UNDERDEVELOPMENT BY DEVELOPMENT: TECHNOLOGY TRANSFER AND RURAL DEVELOPMENT IN THE VOLTA RIVER BASIN OF GHANA

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DEDICATION

This study is dedicated to the Rural Poor
for whose cause it was done.

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ABSTRACT

The construction of dams has increased within the past two decades resulting in consequences which threaten peoples lives in many different ways. Despite these consequences, however, dams continue to be viewed as vehicles of economic growth and development in many developed as well as developing countries. It is usually expected that the transfer of technology and skills which will make possible the use of improved agricultural methods, fertilizers, machines and seeds will benefit the poor either directly or indirectly thereby raising overall living standards.

This study seeks to investigate the transforming effect of technology transfer in the Volta River Basin, Ghana on the rural communities who live in the basin to this day. It has demonstrated that the people are confronted by more problems of underdevelopment, than development. Our study has shown that the 'modernization' strategy which was adopted with the intention of developing the river basin in 1962 by the then Government of Ghana has done more harm than good to the rural people who live in the area. It is this that leads us to conclude that the transfer of technology and strategies of development must be preceded by careful research to determine their applicability before they are adopted.

Until developing countries are able to determine which technology and skills will help provide solutions to their enormous problems, are able to give increased attention to the prevailing socio-economic and cultural conditions in the local area and make efforts to involve would-be beneficiaries of change in the process, programmes designed to eliminate poverty will fall short of expectations and development will fail.

Ebenezer Odarlai Annan
October, 1993.

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Finally, I owe many thanks to my beloved wife Nana and my son Nii Lante for their tolerance and patience to enable me complete this work. My deepest gratitude, however, goes to my Lord and God without whose provision it would not have been possible to complete this study.

If there are any faults with this work, neither my supervisor Gerry Cameron nor any of my advisors are responsible for them, they are entirely mine.

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ACRONYMS AND ABBREVIATIONS

BPA	Bonneville Power Administration
C	Cedis (Ghana's currency)
CEB	Communaute Electrique du Benin
CPP	Convention People's Party
£	Pound Sterling (Britain's currency)
ECG	Electricity Corporation of Ghana
GWH	Gigawatt Hour
KWH	Kilowatt Hour
PNDC	Provisional National Defence Council
VALCO	Volta Aluminium Company

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CHAPTER 1

INTRODUCTION

1.0 HYDROELECTRIC DAMS - BLESSING OR BANE?

The construction of dams has increased within the past two decades and has affected the lives of many people as well as their environment in several ways, especially so in developing countries[1]. Despite problems such as flooding and the destruction of indigenous cultures which result from such projects, they are often seen as a basis for progress and development in both developed and developing countries. It is usually expected that with the local production of hydro-electric power, industrialisation will form the basis for economic growth and development.

Hydroelectric dams have enabled the production of cheap electricity in many countries. For instance the Aswan dam in Egypt has enabled the country to increase its agricultural production through irrigation. With the local production of hydroelectricity other countries including Ghana have been able to diversify their export sector and meagre levels of industrialisation have been made possible.

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[1] Phillip Williams in his introduction to 'The Social and Environm ntal Effects of Large Dams (ed) E. Goldsmith and N. Hildyard. 1984: 9.

The expectation of many governments that the construction of dams would facilitate a transition from agricultural to industrialised economies, however, has resulted in the destruction of ecosystems and traditional agricultural practices. At the same time, the massive financial investment which such projects have required, has reduced the ability of government decision makers to allocate funds for social services which would directly benefit poorer segments of their societies.

Apart from the fact that the technology of dam construction is often inadequately transferred to developing countries, such technology also poses many technical problems which are yet to be fully investigated. Several dam projects in India, for instance, have failed to accomplish their goals due to inaccurate engineering calculations[2]. In some cases, the water reservoirs have encountered siltation problems which affect the smooth operation of turbines and consequently reduce the life-time of the projects[3]. Other considerations such as the effects of ageing structures and the cost of decommissioning dams are yet to the addressed. These problems lend credence and poig. ancy to Williams' view that "the

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[2] See generally Bharat D., 'The Indian Experience with Large Dams' in Goldsmith and Hildyard (ed) 1984. op. cit., p201-208.

[3] See also Drucker C., 'Damming the Chico: Hydro Development and Tribal Resistance in the Philippines' in Goldsmith and Hilyard (ed) 1984 op. cit., p304-313.

concept of 'dam safety' is a new phenomenon"[4].

Planning problems have also been a characteristic of many dam projects around the world. Environmental, health, housing, agricultural and other factors are either ignored or considered secondary as opposed to actual engineering processes in the planning of such projects. Lavergne, in reference to the Aswan Dam, pointed out that "[the] failure [of planners] to anticipate factors such as degradation of the quality of agricultural land, soil salination, deterioration in water quality, coastal erosion and saltwater intrusion is creating massive problems for Egypt"[5]. Factors which are not immediately quantifiable are often discounted by engineers and economic planners during the appraisal stages of such projects. Thus, their construction is based on a cost-benefit analysis within which little consideration has been given to social costs.

Lending agencies and multinational corporations who provide loans to fund dams are usually not prepared to take responsibility for the aspects which are in conflict with their commercial objectives. This leaves local governments with the responsibility of providing funding for resettlement and the social problems which may result from the project. In many cases, however, such funds are either limited or not

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[4] Williams P., op. cit., p10

[5] Lavergne M., 'The Seven Deadly Sins of Egypt's Aswan High Dam' in Goldsmith and Hildyard (ed) 1984 op. cit., p181-183.

available. Deliberate political and economic decisions are also responsible for ineffective planning of dam projects. Where politicians want to get re-elected, they are in a hurry to implement campaign promises without allowing enough time to assess the full impact and potential of dam projects before construction. Unfortunately, environmental and social costs are seen as obstacles to development which should be ignored and attended to only after the project has been put into operation. When this happens, the social costs of the project become enormous and the poor are doubly disadvantaged.

Local people who have been practising traditional agriculture for several hundreds of years are sometimes required to sacrifice their sources of income, culture and possibly their lives for development, from which they receive few benefits. Furthermore, they become victims of social disruption, demoralisation and in many cases declining living standards as a result of relocation. A report from a survey conducted by the Hindu College Nature Club on the Narmada Valley Project in India concludes, "the process we have embarked on is not only ecologically non-sustainable, it is socio-culturally destructive. It has increased inequalities ... broken integrative social relationships and isolated individuals from each other and from nature. Most damaging, our fixation with this 'Western' model has meant the neglect of all alternative forms of change including the possibility of developing a traditional time tested, ecologically-sound

practices like organic farming. Is this development?"[6]

1.1. MODERNISATION APPROACH

Modernization theory emerged in the 1950's as a major framework within which to analyze development and its arguments served as a guide to development for many countries[7]. David McClelland, one of the main proponents of the theory, argued that the rise and fall of civilizations was due to individual values held by a majority of the people living in that particular society. He maintained that personality characteristics acquired through socialization creates opportunities for economic and technological progress for the rest of the population[8].

On the basis on this assumption, Alex Inkeles formulated a set of attitude questions which came to be known as 'the modernity scale'[9]. This was used in the 1960s and 1970s to determine the extent to which members of a society were doing

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[6] Kalpavrish and the Hindu College Nature Club., 'The Narmada Valley Project: Development or Destruction' in Goldsmith and Hildyard (ed) 1984. p224-244.

[7] Fagerlind I. and Saha J., Education and National Development, 1991. Chapter.1 p15.

[8] McClelland D., The Achieving Society, New York, 1961.

[9] Inkeles A. and Smith D., Becoming Modern, London, Heinemann Education Books, 1974.

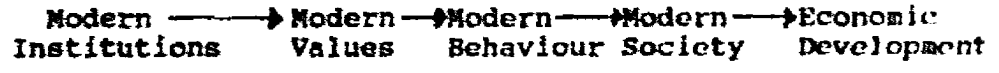
what was considered 'modern'. The main premise, of course, was that modernization was equal to development and therefore no society could develop until the greater portion of its population was seen to be holding modern values.

This philosophy has been the underlying principle for the undertaking of many development projects including hydroelectric dams which have received national as well as international funding in developing countries.

Modernization theory is based on the assumption that there is a causal relationship between five sets of variables namely, modern institutions, modern values, modern behaviour, modern society and economic development, as illustrated below:

FIGURE 1

THE CAUSAL RELATIONSHIP OF MODERNIZATION



Source: The Process of Modernization (based on Inkeles and Smith 1974)

Central to the arguments of the modernists is the concept of growth maximization, and the poor are expected to benefit from the 'trickle down' of the results of overall economic growth.

Proponents of theory of modernization saw development also as the question of increasing gross levels of savings and

investments (both internally and externally) by the private and public sectors of the economy. Development economists realised, however, that this was not being achieved in many countries and the impact of growth only widened the gap between the poor and rich. The evidence for increasing unemployment, malnutrition, homelessness and ill-health is overwhelming even today. Provision for reducing poverty and inequality has therefore been integrated into several national and international development programmes.

In recent years, it has become clear that the arguments of the modernisation school have failed to meet expectations and the need for alternatives approaches have become necessary. Unfortunately, most development programmes continue to concentrate on growth without adequately addressing the issues associated with distribution. The rural communities, however, continue to receive specific attention through the location of projects in rural areas to help reduce unemployment as well as programmes designed to mitigate the social costs of development projects. Many of these programmes, however, do not benefit the poor segments of the society.

The modernization approach to development, like many others has come under criticism from writers in various fields of study. First, research in many countries has yielded findings which do not support the theory. Available evidence, does not support the argument of a direct causal relationship

between modern values and modern behaviour. People who live in rural areas in developing countries, for instance, tend to be generally conservative and are not affected much in their attitudes and values by technological innovations[10].

Second, the term 'modern' is subjective and may vary from country to country. Such variations make it practically impossible to set generalised criteria by which the term could be characterised. Working with such ambiguous terminology is not only suspect but also does not allow qualitative analysis. Third, society usually includes foreign visitors and immigrants with professional skills. So far there is no evidence that such professionals from less-developed countries (who apparently possess modern skills and values) affect the structural and economic development of developed countries to which they either migrate or visit. In the same way people from developed countries who visit or migrate to developing countries do not change the institutional structures of the 'less-modern' societies in which they live to any significant levels, if at all. Fourth, advocates of the modernization approach to development place much emphasis on the establishment of 'modern' institutions to accommodate change and to direct the process of towards economic development. Institutions such as banks, credit agencies, agencies responsible for roads, agriculture, police services, social

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[10] See generally, Mendosa E., 'The Failure of Modern Farming in Sisala Land, Northern Ghana, 1967-1977' in Human Organisation Vol.39, No.3. 1980 p275-279.

welfare, taxation, employment and planning to mention a few become essential at this stage. In the absence of such institutions, therefore, the transition from modern behaviour to modern society will either not be effective or would not take place at all. In developing countries, where in most cases these structures for change are either absent or inadequate, the prospects for applying the modernization approach to development becomes even more bleak and impractical.

The approach also implicitly considers the society which needs to be 'modernized' culturally backward. Apart from the fact that this approach is ethnocentric, there has been no opportunity for participation by the local people. In fact in many cases traditional behaviours, attitudes and culture have been seen as obstacles to progress by the advocates of modernization theory. Development projects are usually designed from the headquarters in the city or even in foreign countries and imposed on the local people in the name of national development.

Finally, the assumption about the final goal of the process of modernization, namely economic development, is ideologically prejudiced. The theory assumes that for a society to be developed it must also become 'Western[11]'. This is clearly unacceptable. As we will demonstrate in chapter

[11] The term 'Western' is often used in the literature in reference to non-centrally planned developed economies of the world.

four, the failure of modernizationists to award the necessary attention to the factors mentioned above, has to a significant extent led to the further impoverishment of the rural poor who live in the Volta river basin.

As has been pointed out, the modernization approach to development has failed to achieve its promised goals in many countries and therefore, it is imperative that theories and strategies of development have to be researched in order to determine how relevant and applicable they would be to the circumstances of adopting countries before they are employed. As a challenge to the modernisation explanation of development and underdevelopment, other schools of thought including the dependency and ecodevelopment schools have emerged. There are also development practitioners who advocate what has become known as participatory development. In the sections below, we will briefly discuss some of these alternatives.

1.2. DEPENDENCY THEORY

The dependency theory was formulated by economists and sociologists from Latin America and its main advocate was Andre Gunder Frank[12]. This school of thought emerged as a critique of the mutual benefits which trade between Latin American countries and their industrial counterparts were supposed to bring to either partner. Advocates of the

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[12] See Roxborough I., Theories of Underdevelopment, 1979. p44

'dependency' theory maintain that core (industrialised) nations benefited immensely from world trade at the expense of their periphery (underdeveloped) partners whose underdevelopment was only deepening. The central argument was that socio-economic dependency or neo-colonialism generates underdevelopment. In order to reverse the trend, advocates of the theory argue, countries of the South had to adopt industrialisation by import substitution, planning, State intervention and regional integration and cooperation. These and other steps, it was believed would help underdeveloped countries to lessen or break the ties of dependency with their developed counterparts.

Like any other theory, the dependency argument has come under severe criticism because of its failure to construct its own theory of development. With regards to import-substitution, the theory is challenged by the fact that many developing countries including Ghana, have small internal markets and therefore, policies in the direction of import substitution industrialisation may not be economically advantageous. Since many developing countries do not develop their own technology and would have to import required technology from other industrialised countries, they would suffer a setback regarding any policy aimed at 'delinking'. Planning and State intervention in the economy does not provide a guarantee for expected results. Unless the skills and knowledge for effective planning and intervention in the

appropriate sectors are available, various problems of efficiency and effectiveness may occur. These and other problems have occurred in many countries where planning techniques have been adopted. Finally, as a result of the differences in the problems and priorities which confront nations of the third world, regional integration and cooperation is not always seen as being a move in the right direction.

Despite the shortcomings of the 'dependency' theory, it has led to critical questioning of the 'modernisation' approach to development. Development economists now recognise the need to analyze particular conditions affecting development in individual countries in order to identify unforseen contradictions which may characterise the process. This gives further credence to the argument that generalisations could be dangerous, and thus that development has to be considered in a country specific context. In other words, since historical, political, socio-economic and other conditions vary from country to country, it is prudent that each country's reality be examined independently, in order to derive appropriate solutions to their peculiar problems.

Development has been based on growth and the exploitation of environmental resources; yet not much attention has been given to the effects of development on the environment. The economic and ecological crises of the last decade (1980 -1990) has however led to an increased awareness of the importance of

the environment in development. Recent literature on ozone layer depletion, global warming and the greenhouse effect on the environment illustrate this concern[13]. The 'Ecodevelopment' school of thought recognises and takes into account the effects of economic growth on the world's environment. It is a development philosophy that advocates efficient use of the natural and human resources of societies and countries in a way that provides for the basic needs of the people and at the same time, protects the environment.

