globe"(Held, 1999: 15). This interaction increases the potential propensity of global diffusion of capital flow, information, goods and people. The introduction of capital, technology and financial support into Gold Coast (now Ghana) for the first time after independence in 1957 was for the construction of the Volta Dam project. This marked the beginning of external dependence and perpetuation of western influence and capital into the local political economy. The World Bank and the U.S government invested substantial financial capital into Ghana's economy through the Volta Dam Project. This resulted to a long-term Power agreement between the VALCO (U.S Multi-national Company) and Volta River Authority (Ghana government's power generating company) for power consumption from the Volta Dam for a period of thirty years, starting from 1967. The agreement contracted marked the beginning of integration of Ghana's economy into the World market. The power contract served the interest of multi-national corporation at the expense of local development. The theory of political ecology helps to explain how external political system impact on the local economy.

2.4 Conceptual and Analytical Framework

Figure 1 depicts socio-economic and political processes that led to the construction of the Volta Dam Project and the major players that influenced its construction. The Volta Dam Project involved a number of actors both local and foreign, who contributed immensely to its processes and implementation. The local actors includes, political leaders like Dr. Kwame Nkrumah and the foreign actors were World Bank and multi-national corporations (VALCO and mining companies). These actors became the lifelines for the construction of the Volta Dam. Their actions brought about both negative and positive impacts on the local political system especially the riparian communities (See fig.1 for details).

Figure (1): CONCEPTUAL / ANALYTICAL FRAMEWORK

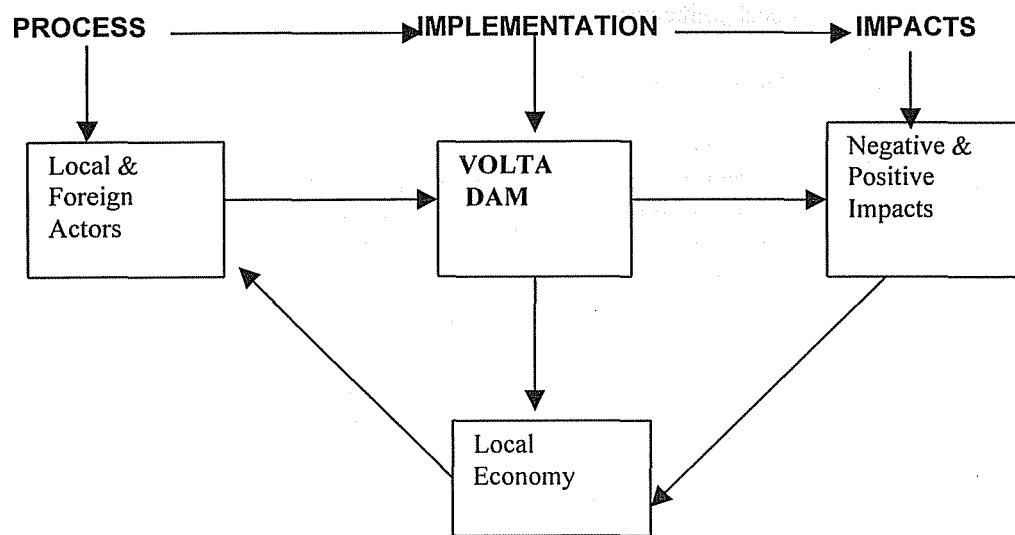


Source: Author's Own Construct

Figure 2 of the analytical framework also shows how the Volta Dam Project evolved over time as a project planning process and cycle. It identified four stages in the life cycle of the Volta Dam Project. This includes the process of the dam construction, the periods of implementation, the impacts (both negative and positive) and the distribution of output (hydroelectric power) in the local economy. In explaining these stages, the theory of political ecology/economy is very useful. It questions the Volta Dam in terms of what, when, who, and why inequity in the use and distribution of hydroelectric power during these periods in the local economy of Ghana.

Figure 2 shows the conceptual framework of the Volta Dam Project

Figure (2): SUMMARY OF ANALYTICAL FRAMEWORK



Source: Author's Own Construct.

CHAPTER THREE: HISTORICAL BACKGROUND AND INSTITUTIONAL ARRANGEMENTS OF THE VOLTA DAM PROJECT.

3.1:Introduction

The first section of this chapter defines the historical and political context within which the Volta Dam was evolved. The second section gives an account on the role of local political actor(s) for the realisation of the Volta Dam Project. The last section reviews the institutional arrangements for the management of the Volta Dam Project.

3.2 History of Ghana: Pre-Colonial Era

In the period of 1400s the Portuguese became the first Europeans to arrive in Gold Coast (now Ghana). Their aim was gold exploitation and expansion of trade relations with the African continent. The Portuguese named the country "Gold Coast" because of abundance of gold and natural resources. The Gold Coast became the centre of European Kingdom exploitation. Notable among them were Denmark, Holland, Britain, Prussia, and Sweden (Division of Technology, Culture and Communication, 2000:1).

In the period of 1482, Elmina Castle was built which served as a contact point for thousands of slave trade to the New World. The British merchants in 1700 took advantage of the rich natural resources of the Gold Coast and colonised it in 1874. During these periods there were excessively discovery and exploitation of rich natural resources of the Gold Coast. In 1914, Sir Albert Kitson, a British and Director of Gold Coast Geological Survey also discovered bauxite deposits which led to the construction of the Volta dam project.

3.3....The History of the Volta Dam Project

3.3.1 Political Geography of the Volta Dam

The Volta Dam is located at Akosombo in the Asuogyaman District of the Eastern Region of Ghana. It was created from the Volta River, which served as a political boundary within the local political system.

Though the Volta River represents the national identity of Ghana, It is far from being claimed as Ghanaian's single water resource. This is because its emanates from not less than six West African States. Two-thirds of its 150,000 square miles come from outside Ghana- Burkina Faso, Togo, Benin, Mali and La Côte d'Ivoire (Maxon, 1969). This gives it greater importance as a transnational water resource that needs to be

sustained by all the West African States. The Volta Lake covers a total land area of 3,275 square miles. It is the largest man-made lake in the world with a capacity of 120 million-acre feet of water resource.

The Volta River has its sources from a town called Bobo-Dioulasso in Burkina Faso. It continues to flows down south of Ghana's western boundary for about 200 miles and proceeds through a narrow gorge in Bui where the third dam is in the process of being constructed. One of the major tributaries of the River Volta is the Oti River (in Ghana) which constitute about 18 per cent of the total catchment area of the Volta Basin. It forms an average of 40 per cent of the River Volta.

Dr Kwame Nkrumah was encouraged to negotiate for the construction of the Volta Dam because large portion of the river Volta falls within the political and geographical boundaries of Ghana. This was to serve as a capital project and multi-purpose dam aimed at promoting industrial development and to show a sense of political and economic independence from British colonial rule.

3.3.2 Politics of Ideological Expansion

The Volta Dam project is a unique one that opened a new chapter, history and political platform for newly independent Ghana. Its seeds started in the folding stages of the British crown colony. The preparatory process of the Dam started in 1951 and was completed in 1966. The history of the Volta Dam and Dr Kwame Nkrumah's government, (the late first president of Ghana) can not be separated. His government was deeply involved in the processes and implementation of the entire Volta Dam project.

The Volta Dam project became a lifeline political factor in Ghana. The reason being that the project emerged during the periods of the cold war- the western and eastern powers were scrambling for the African continent. The political interest of the Western World became intense after the arrangements and negotiations between the Government of UAR with the American and British Governments to build the Aswan Dam failed, but tailored in favour of USSR to construct the Dam (Moxon, 1969). This made U.S and British governments to pay more attention to Ghana as a newly independent state and regarded it as a star of Africa. These governments were

blinded by 'ideological expansion' rather than having a real interest for developing the economy of Ghana.

Several people worked assiduously in the process and construction of the Volta Dam to promote the interest of the western world. Notable among them were Mr Chad Calhoum and Edgar Kaiser, who worked endlessly to win American official and private support, with Rt.Hon. Harold Macmillian and Rt Hon. Duncan Sandys represented the British interest. In the final stage of the Volta Dam Project, President Kennedy (former president of the US) rallied western governments and companies to contract an agreement with the Government of Ghana to supply power for aluminium smelting (Moxon, 1969). The World demand for aluminium was very high during the First World War period and the threats for Second World War was imminent. During the two World War periods aluminium became a vital product for manufacturing of warplanes. So a cheap source of power supply from the Volta Dam was to help propel the aluminium production to meet the world demand (Moxon, 1969).

Within the local political system Dr Kwame Nkrumah also played a vital role in bringing the Volta Dam Project into reality. Nkrumah thought the construction of the Volta Dam proved an anti-colonialization victory and also to reduce over dependence on raw cocoa and timber exports, which then served as the main sources of foreign exchange earnings for Ghana. This trend was historically constructed through the British colonial rule, which has not changed even at present.

3.3.3 The Historical Evolution of the Volta Dam

The history of the Volta Dam could be divided into four stages, with each stage exhibiting a unique characteristic, which is intertwined. The first phase started in 1915 with the discovery of bauxite by Sir Albert Kitson (head of the Geological Survey Department) of the Gold Coast in the Kwahu plateau in the eastern region of Ghana. This new discovery encouraged Duncan Rose, a South African Engineer having a business interest to start a scientific feasibility study on the possibilities of harnessing the Volta River for the generation of hydroelectric power for the production of aluminium (Nartey, 1996). Duncan favoured the siting of aluminium smelter at Koforidua in the eastern region of the Ghana and recommended that the surplus power from the Volta Dam be used to electrify the Public railway line from Accra to

Kumasi. He recommended 40-metre height and between 2-4 million pounds sterlings for the construction of the Volta Dam project. T. W .Charles and Anglo-Transvaal Consolidated Investment Company, a leading South African mining finance house sponsored full-scale investigation of the project. Duncan's recommendation revealed that local development and welfare was not part of his priority. The question of how the displaced communities will be resettled was not part of his major concern and recommendation. His prime motive was to promote private sector development and profit making interest.

The Government of Gold Coast became interested in his discovery as aluminium was in a short supply in the world market. Sir William Halcrow and partners, consulting Engineers, was tasked to undertake feasibility and viability studies on the scheme. The outcome of their study revealed that the Volta Dam could be built in a gorge at Ajena and the aluminium smelter in Kpong, all in the eastern region of Ghana. They also recommended the construction of a seaport at Tema (in Greater-Accra Region) with a connecting railway line that could transport bauxite from Aya-Yenahin. The British Government who were the colonial masters by then accepted the recommendations offered by Halcrow and his team in principle, but shelved the Volta Dam project until a preparatory commission was formed in 1953 charged with the responsibility of carrying out a detailed study on the entire project.

The second stage of the Volta Dam project dated between 1953 to 1956, it centred on the Preparatory Commission, chaired by Robert Jackson, an Australian who had rich experience on large scale development schemes across the world and worked with the United Nations. The commission's feasibility studies focused on development and operation of local bauxite, communication and the construction of the Dam. It also recommended \$230 million as the total cost of the project (Moxon, 1969).

The third phase covered the year 1957 to 1961, a period of break down of negotiation between the British and Ghanaian Governments towards funding the Volta Dam project. The reason being that, after post-war debacle of the Tanganyika Groundnuts Scheme lacked proper feasibility and viability studies, the Britain Government was much careful of entering into any financial commitment on overseas development like the Volta Dam project (Moxon, 1969:83). This compelled Dr. Nkrumah, to seek financial support from the U.S. Government, under the leadership of President Eisenhower. The American Government agreed to make part payment of the fund provided Kaiser Engineers, an American firm, re-appraised the project which was agreed by the Ghana Government. Therefore Kaiser Engineers representing U.S interest made some changes in the plan and recommendations of the preparatory commission report. For example, the cost for the dam construction was fixed at 70 million pounds sterlings Again, the sites for the Volta Dam and aluminium smelter were changed from Ajena and Akuse to Akosombo and Tema respectively. Kpong township in the eastern region of Ghana was proposed by Kaiser Engineers as a site for the construction of a second dam, to provide domestic power to the people of Ghana. This was seen as a political strategy and manipulation meant to reduce competition from the local residential and industrial consumption and to create monopoly for the U.S Aluminium Company (VALCO) as the sole consumer of power from the Volta Dam Project.

One major change made by the American Government on the Preparatory Commission Report was on financial arrangements on the Volta Dam Project. It recommended that, Ghana Government should pay for the full cost for the construction of the dam, whiles private companies bear the responsibility for the smelter. On the part of Ghana Government, International Bank for Reconstruction and Development (IBRD/World Bank) and the U.S and British Governments provided financial support through three governmental lending agencies, namely, Agency for International Development of U.S, the Export-Import Bank of Washington and the Export Credit Guarantee Department of the Board of Trade of the British Government in the form of loan (Nkrumah and Moxon, cited in Tsikata, 1994).

In 1959, a consortium of North American companies under the leadership of Kaiser Engineers was requested to form the Volta Aluminium Company Limited (VALCO) that

would constitute the major consumer of the hydroelectric power and to justify the Volta Dam project. This became very necessary because Ghana did not have big industries that could consume the power to be generated from the Volta Dam. A formal signing of the power contract between Ghana and VALCO followed. In 1960, tenders for the construction of the Volta Dam was called, and a consortium of Italian companies incorporated in Ghana as Impregilo won the contract.

The fourth phase marked the construction period. In 1961, the Volta River Authority was established under the chairmanship of Dr. Nkrumah charged with the responsibility for the construction and administration of the Volta Dam project (Nartey, 1996).

3.4 The Role of Local Political Actor (s): Dr. Kwame Nkrumah.

The role-played by Dr Kwame Nkrumah, in Ghana's politics in bringing the dreams of the Volta Dam project into reality can not be underestimated. It all started during the period of colonisation under the British crown colony. In the periods of colonisation of African continent, Ghana became a beacon country from the sub-sahara Africa to achieve political freedom and independence in 1957. The new nation's most influential figure was its Prime Minister, the late president Dr. Kwame Nkrumah (Yergin and Stanislaw, 1998:1). Nkrumah came from a modest and traditional family and had most of his early education with the Catholic Missionaries and advanced education in the Lincoln and Pennsylvania University in the United State. During the second World War, Nkrumah moved to London and help organised Pan –African congresses, linking emergent educated groups of the Africa colonies with activists writers, artists and sympathizers from the developed World (Yergin and Stanislaw, 1998). He had a strong conviction that securing African solidarity and independence from the colonial rule could unify Africa.

In 1947, Nkrumah returned to the Gold Coast (now Ghana) to form the Convention People's Party (CPP) which later led Ghana into independence. In the process of developing a development path and strategy to transform Ghana, Nkrumah noted that, "Capitalism is too complicated a system for newly independent nation, hence the need for a socialistic society". Many African scholars refuted his argument and emphasised that capitalism is the wisdom of the time. Kwame Nkrumah, was convinced that a big

push approach to development could bring about socio-economic transformation of Ghana. He harnessed his hope that led to a multi-purposes large-scale water development scheme termed Volta River Project. He was certain that, exploitation of Ghana's large-scale bauxite deposit could transform the country into a major aluminium exporting country. Also, cheap power supply from the Volta Dam could jump-start industrialisation and economic independence in the country (Yergin and Stanislaw, 1998). Through several negotiations, discussions and frustration resulted in a number of contract documents that was described as the world "most complex document since Queen Marie was selling Romanian bond".

In November 1961, Ghana celebrated a new era of decolonization, and President Nkrumah invited Queen Elizabeth of Britain to attend. But, then several bomb blasts occurred in the capital city of Accra, which mounted pressure on the House of Commons to initiate a process of cancelling the Queen's trip. The formal Prime Minister of Britain, Harold Macmillan warned of his resignation should the trip be cancelled. The reason is that, Macmillan feared that Nkrumah could leave the Commonwealth of Nations and aligned to Moscow. To prevent such occurrence, Macmillan appealed to President John Kennedy to confirm that "United States would help to under write the Volta River project" (Yergin and Stanislaw, 1998). The Queen's trip became very successful and was hailed by the Ghanaian media with the inscription – "the greatest socialist monarch in the World". The Queen's visit became a blessing in a disguise, which prepared the grounds for the funding of the Volta River Project. Immediately, Macmillan telephoned President Kennedy and said "I have risked my Queen, You must also risk your money" Kennedy responded that "I would match the queen's brave contribution with mine" (Yergin and Jose, 1997:5). The United States finally signed on to fund the Volta Dam Project.

Despite Nkrumah's alignment with the West, he continued to maintained working relations with the Soviet Union and Red China in order to attract foreign investors to boost the economy of the newly independent Ghana (Division of Technology, Culture and Communication; 2001). In 1966, the Volta Dam Project was commissioned and immediately after that, Nkrumah's government was overthrown through a Coup d'etat while visiting Peking, China. The American Government was suspected of their involvement in the Coup d'etat through the use of her Central Intelligent Agency (CIA)

which assisted the Ghanaian Army and the Police Forces. This was published in the New York Times, which aroused public consciousness in US, and Ghana (Moxon, 1984:270). Nevertheless, Nkrumah's overthrow did not kill the Pan-African Spirit across the continent, many African countries took steps forward toward achieving their political independence.

3.5....Institutional Arrangements for the Volta Dam Project : Volta River Authority

The Volta River Authority (VRA) was set up as an institutional or corporate body by the Volta River Development Act (Act 46) of 1961, charged with the responsibility to plan, execute and manage the Volta River Development (Gordon and Amatekpor, 1999). The prime functions of the V.R.A include the generation of electric power, through the development of hydroelectric potential of the Volta River and the construction and operation of the transmission system for the supply of electrical energy for industrial, commercial and domestic use (VRA, 2000).