1.3. OTHER RECENT CONCERNS IN DEVELOPMENT

First, the questions of equity and equality in distributing the benefits from development have become key issues in the field of development in recent years. In a forward to the Food and Agriculture Organisation's Peasant Charter, the Secretary-General of the Organisation, Edouard Saouma, sums up this concern as follows: "The rural poor must be given access to land and water resources, agricultural inputs and services, extension and research facilities; they must be permitted to participate in the design, implementation and evaluation of rural development programmes ... . Growth is necessary but not sufficient; it must be buttressed by equity and, above all, by people's participation in designing, implementing and evaluating rural development programmes and

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[13] World Development Report ., op.cit., 1992.

policies[14].

Second, the relationship between development and socio-political transformation has also become a concern for development workers. The main concern is that if development is to benefit the poor and disadvantaged in society, existing socio-political and economic structures would either have to be dismantled or transformed. It is certain however, that the custodians of power would not relinquish their oppressive status without conflict. Thus the question upon which this concern pivots is whether poverty could possibly be eradicated without breaking down the social, political and economic structures which create and maintain it.

Third, the role of women in development has also received considerable attention within the last decade especially since the United Nations Decade for Women - 1975-1985[15]. The role of women in development is increasingly being recognised and the traditional belief that women are meant to be home-bound is changing. As a result, the argument that women must be allowed not only to contribute but participate in making decisions which affect and rule their lives is beginning to gain sympathizers even among male-dominated institutions.

In general terms, we can say that development must be

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[14] The Peasants' Charter: The Declaration of Principles and Programme of Action of the World Conference of Agrarian Reform and Rural Development, FAO, Rome, 1981.

[15] See Nuket K., Bringing Women In: Women Issues in International Development, 1991.

comprehensive and that the relationship between social, economic, political and human development must be carefully worked out.

Development is a complex and sometimes slow process involving people and other factors such as capital, the environment, geographical location and the natural resource endowment of the society or country. Development workers therefore, have to work patiently with people to facilitate and support the initiatives that arise from their priorities as individuals, groups and communities. This would lead to a sustainable form of development emerging from, and supported by, the would-be beneficiaries themselves. The importance of increased involvement by the beneficiaries of development in the process can no longer be ignored. This study will demonstrate that apart from institutional, environmental, financial and other problems which have rendered the strategy for rural development in the Volta river basin a failure, cultural insensitivity on the part of planners to the circumstances of the rural people, as well as their lack of involvement, were even more debilitating to the success of the project.

1.4. THESIS OF THE STUDY

This study is based on the premise that the way in which government decision-makers define or explain development

determines the country's development goals and priorities and consequently, the knowledge and/or technology to be employed (whether locally or externally acquired) in order to achieve those goals. The main point which this study seeks to prove is that technology transfer will have devastating consequences on development it is not preceded by careful research to assess its viability and appropriateness. It is the contention of this study that the consequences of the Volta Basin Project in Ghana and especially the problems which have hampered rural development in the Volta River Basin up to this day are, among other things, the result of the modernization approach to development which was adopted by the Convention People's Party (CPP)[16] government in Ghana between 1957 and 1962. In other words this investigation seeks to answer the question as to whether the modernization theory approach to development which motivated the construction of the Volta Dam has achieved development for the rural people who live in the river basin as promised by the CPP government in 1962. The project was intended to precede industrialization and development in Ghana as well as improve the standards of living among the rural communities living in the River Basin. Instead, as we will show, the Project has brought about many of the problems with which underdevelopment is associated.

An analysis of this sort is important because technology

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[16] The Convention People's Party was elected into power in 1957 and ruled until it was overthrown in a military coup d'etat in 1966.

transfer, largely associated with modernisation, and its impact on development has become an important subject among practitioners in development in recent years[17]. Interdependence has become so basic a concept in the world today that the tendency for countries to acquire knowledge, skills and ideas from the development record of others as well as import foreign technological 'hardware' to be able to maintain their niche or find a suitable one in the global economy, is increasing and will persist. In fact, some writers believe that new technologies offer developing countries a low cost, easy use of technology that is extremely amenable to small scale applications which if properly exploited, will enable these countries to move out of their dependent states and become truly self-reliant[18]. It is only when countries, especially in the developing world, are able to employ an appropriate mix of imported technology with their own resources that their development efforts will yield expected results. The inability of many developing countries to undertake such analysis in order to determine the appropriateness of imported technology or knowledge, has resulted in the failure of many projects in those countries.

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[17] Blake D. and Walters R., The Politics of Global Relations, 1983. Chapter 6.p146

[18] Wad A., 'Limitations and Opportunities for Developing Countries of emerging Micro-Electronic Technologies', cited by Cole S. in 'The Global Impact of Information Technology', World Development Vol.14 No.10/11 p1278.

1.5. SOURCES OF INFORMATION.

Since the completion of the Volta Lake project in 1965, the literature has become abundant. This work will therefore draw extensively on published material or work which has already been done by various experts in different disciplines. These would be supplemented by other secondary library material including maps, journals, government and non-government publications and data which are deemed relevant to the issues being discussed.

There are several advantages which accrue from the use of secondary material. As indicated by Lincoln and Guba[19], secondary material is always available at low cost (in terms of investigative time), often for free. Such material is also stable in the sense that it represents a specific period in the past and therefore can be analyzed and re-analyzed in both the present and the future. Apart from the fact that secondary materials constitute a rich source of information appearing in the language of the particular period and the setting within which they were compiled.

There are of course disadvantages in the use of such material. First, there is the possibility of the lack of objectivity; it may only represent the biased views of the author. Since objectivity is required in every academic

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[19] See Lincoln Y. and Guba E., Naturalistic Inquiry, 1985, cited in Purvo Santoso., Political Challenges to Sustainable Development in Indonesia, 1992. p11

enquiry, this could be a severe limitation. However, this problem is not insurmountable. Caution would be exercised to cross-check the data with other sources to establish consistency.

1.6. METHODOLOGICAL LIMITATIONS

Like any other study, this work is not without limitations. First, the analysis is based largely on secondary material. Although efforts have been made to cross-check their accuracy and consistency with other sources, the information available should ideally have been verified by primary field data. Unfortunately, time and financial constraints did not permit such an investigation. Second, most of the research material and information which was used for analysis were published in the 1980's or even earlier. It arguable that we should have consulted some more recent publications reflecting any changes in conditions in the Volta River Basin. This would perhaps have altered the conclusions arrived at in this study.

Nevertheless, and despite these limitations, the study has indicated that this is a line of inquiry worth pursuing and given the information available, the conclusions in this thesis are valid.

This thesis will be structured around five chapters. Chapter two will discuss in detail the meaning of the term 'technology' as has been used in the literature by various

writers. The discussion will deal with the various ways in which technology is transferred as well as some of the reasons for which such transfers are made. Terms such as Rural Development, Integrated Rural Development and some of the causes of rural poverty will also be briefly discussed. Chapter three presents a review of the work which has already been done on the Volta Lake Project by various experts and the historical and ideological circumstances which form a background to the construction of the Volta Dam. Finally, some light will be shed on the expectations as well as the socio-economic consequences of the project. Chapter four will constitute an assessment of the entire project using available statistics to determine its overall impact on rural development in the basin. Conclusions and recommendations not only for further study but also for future policy making would be made in Chapter five.

CHAPTER 2

TECHNOLOGY TRANSFER AND RURAL DEVELOPMENT

2.0 THEORETICAL FRAMEWORK

While an analysis of technology transfer and its impact on rural development is necessary in the case of the Volta Lake Project, it is also necessary to provide a framework for the use of terms and concepts which would be employed in this thesis. This chapter is devoted to this purpose. We will also discuss terms such as 'technology', 'rural development', 'integrated rural development', and consider some of the reasons why technology is transferred.

Technology has often been identified with 'hardware' such as machines, tractors, computers and cameras as well as the skills which enable one to use such items. Some economists[20] tend to define technology as 'the knowledge and techniques with which inputs into the production process are transferred into output'. Others are of the opinion that technology is 'knowledge' and more importantly, 'knowledge' which enables the achievement of desired ends[21]. Soete refers to technology as 'innovations', and argues that individuals and firms do not

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20 See eg. Holzman F. and Portes R., The Limits of Pressure, cited in Blake and Walters R., op.cit., p149.

21 Blake D. and Walters R., op. cit., p149

immediately adopt an innovation because of the uncertainty and lack of information about new technology[22]. Ernst and O'Connor have stated that "technology has to do with certain kinds of knowledge which allow the adaptation of means to ends. It is embodied in machines but also in the brains of people, in organizational structures and in behavioural patterns which in turn are conditioned by the strategies of different social factors and their patterns on conflict and cooperation"[23]. As a result of this, they caution that in-depth case studies at sectorial, product and firm levels are required to identify specific historical contingencies before any technology is adopted.

2.1. WHAT IS TECHNOLOGY?

In this thesis, a broad definition of 'technology' is employed and is in conformity with explanations offered by Stewart[24] as cited in Meier[25]. As used in this thesis

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[22] Soete L., 'International Diffusion of Technology; Industrial Development and Technological Leapfrogging' in World Development, 1986. p410.

[23] Dieter E. and O'Connor D., Technological and Global Competition, The Challenges For Newly Industrialising Economies, 1989. p20.

[24] Stewart F., Technology and Underdevelopment, 1977. p1-3. This discussion on 'technology' and its appropriateness was reprinted in Meier 1989.

[25] Meier G., (ed) Leading Issues in Economic Development, 1989.

"Technology [thus] includes methods used in non-marketed activities as well as marketed ones"[26]. It embraces skills which are known to a country or unknown but are transferred from other countries/societies for the improvement of agriculture, hygiene, medical care, housing and environ-mental protection among others.

Technology has also been divided into two main categories, namely, physical technology and social technology. Physical technology constitutes tangible pieces of equipment which are actually used with the aim of achieving certain ends. Social technology on the other hand is composed of three intangible parts. First, skills and expertise which people possess and can use to help achieve required results. Second, intellectual ability and the gift of invention which results in innovations. This form of technology is usually the result of an investment in people's education. This is the reason why levels of education in various countries are related to their levels of development. Third, the institutions, whether at the community or State level which enables technology to transform the society within which it is used, are part of social technology. After all, technology per se is not valuable unless it has a transforming effect on society.

The transfer of technology and its impact on developing countries has been of central concern to many researchers in development studies as well as economics in recent years. This

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[26] Stewart., op. cit.,

has brought about various definitions for the term, and despite the seemingly different opinions there is agreement among writers that 'technology' is more than a product. In fact it includes the means to achieve that product or end.

Stewart argues that technology consists of unique techniques available to a particular country and those that could be acquired through various means from the rest of the world. Technology which is adopted by a country is therefore only a part of what is known both to the country and the rest of the world. If the technology which is adopted by an individual, society or country does not yield the required results and is declared inappropriate, it is because an inappropriate selection of techniques which are known and are available to the adaptor has been made, or that the volume of technology known to the world is inappropriate to the adaptor's circumstances or that techniques available to the adaptor are inappropriate.

Let us say world technology is represented as:-

WT = (Ta, Tb, Tc, Td, ...Tn)

where WT = Technology known to the world

Let us assume again that technology known to the country is represented as:-

CT = (Ta*, Tb*, Tc*, Td*.....Tn*)

where CT = Technology known to the country.

The asterisks indicate that only technology known to the country and are available are included.

CT is therefore a subset of WT and is represented as:-

The nature of technology, Stewart, maintains, is determined by several circumstances for which they are designed for instance, weather and climatic conditions, soil texture and income levels of the target groups. Technology which is actually used would be a selection from that which is available to the country (whether it was originally developed or acquired from elsewhere in the world). Technology in use is represented as:-

$$UT = (Ta^*, Tb^*, Tc^*, Td^*, ...Tn^*)$$

where UT = technology which is actually in use. The asterisk indicates that the techniques are known to the country and are available.

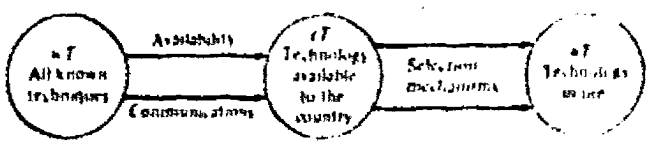
Techniques which are actually in use would be a subset or a selection of those techniques which are known and are available to the adaptor.

Finally, technology in use is a subset of technology available to the adaptor which is also a subset of the volume of technology known to the rest of the world. The relationship is represented as:-

This could be illustrated diagrammatically, as follows:

FIGURE 2

USED, COUNTRY AND WORLD TECHNOLOGY



Source: Meier G., op.cit. p269

Our definition of technology includes adopting new skills and methods of doing things. These new ways of life may involve shifts from traditional to mechanized agriculture, replacing mud huts with thatched roofs by cement block houses with aluminium roofs, the introduction of formal/orthodox medicine in place of traditional/herbal medicine and travelling by ferry instead of walking. These changes in life-style usually associated with modernity, are expected to

precede an economic development phase, as the modernisation theorists would have us believe. On the contrary, certain ways of life may be appropriate only in particular historical, socio-economic and cultural circumstances. Technology could be said to be the product of the particular social relations in which it was developed because social conditions to a significant extent determine its development[27]. Perez opines that "since technology is the 'how' and 'what' of production, it is in fact very much a social and economic matter"[28]. She maintains that technological decisions are taken in a specific socio-economic context and those decisions in turn affect that context.

Consequently, 'technology', 'knowledge' or strategies of development whose application have proved successful in other countries, may not necessarily be helpful to others. The lack of research into local problems by indigenous researchers to determine the appropriateness of imported technology in many developing countries, leave decision makers with no alternatives but to adopt technology with a) high capital intensity, b) high degrees of skill mix which is usually not available, and c) high dependence on imported raw materials

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[27] Kaplinsky R., 'Electronics Based Automation Technologies and the Onset of Systemofacture: Implications for Third World Industrialization', in World Development Vol.13, No.3,1985. p423-439.

[28] Perez C., 'Micro-Electronics, Long Waves and World Structural Change: New Perspectives for Developing Countries,' in World Development, Vol.13(3), 1985.p441-463

rendering such technology inappropriate[29]. It is important that caution is exercised before borrowing or adopting technology from other countries. This would, hopefully, help avoid the failure which has plagued many development projects in developing countries.

Many of the writings on technology transfer and especially the selection of techniques in developing countries seem to share the view that such technology is 'inappropriate' for their environment, socio-economic needs or for overall development efforts. More often than not, conclusions regarding the appropriateness of technology in developing countries have been reached on the basis of relative (physical) factors rather than on profitability or even the social cost of the choice of technology. Meier observes that, "although these studies indicate a wide potential choice in both primary and secondary production operations and alternative commodity specifications, the fact remains that the selections actually made in developing countries still appear to be 'inappropriate'... . It is therefore necessary to analyze why the problem of inappropriate technology persists and what policy measures might be undertaken to overcome the obstacles to the use of appropriate technology"[30]. From the above discussion it must be noted that anything whether a

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[29] Ahiakpor J.W., 'Do Firms Choose Inappropriate Technology in LDC's', in Economic Development and Cultural Change, 1989. p558.