In addition to the above function, VRA was charged with the responsibility to perform the following functions:

- i) To develop the fishing potentials, irrigation, tourism and commercial transportation on the Volta Lake.
- ii) To control and safeguard the health and wellbeing of the riparian communities in the Volta Basin.
- iii) To Resettle people displaced by the Volta Lake.
- iv) To administer Akosombo township (the dam town) as a local government agency.
- v) To promote and undertake collaborative research with other agencies in development prospects and problems of the Volta Lake, in the area of public health, bio-diversity studies and shoreline agriculture. VRA has made some achievements in relations to socio-economic development of the Volta Dam Basin. The following are the contributions of VRA to the local economy.

a) Medical Services

VRA provides first class health services for communities around the enclaves of the Volta Dam project. A well-equipped hospital is sited at Akosombo township in the Eastern Region of the country. The riparian communities are charged a fee for the use of the hospital facilities. But one needs to question the fairness in the payment of these fees since the diseases (Bilharzia, River Blindness, Malaria) affecting the riverine communities are caused by the Volta Dam Project initiated by the State. VRA started her operation with free medical services for the riparians, but changed with time. Presently, most of the communities are paying for health services provided by the VRA hospital. This is seen as a short-term remedy for controlling water borne diseases created by the Volta Dam. These diseases still exist in the riverine communities which is dis-stabilizing the local economy through loss of man's hour and job absenteeism (Nartey, 1996). To address this situation, VRA in 1990 commissioned a Medical Boat termed 'Onipa Nua' to provide basic medical services and public health education programmes for the local communities in the Volta Basin. Even though, the programme is a nice attempt by VRA to reduce the impact of the dam on the riverine communities, its coverage is limited in scope. Only small fragments of hinterlands communities get access to this services (VRA, 2000). Also, most of the efforts by VRA towards disease control in the riparian communities are more of curative measures than preventive. The drinking water of the Volta Basin communities are not safe. Their water source, which is the Volta Lake, is highly polluted as a result of industrial waste discharge and snail vector of bilharzia and river blindness.

b) Environmental Protection

Currently, there is an on-going reafforestation programme carried out by VRA in collaboration with local opinion leaders and political institutions (District Assembly, National Commission on Civic Education) to prevent land degradation and siltation along the Volta Dam Basin.

C) Subsidiaries Services

VRA renders non-power services through its subsidiaries companies-The Kpone Farms Ltd, Volta River Transport Company Ltd and the Volta Hotel Ltd. Kpone Farms provides a modern agriculture services to farms and students from agricultural

colleges in the country. It uses the water from both Volta Lake for irrigation project in the Accra Plains. In real sense, the displaced communities have little or no direct access to the irrigation services.

The Volta River Transport is also providing a basic River transport services for the displaced communities. To facilitate its River transport system. It has built ports, landing facilities in Ghana to transport goods and services from the Akosombo Port to major commercial centres in the hinterland.

It is also important to note that the displaced communities have been provided with basic services such as water, electricity, health, education, roads, etc. These services are provided by the government and other agencies. The displaced communities have been provided with basic services such as water, electricity, health, education, roads, etc. These services are provided by the government and other agencies.

It is also important to note that the displaced communities have been provided with basic services such as water, electricity, health, education, roads, etc. These services are provided by the government and other agencies.

It is also important to note that the displaced communities have been provided with basic services such as water, electricity, health, education, roads, etc. These services are provided by the government and other agencies.

It is also important to note that the displaced communities have been provided with basic services such as water, electricity, health, education, roads, etc. These services are provided by the government and other agencies.

It is also important to note that the displaced communities have been provided with basic services such as water, electricity, health, education, roads, etc. These services are provided by the government and other agencies.

It is also important to note that the displaced communities have been provided with basic services such as water, electricity, health, education, roads, etc. These services are provided by the government and other agencies.

It is also important to note that the displaced communities have been provided with basic services such as water, electricity, health, education, roads, etc. These services are provided by the government and other agencies.

It is also important to note that the displaced communities have been provided with basic services such as water, electricity, health, education, roads, etc. These services are provided by the government and other agencies.

It is also important to note that the displaced communities have been provided with basic services such as water, electricity, health, education, roads, etc. These services are provided by the government and other agencies.

It is also important to note that the displaced communities have been provided with basic services such as water, electricity, health, education, roads, etc. These services are provided by the government and other agencies.

CHAPTER FOUR: POWER AND POLITICS OF THE VOLTA DAM PROJECT

4.1 Introduction

The first section of this chapter gives the general overview and analyses of the power contract between the Ghana Government (represented by Volta River Authority) and Volta Aluminium Corporation (VALCO) owned by U.S Multi-national Corporations (Kaiser Aluminium and Chemicals Corporation (KACC) and Reynolds Metals Company (Reynolds). The provision in the power contract charged Volta River Authority to supply cheap hydroelectric power from the Volta Dam to VALCO for alumina smelting. The contract provides a deeper understanding on how transnational corporations exercise permanent sovereignty over the natural resources and wealth of developing countries.

The next section gives detailed analyses on how hydroelectric power resources generated from the Volta Dam project are distributed and priced within the local political system of Ghana. The third section gives a critical analysis on the neglect of local bauxite deposit by VALCO which was a pre-requisite for the Volta Dam Project.

4.2 The Power Contract Between : VRA AND VALCO

In 1962 a hydroelectric power contract was signed between Ghana Government (represented by Volta River Authority) and the Volta Aluminium Company Ltd (VALCO) to supply power at a price fixed for a nominal term for fifty years. They were to be run for 30 years, with renewal plan for 20 years at Valco's option.

During the periods of the preparation of the power contract, the Government of Ghana relied on international experts and foreign governments for technical advise and the World Bank and men of great experience represented Valco for the same purpose (Moxon, 1969). It is alleged that Ghana at that time did not have the required manpower resources for effective negotiation. Dr. Kwame Nkrumah was the only major player in the negotiation process for Ghana. This meant that not only did Ghana lack political power in the bargaining process but also technical competence. Ghana was not prepared technically for good bargaining. Besides the issue of advice, Ghana lacked the bargaining strength for proper negotiation. Before the commencement of the negotiation, Nkrumah committed himself publicly for the implementation of the Volta Dam Project. He started building complementary infrastructural facilities to

welcome the Volta Dam project. For example the building of Tema harbour to transport goods. This and other things like lack of finance weakened the bargaining strength of Ghana for a good power contract.

Graham (1982, cited in Tsikata, 1986), described the 1962 agreement's terms as those "... whereby Ghana would have the dam and surplus electricity, whilsts Valco gets the smelter and the profits...". This means that the Dam was built not for local development, but to facilitate the process for VALCO to make super normal profits.

The 1962 contract fixed the power rate at 2.625 mills per kilowatt-hour or (a mill is one-tenth of U.S cent). The power rate was fixed at a comparable price charged by Bonneville Power Administration (BPA), a U.S power authority at 2 mills since 1938. This rate was not justifiable, because over eight smelters depend on BPA for power supply, making it technically feasible and economically viable. If the principle of economies of scale holds, then one can say that the more the maximum capacity of a dam is utilised to generate power, the lower the cost of production per-unit would be. As a result, the price to be charged can be less. However, this was not the case for the Volta Dam Project. The Volta Dam in the early periods of 1967 was operating under capacity, therefore VALCO needed to pay a more fairly price for electricity to maintain its operational cost. Currently, VALCO is paying an amount that gives VRA a minimal foreign exchange earning to pay for its debt and to run the operations of the organisation

The power contract also fixed rates to be charged on water, harbour and wharfage dues and other charges for 30 years in nominal terms. The government of Ghana was required in the agreement to put in place measures through legislation to protect the interest of VALCO. There were no provisions to alter any of the contract. The power contract generously favoured VALCO in such a way that the US senate commented that the deal was so favourable to give Kaiser unfair market advantage over other competitors (Mahoney 1983 cited in Tsikata, 1986).

4.3 Ghana Subsidising VALCO's Power Consumption.

Valco opted to sign power contract with Ghana Government in order to pay low power rate over long period of time. It also singularly consumes much of the total power

generated by the Volta Dam Project much to the disadvantage of the Ghanaian overall economy. Meanwhile, the over all power contract did not make provision for future rate adjustments over time. The low power rate contract and the subsequently low power revenue from the biggest consumer ie VALCO to VRA has since been the cause of the weak financial position and poor operational problems bedevilling the Volta Dam Project. This is affecting VRA to deliver power efficiently and reliably to meet the present user demands, accounting for the presently low industrial and economic productivity as well as social development in the country. To keep VALCO and other high power-consuming multi-nationals such as the Mines in operation, Ghana government has resorted to continuously subsidising the operations of VRA. This, the government does through foreign loans and high power tariffs to other consumers including the Ghanaian domestic users of power. This means that the badly needed financial resources for the provision of social and economic infrastructure for the riparian communities displaced by the dam and Ghanaians in general are rather being used to promote and protect VALCO's interest. The Ghana government is taxing the already impoverished Ghanaians to aid the process in order to meet the terms and demands of the 'old aged power contracts'.

For example, while at present (2002), VRA produces or imports power a kilowatt-hour at the cost of about 5 cents, VALCO buys power below 2 cents for a kilowatt-hour (Ghana's Daily Graphic, 2002). On the contrary, the numerous Ghanaian local user industries are not benefiting from VALCO's alumina output in the country even though, there is very high demand of alumina produced in the country. Presently, out of 200,000 metric tonnes output a year of alumina in VALCO, only 1,000 metric tonne go to ALUWORKS, Ghanaian-based aluminium products manufacturing firm and the rest exported. Meanwhile, ALUWORKS has the capacity to triple its output should it get enough alumina products (Ghana's Daily Graphic, 2002). It is therefore not surprising that, there is a strong feeling in the country questioning the linkage between VALCO and the rest of the Ghana's economy, except its contribution to charity in areas of education, medical and sports. It instructive to note here that presently, only 40 per cent of Ghana itself is covered with electricity.

On a sad note, under the Power Contract, Ghana did not have the legal right to impose any form of duty on alumina imported by Valco into the country for processing.

This is also extended to alumina, produced in the country. A report from Internal Revenue Service of Ghana revealed that, from 1967 to 2001 a company tax from VALCO is on the average of \$8 million annually. This is because, the company pays corporate tax on what it earned from tolling charges and not from what it earns in the sale of aluminium manufactured from the smelter (Ghana's Daily Graphic, 2002). VALCO, operates as a tolling company under the obligation to produce aluminium for its shareholders, allocating its smelter capacity to them based on their shareholder strength. The shareholders own and supply imported alumina which is processed into finished product. Valco therefore make some earnings from the processing fee paid to it by the stakeholders which is technically called tolling charges Tsikata, F.(1986). Here again, VALCO could have used the huge bauxite deposit from Ghana, as a source of raw material, to promote economic integration into the local economy. VALCO's interest is not in this direction but rather chose to import the raw materials from Jamaica for processing and onward exportation out of Ghana.

4.4 VALCO Must Pay More For Power Supply

It is out of the general concern that, Ghana government could no longer continue to subsidise power for VALCO, the largest consumer of hydroelectric power. A Government Negotiating team was set up in early 2002 on the power supply to VALCO with the view to re-appraise the power allocation to reflect the prevailing circumstances. The need for this move is justified for the reason that there have been changes in population, growth of industries and high demand for power at all levels. In fact it is due to the increasing demand for power at all levels which prompted the setting up of a Thermal Plant at Aboadze near Takoradi, whose average cost of running was reported to be far and above that of the Volta Hydroelectric Power production. Though, the Government Negotiating team is yet to conclude work with VALCO's negotiating team, however, at its maiden meeting in Accra, its Chairman Mr. J.B. da Rocha stated unambiguously that, the country can no longer continue subsidising power for VALCO. This has sent a signal to VALCO that, it should be prepared to pay for an economic rate to VRA. It is also expected that the privileges and exemptions enjoyed by VALCO even after the lapse of the 30 years power contract be appraised for the betterment of the people Ghana.

4.5 Unrealistic Power Rate

According to Tsikata (1986), 2.625 mills power rate charged by Volta River Authority (VRA) to VALCO is in line with power rates charged in most parts of the world. Before the 1970's one of the preconditions for financing dams construction were large-load users that could make effective and efficient use of the power generated. Most large dams operating in the western world have large pull of energy demand from smelters. This placed them on production advantage. Thus utilising their production maximum capacity of the dam, which consequently pulls down the cost of power generation. However, the Volta Dam project has a common base-load user (VALCO) with energy payments representing 30 percent of the production cost of VRA. This could not be effective and efficient way of maintaining the dam. Table 1 below shows power rates charged by the Volta River Authority to VALCO in comparable with Bonneville Power Administration of the U.S.(see table 1 for further details).

Table 1: Average Power Rate Charge by VRA and BPA to Aluminium Smelters (U.S.Mills/Kwh)

YEAR	BONNEVILLE POWER ADMINISTRATION	VOLTA RIVER AUTHORITY
1938-1966	2.0	n.a
1967 – 1972 Sept. 30 th	2.0	2.625
1972 Oct 1 st – 1973 Feb. 28th	2.0	2.75
1973 Mar 1 st – 1974 Dec 31	2.0	3.25
1975	3.0	3.25
1976	3.2	4.5
1977	2.2	4.5
1978	2.6	4.5
1979	3.0	4.6
1980	4.9	4.6
1981	7.5	5.0
1982	19.3	5.0
1983	22.5	5.0

SOURCE: Tsikata,f. (1886)

The under-utilised dam capacity and the rate charges could not in any way be compared to energy supply sources from the western world. Compounding the

problems is the oil hikes of 1973 and 1979-80, which compelled most power companies that supplied to smelters to increase their rate charges. From the table 1, it is shown that in the early 1967's when the Volta Dam started operation, the Volta River Authority (VRA) of Ghana was charging power to VALCO at 2.625 mills/kwh as agreed in the power contract.

Bonneville Power Administration (BPA) of the U.S was also charging power to its smelters in U.S at 2.0 mills/kwh. What may appear at first sight that the rate of VRA was comparatively higher than that of BPA, in actual fact, it is not to be the case. The reason being that, BPA had over eight smelters that depended on for their power supply. BPA was operating at maximum capacity, whiles at the same time enjoying maximum power sales leading to optimality of her operations. Therefore the rate charges could be lower in comparative sense. The Volta Dam project in the early periods depended on VALCO as the major consumer of power. This created under-utilisation of power making operational cost very high. Therefore the rate charged was reasonable to compensate for the operational losses. By the early 1980's VALCO power rates was quoted by International Bauxite Journal (Vol.8, No. 1) as the lowest paid by aluminium smelter in the world. Table 1 shows that whiles BPA was charging between 19-23 mills/kwh, Valco was paying only 5.0 mills/kwh.

This was said to be 5% of the average world price in 1983 (Ghana Government Report, cited in Tsikata, 1994). For over thirty years of its operations, VALCO enjoyed tax holiday (Except for income tax at the rate of 40% of chargeable income and some minor taxes). It was granted pioneer company relief in respect to financial contribution by shareholders to the establishment of the smelter.

Presently (2002), while VRA produces or imports a kilowatt-hour of power at 5 cents, it supplies VALCO at about 2 cents. What VALCO pays is too low and is well below the cost of producing the power. This is no longer acceptable in the view of both Ghanaians Authorities and the general public. The current negotiation is keen to address this anomaly. It was no wonder that in the 2000 Annual Report of the VRA, its chairman of the Board lamented that "the uneconomic tariff rate charged for electricity produced continued to be of a grave concern to the authority. The continuous widening gap between the rapidly exploded production costs and applicable tariffs

caused a remarkable reduction in revenue, delay in procurement schedules, and in resource mobilisation". (VRA Annual Report & Account, 2000:15).

4.5.1 *Financial Sustainability*

The financial performance of the Volta Dam project is becoming worse. According to Volta River Authority (VRA) annual report, 2000, the Volta Dam Project made a net loss of ₦983.3 billion (£1,467,611,940) at the end of, 000 compared to a net loss of ₦283.2 billion (£422,686,567) at the end of 1999. This is through the supply and sales of cheap hydroelectric power. There is growing threat of financial bankruptcy, which is affecting the efficient management of the dam and the possibility of the Volta River Authority (VRA) satisfying domestic energy demand to answer the question of equity in the hydro-power dam distribution. The fact is that, VRA's financial bankruptcy would not enable her the ability to generate the maximum capacity of hydroelectric power or find alternative power sources to meet domestic demand. This means that in the event of low power generation from the dam as a result of financial losses, the most powerful in society like the multi-national corporations could influence how the small power generated should be distributed. The sadness of this is that, the Ghana government provides financial back up in a form of subsidies out of taxes collected from the local people to run the Dam. VRA financial losses could be attributed to low power rates paid by consumers more especially multi-national corporations like the Volta Aluminium Company (VALCO). The Volta River Authority (Ghana's power generating authority) says that due to low power rates charged, it is not able to recover its production costs, which is hampering its ability to supply power to the rural communities and most riparian communities displaced by the Volta Dam (Accra Mail, 2002). Currently, there is a public outcry of high electricity tariff. According to the Chief Executive of VRA, (Dr. Yves Wereko Brobby), the realities in the energy sector has made tariff adjustment a necessity. He stressed that Ghanaians must be prepared to pay economic tariffs to enable VRA pay its short term and long term debts amounting to \$130 million (Accra Mail, 2002). There is now a growing shift of responsibility in the payment of the cost of production of electric power to local uses. The multi-national corporations that pay lower rates on electricity supply are not pressurised to pay more economic and realistic rate for their energy consumption. Most of these corporations use power for economic ventures in the area of aluminium smelting and minerals exploitation, which are noted for high consumption of power and generates higher

economic returns. There is therefore the need and justification for them to pay high rates for the sustenance of the Volta Dam project. Since the multi-national corporations used more power to the disadvantaged of the local political economy, it is fair that they pay economic rate for the use of the hydroelectric power in order to satisfy the principle of social justice, equity and sustainability in the use of Volta Dam power resource.

4.6 Energy Distribution

The Volta Dam has a production capacity of 912 MW. However, VALCO averagely consumes more than half of the power generated from the Dam. This leaves the ever-growing population and industrial activities with little chances of attaining hydro-power. Most domestic users in both rural and urban centres are without much power. Of particular concern and sympathy is that, the displaced communities whose lands have been swallowed up by the dam construction and who now live on the fringes of the river banks of the hydro-power are yet to have access to power for domestic use let alone for social and economic adventures.