[30] Ibid p557.

piece of equipment or knowledge which enables the user to achieve an end or which is employed with the intention of achieving a goal could be considered as some form of'technology'. It is in order at this point to briefly deal with some of the reasons for which technology is transferred.

2.2. HOW IS TECHNOLOGY TRANSFERRED?

Technology is said to be transferred when knowledge relating to the transformation of inputs into outputs is acquired by entities (such as firms, research institutions and government agencies) within a country, society or community from elsewhere. International trade and inter-dependence has made this process a common phenomenon and it occurs between developed as well as between developed and developing countries through licences and patents, supplies of machinery and equipment, exchanges between scientific institutions of different countries, consulting and engineering services, aid packages and by students studying abroad. While technology flows take many forms, they are mainly linked to foreign investment in overseas countries. Foreign investment includes capital investment through subsidiaries and joint ventures as well as non-capital investments such as patent rights and licensing.

As noted earlier technology reflects the particular conditions within which it is developed and that is why

caution should be exercised in adopting foreign technology. There is an emerging view in the literature, however, that the transfer of technology has some advantages. It has been argued that the costs of research and the development of technology to the adopting country are reduced or eliminated. Especially in cases where the adopting country cannot afford these costs, it makes economic sense to acquire such equipment or knowledge from elsewhere. Lewis writes, "it is not necessary to be a pioneer in order to have a large export trade. It is sufficient to be a quick imitator. Britain would have done well enough if she merely imitated German and American innovations. Japan, Belgium and Switzerland owe more of their success as exporters of manufactures to imitation than they do to innovation"[31].

Technology could also be transferred by copying techniques used by other countries. Japan, for instance, copied a significant portion of its technology from Holland and the former West Germany. This was achieved by purchasing equipment from those countries and then having engineers dismantle them to learn how they were manufactured. It is also possible for mechanical engineers and technicians to learn about various equipments by merely repairing them over a long period of time. It becomes possible, then, after a while, to develop proto-types of such equipment and improve upon them

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[31] Lewis W.A., 'International Competition in Manufactures' quoted in Fransman M., Technology and Economic Development, 1986. p66.

over time.

Whatever the pros and cons of technology transfer, there is evidence that it leads to dependency problems ranging from 'brain drain' to the loss of scarce resources as well as the involuntary acquisition of foreign norms, structures, cultural values and strategies of development.

These methods, skills and 'knowledge' (which we prefer to call 'technology') are transferred by governments (for various political and economic reasons), Trans-National Corporations (TNC's), as well as Small and Medium Enterprises (SME's), especially to developing countries through the establishment of local industries, distribution outlets and training facilities for commercial purposes[32]. It has been estimated that Transnational Corporations account for between 60% - 70% of technology traded and a large portion of this figure is exported to the developing countries. A large portion of these flows originate from parent companies through their subsidiaries - the latter either partially or totally owned by the former. Small and medium sized enterprises in developing countries, usually employing fewer than 500 people and representing over 90% of such enterprises are also responsible for transferring technology in countries within which they operate. This is not surprising taking into account the fact

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[32] Herbolzheimer E. and Ouane H., 'The Transfer of Technology to Developing Countries by Small and Medium Sized Enterprises of Developed Countries', in Trade and Development, An UNCTAD Review No.6, 1985.

that SMEs represent between 15% to 30% of all subsidiaries of European enterprises operating in Brazil, Mexico, Peru and Venezuela[33] for instance.

Having dealt with the varied explanations for the term 'technology', my definition of the term in this thesis is further clarified. Although, various pieces of equipment and machinery, materials and skills (which in themselves constitute technology) were imported to undertake the construction of the Volta Dam per se, they do not form part of the analysis to be undertaken. The main form of technology being considered are the 'new methods' of production which were necessitated by the implementation of the Volta River Project and which were expected to facilitate economic growth and development not only in the Volta river basin but also in the nation as a whole.

It is appropriate at this point to explain how terms such as 'Rural' and 'Development' are used in this study.

2.2.0 DEFINING 'RURAL DEVELOPMENT'.

Rural areas, especially those in the developing world, are characterised by impoverished people who engage in agricultural occupations[34]. While it is true that most rural

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[33] Dieter E. and O'Connor D., op.cit.

[34] See Dixon C., Rural Development and the Third World, Routledge, 1990. Chapter 1

people are poor, many of them may not necessarily be involved in agriculture. Some rural people are engaged in the rural industrial sector, own vast portions of land, and others offer their labour to prosperous companies for cash, thus having life-styles similar to that of urban dwellers. It is difficult, therefore, to draw a fine line between rural and urban areas based only on wealth and life-style. In many cases, the definition is a matter of geographical location rather than other factors. In this work, the term 'rural' has been used to describe the 52 settlements which were established for the resettlers affected by the construction of the Volta Dam (see figure 4).

2.2.1 EXPLAINING RURAL POVERTY

Majority of the world's poor live in rural and semi-urban areas, and therefore in recent years, a lot of attention has been devoted to the question of 'Rural Poverty' and its causes. Rural poverty has been explained as being the result of inadequate land holding per person, inadequate per capita annual earnings, poor methods of farming and production used by rural dwellers. Though these factors are helpful in explaining the predicament of the rural poor they only provide a limited view of the problem.

Chambers[35] provides a detailed analysis of some of the

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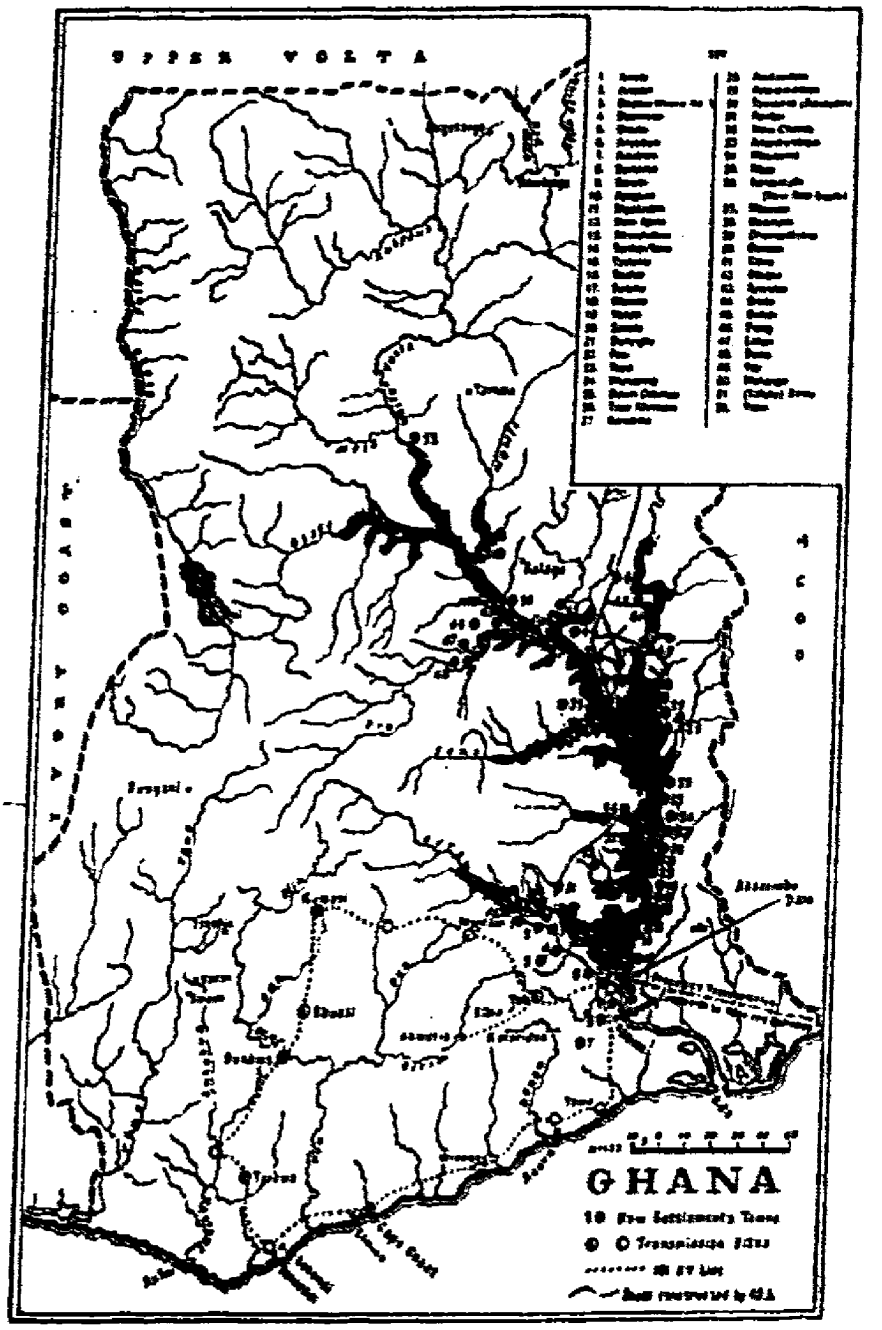
[35] See Chambers R., Rural Development: Putting the Last First, 1983.

MAP 1

GHANA - VOLTA RIVER PROJECT NEW SETTLEMENT TOWNS



The Volta River Project in Ghana (Moxon 1969)

ways in which limited access to political power results in a poor bargaining power (on the part of the poor) when dealing with wealthy landowners, merchants, landlords, money lenders and even the state. The poor then become not only vulnerable but also isolated from the rest of the society. He argues that these characteristics are re-enforced by ill-health, malnutrition and an unending pre-occupation with the ability to survive (see table 1).

Researchers who have tried to explain the causes of rural poverty have so far done so from two main perspectives. First, there are those who attribute poverty among rural communities to broad physical and environmental factors and secondly, there are those who are convinced that rural poverty has causes which are external to the rural sector itself. This is the subject of an ongoing debate between the Political Economy and Physical/Ecology schools of thought.

2.2.2 POLITICAL ECONOMY VIEW OF RURAL POVERTY

The socio-economic approach to explaining the causes of poverty in rural areas has been referred to as the Political Economy view. Proponents of this view explain rural poverty in terms of the distribution of wealth and power within the rural community. At the centre of their analysis is the argument that the processes whether international or national, which make it possible for power and resources to be concentrated in

Table 1

SOME CHARACTERISTICS OF POVERTY

Landless	Low life expectancy
Too little land	Large families
Lack of transport facilities	Deforestation
Malnutrition	Child labour
Lack of adequate tools	Low income due to low producer prices
Ill-health	Irregular income
Drought/Floods	Weak bargaining position
Illiteracy	Poor housing facilities
Poor sanitation	Pre-occupied with survival
High infant mortality rate	Indebtedness
Unemployment	Low productivity

the hands of a few local people give rise to rural poverty. The predicament of the rural poor is thus viewed as tied into the national and international unequal economic system. For instance, a fall in world market prices of agricultural products almost invariably reduces the ability of national governments to pay higher producer prices to farmers, and

consequently, national prices fall as a result of excess supply. In such periods of tumbling prices, farmers, who for the most part live in the rural areas are confronted with the choice of accepting low prices for their produce or the loss of their harvest due to poor storage facilities.

Since poor families are almost always under pressure from local money lenders to repay loans and rent for land use, and since they are also in need of money to meet daily expenses, they have no choice but to sell their produce at less than expected prices. As a result of this experience agricultural inputs such as tractors, fertilizers, high-yielding seeds and pesticides accrue to the wealthier farmers and powerful absentee farmers, thus widening the gap between the rich and poor.

Furthermore, the political economists maintain that factors such as neo-colonialism and its legacies, inappropriate school curricula, lack of awareness, dependency thinking, division of labour, political instability, sectarianism, lack of political education and lack of democratic decision-making are among the causes of poverty. Unfair intra-and international trade, central marketing and external debt have also been blamed for rural poverty.

2.2.3 THE PHYSICAL/ECOLOGICAL VIEW OF RURAL POVERTY

The relationship between rural poverty and the

environment has been documented extensively[36]. This is supported by the fact that some of the most impoverished rural communities in the world live in the desert and mountainous regions of Africa and Asia. The physical/ecological school of thought blames the causes of poverty on factors such as poor soils, unreliable rainfall, lack of surface water, lack of natural resources, overgrazing, deforestation and erosion[37].

There is evidence to substantiate this argument but then no generalizations can be made regarding this phenomenon because there are poor communities occupying the silt-rich deltas of the Ganges and Brahmaputra rivers in Asia, and on the volcanic soils of Java in Indonesia. Whether people live in a resource rich or poor environment, population size, methods of farming, diseases and local depletion of the ecosystem could also contribute to rural poverty. It is clear from this study that the construction of the Volta Dam has not only perpetuated conditions of poverty but also maintained those conditions in the river basin.

2.3.0. THE NATURE OF RURAL DEVELOPMENT

The concept of Development has been defined in several ways by many writers but a compendium of the various

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[36] See generally World Development Report, 1992

[37] See Burkey S., People First: A Guide to Self-Reliant, Participatory Rural Development, 1993.

explanations is not intended here[38]. Suffice it to say that there is consensus among development practitioners that "development" has to do with improvements in living conditions of people. It is our opinion that Development must also entail efforts which will enable the supposed beneficiaries to better understand their local socio-economic and political processes and enhance their competence to solve their own peculiar problems. Development efforts must also make possible the expansion of personal skills and enable a greater control of economic resources by the local people, restore their dignity and self-respect and make it possible for them to deal with other social groups on the basis of mutual trust and respect[39].

The United Nations Education, Scientific and Cultural Organisation (UNESCO), defines the goals of development to be "not to develop things but to develop [people]. Development must be aimed at the spiritual, moral and material advancement of the whole human being, both as a member of society and from the point of view of individual fulfilment"[40].

In general rural development could be said to be the process by which both government and the various rural

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[38] See generally, Charles Wilber and Kenneth Jameson., Paradigms of Economic Development and Beyond, in Directions in Economic Development, University of Notre Dame press 1975. p1-41.

[39] Dharam Ghai., Participatory Development., Some Perspectives from Grass-roots experiences., United Nations Research Institute for Social Development (UNRISD), 1988.

[40] See United Nations Environmental Data Report, Oxford, 1987.

communities harness known and available resources and technology towards improving the quality of life of rural people who in many developing countries, including Ghana, live in conditions of poverty. These improvements in living standards should be reflected in measurable indicators such as income, access to education (both formal and non-formal) and health facilities, nutrition, environmental protection, housing as well as the extent to which the poor are involved in decisions which affect their day to day lives. Appreciable levels in such indicators reflect the develop-ment within the rural society. According to the World Bank, "Rural Development is a strategy designed to improve the economic and social life of a group of people - the rural poor. It involves extending the benefits of development to the poorest among those seeking a livelihood in the rural areas"[41]. The stage of a country's economic development, depends on attitudes of the rural community as well as the sincerity, skill and knowledge of planners at all levels. These factors will contribute in a significant way to achieve rural development goals as well as national economic development.

Rural development has become more broad-based and programmes are less focused on agriculture, although some critics argue that programmes are often more integrated only in name. This broad-based multi-purpose pattern in which Rural

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[41] See World Development Report., World Bank, Washington DC, 1985.

Development programmes have been designed is referred to as Integrated Rural Development (IRD). We now briefly consider the latter.

2.4. INTEGRATED RURAL DEVELOPMENT

The term 'Integrated Rural Development' (IRD) has no single definition. Cohen[42] explains that 'syatems analysis' which was propounded in the 1960s contributed significantly to the tendency for Rural Development to be viewed from a broad perspective. Mosher[43], for instance was influential in promoting the view that Agriculture and Rural Development involve the systematic interaction of numerous activities and that those activities had to be carefully designed and planned if economic growth and increased quality of life would be achieved. Based on this premise, Mosher outlined five components for increased agricultural production. These are, the provision of markets for farm products, a constantly improving technology base to enable adaptability to changing conditions, local availability of supplies and equipment, improving and expanding agricultural land to keep up with increasing demand and national planning for agricultural

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[42] See Cohen M., Integrated Rural Development: The Ethiopian Experience and the Debate, 1987.

[43] See Mosher A., Getting Agriculture Moving, 1966. See also Creating a Progressive Rural Structure to serve a Modern Agriculture, 1969.

development. In his view all these components were necessary to yield economic growth and improve the living conditions of the rural sector whose livelihood depended, invariably, on agricultural production.

In order to make an effective link between these components, however, the plan for Rural Development, Mosher argued, must include agricultural research, extension services, credit facilities to farmers, creation of market linkages and roads. Other non-agricultural but production related activities such as rural public works, local administrative units, educational and health facilities were also necessary.

The analysis provided by Mosher was given credence by a change in economic development theory which occurred in the 1960s. During this period, there evolved the increasing belief that for developing countries, agricultural exports could be a major engine of growth[44]. Small-scale farmers were seen as the group who could play a major role in agriculture-led development. This was the basis for much of the agriculture-led development advise which Sir Arthur Lewis gave to Ghana's CPP government after the country had become independent.

It became evident in the mid-1960s that developing countries could not compete on the world market and that their

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[44] Ruttan V., 'Integrated Rural Development Programmes. A Historical Perspective', in World Development, XXI (4), 1984 p393-401. See Also Siffrin J., Administrative Problems and Integrated Rural Development, 1979, p1.

small domestic markets could not attract industry due to overall poverty. Without markets, industry could not expand and without expansion of industry only a few jobs could be created. By the late 1960s, there was much emphasis on rural development and the possibility of producing food not only for increasing populations but also for improving income levels of rural people in order to help generate demand for industrial products. This rural-led development strategy was accelerated by the development of high yielding varieties of wheat, rice and corn. The use of fertilizers also increased and it was expected that with a combination of adequate rainfall, irrigation and good farming practices, agricultural production would be increased in many developing countries.

Rural development is increasingly being considered to include both increases in food production and improving the quality of life of rural people. For example, Albert Watersto had this to say about rural development; "the purpose of agricultural development [is] to increase agricultural production [and that] deals only with one sector, farm commodities. The purpose of rural development [is] to improve the standard of living of the rural population [this] is multi-sectorial including agriculture, industry and social facilities"[45].

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[45] Office of Development Information and Utilization, 'Development information on Integrated Rural Development', Development Support Bureau, Agency for International Development, 1978. p79.

Increasing acceptance of this view of rural development in the 1970s by both national governments and donor agencies re-enforced the tendency, then, to promote projects with multi-sectorial objectives. During the same period, a wide range of reports and articles setting out the objective of Integrated Rural Development (IRD) emerged. The prescriptions for rural development became increasingly generalised and therefore, the term itself became broadly construed.

In conclusion, the following points must be emphasised: Rural Development involves the process of bringing about desired changes in rural areas. The questions which come to mind, though, are two-fold: first, who designs the changes; and second, for what purpose are those changes designed? Rural development must be people-oriented and involve the communities who are expected to benefit from the programmes which are put in place. These programmes must be capable of reducing unemployment using existing human community resources, improve health-care, provide education, eradicate all forms of dependence of the rural people on external conditions and forces, and above all, must be geared towards eliminating poverty at its source.

It is hoped that some of the lessons of transferred technology and its impact on rural development, as is being considered here, would serve to guide not only Ghana but other developing countries as they search for ways to eradicate rural poverty and underdevelopment.

The Chapter which follows will examine the Volta River Project but will be preceded by an overview of the political and ideological circumstances within which the project was implemented.

CHAPTER 3

THE VOLTA BASIN PROJECT

" Few of Man's modifications of the landscape can initiate such profound physical, economic and social changes as dams"[46].

This chapter discusses the Volta Basin Project at some length. It provides a brief overview of the geographical location and extent of the project, as well as a review of some of the literature on the project. The ideological and policy framework within which the Volta Basin Project was implemented is provided, although in part, as a basis to facilitate comprehension of the basic arguments advanced in this thesis. Finally, some of the enormous social and economic consequences which have plagued the rural communities in the river basin are reviewed.

3.0. BACKGROUND AND EXPECTATIONS

The Volta Lake Project is one of the largest (if not the largest) development project in Ghana (see Map 2). The Lake

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[46] Quotation by Church cited in Rubin N. and Warren M., (eds), Dams in Africa. An Interdisciplinary study of man-made lakes in Africa, 1968, p1.

lies between longitudes 1° 30'W and 0° 20'E and latitudes 6° 15'N and 9° 10'N at an estimated altitude of 85m above sea level. The Volta river occupies the centre of Ghana's riverine system[47], drains most of it's rivers and covers 8482km^2 (3275mi^2) or 3.6% of the country's surface area. The lake is about 402km (250mls) long with an estimated circumference of about 4828km (3000mls) in 1973. Archaeologists[48] maintain that human presence in the Volta Basin dates as far back as 500,000 years but before the area was flooded, it was home to 80,000 farmers and fishermen[49]. This represented approximately 1% of Ghana's population in 1962. These people lived in about 700 villages and belonged to nine ethnic groups namely, South Afram, Kwahu, Akwamu,
Ewe Guan, Buem Akan, Pai, Krachi, Brong and Gonja[50] (see table 2).

Traditionally, Ghana has depended on a single export crop, cocoa. This constituted a hinderance to economic

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[47] Kalitsi E.K., Volta Lake in Relation to the Human Population and some issues in Economics and Management, in Man-made Lakes: Their Problems and Environmental Effects, edited by Ackermann, White and Worthington, 1973.

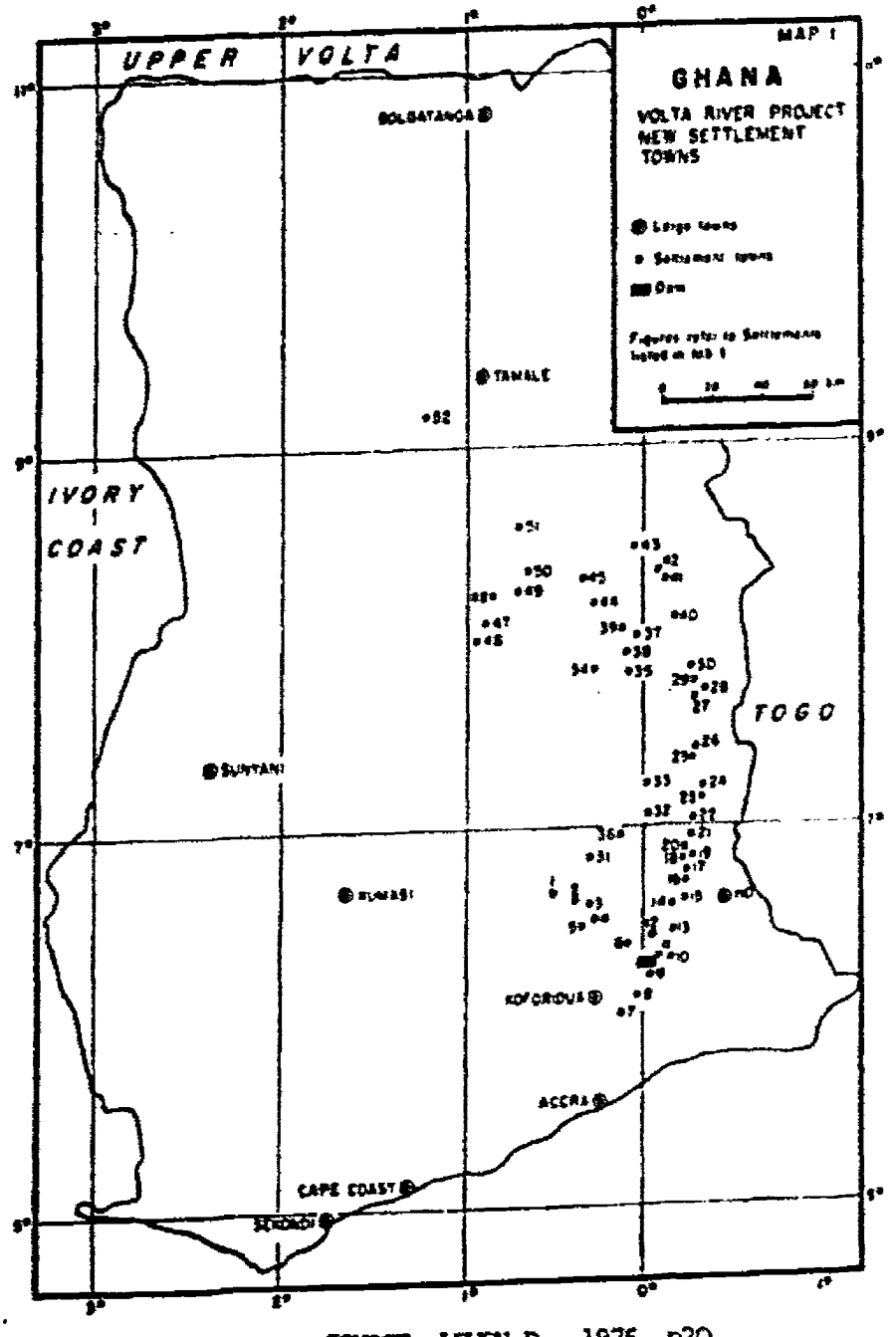
[48] Davies Oliver., conducted a series of archaeological surveys in the Volta Basin before the project finally took off. His findings we published in 1965. See Special Exhibition of Archaeological findings from the Volta Basin Report., State Publishing Corporation, Accra, 1965.

[49] Benneh G. and Dodoo R., The Impact of the Volta River Project on the Life style and Population Distribution in the Volta River Basin, in Proceedings of the West African Conference, 1976, p125.

[50] Benneh G. and Dodoo R., Ibid.,

MAP 2

THE VOLTA RIVER PROJECT - GHANA



SOURCE: LEVIN D., 1976. p20.

growth, and therefore the need for a strategy to diversify the economy by changing the commodity structure of exports, and to pursue a policy of industrialization became imperative. The Volta Lake project, therefore, became one of the most important aspects of this strategy.

Table 2 shows the number of people in the various sthnic groups as of December 31st, 1965.

AREA	No. of Population	No. of Houses	No. of New Villages	Settlement
North Kwahu	11,670	2,460	199	5
South Afram	11,659	1,877	52	6
Akwamu	6,822	1,437	69	5
Ewe Guan	8,397	1,894	97	9
Buem Akan	4,747	1,091	102	4
Pai	5,698	1,148	48	3
Krachi	14,533	2,516	75	7
Brong	6,742	1,156	71	5
Gonja	7,141	1,210	44	8
Total	77,409	14,799	757	52

SOURCE: Benneh G. and Dodoo R., 1976. p216.

The project involved the building of a dam at Akosombo to provide hydroelectric power and the establishment of an aluminium smelter to exploit the country's enormous bauxite reserves. It was also hoped that the local production of hydroelectric power would lay the foundation for

industrialization and economic development in Ghana.

Planners of the then Conventional People Party (CPP) government envisaged that the Volta Lake project would provide a transport link between the northern and southern sections of the country, as well as make possible increased agricultural productivity by means of irrigation especially in the Accra Plains. This optimism was consistent with the governments determination to achieve food security in Ghana. With the accumulation of water and the formation of the lake, it was expected that the fish industry would also experience a boost with the annual fish catch estimated to reach 250,000 tons per year[51]. This was considered adequate to meet the total national requirement at the time. The Volta basin was also to be transformed into a tourist attraction in order to provide some revenue for the Government. The project was also expected to provide jobs for the people who lived in the basin, increase their earning capability, provide improved housing facilities and create conditions for better living standards.

The Volta River project, which was completed in 1965, has affected the socio-economic as well as the political lives of the people who share its environs and these consequences have attracted the attention of many researchers in academia. We will now review some of the literature on the project.

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[51] In a book published in 1968, while in exile in Guinea, Kwame Nkrumah recounted the development goals of his administration. For further details see generally, Nkrumah K., Dark Days in Ghana, 1968.

3.1. IDEOLOGY AND THE POLITICS OF DEVELOPMENT

Bob Fitch and Mary Oppenheimer[52] in discussing the political agenda of the Conventional People's Party (CPP), argued that there were two phases of Ghana's development strategy between 1957, and 1966 when the government under Kwame Nkrumah was overthrown. They describe a modernisation approach to development which was abandoned in 1961 and a socialist planning strategy which was in effect when the Nkrumah regime was overthrown.

Sir Arthur Lewis conducted a survey of industrialisation prospects in the then Gold Coast[53] between 1952 and 1954. In a report which was published in 1955, he concluded that the only way Ghana could industrialise and develop was to raise the necessary capital and skills as well as increase agricultural production through mechanisation. Efforts were also required to attract foreign investment as a basis for industrialisation and development. Nkrumah and his advisors viewed increased agricultural production as a slow alternative to the achievement of industrialisation and therefore began to whip up support to develop an industrial complex including a harbour at Tema, the Volta River Project and the construction

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[52] Fitch B. and Oppenheimer M., Ghana: End of An Illusion, Monthly Review Press, 1966.

[53] Before 1957 Ghana was known as the Gold Coast. This was a name given to the country by Portuguese merchants trading along the coast of West Africa because of the territory's gold resources.

of an aluminium smelter. Nkrumah's optimism was motivated by his belief that industrialisation was modernisation[54]. The newly elected President of Ghana was committed to the project because for him it constituted a keystone of an industrial dream and a symbol of the new nation's modernisation and development in the future. This view was summed up in a speech Nkrumah made when he announced the award of the contract for the project. He declared "... nations such as ours, which are determined by every possible means to catch up in industrial strength, must have electricity in abundance before they can expect any large-scale industrial advance. That, basically is the justification for the Volta River Project"[55]. In any event, although some members of Nkrumah's left wing saw the American involvement as another 'imperialist' venture and expressed caution, the President was determined to see the project implemented.