Even in the case of communities sitting on the catchment of the hydro-dam station, it is only those that fall within a mile radius are connected to the power from the dam. The reason being that there is no available power to distribute. The above scenario is the result of the historical context and political arrangement for the construction of the Volta Dam which placed VALCO at the most favored end for the consumption of the bulk of the hydroelectric power supply. It managed to negotiate for a long-term power contract with the Ghana Government for thirty years. This has made VALCO a monopoly company in the use of hydroelectric power in Ghana. In times when power production have to be temporarily reduced to allow for proper management of the lake, or technical reasons VALCO's supply is considered paramount. Figure 3 and 4 illustrate power distribution among various stakeholders in Ghana.

Fig. 3: Annual Energy Consumption - KWH (1990 - 2000)

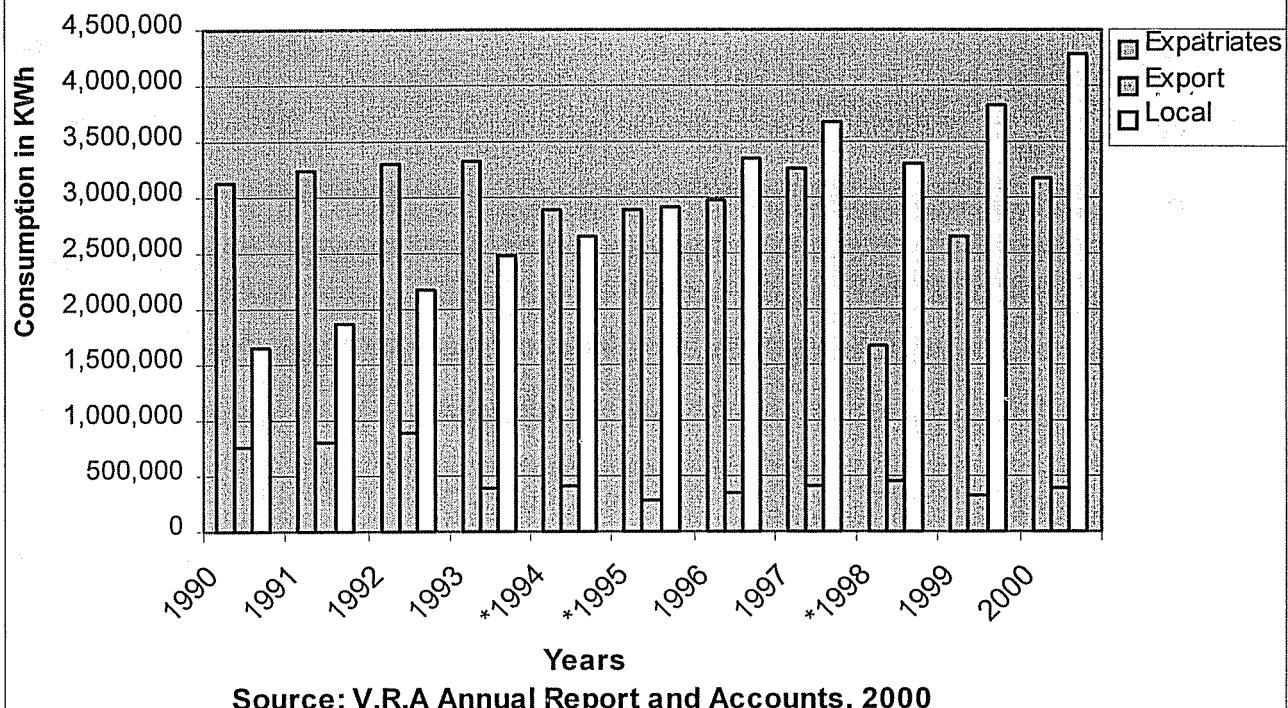
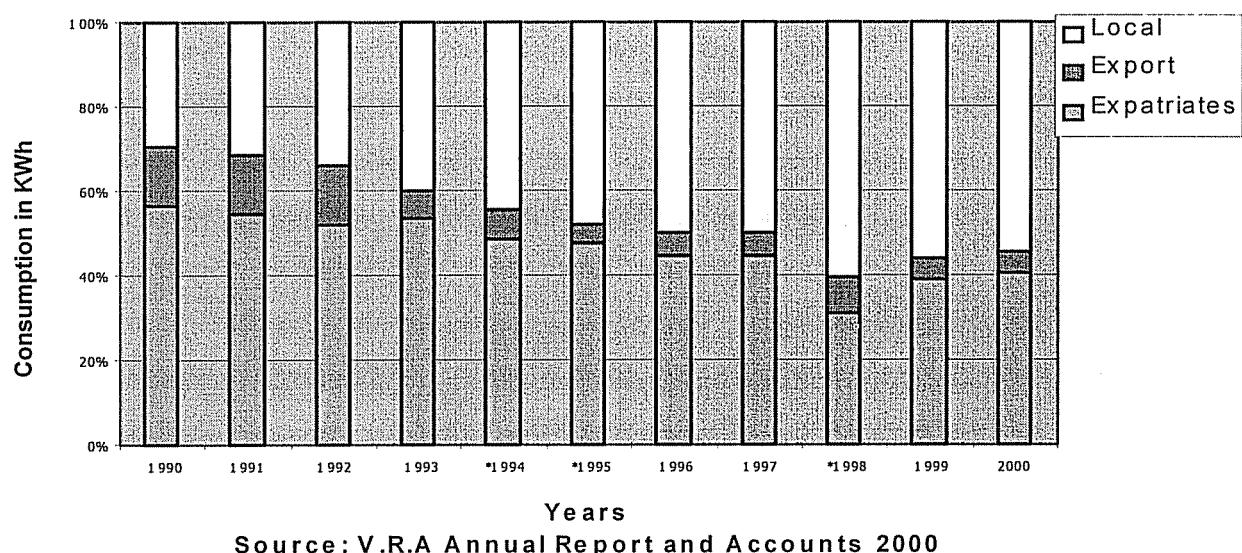


Fig. 4: Annual Energy Consumption KWH (1990 - 2000)



From figure three and four, it can be deduced that there are three major consumers of power in Ghana. These include the following classes: expatriate companies made up of mining companies, aluminum smelting company (VALCO), Textile companies;

Export of power to countries like Togo, Cote d'Ivoire and Benin; and local consumption. The total power consumption from expatriate companies constitutes the largest in the country. The Volta Aluminum Company (An American Private Company) consumes the largest among the expatriate companies followed by the mining companies. The domestic (local) consumption in relative sense including the local industries recorded the lowest. The annual kilowatt per hour consumption from figure 3 and 4 revealed that expatriates and export consumption combined in the early years of 1990s in relative terms was more than local consumption ever after the elapse of 1962 power contract. Though the agreement was re-negotiated by the PNDC Government nearly twenty years later (Moxon 1994; Hart, 1980; Tsikata, 1986; cited in Diaw 1990), the expatriate company's power consumption still dominate the local economy. Power Consumption by expatriate companies still constitute the largest in Ghana. Again, in 1997, power consumption increased for the mining companies from 315,047 to 747,984 KWH, while's local consumption level remained the same (See Appendix one).

In 1990 the total annual energy sold from the Volta hydroelectric power was 5,536,684 KWH, out of which VALCO consumed 2,788,500 KWH, expatriate mining companies consumed 315,047 KWH, while's export to neighboring countries (Benin, Togo and Cote d'Ivoire) accounted for a total of 761,040 KWH (See Appendix 1). The prime purpose of the Volta Dam project, as perceived by the first president of Ghana, Dr. Kwame Nkrumah was to produce cheap hydroelectric power to promote Ghana's industrialization strategy. This was to ensure that there is growth and development in the country. However, how can this take place if multinational companies consume more than 70% of the power generated from the Dam?. The American and British governments took advantage of the weak development policies made by Nkrumah

and invested heavily in the mining sector and also made huge investment in the aluminum smelting industry. It is also alleged that most of the profit generated by VALCO in the country is repatriated back to US at the expense of local development. The aluminum export does not even reflect in national accounting as goods produced in Ghana.

Again, industrial activities in both mining and smelting are the major polluters of Ghana's environment. The local people who have been impoverished by their activities through displacement from their own land are also paying another price from the environmental pollution through water and air pollution. There is no environmental impact assessment procedure followed by these industries. Currently, Ghana government is pursuing an environmental management system (polluter-pay-principles) that makes polluters pay more tax on the level of pollution. This principle would not necessarily guarantee the protection of the riparian ecosystem. There is higher possibility that a multi-national corporation like VALCO, which has the financial strength, would like to pollute and pay for any penalty.

However, after 1997, the trend of power consumption has changed. The local consumption has increased and expatriate power consumption has been reduced (See fig.3&4 and Appendix 1). This could be attributed to economic and political reasons. Between 1997 and 2000 marked the period of election in Ghana, so the government in power, National Democratic Party (NDC) was forced to put in place mechanism to increase local power supply in order to win election. This was achieved through rural electrification programmes, geared towards communities that supports the government in power. This means that opposing communities were left out. This

does not demonstrate the principle of equity, which recognized fairness in the distribution of power resources.

Again, the introduction of the Export Free Zone concept allows local investors both local and foreign to invest in specifically in the demarcated zone of a peri-urban area. Services were provided including hydroelectric power to attract investors in order to promote economic growth.