In 1957 Nkrumah invited economist Arthur Lewis to advise him on development issues. Lewis prescribed development policies which reflected his belief in increasing agricultural production through mechanization and attracting foreign investment. When the second five-year development plan (1959-1963) was unveiled, it clearly reflected Lewis'

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[54] See Sims R and Casely-Hayford L., 'Renegotiating the price and availability of energy for an Aluminium Smelter: The Valco Renegotiations', in Essays from the Ghana-Valco Renegotiations 1962-85, p17.

[55] See Lumsden P., The Volta Project: Animation, in Canadian Journal of Africa. 1973. p117

'modernisation' strategy.

The government restricted its activities to attracting foreign investment and building infrastructure. The rate of investment increased from 15% to 21% of Gross Domestic Product(GDP) between 1957 and 1960. There was also a moderate growth of 1.5% per year in the GDP during the same period. However by the end of the decade, the economy had began to decline. This economic decline, among other things was caused by two main factors. First, since it was the aim of the CPP government to attract foreign investment, it offered tax holidays and lenient profit repatriation regulations to many transnational corporations (TNC's) and their subsidiary companies which had arrived in Ghana. Unfortunately, most of these companies repatriated their profits rather than re-investing them in Ghana. As a result, it became difficult for the government to retain, let alone accumulate any foreign exchange for local programmes. Second, the Ghanaian domestic market was too small for the various goods and services which appeared within this short period. Some companies were forced either to produce below capacity or close their operations.

There was a deterioration in the country's balance of payments, the nation's external reserves were being depleted rapidly; what was called 'industrialization by invitation'[56] had failed to produce the expected results. This constituted

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[56] Okonjo Chukuka., The concept of Development, in Rural Development in Ghana edited by Brown C.K., 1986.

a major problem for the CPP government. Fitch and Oppenheimer conclude, " ...complete reliance on the conventional wisdom reflected in the Lewis approach had led Ghana into this predicament"[57].

In 1961, the CPP openly abandoned the second five-year plan and introduced socialist techniques of planning although its faith in foreign investment did not completely disappear. The CPP's new strategy included large government outlays for consumer and capital goods factories, stringent import and export controls and expanded use of monetary and fiscal measures to regulate the economy. As a result of the problems mentioned above the CPP government under Nkrumah became vulnerable to an exploitative agreement which would be signed with foreign investors regarding the Volta River Project in 1962.

3.2. FINANCING OF THE PROJECT

Moxon[58] and Graham[59] have written about the historical background of the Volta River project in great detail. According to Moxon, in the 1920s a geologist called Kitson discovered huge deposits of bauxite in Ghana. In the report which announced his discovery, Kitson also indicated that the

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[57] Fitch B. and Oppenheimer M., op.cit.

[58] See Moxon J., Volta: Man's Greatest Lake, 1969.

[59] See Graham R., The Aluminium Industry and the Third World, 1982.

steep sided gorges of the Volta River could be a potential for a hydroelectric site. Since the processing of bauxite into aluminium requires large quantities of electricity, the possibility of a hydroelectric site near bauxite deposits made economic sense. Unfortunately, the British government (the colonial rulers in Ghana at the time) did not do much to get the scheme off the ground.

In 1949, The Aluminium Company of Canada Ltd. (ALCAN) currently the world's largest producer of aluminium, formulated an integrated scheme which would have used Ghana's bauxite, changing it into alumina and installing a smelter which would produce 210,000 tons of alumina every year. The scheme included a power station capable of generating 564,000 kilowatts of electricity; 514,000 kilowatts would be required for the smelter and 50,000 kilo watts (at the time close to the national demand), would be available for domestic use.

When Nkrumah came to power in 1951 as First Minister of State, he was eager to develop the bauxite resources and build an aluminium smelter. As has been stated elsewhere, Nkrumah equated modernisation with industrialisation and believed the first requisite was the availability of cheap power[60]. Considering that the project was expected to have other spin-offs namely, the provision of jobs, better housing facilities, schools, a lake transport link between the North and South of Ghana and increases in agricultural as well as fish production

[60] Moxon J., op.cit., p86

there was very little opposition to the project.

In the mid-1950s as the Gold Coast advanced towards independence, the departing British administration favoured the British Aluminium Company which in partnership with the Aluminium Company of Canada (ALCAN), proposed producing aluminium exclusively for the British market. This arrangement was unacceptable to Nkrumah and his team of negotiators who hoped to develop the Volta Project to facilitate industrial transformation of Ghana's economy[61].

When Ghana became independent in 1957, the United States became increasingly interested in Africa and Ghana in particular. This interest was based on its desire to contain the threat of Communism spreading to newly independent countries of Africa. Nkrumah capitalised on this interest to ask the United States for help to implement the Volta Project. During the same period, ironically, anti-American feelings were brewing in Ghana. American foreign policy advisors however, felt that the then Soviet Union would lend support as they did at Aswan, Egypt, if the United States backed away. This it was believed, would have shifted the super-power balance in Africa in favour of their long time adversary, the USSR. The United States government therefore sent Edgar Kaiser of Kaiser Engineering and Contractors Incorporated to conduct a feasibility study of the proposed project and make recommendations which would make the project more profitable.

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[61] See Graham R., chp 12. p132

Kaiser Engineering and Contractors Inc. presented a report which included three major changes to the original plan. First, the site of the dam was moved from Ajena to Akosombo because the Volta River was narrower at that location. This helped to reduce the construction period from seven to four years and improved the capacity of the dam for hydroelectric generation. Second, the site for the aluminium smelter was changed from an area near the Volta river to a location near the harbour at Tema. This presumably was to reduce the cost of transporting imports and exports to and from the smelter. Third, the middle stage of the project which would change Ghana's alumina into aluminium was omitted. Kaiser argued that the additional costs of mining bauxite, transporting it to an alumina plant and later on to Tema would render the project incapable of producing adequate return to investors[82]. The report was good for a period of ten years during which Ghana's bauxite would be mined and exported. Up to today this practice persists.

Under the new arrangements, the dam, power station and lines were estimated to cost E70 million sterling. However, by the end of the project the total cost had been reduced to E56 million sterling. This was financed by the World Bank, the United States Export and Import Bank (EXIM), the British

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[82] See Rod S and Casely-Hayford L., 'Renegotiating the price and availability of energy for an Aluminium Smelter: The Valco Renegotiations', in Essays from the Ghana-Valco Renegotiations 1962-85. p18.

government and the Ghanaian government with the latter putting up one-half of the total cost. Ghana also had to come up with £7.2 million sterling to extend the harbour at Tema, construct roads and houses (including Valco staff houses).

The smelter on the other hand was estimated to cost £48.9 million sterling or $128 million. Out of the total the US EXIM bank lent $96 million and the remaining $32 million was covered by a US government political risk guarantee. The political risk guarantee provides assurance to US investors in other countries that, their investments will not be lost for any political reasons. As has been mentioned elsewhere, the involvement of the United States government in the project could be attributed only partly to its technical and economic potential. Most important was its strategic interest in Africa and Ghana in particular.

The government went into an agreement with Kaiser Engineering in 1962 and by 1967 both the smelter at Tema (operated by VALCO) and the hydro-electric dam (operated by Ghana's Volta River Authority) became operational. Although a discussion of the details regarding the agreement is not intended here, it is only practical to provide some highlights on its provisions. First,the 'master agreement' stipulated among other things that the contract could only be re-negotiated after 30 years with a 20-year renewal option at VALCO's choice. Second, the power rate was set at a price of 2.625 mills per kilowatt hour (kwh) (One mill is equivalent to

one-tenth of a US cent). Table 3 provides comparative power rates charged by VRA and the Bonneville Power Administration (BPA) between 1938 and 1983.

The BPA supplies power to smelters representing one-half of the US primary aluminium capacity. Third, under the contract, VRA was obliged to constantly supply up to 370 megawatts (mw) of power to VALCO.

In 1962, Ghana's total demand for power was approximately 70 megawatts and the VRA's power facilities could at full capacity, generate 615 megawatts of power. Clearly, VALCO dominated the use of Ghana's electricity but for the time being, the country's domestic demand was catered to (see tables 4 - 6).

The agreement with Kaiser treated the irrigation, fishing and other social services aspects of the project as separate from the main objective of building a smelter for the production of aluminum. VALCO was therefore not committed in any way to sharing the environmental and other social costs which were to result from its operations in the future. As a result of this, Ghana received less benefits than had been anticipated by the original plan. Cheryl Payer makes reference to an anonymous world bank expert who explained " [that] the World Bank initially hesitated to back such a clearly exploitative agreement, but faced with growing Soviet influence in Ghana and the possibility of working in the interest of US foreign policy, finally relaxed and agreed to

TABLE 3.

AVERAGE POWER RATES CHARGED BY BPA AND VRA TO ALUMINIUM SMELTERS (US MILLS/KWH)

	Bonneville Power Administration	Volta River Authority
1938-1966	2.0	n.a.
1967-1972 Sept.30th	2.0	2.625
1972 Oct. 1st-1973 Feb.28th	2.0	2.75
1973 Mar. 1st-1974 Dec.31st	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

The price for VRA power to Valco is that shown in the Power contract adjusted with the agreement of Valco in 1972 and 1975, when it was partly related to VRA's costs of power production.

For the BPA, the above rates are the result of dividing the total revenue from aluminium companies by the energy consumed. BPA's actual rate to aluminium companies has both energy and capacity charges and is seasonally differentiated.

SOURCE: Sim R and Caseley-Hayford L., 1986. p23.

underwrite the scheme. The rationalisation offered for this decision was that, contrary to all previous conceptions, the success of the scheme now depended not on the smelter load and its payments for power but on the non-smelter demand. This was only one year after the Bank had indicated that at 2.5 mills, power revenues would never be large enough to cover debt

service"[63].

Many aspects of the project especially those which had to do with improving the living conditions of the people, and which constituted great expectations for the government of Ghana were either scaled down or scrapped completely, including the resettlement programme for the over 80,000 rural people who were to be displaced by inundation. As Kalitsi succinctly put it, "Implementation concentrated on power as the direct economic objective and important works to achieve socio-economic objectives and ensure desirable biological conditions were left in abeyance resulting in problems more difficult to solve than would have been the case"[64].

It must be pointed out that, despite the exploitative terms of the agreements with Kaiser, the CPP government proceeded with the project because it believed that once it took off, industrialisation and diversification of the economy would be achieved and then, the social, environmental and other problems which may arise from the project would be granted attention. This belief has led to devastating consequences and hampered rural development in many developing countries.

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[63] See Payer C., The World Bank. A critical analysis, New York, 1982. p258-259. Quote was cited from 'Imperialism and the Volta Dam', West Africa, March 24, 1980. p523.

[64] See Graham R., op.cit., p133.

TABLE 4

VOLTA RIVER AUTHORITY
ANNUAL ENERGY CONSUMED PER CLASS OF CUSTOMER, 1966-1984

YEAR	ECG	TAG MINES	AKOSOMBO TEXTILES	AKOSOMBO TOWNSHIP	VALCO	C.E.B.	TOTALS
	(GWH)	(GWH)	(GWH)	(GWH)	(GWH)	(GWH)	(GWH)
1966	300.90	127.20	-	2.70	13.90	-	
1967	360.30	166.10	-	6.30	925.20	-	444.70
1968	420.10	177.40	2.00	6.80	1,869.90	-	
1969	502.80	185.50	6.30	6.80	1,972.20	-	3,453.90
1970	564.80	206.80	14.85	7.20	2,012.40	-	
1971	659.25	226.50	20.82	8.81	1,919.00	-	2,672.70
1972	699.45	242.64	20.94	9.01	2,263.81	1.26	
1973	768.12	245.07	21.98	12.54	2,625.99	99.72	2,673.60
1974	893.46	257.02	19.27	11.06	2,734.77	127.78	
1975	893.17	271.02	22.57	11.50	2,518.24	136.70	2,806.05
1976	980.01	278.28	22.98	9.68	2,644.89	153.34	
1977	1,034.70	260.27	24.31	11.00	2,783.61	178.81	2,834.37
1978	1,062.84	250.25	24.15	11.33	2,086.38	218.63	
1979	1,027.76	259.34	17.60	13.01	2,907.53	299.25	3,237.10
1980	1,074.71	271.85	11.53	13.14	3,318.68	439.77	
1981	1,115.33	273.99	6.56	9.53	3,303.24	472.19	3,771.41
1982	1,000.29	257.78	1.93	8.77	3,008.71	521.46	
1983	968.04	232.49	2.97	8.09	752.93	690.78	4,043.35
1984	799.05	218.83	4.22	7.44	13.18	316.89	
							3,853.20
							4,091.17
							4,292.70
							3,651.57
							4,524.49
							5,129.68
							5,180.85
							4,498.92
							2,453.55
							1,359.60
TOTALS	15,105.06	4,404.29	244.96	174.68	39,668.60	5,456.57	65072.15

SOURCE: ROD S. and CASELEY-HAYFORD L., 1986. p27.