Currently VALCO is renegotiating for an increase in power supply. If this is achieved, local consumption of power will be reduced.

4.7....The Development of Local Bauxite Deposit

The 1962 VALCO –Ghana Government power contract made a tentative provision that authorized VALCO to develop Ghana's rich bauxite deposit at Awaso into alumina through the use of cheap power source from the Volta dam. During the preliminary stages for the negotiation of the Volta River Project in the early 1960s, VALCO's representative Edgar Kaiser expressed that Ghana's rich bauxite resources was the major reason for his interest in the dam project (Tsikata, 1986:4). President Nkrumah, also saw a direct link between the development opportunities for Ghana's economic growth and bauxite development. The presence of the local deposit for alumina production justified the construction of the hydroelectric power to the foreign investors.

This provision has not been implemented since the two parties signed the power contract. This could have created a lot of investment opportunities in the local economy. The Mining of local bauxite could have provided avenue for the creation of employment, development of basic infrastructure and raw material for the local industrial development and revenue in the form of royalties for the local communities.

However, all opportunities have been shelved as a result of VALCO's decision to rather import bauxite.

This stemmed from the fact that massive capital infrastructure investments in the area of railway development are very necessary for take-off of the project. This infrastructure has a financial implication which VALCO was not prepared to risk (The Ghana Federalist Movement, 2002). Also, VALCO found it to be more economical and profitable to import bauxite powder from Jamaica and Guinea than to invest high capital infrastructure to refine bauxite in Ghana (Division of Technology, Culture and Communication; 2001). The most likely reason could also be the fear that Nkrumah might nationalize the bauxite industry if it is fully integrated in the economy. President Kennedy sent a word to Kaiser to reassure him that, Nkrumah would not see the opening of the power plant in 1967(Ghana Federalist Movement, 2002). This partly explains why Nkrumah was overthrown on his trip to China. Nkrumah's vision of a giant aluminum export industry of bauxite had failed –and at a great cost. After the overthrow of Nkrumah, successive governments have tried to at least build alumina plant, but to no avail (Maloney and Abernethy, 2000:5).

4.7.1 The Local Bauxite : Current Re-Negotiation

The present Government of the New Patriotic Party of Ghana was not satisfied with the commitment of VALCO regarding the power agreement signed since 1962. This has compelled the government to open a new chapter for re-negotiation, which commenced early last year (2001). One of the critical issues under discussion is the development of local bauxite deposit. The Ghana government negotiation team at present is demanding that VALCO reserves half of its production output for local industrialization, and also to develop the local bauxite at Awaso in the Western Region

by the year 2003 (Ghana Federalist Movement, 2002:7). The negotiating team is convinced that aviation parts and automobile engines could be developed from the aluminum produced by VALCO. The team charged the Ghana government to put in place infrastructural services like railways to facilitate the process of bauxite development. For example, to repair Awaso-Tema railways, which is currently in disrepair. But the question is whether Ghana has the necessary capacity to meet the demand as spelt out by the negotiating team. The government negotiating team requested for half of VALCO's production output of 100,000 tons to propel local industrialization seems unrealistic due to the present production capacity of the local industry. Aluworks Limited, Ghana's largest primary aluminum processing plant has a maximum installed capacity of 30,000 tons, which is even a recent expansion. Aluworks produces relatively low value added products (flat sheets, corrugated roofing sheets, coils, circles), bulk of which are exported to foreign countries like United States and West Africa Regions (The Ghana Federalist Movement, 2002). This export trend can not support local industrial development and consequently provide multiple effects on the local economy. One major outstanding problem is how the Ghana's negotiating team could address the issue of excess 70,000 tons of VALCO aluminum requested. One way of addressing this problem is to phase out their request into three stages-short, medium and long-term periods. The negotiating team could adopt 25-55-100 (000, tons) formula, meaning that, in the short term, they could request for about 25,000 tons, 55,000 in the medium term and 100,000 in the long term. This would enable Aluworks develop the necessary technological and managerial capacity to consume the surplus aluminum to be provided by VALCO.

Again, VALCO's parent company Kaiser, is filing for bankruptcy protection in the United States (The Federalist Movement; 2002). This means that, Kaiser's global

operations under the bankruptcy protection plan will come to an end. Though Kaiser intend to maintain VALCO's operations due to maximum profits it generates, it is not likely to opt for expansion and investing huge capital outlay in infrastructure development and processing plant.

4.7.2 The Role Of VALCO in Local Development

Despite some shortcomings of VALCO's operations in the Ghanaian economy, Its contribution to the socio-economic development can not be ignored. Since its operation in 1967, it has contributed over seven (7) billion dollars to the Ghana's economy (Ghana's Daily Graphic, 2002). VALCO is also one of the largest corporate tax payer, contributing over 10 per cent total tax receipt over the years. Though the impact of VALCO's financial contribution to Ghana's economy can not be disputed, in proportionate terms to its profit generation, is woefully inadequate. It enjoys free import duties on the aluminum imported from Jamaica and Guinea at the expense of local integration and development. In the area of education, VALCO contributes an estimated 500,000 dollars annually into Trust Fund in support of education, health and other social and cultural services to benefit Ghanaians (Ghana's Daily Graphic; 2002). But in most cases the benefit is less to rural and riverine communities.

VALCO is one of the largest private sector employers in Ghana. The company currently employs 1,017 with Ghanaian constituting about 99% of the employees. But comparing the salary paid to workers of Kaiser elsewhere, VALCO employees receive one of the lowest. In general, one could confidently say that VALCO's economic gains from the Volta dam project far out-weighed the maximum benefits to the local economy.

4.8 Conflict of Interest

One of the fundamental issues that discredited the authenticity of the power contract is the double role played by Kaiser engineers, the owners of VALCO. During the preparation periods of the Volta Dam project, the American government commissioned Kaiser Engineers to conduct feasibility studies as a pre-condition for financial and technical support for the construction of the Volta Dam. At one end, Kaiser Engineers were asked to form an aluminum smelting company that could consume the power generated from the Volta Dam. The dual role placed them at a more advantageous position to negotiate for a lower power rate.

For instance, during the feasibility studies, Kaiser estimated that the annual power capacity of the Volta Dam is 5400GWH. This falls short of the 1983 annual energy capacity estimated by Acres International (consulting firm commissioned by VRA) of 4400GWH (Tsikata, 1986). The Kaiser's annual power capacity estimates were used for the contract, this provided 60 per cent guaranteed power supply for VALCO for the period of thirty years. This means that only 40 per cent of power were left for Volta River Authority to distribute to other consumers even after the construction of the second dam at Kpong. The expatriate mining companies, are noted for the consumption of more power, were included in the 40 per cent quota. A guaranteed power supply to VALCO means that the indigenous companies will get less power to meet their production targets. The local industries operate under capacity. This will have a negative consequence on the economic development of Ghana and therefore discourage local entrepreneurs to invest in the economy.

CHAPTER FIVE: FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

The lessons learned from analyzing the various concepts and findings of earlier researchers, as well as the research questions and objectives reveal several important messages that transcend national boundaries. It provides analytical findings, which require researchers, development actors to re-examine their thoughts on large dam project like the Volta Dam.

5.2 Major Findings/Lessons

A) Findings

5.2.1 *Historical Inequity in Power Distribution*

The inequity distribution of hydroelectric power from the Volta Dam is historically constructed. The thirty-year power contract between VALCO and the Government of Ghana ensured that about 60% of the power supply from the Volta Dam goes to VALCO at the expense of power supply to Ghanaians. The present condition whereby VRA undertakes load shedding makes development less responsive to local needs.

5.2.2 *Large Dams Development, the Question of Access and Distribution.*

Large dams construction cannot in itself bring about industrial transformation, but access and distribution of power is crucial as a cutting edge for industrial progress and development. The Volta Dam project though constituted one of the largest hydro-dams in the world, distribution and access to the power resources by the local people are woefully inadequate. This is therefore hindering industrial development of the local economy. Bulk of the power generated goes to VALCO, a multi-national corporation and paying one of the lowest power rates in the World. The prime aim for the construction of the Volta Dam as established by Dr Kwame Nkrumah was to promote

local industrialization and self-reliance economy. These objectives changed over time, when the U.S. Government and World Bank decided to fund the Volta Dam project.

The conditionalities set by the U.S and the World Bank made Ghana to lose control over the use of her own hydroelectric power resources to multi-national companies (VALCO and mining industry).

5.2.3 Globalization Disintegrates the Local Economy

Global integration does not necessarily provide an answer to development in the local economy. It rather, disintegrates the local political system, leaving remains of deprivation and poverty. For example the injection of technology and finance into Ghana's economy for the Volta Dam construction increased water borne diseases, bio-diversity losses, and loss of economic activities in flood plain agriculture. It also provided a fertile ground for the creation of dependent local economy on the global western system through aid and loans thereby increasing the balance of payment deficit of the economy of Ghana. This relations of dependence between the two economies, assumes the form of dependency in such a way that the developed economy (the dominant ones) can expand and can be self sustaining, whilst other countries (the dependent ones) can do this only as a reflection of that expansion (Kay, 1989:129). This confirms the role of multi-national corporations like VALCO taking advantage of local power resources to the detriment of local development. As VALCO expands its access to the local power, it reduces the local supply of power thereby placing hindrance to the socio-economic development of the local economy. This means that, the already impoverish displaced local communities will continue to depend on the developed economy. The developed economy will continue to dominate the local economy and determine the pace of development.