* Valco = Volta Aluminium Company
* ECG = Electricity Corporation of Ghana
* Cedi = The Cedi is the currency of Ghana
* Gwh = Gigawatt hour
* CEB = Communaute Electrique du Benin

TABLE 5

VOLTA RIVER AUTHORITY
AVERAGE PRICE PER KWH OF ENERGY SOLD PER CUSTOMER 1966-1983

Year	E.C.G.	The Mines	Akosombo Textiles	Akosombo Township	Valco	C.E.B.
	Average Price Cedi/kwh	Average Price Cedi/kwh	Average Price Cedi/kwh	Average Price Cedi/kwh	Average Price Cedi/kwh	Average Price Cedi/kwh
1966	.007055	.006769	-	.022889	.002101	-
1967	.007359	.006519	-	.007549	.002502	-
1968	.007567	.006859	.017650	.007882	.002679	-
1969	.007623	.006970	.017079	.006632	.002679	-
1970	.008044	.007105	.008778	.007506	.002678	-
1971	.007981	.007648	.007567	.007356	.002732	-
1972	.008070	.007601	.008326	.009250	.003396	.011774
1973	.008064	.007675	.008377	.009244	.003192	.009584
1974	.007515	.008219	.009954	.009197	.003162	.009591
1975	.008111	.008806	.008845	.009202	.003196	.009131
1976	.009762	.010617	.011767	.009197	.005175	.009927
1977	.012882	.013812	.014976	.030281	.004974	.011234
1978	.016824	.020472	.020950	.015982	.008300	.026506
1979	.022228	.036823	.042888	.026668	.012827	.040992
1980	.044068	.065827	.091138	.047918	.013191	.039595
1981	.076708	.089457	.127487	.075097	.015886	.039479
1982	.079217	.092006	.271406	.077107	.013750	.058664
1983	.095709	.100443	.290725	.093101	.017855	.226430

$$\text{Average Price} = \frac{\text{TOTAL POWER SALES TO CUSTOMER PER ANNUM}}{\text{TOTAL ENERGY CONSUMED BY CUSTOMER}}$$

SOURCE: Rod S. and Caseley- Hayford L., 1986, p24

* Valco = Volta Aluminium Company
* ECG = Electricity Corporation of Ghana
* Cedi = Cedi is the currency of Ghana
* CEB = Communaute Electrique du Benin
* Kwh = Kilowatt per hour

TABLE 6

VALCO'S NET PROFIT AND ADJUSTED RETURNS TO SHAREHOLDERS
US$ '000

Year	(1) Valco's Net Profit	(2) Share-holders Equity	(3) Tolling Charge Pre-payments from Share-holders	(4) Repay-ment of Tol-ling Charge Pre-payment to Share-holders	(5) Divi-dents to Share-holders	(6) Change in Credit Exten-sion and Trade Debtors to Share-holders	(7) Gain from Tol-ling Arrang ements to Share-hol-ders	(8) Net Cash Flow (NCF)* to share-hol-ders	(9) NCF dis-counted at 20%
1964	-	6,000		-	-	-	-	16000*	-16000
1965	-	6,000	10,000	-	-	-	-	16150*	-35350
1966	-	-		-	-	-	-	-	-42420
1967	(0.670)	-	10,150	-	-	2,053	1,720	3,771	-47131
1968	4,267	-	-	-	-	13,496	5,253	18,749	-37809
1969	7,022	-	-	-	-	4,535	5,532	10,067	-35303
1970	4,303	-	-	-	-	2,012	5,682	2,694	-39669
1971	4,066	-	-	-	-	(3,730)	5,572	(958)	-48561
1972	8,555	-		-	-	5,274	6,618	11,892	-46381
1973	2,845	-	5,000	4,378	-	(3,821)	6,746	7,303	-48355
1974	11,319	-		4,323	-	2,254	9,344	15,917	-42109
1975	10,380	-	2,800	4,088	-	(3,220)	10,277	11,145	-39586
1976	5,855	-	-	4,001	-	(8,244)	10,691	6,448	-40814
1977	6,536	-	-	4,504	-	5,381	8,578	18,463	-30515
1978	6,640	-	-	3,776	-	927	8,169	12,872	-25746
1979	20,852	-	-	2,370	-	39,398	11,062	52,830	+24335
1980	28,677	-	-	-	20,000	(15,863)	13,344	17,344	+46546
1981	25,173	-	-	-	-	(28,911)	11,935	16,986	+38869
			-						
			-						
			-						
			-						

SOURCE: Rod S. and Caseley-Hayford L., 1986.p30.

3.3. SOME CONSEQUENCES OF THE VOLTA RIVER PROJECT

Dams have varied ecological, social as well as economic impacts on their immediate environs. Where these are not identified during the planning stages of the project in order to seek ways to mitigate them, they obstruct the development objectives of such projects. Poor people are usually the most vulnerable to these adverse consequences.

The literature sufficiently documents the consequences of the Volta River Project. These include changes in freshwater fauna and flora, effects on the distribution of fish stocks, increases in the presence of disease transmitting hosts, changes in population and life-styles of people, economic as well as agricultural issues. For the purposes of this thesis, the focus is confined to the social and economic consequences related to the project.

3.4. LITERATURE REVIEW

The Volta River Project has several commonalities with other dams especially in Africa including the Kariba, Aswan and Kainji. These dams were all built on large rivers in the respective countries, displaced between 50,000 - 100,000 people and have obstructed both upstream and downstream

regimes of the rivers which were dammed[65].

In a recent study, Brown[66] examined the contribution of the Volta River project to Ghana's economic growth and diversification. Although she did not deny that the full potential of the project had not been exploited and that enormous social costs had accrued from the project, she concluded that it had contributed not only to the country's economic growth by making possible the establishment of many industries, but had also given impetus to other sectors of the economy and enabled diversification of exports.

In separate studies, Mou as well as Klumpp and Chu have also written about the socio-economic consequences of the project, especially in the area of health. It is evident from their analysis that the incidence of diseases such as malaria, bilharzia and schistosomiasis among others have increased[67] at least since 1962, and that the aquatic weed Ceratophyllum which grows extensively in the lake, was an important factor in the transmission of Schistosoma Haemotobium in the Volta

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[65] See Scudder T., Man-made lakes and population resettlement in Africa. In Lowe-McConnel R., (ed) Man-made Lakes 1966.

[66] Brown G., The Volta Basin Project: An Examination of its Contribution to Economic Growth the Diversification in Ghana. unpublished MA thesis, Dalhousie University, 1988.

[67] Mou Li., Socio-Economic Consequences of Health Impacts from Water Resources Development Projects, MA thesis submitted to St. Mary University, Halifax 1992.

Basin[68].

Benneh and Dodoo have also written on the impact of the project on the life-style and population distribution of the people living in the basin. They maintain that more people including some who did not originally reside in the basin, were taking advantage of the lucrative fishing industry which had emerged. However, mechanized agriculture[69] did not seem to have become very popular among the rural people.

The resettlement programme[70], especially those aspects relating to agriculture in the Volta River basin, has also been studied in detail. It has been pointed out that the experience was rather disappointing due to inadequate planning, inadequate statistics, the lack of skilled extension personnel as well as a swift shift from several hundred years of traditional agricultural practices to mechanized/modern farming methods. Afriyie concludes, 'resettlement agriculture does not automatically produce higher standards of living and that the complex problems associated with resettlement need to

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[68] Klumpp R. and Chu Y., Importance of the Aquatic Weed Ceratophullum to transmission of Haematobium in the Volta Lake, Ghana., in Bulletin of the World Health Organization Vol.58 (5), 1980.,p791-798.

[69] Benneh G. and Dodoo R., Op.cit., p129. The authors refer to mechanized agriculture as the change from the use of traditional tools such as hoes and cutlasses to the use of tractors and fertilizers.

[70] The process of re-locating the 80,000 people displaced by the creation of the dam has been referred to as 'resettlement'. See Afriyie E.K., 'Resettlement Agriculture in Ghana - An Experiment in Innovation in Brown C.K., (ed) 1986.

be given much more thought before implementation'[71].

There is consensus among almost all researchers on the Volta Lake project, whose work at least, are available to me, and to whom I have referred, that although the project is of significant economic importance, the rural dwellers in the basin have and continue to receive few direct benefits from it[72]. Equally true and common to all the studies on the project is the fact that they all seem to deal with various consequences which have trailed the project. A varied analysis of this sort is necessary because it constitutes an immense reservoir of information and reveal several lessons for the future. This thesis, however, differs in many respects. Although it draws extensively on work already done, it also traces the predicament of the river basin much further. This is done by discussing the development strategy which motivated the implementation of the Project even when the terms of the agreement regarding the implementation were so much to the disfavour of the government and people of Ghana.

3.5.0. RESETTLEMENT

The problem of resettling the over 80,000 rural people

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[71] Ibid.

[72] See also Assibi O., Economic Impact of the Volta River Project, in Proceedings of the West Africa Conference, 1976, p131-137.

living in the Volta Basin and who were to be displaced by inundation was the most elaborate post-construction programme which received the attention of the Nkrumah regime. As a result of the project, isolated ethnic communities living in the river basin, practising the most suitable form of agriculture were made to change their entire way of life in order to conform to a 'development' process from which they have received meagre benefits.

At the beginning of the resettlement programme, the Volta River Authority (VRA), the government agency charged with overseeing the resettlement programme gave the would-be resettlers an option to choose between cash compensation and resettlement by government. It is estimated that 27% or 16,579 people chose to be compensated with cash. This group of people were not covered by the resettlement plan at all. The remaining 64,000 were moved into 52 villages in larger populations than they were used to, sometimes between 2,000 and 5,000 each (see Map 1).

Facilities in the resettlement villages such as housing, drinking water, cleared farm lands, money and food were so inadequate that many resettlers left their assigned villages in search of better conditions. In a survey conducted in 1970, it was determined that only 25,000 people were still living in the resettlement villages[73]. This points to the social disruption which the resettlement programme created for the

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[73] See Graham R. op.cit., p134

rural people especially, considering that most of those who remained were women and children. During the transit from old to new settlements, would-be settlers had to use or hire manual labour to transport their belongings for which they had worked so hard. Unfortunately, many lost their personal belongings to the fast accumulating and expanding Lake.

As if that were not enough, in 1964 the CPP government announced its inability to rebuild all the schools, offices recreational centres, gas stations, church buildings, markets, hospitals and roads which were required by the new settlers. This responsibility was to be taken over by the various ministries and departments in charge of such services. Consequently, very few facilities were available for the use of resettlers on arrival at their assigned villages, posing additional hardships on them.

The scarcity of farm land created an antagonism between ethnic groups and tribes who had enjoyed good relations and friendship for hundreds of years, dating far back into historic times. Old settlers were naturally unprepared to give their land to new settlers in the name of 'development', and this state of affairs soon led to conflict. Prosperous independent farmers who were hitherto self sufficient and cultivating their own food became dependent on food aid provided through the United Nations World Food programme or on food bought at the market, if they could afford it.

Road networks connecting most parts of the river basin

were disrupted and transport linkages which were promised were never provided. Travel became increasingly cumbersome and inter-community trade was jeopardised. The settlers were linguistically, culturally and occupationally a heterogenous group of people and therefore it was difficult to avoid conflicts especially since the tribes were forced to live together - a way of life new to them (see table 1). Perhaps in the midst of all the hardships, the resettled would have been better off if their compensations had been forthcoming. By 1971, about C1.7 million cedis was paid out for crops which were destroyed, but there was no compensation for submerged lands and only 1/4 of the land required was cleared when the resettlement programme began (see table 7).

Technical co-operatives were established by the Volta River Authority and farmers were assigned to the production of specific crops in conformity with the government's agricultural policy. While some farmers were directed to cultivate tree crops, cotton and tobacco, others were encouraged to keep pigs and poultry. Despite these efforts, lack of equipment and machinery, skilled extension personnel and inadequate knowledge of the use of chemical fertilisers prevented any meaningful growth in agricultural production. What became clear is that the VRA's efforts did not produce enough food to feed the resettlers let alone enough for export as was originally envisaged.

Regarding housing, the VRA built one bedroom 'core'

houses with space for another bedroom and a veranda which was expected to be completed by resettlers after occupation. This idea tended to be impractical because cement blocks and building materials were not only expensive but unavailable. Resettlers could not complete their houses as proposed and this added further hardships to an already difficult situation. Another problem with the housing scheme was that houses were allocated on home-to-home basis and not on room to room basis. People who originally lived in one house but with several rooms were assigned a one bedroom house. In a region where polygamous families were common, this constituted a major setback for the entire resettlement scheme and inflicted further discomfort on the resettlers. A survey of Old Kete Krachi showed that 4185 people lived in 486 households each with an average of 8 rooms. In new Kete Krachi, however, the ratio of people to rooms rose from 1.5 to 2.2. Considering that many of the resettlers left earlier, the housing problem would have been even more acute. Hart adds another dimension to the problem faced by those who were even settled. He writes " the traditional houses possessed a greater thermal inertia, that is, the mud and thatch house tended to be cooler than the ambient temperature during the day and warmer than ambient at night"[74]. This was discomforting to many people. Finally, one would have imagined that since the rural people had lost their original homes as

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[74] See Hart D., The Volta River Project, 1968. p80.

a result of a government 'development' project, the new houses would be assigned at minimum or no cost to the resettlers. On the contrary, the cost of the houses (C780 each), was deducted from compensations made to them for their destroyed crops.

Ironically, few buildings in the resettlement villages had hydroelectric power. Pipe-borne water was not available in many homes, and sanitation and other health problems began to emerge within the villages. Above all, antagonism sprang up among neighbouring tribes, who had otherwise lived in harmony, due to a desperate scramble for fertile farm land, water and even fishing grounds.

3.5.1 HEALTH ISSUES

Certainly the creation of the Volta Lake, did not introduce water-borne diseases in the Volta Basin. However, the creation of the dam which resulted in a massive accumulation of water to form one of the world's largest man-made lakes, enhanced conditions for an escalation of many diseases including those which already existed in the area. Of course, some of these were envisaged in the 1956 Report on the project. Unfortunately, the final report which was prepared by Kaiser Engineering and Contractors Inc. ignored these possible diseases and concentrated on measures related to the construction of a smelter, their primary concern.

Since the completion of the Volta dam, there have been

TABLE 7

PAYMENT OF COMPENSATION CUMULATIVE TOTAL UP TO 1971

S/No.	Settlement	Cumulative total to July 1971		
		No. of villages	No. of claimants	₵
1	New Owerebong (Asafo)	19	1 102	66 390
2	Kumbo Asamfrom (Anyam)	11	601	46 347
3	Dadeasewiraka	28	1 220	99 220
4	Donkasa	14	398	35 435
5	Asuka	2	66	5 337
6	Anyabeni	29	901	33 661
7	Adukrom	10	81	8 401
8	Sammya	6	224	18 628
9	Sanchi	3	57	1 018
10	Apagaso	5	151	10 906
11	Nyakadom	4	345	5 806
12	New Ajasa	7	933	60 786
13	Nkrankwaa	6	74	5 504
14	Kaira/Tenkor	4	363	44 307
15	Todasa	4	108	14 284
16	Tenkor	3	159	37 441
17	Betaka	3	131	12 765
18	Kuruta	15	1 230	62 257
19	Yakpo-Dunyo	12	751	81 865
20	Savalu	5	145	24 739
21	Danyigba	6	144	11 090
22	Posi	9	884	72 695
23	Tepo	19	823	72 173
24	Nkrapong	11	1 145	224 006
25	Bewiri Oduasi	5	134	24 911
26	Abotoasa	5	322	17 068
27	Katanga	3	88	21 650
28	Akrose Asamfrom (Anbrakaw)	6	419	49 746
29	Adenkwanta	3	18	1 284
30	Tokorano	5	19	697
31	Perifori	21	597	76 071
32	Asamkakrom	23	726	144 495
33	Ntoaboma	6	229	39 241
34	Kajaji	6	127	22 430
35	Kete Krachi (Katamkafri)	4	107	19 615
36	Nsa-Chemfo	8	333	33 410
37	New Biawusa	4	19	1 143
38	Ouremani	9	47	1 303
39	Obiasakyeme	2	5	88
40	Dambai	4	20	574
41	Kitari	1	45	3 300
42	Kladjo	1	1	55
43	Kpandai	1	41	1 823
44	Oruhi	1	3	84
45	Quishi	-	-	-
46	Prang	2	12	823
47	Labun	3	6	738
48	Busa	-	-	-
49	Tuji	8	148	13 310
50	Nakanjo	3	7	305
51	Bao (Kafaba)	1	2	16
52	Tapoi	2	481	31 274
53	People outside the repet. prop.	22	1 301	89 212
	GRAND TOTAL	396	17 373	1 650 760

SOURCE: LEVOI D., 1976. p29.

increases reported in the incidence of diseases such as Schistosomiasis (bilharzia), onchocerciasis (river blindness) and various forms of malaria. A hospital was built at Akosombo to cater for the health needs of the people but most of its beneficiaries have been expatriate staff and workers who are directly connected to the project site. It has been estimated that before the formation of the Lake, the infection rate of Schistosomiasis in the Volta river basin was between 1 - 5%. By 1968, this had increased to about 80% and in some villages as high as 100%. The Volta River Authority put in place a programme to study aspects of the resettlement scheme relating to infectious diseases in order to design methods to control their spread. In 1976, this vital follow-up programme was discontinued due to lack of drugs. It is estimated that over 100,000 people in the Volta Basin suffer from the effects of onchocerciasis[75] and 70,000 of that number were totally blind by 1980. In the northern sections of the Volta basin where 'formal' medical care is still unaccessible to many people, whole villages have been depopulated from the effects of the disease.

3.5.2 ECONOMIC ISSUES

Although the resettlement agricultural programme was not very successful, the same could not be said about the fishing

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[75] Graham R., op.cit., p137.

industry. As a result of the transformation of the former river into a lake fishing opportunities were created for a large number of people. Before the lake was created, there were about 1,200 fishermen living along the Old Volta river and its tributaries. By 1970, the number had risen to over 12,500. These incoming fishermen have established more than 1,000 villages around the lake - the dominant ethnic group being the Tongu. The fishing industry has been so lucrative along the Volta Lake, that it has been attracting many young people in other occupations such as teachers, clerks, labourers and traders. A spin-off of this migration of some educated people into the fishing industry in the Volta Basin has been the commencement of literacy classes for adults and children.

On the other hand, economic activities on the lower Volta has suffered significantly. The annual flooding of the river enriched the land used for agriculture and restored numerous creeks used for fishing. When the river was low, the riverine population depended on a prosperous clam harvest. However, with the creation of the dam, this way of making a living has disappeared. As Benneh and Dodoo put it, "Damming the river brought about changes in the ecological balance of the physical environment upon which the farming and fishing communities of the lower Volta depended for their economy; consequently many people lost traditional means of making a

living"[76]

Barrington described the views of his respondents in a 1969 study of New Kete Krachi. He writes, " respondents ... expressed disappointment and alienation in response to a wide variety of questions ... the population was unhappy and dispirited four years after being resettled. Those who moved away, we can assume, were even more dissatisfied". He continues " almost everyone ... thought that his or her life in general was worse off after than before the time of the resettlement, and most of them blamed the Volta Project rather than the military coup [which overthrew the CPP in 1966] or other situations"[77].

3.6. FINAL OBSERVATIONS

Throughout this chapter, it has been pointed out that the problems facing rural development in the Volta Basin and especially, the people, emanate from the 'modernisation' approach to development. The CPP anticipated that with the provision of hydroelectric power industrialisation would be facilitated and economic growth and development would be achieved. It must be pointed out that with such a conviction, it was unimaginable to delay or negotiate for better terms

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[76] See Benneh and Dodoo, op.cit., p128.

[77] For further reading see Barrington L., Migration and the Growth of a Resettlement Community: Kete Krachi, Ghana, 1962 and 1969. 1973 p138. Quoted in Graham R., op.cit.

before the implementation of the project. It was as if to say 'the problems would be taken care of after we have achieved our industrial goal'. Such assumptions were costly and more so defeated the well-meaning expected results. Unless academics and development practitioners begin to challenge 'Western' models of development to ascertain their validity and applicability, development efforts by governments, especially in the developing world, will continually yield devastating results as in the case of the Volta Basin Project.

CHAPTER 4

WHAT WENT WRONG

" No one should as a result of the Project be worse off than before and new conditions should be as good if not better than the old ones left behind"[78] .

In this chapter we will present a further discussion on the effects of the Volta Basin Project pointing out the inherent problems which in the end, rendered the project a failure. We will also show how inapplicable the modernization approach to development was in relation to rural development in the Volta river basin. This analysis will support our argument that the project has reinforced rural poverty and conditions of 'underdevelopment' rather than 'development' among the rural communities in the Volta river basin.

Of course, it may be easier to find fault with the Volta Basin Project than to provide realistic and sustainable alternatives to solve the problems which continue to confront the rural people - the prevalence of diseases, food shortages, unemployment, environmental degradation and isolation.

We recognise that no amount of debate or criticism, per se, would improve the socio-economic conditions of the people.

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78. Statement by Ghana's first President, Kwame Nkrumah in reference to the Volta Basin resettlement scheme. Quoted in Benneh G. and Dodoo R., op.cit., p126.

However, by highlighting the obvious disadvantages of the project, we intend not only to draw attention but also heighten the awareness of planners and policy makers regarding the problems which may occur when development theories and strategies are adopted. Furthermore, we will argue that transferred technology will produce devastating consequences for rural development when the process is not preceded by careful research, and more importantly, where efforts are not made to involve the would-be local beneficiaries of the development project in the planning stages. Hopefully, this discussion will contribute to the efforts of development practitioners who may in the future be seeking practical and sustainable alternatives for developing the rural sector not only in Ghana but also in other countries, both developed and developing.

4.0. MODERNIZATION - WHAT WENT WRONG IN THE VOLTA RIVER BASIN?

In Chapter 2, we provided a brief discussion of the belief held by advocates of the modernization approach to development that there exists a causal relationship between modern values, modern behaviour, modern institutions, modern societies and economic development. We also indicated that it is at the stage of modern institutions that emphasis is placed on the transfer of scientific and technological innovations. These innovations thus come with new ways and methods of doing

things - the use of fertiliser replaces traditional forms of manure, high-yielding seed varieties are planted instead of more adaptable local varieties; plantation farming replaces shifting cultivation agriculture; the use of tractors and combine harvesters take over from ox-drawn ploughs; and irrigation replaces dependence on rainfall patterns. As the rural communities begin to adopt these innovations, the society is said to acquire modern characteristics. Farmers would become richer as a consequence of increased production, enabling them to purchase basic needs such as health care, food, clothing, education and housing. Local demand for the industrial sector will then expand, rural entrepreneurs will re-invest their capital thereby providing jobs within the community. The rural community, so it is said, will be gradually transformed from its rural to an urban condition and overall economic development will be achieved as links are developed with other urban sectors of the national economy.

Clearly, the way in which this scheme is presented ignores the inherent short-falls in the modernization argument. Since the theory stresses a cause-and-effect relationship between a number of variables, we will argue that without the effective functioning of key variables, the process of achieving economic development will be either slowed down or disrupted. It is not too difficult to recognise the reasons why the approach failed in the context of the rural communities in the Volta basin.

4.1. INSTITUTIONAL LIMITATIONS

During the implementation of the Volta basin project, there was no effective institutional support for the new problems which emerged during the resettlement of the over 80,000 people affected by the construction of the dam. The Volta River Authority (VRA) was set up with a mandate to supervise all aspects of the resettlement programme including the payment of compensation to those affected people who opted for cash compensation. As a result of improper administrative procedures, payments to villagers who opted for cash compensation were hardly paid. By 1976, almost a decade after the move began, only a total of C7.2 million had been paid out to those affected. This amount works out to approximately C700 per person. Certainly, the money was hardly enough to start any new venture in a period of high inflation.

Another problem which the people faced as a result of poor administrative support was inadequate transportation to facilitate their move from old to new settlements. There were not enough government lorries provided for this service and therefore, most of the rural people had to transport their belongings manually or hire the labour of others if they could afford it. For a few unfortunate people, most of their possessions were lost to the elements of the weather.

In October 1964, the CPP government announced that it could no longer afford to rebuild all the State buildings,

offices, recreational centres and schools which had been left behind. The responsibility of rebuilding these structures was transferred to such ministries as Education, Social Welfare and Culture under whose jurisdiction it was thought the provision of such facilities fell. These ministries were unable to provide the necessary services due to budget constraints. Consequently, many of the new towns began life without markets, schools, gas stations, roads and transport facilities. Moxon described the situation as a "national disaster"[79].

4.2. TECHNICAL LIMITATIONS

An important aspect of the process of modernization, as its proponents would have us believe, is the development and use of scientific innovations. During the stage when the society becomes 'modern', it is expected that technology transfer takes place and opportunities for scientific innovations are opened. This is the stage at which massive technology and new methods of production are transferred from developed to developing countries. In the mid-1960s and shortly after the dam was constructed, new techniques of farming, farm tools, tractors, fertilizers, insecticides as well as high-yielding seeds were introduced into the Volta basin. There were two main problems. Firstly, the farmers were

[79] Graham R., 1984. op.cit p135.

not familiar with the new technologies; secondly, the extension officers who were sent to the field to help farmers use these new techniques were not only few but inexperienced. In consequence, there were cases of the mass miause of chemicals and fertilizers as well as deaths from inappropriate use of toxic insecticides. Many farmers suffered from poor harvests and the decline of agricultural production, thus increasing their poverty.

Farmers were also instructed to adopt what was called 'plantation farming' instead of 'mixed-crop farming'. The VRA assigned farmers to the cultivation of crops such as tobacco, cotton and other tree crops according to the government's agriculture-led national development plan. Others were encouraged to raise poultry and pigs to supplement the national protein requirement. A major set-back to this initiative was the fact that most of the farmers had too little land to establish any economically viable plantations. The lack of adequate land was a result of the fact that out of the estimated 54,000 acres of land to be cleared before the arrival of resettlers, only 15,000 acres had been cleared. Meanwhile by way of comparison, the flooded area had contained approximately 128,000 acres of agricultural land. This situation resulted in a lot of frustration for the farmers, more so because they could not practice their traditional skills or even grow enough food for their families. The problem was aggravated by the requirement that mechanised

equipment, which was provided and controlled by the VRA, could only be used by co-operative farms and not by individual farmers. This was a source of major concern to many hard-working farmers who had depended on their own skills and the labour of their families for so long.

According to modernization theory, modern institutions can only function if there are adequate skilled personnel to formulate and implement the various programmes. In the case of the Volta basin project, extension personnel were not only inadequate but also inexperienced even in the methods of farming they were supposed to teach the local farmers. As a result, factors such as inappropriate as well as excess use of fertilizers created produce loses rather that increases. Since most farmers were of the opinion that the use of fertilizers would almost automatically yield improved harvest, not much attention was given to the rainfall pattern during planting. On the contrary it was discovered that some fertilizers gave better results with more rainfall than would have been required without their use. Many farmers were disappointed by the results of using fertilizer and subsequently refused to use them.

With the inundation of the Lake, traditional routes linking the various communities were disrupted. At the same time the CPP government's promise of easier transportation from Akosombo in the south to Yapei in the north by ferry had not materialised. It was difficult for the rural people to

travel around either to sell or buy goods to or from other communities. The situation was so bad that between 1966 and 1968, the United Nations Relief Agency made available 6,000 tons of food including flour, milk, butter, maize and canned fish to the local people. By 1970, it became clear that even massive food aid could not solve the problem of hunger in the river basin.

4.3. ENVIRONMENTAL LIMITATIONS

The object of modernization has been unlimited economic growth and therefore, not much attention has been given to the effects of natural resource-exploitation on the environment. The effects of man's activities on the environment has been the main concern of 'ecodevelopment' theory. Although the possible effects of the dam's construction on the environment was envisaged and spelt out in the 1956 report, the agreement which was signed by the CPP government and Kaiser Engineering and Contractors Ltd. excluded clauses which would have made the company responsible for environmental protection of the dam's catchment area. Inundation by the lake has led to serious environmental problems in the Volta basin some of which have been noted earlier. For instance increases in the incidence malaria, river blindness and bilharzia are cases in

point. Ganley[80] maintains that by the mid-1970s the upper reaches of the Volta river had the highest infectivity rate of schistosomiasis in the world. Diseases such as trypanosomiasis, diarrhoea, pneumonia, yaws and kwashiorkor were also recorded to have increased in the river basin.

There has also been floral and faunal changes in the river basin as a result of the project. The creation of the dam has increased some fish stocks in the lake and many fishermen have established cottages along the lake to exploit its fish resources although; however, that this has not happened without costs. Assibi[81] reveals that a prosperous clam industry which existed in the lower lake region before the construction of the dam has been eliminated by the project. Edible molluscs, the trapping of which was a dietary staple and income earner for most basin dwellers was replaced by snails which played host to the transmission of schistosomiasis. Obeng[82] reported a reduction of certain fish populations including that of the momyrid which had been abundant in the Black Volta and the main Volta river; she also reported a reduction in the citharinidae, as well as some synodotis species. Other species like the characid (Alestes

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[80] Ganley J., Volta River Project, Impact on Public Health, 1984

[81] Assibi O., op.cit., p131.

[82] Obeng L., Keynote Paper No. 1, Whither Freshwater Biota?, 1968

nurse) migrated north in order to survive, while the ctenopoma species disappeared from the south. As McConnell-Lowe puts it "Dams are an impediment to fish migration and a nuisance to other fauna, often upsetting the whole balance of populations above them - unless special facilities are created for them as, for example, passages for fishes"[83]. If this trend continues, fish stocks in the Volta river itself will be reduced as a result of further extinction or migration.

4.4. DISTRIBUTION OF AGRICULTURAL INPUTS

Modernisation theorists do not address the issues of equality and distribution of either inputs or the benefits of development. When the government of Ghana decided to remove subsidies from farm inputs, including fertilizers, only rich farmers who had ties to powerful members of government or with elite groups in urban areas could afford to buy inputs. These rich farmers began to offer tractor services for fees in some villages in the basin and the poor were deprived of the use of such equipment.

The principle of modernization only promises an increasing standard of living along 'Western' lines. Modernization in the western sense emphasises personal consumption and individualism. On the contrary, most of the

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[83] See McConnell - Lowe R., "Reservoirs in relation to Man-made lakes - Fisheries", in Man-made Lakes, their Problems and Environmental Effects, 1973. p641-655.

societies and tribes in Ghana, and indeed in the Volta basin are based on strong communal affiliations. The assumption that modernization would influence the attitudes of individuals, help increase savings and investments as well as make people see themselves differently was flawed.

4.5. LACK OF LOCAL PARTICIPATION

The need for involving local people in the process of development will be discussed later in this chapter in relation to rural development. We will demonstrate that the consequences of the Volta Basin Project would have been different with effective local participation. Durning maintains that "True development puts first those whom society puts last. For development to help the poor, it must put them first not only as intended beneficiaries, but also as active participants, advisers and leaders. True development does not simply provide for the needy, it enables them to provide for themselves"[84]. This philosophy was lacking during the implementation of the Volta Basin Project.