5.2.4....Commitment to Exploit Ghana's Bauxite Deposit

After over thirty five years of VALCO's operation in Ghana, it has not committed itself to the development of Ghana's rich bauxite deposit that would generate a multiplier impacts on Ghana's economy through, foreign exchange earning, employment generation, incomes and infrastructure development.

5.2.5....Financial Capability for the Management of Volta Dam Project

The Volta Dam Project lacks financial capacity for efficient management. This is because the power rates paid by multi-national corporations in the aluminium smelting and mining sector in Ghana are woefully inadequate to sustain the dam and to enable Ghana government provide alternative sources of energy for energy for the local economy. In their Annual Report and Account, VRA accept that the Volta Dam Project is financially bankrupt (VRA, 2000:15).

5.2.6. Financial Commitment to Resettlement Programs

The construction of large dams turn to focus financially and technically on the physical structures with less emphasis on rehabilitation of the displaced riparian communities. The success of large dam project is tied to the physical infrastructures and less on the resettlement communities. This was the case of the Volta Dam project, where resettlement communities were less catered for. The displaced communities were inadequately compensated with marginal land, which was less fertile and could not support sustainable agriculture.

5.2.7 Lack of Expertise for Power Contract Negotiation

Immediately after independence in 1957, Ghana did not have the necessary local expertise to help in the negotiation of the power contract with VALCO. Local expertise

with knowledge on local situation could have bargained well for Ghana. This plagued the country into a weak bargaining with VALCO and is still causing harm to the local economy through low power rates.

5.2.8 *Conflict of Interest*

The World Bank and the U.S Government provided technical advise to VALCO regarding the power contract with Ghana Government and at some time gave financial support to Ghana for the construction of the Volta Dam. This was a clear case of conflict of interest. For example the terms of repayment of the loan for the Volta Dam project was high, but VALCO pays one of the lowest power rate in the World.

5.2.9. *Socio-Economic Displacement of Riparian Communities*

Socially, the Volta Dam displaced about 80,000 people from the riparian communities across the country. They occupied about 750 villages (Johnson, 1971). These people were resettled in already densely populated area. This posed a lot of competition and conflicts between the residents and the new settlers. As a result the new settlers were forced to change their traditional mode of farming which was basically shifting cultivation to more settled agriculture with modern inputs, which was the intention of the Ghana government. The Volta Dam flooded most of their farmlands, cultural heritage, loss of lives, and ancestral and traditional groves. In 1956, according to the Volta River Project Commission Report, an estimation of 6,000 acres of the cultivated cocoa farms was inundated and over 50,000 cropland were flooded. This means that the survival and livelihood of the local people are threatened. The land given to them were very small which could not be used for any meaningful economic venture. The government's compensation package was not sustainable. Their larger families will continue to depend on this small piece of land from generation to generation. That is,

intra-generational poverty is likely to be created among the riparian communities. This was not the case in their former environment. They were introduced in a new environment that takes them more than a century to adopt. The problem of adaptation hinders them from carrying out meaningful economic activities.

Furthermore, most of the riparian communities have been affected with diseases like Schistosonomiasis (bilharzia) and Onchocerciasis (river blindness). Though the diseases existed at a minimal rate, they were aggravated after the construction of the Volta Dam. Waterweeds in the Volta Lake provided ideal breeding grounds for the vector (snail) (Nartey, 1996: 4). As much as 80% of children and 35% of adult population in Ada (a community in the lower Volta Basin) were affected by the bilharzia. These infections do not only prevent the riparians from doing their active economic ventures, but also put them in a permanent situation of 'disrepair'. Most of the youth and adults in the economic active group fall prey to these diseases. This put unnecessary hardship on the local economy, thereby increasing their economic dependency on the government as well as donor support.

Environmentally, apart from flooding of croplands, large tracts of local forest resources with high economic value like mahogany, wawa, and ebony were inundated. The Volta dam also created permanent stumps in the watercourse. These stumps are noted for causing many accidents on the lake, killing a number of riparian communities. Again, the natural regime that promoted floodplain crop production and fisheries (prawn and clam) has ceased. The riparian communities have shifted their farming activities to the top of mountains. This has resulted in siltation of the Volta Dam and consequently compelled the Government to enact bye laws to restrain the riparians farming activities.

5.2.10 Gainer and losers

The Volta Dam project has impacted on three groups of people both positively and negatively. This includes the following: multi-national corporations, Government and riparian communities. The multi national corporations has benefited positively in terms of cheap power, cheap labour, high profit margin, tax holiday and not responsible for any social and environmental impacts created by the Volta Dam construction. To the Government, the power from the dam has been extended to cover 40 % of the total area of the country. This is an opportunity for future development. The riparian communities are the most losers of the Volta dam project. They are displaced socially, economically and environmentally. Most of the communities lost their livelihood to the dam which has been compounded by diseases. In all the best group of people who gained from the Volta Dam is multi-nationals followed by government and riparians being the last on the ladder in terms gains.

B) Lessons

In order to reduce drastic impact on the forth-coming Bui Dam construction in Ghana the following lessons from the Volta Dam Project could be useful:

The Government of Ghana should avoid contracting a long-term power contract which is very rigid in nature. The Bui power project should consider short term contract which should be flexible to meet the growing national demand and opportunities.

Loans with stringent conditionalities like that of the World Bank and U. S Government for the Volta Dam Project should be avoided. Loans which is not favourable to transform the national economy should be seen as a hinderance to national development.

Addressing socio-economic and environmental issues related to dam construction must go side by side with constructional face of the dam rather than being last activities.

The Bui Power project should be directly link up to socio-economic opportunities within the national economy rather than only the production of hydropower.

The zeal giving to the construction of Dams must go equally with rehabilitation of the riparian communities.

5.3 Conclusion

Construction of large Dams appears to be a mirror for modernization and industrial development. The "estimated assumptions of modernization- that social change can be orderly and predictably manipulated through planned investments-is increasingly subverted by unintended consequences, side affects, and the systemic production of risk, suffering and despoliation"(Dwivedi, R., 2001). In more than one way the state is seen as having perceived limitation in state's vision and strategies of change. Most of these approaches in development interventions fail to use the principle of equity as a tool to achieve its goals. Basically, it is a defacto and top-down approach without a human face.

From the set of data presented and the analyses made revealed that, undoubtedly, large dams are not an appropriate development intervention for a local economy and to feed the world hungry. It destabilized sustainable livelihoods of the local political economy and plunges the local system into inequity through the process and

implementation of large Dams. It also shifts ownership of resources from the local people to multi-national corporations creating impoverishment in the local economy.

The third world countries like Ghana are forced into development agreement through development aids and loans by World Bank and Western countries in the name of global integration and capitalism. This compelled most political leaders in the third world countries to commit themselves to the implementation of large dam projects in the name of bringing relief and development to the local economy and also to gain political support from the electorates. This has resulted to massive displacement of riparian communities

Similarly, the Volta Dam became an asset to VALCO, a multi-national corporation, which consumes more than half of the power generated from the Dam and pays one of the lowest power rates in the world. This was as a result of long-term power contract signed with the Ghana government. However, the power contract had a negative impact on Nkrumah's broad aspiration of turning Ghana into an industrial complex. Nkrumah's vision of making Ghana an industrial country did not materialized. VALCO also failed to develop Ghana's rich bauxite, which was might to transform the local economy into a major aluminum exporting country.

In addition, the Volta Dam did not only created inequity in the use and access to power resource within the local political system but created a number of social, economic and environmental impacts that destabilized the local economy for good.

From the above analyses one can confidently say that the Volta Dam project is more of a liability than an asset. It is a good for nothing investment. Developing countries like Ghana should resort to sustainable alternative energy supplying system like bio-gas and solar energy with technical support from developed countries. Again, Ghana

Government should learn a lesson from the impacts created by the Volta Dam in her choice of constructing new dam at a town called Bui. This could reduce a massive displacement of the riparian communities across Bui Basin.

In sum one would like to mention that, it is justified to say that, Large Dams are worthless capital investment meant to perpetuate colonial ideology and to promote western political agenda at expense of the local interest and development.

The best way forward is to push donor agencies like the World Bank, International Monetary Fund (IMF) and Governments to cut down its financial support for large Dam projects. This could be achieved through pressure from local and international environmental civil society groups in an effective campaigns and advocacy programmes aimed at sensitizing the local people and drawing the attention of those holding political power.

5.4 Recommendations

- The price paid by VALCO for power must bear a direct relation to the cost of producing and transmitting power to the VRA in order to free government resources for the development of the overall economy of Ghana particularly the affected communities.
- To enhance Ghana's industrialization, allocation of power to VALCO must be in the context of the needs of the nation's overall power requirements. In this direction, VALCO must have power on two bases; firm power and additional power when necessary.

- Electricity supply under the present circumstances should be a mix of hydro and thermal power for all consumers including VALCO, to ensure equitable and optimal use of facilities and resources of Ghana.
- There is the need for Valco to process Ghana's large deposits of bauxite, the raw material base for VALCO, in the country to enhance revenue creation for the nation and also of job avenues for the citizens.
- In order to ensure multiplier effects of VALCO's operations in Ghana, the company should increase her output allocation of alumina to the domestic user industries in Ghana. This could only be achieved through expansion of production capacities of the local industries to contain excess production from VALCO.
- Again, infrastructure facilities like railway lines from Awaso to the Tema Port should be rehabilitated by Ghana government to facilitate the process of the Bauxite exploitation and to encourage sustainable exploitation of gold, diamond and timber resources from the Western Region of the country.
- The construction of the Volta Dam has caused socio-economic displacement of the riparian communities in the Volta Basin. There is therefore the need for Government of Ghana to set up a Rehabilitation Fund that could be through a Parliamentary Act to help rehabilitate the displaced riparian communities.

REFERENCE

Birley, M. H., (1995). *The Health Impact Assessment of the Development Projects*, HMSO,

Bocking, S. (1998) *Dams and Development* [Internet], International Development Studies Network. Available from: <http://www.idsnet.org/Resources/Dams/credits.html> [Accessed 26 August 2002].

Buabeng, C.S(2002) *Ghana's Daily Graphic*, 4th February, p.1

Bunker, S. G. (1994) *Underdeveloping the Amazon: Extraction, Unequal Exchange, and the Failure of the Modern State*, University of Illinois Press, Urbana and Chicago, USA.

Carley, M. and I Christie (2000) *Managing Sustainable Development* (2nd Edition), Earthscan Publications Ltd, London.

Cavalcanti, C., (2000) *The Environment, Sustainable Development and Public Policies: Building Sustainability in Brazil*, Edward Elgar Publishing Ltd., U K.

Diaw, K. and Schmidt-Kallert, E. (1990) *Effects of the Volta Lake Resettlement in Ghana- A Reappraisal after 25 years*, Institute fur Afrika-Kunde, Hamburg

Division of Technology, Culture and Communication (2001) *The Volta Dam Project (A)* [Internet]. University of Virginia,
Available from: <http://repont.tcc.virginia.edu/ethnic/Cases/volta/volta.html> [Accessed 21 October 2002].

Dryzek, S. and Schlosberg D., (1998) *Debating the Earth: The Environment Politics Readers*, Oxford University Press, N.Y.

Dwivedi, R.,(2001) 'Resources Conflict and Collective Action: The Sardar Sarovar Project in India ': Published Doctor of Philosophy (Development Studies) Special Study Submitted to Institute of Social Studies, The Hague.

Frank Gunder, A. (1969) *Latin America:Underdevelopment or Revolution*, Monthly Review Press, N.Y.

Fred P. (1997. *Dams and Forms of Development*.[Internet]. International Development Studies Network Available from <http://www.idsnet.org/Resource/Dams/Development/DPDdev't.html>.[Accessed. 5.August.2002].

Ghana Daily Graphic, June 1, 2002.

Ghana's Daily Graphic (2002), No.148450, 16th February

Goldsmith, E. and N. Hildyard (1984) *The Social and Environmental Effects of Large Dams*, The European Ecological Action Group, Germany.

Gordon, C. and J. A. Ametekpor (eds), (1999) *The Sustainable Integrated Development of the Volta Basin in Ghana*, Volta Basin Research Project, Accra, Ghana.

Held David (1999) *The Global Transformations*, polity press, Cambridge, U. K

Jobin,W. (1999) *Dams and Disease: Ecological Design and Health Impacts of Large Dams, Canals and Irrigation Systems*, E &FN Spon, London, UK.

Kay, C (1989) *Latin American theories of Development and Underdevelopment*, London:Routledge.

Maloney C and Abernethy (2000) Development Deferred: The Volta River. Project [Internet]. Stanford University; Available from:<http://www.stanford.edu/cmaloney/volta> [Accessed 21 October 2002].

McCully, P. (1996) *Silenced Rivers: The Ecology and Politics of Large Dams*, Zed Books Ltd., London, UK.

Moxon, J. (1969) *Man's Greatest Lake*, Andre Deutsch Ltd., London

Muschett, F. D. ed. (1997) *Principles of Sustainable Development*, St. Lucie Press, USA.

Nartey, M (1996) "The effects of the Volta Dam on the economy of settlements along the Lower Volta: Case Study of Atimpoku and Senchi". Unpublished BSc (Planning) Special Study Submitted to the Department of Planning, University of Science and Technology, Kumasi, Ghana.

Peet, R. and M. Watts, ed.(1996).*Development, sustainability, and environment in a age of market triumphalism*, Routledge,London.

Rich, B, (1994). *Mortgaging the Earth: The World Bank Environmental Impoverishment and the Crisis of Development*, Earthscan Publication Ltd, London.

Roggeri, H. (1985) *Africa Dams impacts in the Environment: The Social and Environmental Impact of Dams at the Local Level: A case study of five man-made lakes in Eastern Africa*, Environment Liason Centre.

Ross E., (2001/2002). Introductory Course on *Political Ecology of Development*. Unpublished Document.

Scott J. (1998) *Seeing like a State: How Certain Schemes to Improve the Human Condition Have Failed* Yale University Press, London.

The Economist (2002) *The World Summit on Sustainable Development: A few. Green Shoots in Johannesburg*

Thibodeau J.G and Williams, B. P. (1998) *The River Dragon Has Come*, M.E. Sharpe, Inc., N.Y.

Tisdell, C (1999) *Biodiversity, Conservation and Sustainable Development: Principles*

Trussell, D., (1992). *The Social and Environmental Effects of large Dams: Volume III*, Wadebridge Ecology Center, Uk

Tsikata, E. (1994). "Gender, Livelihood and Ecological Change in the Riverine Communities of the Lower Volta Basin: An Exploratory Study of Tefle and Mepe." Unpublished M.Phil (Sociology) Special. Study Submitted to the Department of Sociology, University of Ghana.

Tsikata, F. (1986) *Essays from Ghana-Valco Re-negotiations-1982-1985*. Ghana Publishing Corporation, Accra.

Usher Danaiya, A. (1997) *Dams as Aid: A political anatomy of Nordic development thinking*, Routledge, London. U. K.

Volta River Authority (1999) *Annual Report and Account*, Vol.38.,

World Commission on Dams (2000) *Dams and Development: A New Framework For Decision-Making*, Earthscan Publications Ltd.,London.

World Health Organization (1993) *Parasitic diseases in water resources development: The need for intersectoral negotiation*

Yergin D. and Stanislaw J., (1998). *Commanding Heights*, [Internet]. Simon & Schuster, Inc., N.Y. Available from:

<http://www.pbs.org/wgbh/commandingheights/shared/minitext/o/p>. [Accessed 3 October 2002].

APPENDIX 1: ANNUAL ENERGY CONSUMED PER CLASS OF CUSTOMERS (kWh)

	1990	1991	1992	1993	1994*	1995*	1996	1997	1998*	1999	2000
Total Generated	5,720,863	6,108,668	6,602,366	6,313,115	6,104,932	6,133,432	6,626,859	6,885,529	5,012,729	5,924,307	7,222,706
Total Imported	3,525,656	1,253	31,515	60,511	319,776	228,405	660,413	573,140	1,031,640	863,617	--
Total Gen. & imported	5,724,388	6,115,324	6,603,619	6,344,630	6,165,443	6,453,208	6,854,904	7,545,942	5,585,869	6,955,947	8,086,323
Total sold	5,536,684	5,911,818	6,382,022	6,196,837	5,974,179	6,076,553	6,657,534	7,341,528	5,437,113	6,804,464	7,834,525
VALCO	2,788,500	2,795,159	2,853,643	2,821,877	2,275,447	2,197,580	2,212,421	2,466,639	9,26,655	1,928,331	2,504,762
E.C.G	1,560,812	1,752,777	2,020,733	2,291,416	2,465,673	2,693,036	3,088,592	3,387,317	3,024,385	3,492,529	3,918,610
N.E.D	66,071	93,233	128,887	151,471	166,797	188,709	229,091	255,053	254,024	306,782	330,349
Mines	315,047	407,565	418,539	469,100	589,875	653,970	717,908	747,984	713,087	696,209	630,420
Akosombo Township	11,343	16,255	19,364	21,202	15,772	15,602	15,297	16,762	16,804	18,222	20,568
Akosombo Textiles	20,599	22,883	28,047	27,129	22,860	24,228	26,014	27,509	26,459	18,690	20,432
Aluworks Ltd	7,195	9,222	11,422	12,218	12,392	11,246	12,335	11,605	10,807	13,149	12,976
Akuse (V.R.A)	6,077	6,674	6,910	7,650	6,937	7,434	7,777	6,318	5,095	4,767	4,365
C.E.B, Lome (1)	452,078	358,887	485,097	310,787	400,344	284,747	348,099	422,341	459,535	325,631	391,902
Export to C.I.E	308,962	449,163	409,380	83,987	18,082	0	0	0	262	160	141

Source: Volta River Authority Annual Report 2000 Pp. 34.

Exports in 1998, 1999 and 2000 are inadvertent exchanges

* Year National Load curtailment