The VRA, the main government agency responsible for resettlement and rural development, designed its projects in pursuance of the government's national development plan to the

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[84] Durning A., "The Third World Fights Back: People Overcome Poverty and Pollution", in The Progressive, July 1990. p25

exclusion of local input and involvement. However, the local people were capable and would have offered basic help in identifying what their real needs and priorities were during the planning and implementation of the resettlement plan. Since this was not done, the type of houses which the VRA chose to build for resettlers turned out to be too warm and inadequate for the needs of the people. It must be noted that each housing unit was made up of a single bedroom, a living room and space for future expansion to be built at the occupants' own cost. Since the houses were allocated on house-to-house basis instead of on household basis, large families had no choice but to be overcrowded. It is not surprising, therefore, that by 1970, five years after the move, only 25,000 out of approximately 64,000 who were actually resettled, remained in the resettlement villages. You will recall that farmers were assigned crops to cultivate and were not allowed to practice their traditional skills or offer any advice which was not considered 'modern'. These and other factors contributed to the failure of the entire resettlement plan and left the rural people worse off than before they were moved - a contradiction to the promise made by Kwame Nkrumah in 1965.

The CPP government was of the opinion that modernization would be achieved with the implementation of programmes such as the provision of adequate housing for the affected people, land allocation and the availability of cleared land. The VRA

performed its mandated function in accordance with the government economic development plan and there was no provision for participation by the local people. The people were denied the opportunity to contribute to decisions which were made, and were not consulted to help adopt realistic techniques. As a result, the land clearing targets were not met, the houses which were provided were not suitable for most of the resettlers, and the programme suffered major setbacks.

This was clearly evident when the government handed over the provision of services to the respective ministries. At such a critical period in the implementation of the resettlement scheme, effective institutional support was withdrawn, leading to further problems for the rural poor. The wisdom of the local people was discounted and was considered to be an obstruction to development.

In fact it is our strong belief that many of the problems confronting the rural people in the Volta basin today could have been avoided if they had been involved at the various stages of the rural development process. Given all the conditions and factors appropriate for implementing a rural development plan, not much can be achieved without giving adequate attention to the culture of the local people, and above all creating the opportunities for their involvement.

4.6.0 THE CASE FOR PARTICIPATION IN RURAL DEVELOPMENT

Paulo Freire[85], a Brazilian educationist and philosopher, argued that sectarianism in any form constituted an obstacle to the emancipation of human beings. In Freire's context, sectarianism is the narrow minded way in which theoreticians and practitioners in development put their beliefs or interests before the interest of the majority of people in society. Freire holds the view that in many cases, theoreticianc do not perceive the reality of the poor. Even when they do, the tendency to misinterpret this reality is common.

Freire points out that, the desire to be human has always been of concern to mankind because people do not want to be dehumanized. Both humanization and dehumanization therefore are possibilities for human beings and could be considered alternatives. He argues that if dehumanization is considered the result of historical factors alone then the struggle for humanization, emancipation, overcoming alienation and improving living conditions of the poor would be meaningless. The hope for improved living standards - development, is therefore premised on the fact that poverty is not a given. Although poverty may be related to historical circumstances, it is the result of a combination of unjust factors usually imposed on the poor by theoreticians, policy makers and

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[85] See Freire P., Pedagogy of the Oppressed, 1970

sometimes the State. These factors tend to engender poverty and related conditions among segments of the society.

Development models and theories lead the poor to internalise their situation and reduce themselves to fatalistic positions. They soon begin to feel that there is nothing that could be done to help them or that they could do to help themselves. Poor people then become inhibited because, although they are aware of their reality, they find it difficult to take risks and the opportunities for concerted action are never present. After all, who is better prepared than the poor to understand their reality and to participate in their own development? Who can better understand the effects of the poverty which confront the rural people than themselves? Yet they fear that taking risks may cause losses in production, harvests, or even lure them into further subordination. How then can the poor, with a varied range of priorities and differences, participate in improving their own conditions of life? Much as there are no easy or straight-forward answers to these questions, a few suggestions are outlined to support a case for participation in development.

First, since the poor, as a result of their living conditions easily drift into a fatalistic situation thereby losing their self-respect and confidence, efforts should be made to enable them to regain these virtues in order to bring themselves to the understanding that their circumstances could be altered for the better. It is important that such people

who have hardly been consulted during the planning and implementation of development projects in the past be involved at every stage of the process - planning, implementation and evaluation.

Second, the poor want to be heard and therefore there emerges a sense of belongingness and responsibility when they are made to feel that their contributions count in the overall development effort. People want to be treated fairly, and generally do not want to be humiliated by the fact that they are persistently vulnerable. Efforts should be made to ensure that the poor receive fair prices for their produce on which their lives are so necessarily dependent. Dialogue is crucial in dealing with the poor and mostly illiterate rural people. Instead of researchers and policy makers imposing their plans and development programmes on the rural communities, efforts must be made to utilise the enormous traditional knowledge which rural people possess if any rural development programmes are sincerely meant to benefit them.

Chambers has succinctly analyzed why rural poverty is not understood by researchers and development workers. He writes "Outsiders are people concerned with rural development who are themselves neither rural nor poor. Many are headquarters and field staff, ... researchers, aid agency personnel, bankers, businessmen, consultants ... and other professionals. Outsiders under-perceive rural poverty". He continues, "most urban based outsiders have not experienced poverty at least in

the way that the rural poor do and therefore they are limited in their perception. For most urban-based outsiders, brief and hurried visits to rural areas only constitute rural development tourism"[86].

As Chambers points out, it is both dangerous and myopic for researchers to concern themselves with few explanations of poverty and to ignore others. It is in the light of this that he advocates 'pluralism' in rural development. In order words, there is the need to adopt a broader approach in identifying the causes of rural poverty giving equal attention to academic, practical and cultural issues. It is important that development practitioners recognise the effect of culture on a group of people or society. Unless the elements of a society's culture are understood, it would be difficult if not impossible to find lasting and genuine solutions to rural poverty and underdevelopment.

4.6.1 WHAT IS PARTICIPATION

The idea of participation, like development has been defined in different ways. As a result, the term has in many cases been misconstrued with others such as 'mobilization', 'decentralization' or even 'democracy'.

'Mobilization' has to do with organising people to undertake social and economic projects which are usually

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[86] Chambers R., op.cit., p2

designed from the headquarters of State and other institutions responsible for development. Participation in this sense, constitutes contributions of labour, materials and in some cases money by the poor for projects[87]. Since most of these projects are infrastructural in nature, they are assumed to be of benefit to the poor in society. In reality, however, the benefits from such projects depend on factors such as patterns of ownership, the distribution of political power within the society and the nature of the project. Invariably, participation becomes the free provision of labour and other inputs by the poor to either build structures or implement programmes from which they derive little or no benefit.

Participation has also been used interchangeably with 'decentralisation'. Decentralisation involves the transfer of resources and decision-making on some development projects to lower level administrative units of the State apparatus in villages or districts. Although such units could facilitate local-level decisions on the choices, design and implementation of projects, meaningful participation by the people is usually lost to appointed or even elected officials. The dynamics of political and economic power at local/village level almost always enable the affluent in society to benefit more from development while the poor remain helpless.

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[87] See generally Oppong C and Abu K., Seven Roles of Women: Impact of education, migration and employment on Ghanaian mothers, ILO 1987. Also Molyneaux M., 'Mobilization Without Emancipation? Women's Interest, the State and Revolution in Nicaragua', in Feminist Studies 11(2), p226-254.

The power of the vote is also considered as participation. Democracy is part of the complex process of participation but in many countries where voting is by either adult male suffrage or skin colour, a vast portion of the population is left out of decision-making. Even in cases where voting is by universal adult suffrage, very few people have an influence on decisions made. This is because decisions are made by elected or appointed officials who represent various interest groups and classes within the society.

In the real sense, then participation has to do with empowering the deprived people in society[88]. It implies strengthening the ability and influence of the poor on decisions within the society. Participation means, not just including or mobilizing, but involving the poor in every stage of the development project cycle - planning, implementation and evaluation. This kind of empowerment would make it easier and to mobilise the peoples' effective and concerted efforts and strength aimed at achieving their development objectives. It would also, hopefully, enhance their technical skills, planning and managerial competence and analytical and reflective abilities. Participation that leads to empowerment which consistent with the notion of development as a

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[88] See generally, Gran G., Development by People: Citizen Construction of a Just World, Praeger, New York, 1983. Also Oakley P. and Marsden D., Approaches to Participation in Rural Development, ILO, Geneva, 1984.

fulfilment of human potential and capabilities[89]. There is abundant evidence that participatory forms of development strategies have been successful in Nepal, Jamaica, India, Sri Lanka and the Philippines, to mention a few[90].

Participation in development has become an important concern of both national and international development agencies. The Peasants Charter of the FAO states "Participation by the people in the institutions and systems which govern their lives is a basic human right and also essential for re-alignment of political power in favour of disadvantaged groups and for social and economic development. Rural development strategies can realise their full potential only through motivation, active involvement at the grassroots level ... in conceptualising and designing policies and programmes ... and evaluating them"[91].

It is becoming increasingly evident that the poor have not participated in sharing the benefits of development projects in the past. The need for participation is not only a matter of rejecting authoritarian and paternalistic development strategies or even for considerations of basic human rights but as a means of drawing attention to the 'real'

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[89] Wilber C, and Jameson K., 1975 op.cit.,

[90] See generally, Ghai D., op.cit., Chambers R., The Working Women's Forum: A Counter-Culture by Poor Workers, Institute of Development Studies, Brighton, 1985.

[91] FAO Peasants' Charter, 1981. op.cit.,

needs of the people and finding solutions through self-reliance and mass involvement. Cohen and Uphoff[92], maintain that participation of the rural poor in their own development has been a key factor in the success of projects in many underdeveloped countries.

Participation is an important part of human growth and leads to self-confidence, pride in people's own efforts, initiative, creativity, responsibility, cooperation and liberation from oppression[93]. Without these virtues, efforts to alleviate poverty would have little or no impact. Yet the process by which people learn to identify and solve their own problems is the essence of development.

Finally, the rural people in the Volta basin continue to face enormous problems as a result of a vicious cycle of poverty. Until researchers in the area adopt participatory forms of enquiry, project design and implementation, efforts to help would not yield any meaningful results. We would proceed to consider the importance of culture in the design of rural projects.

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[92] See Cohen M. and Uphoff N., Rural Development Participation: Concepts and Measures for Project Design, Implementation and Evaluation, Monograph series (2), RID Committee, Cornell University, 1977. Also Pamune O., Rural Transformation through River Basin Development. A Case Study of the Upper Benue River Basin Development Project (UBRBDP), in Poverty and Rural Development, Puttaswamaiah K., (ed), 1990. p293-306

[93] See Burkey S., op.cit., 1993.

4.7. CULTURAL SENSITIVITY AND RURAL DEVELOPMENT

Culture has been defined in different ways by anthropologists, archaeologists as well as sociologists. One such definition is that it consists of language, customs, institutions, law, knowledge and other human attributes. These attributes may be unique and therefore distinguishes one group of people from others[96]. Culture may also be said to constitute learned behavioural patterns which are acquired during the early ages of childhood. These behaviours are not hereditary but rather acquired through imitation, hearing and seeing what goes on in the day to day life of the community or family.

Anthropologists believe that learned behaviours are passed on from generation to generation by non-hereditary means. Culture in the anthropological sense, therefore, constitutes the way of life of a group of people. This includes their music, methods of farming, houses, festivals, means of exchange and anything which portrays how a particular group of people live and what they do as a community. These elements of culture may vary from place to place but no society has a culture superior to that of another. Culture also reflects how a group of people adapt to or overcome the peculiar conditions within which they live. The Gas who live

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[96] Poostchi I., Rural Development and the Developing Countries. An Interdisciplinary Introductory Approach, 1986. p335.

along the coast in South-eastern Ghana, for instance, eat kenkey[95] and fish as their main diet. This is partly due to the fact that the Accra plains where they live has a savannah grassland type of vegetation and the main crop grown in the area is corn. Since they live along the coast, the Gas (both men and women) are mainly fisherfolk. This is why kenkey and fish is the commonest type of food in the area and therefore, it has become the main diet of the people.

In studying rural development, knowledge of the society's culture either as tribes, clans or as a rural community in a village becomes vital. This knowledge would help to determine which policies and programmes would be successful and more importantly, acceptable to the society if implemented. A good knowledge of the culture of the society being studied would also help to prioritise the development needs of the community. One characteristic of culture is that is has norms or standards which are set by the people who share that culture. These norms determine what is good or bad, right and wrong and spells out acceptable behaviours and values within the community.

The tendency for researchers to perceive other cultures from the point of view of their own cultural biases makes most development workers vulnerable of ethnocentrism. This is why it is necessary to involve the local people in the process of

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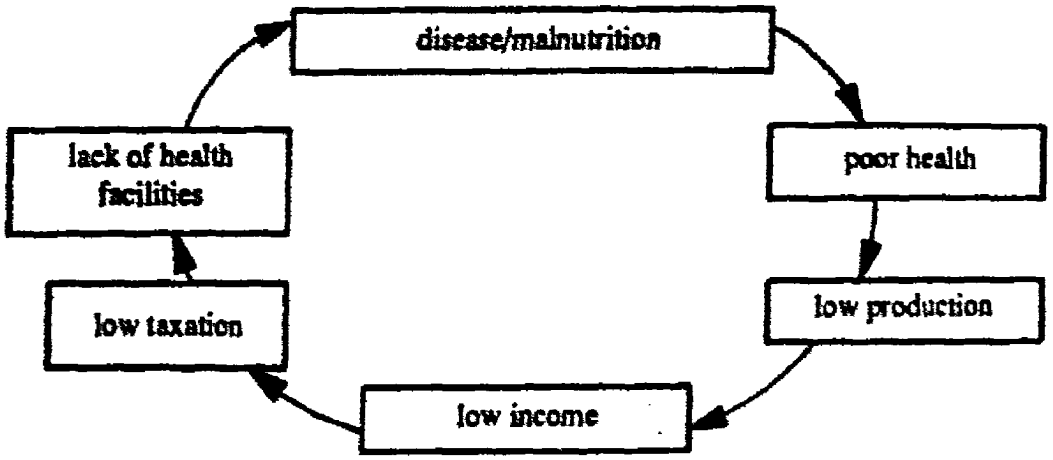
[95] "Kenkey" is prepared from fermented corn-dough. It is usually eaten with red-hot pepper and fried or smoked fish.

development so that they would help find culturally acceptable solutions to problems which confront the community. The time-period between project planning and implementation is usually short and resources are almost always limited. A process which would involve the local people, therefore, would have the potential of providing a cheaper, faster and more appropriate alternative to the development needs and priorities of the poor in the long run. Without participation by local people, development projects might not fully benefit the poor in society and might be ineffective in eliminating poverty. Even more discouraging is the fact that where the causes of poverty are not addressed properly they become more permanent in the form of a vicious cycle. Figure 3 below illustrates the vicious circle of poverty. When people are malnourished their chances to remain in good health are reduced. In consequence, their productive capacity is also reduced and resulting in low production of output. A low level of production means that their earning capacity declines and monthly as well as annual income remains low. Assuming that the taxation system within the society is fair, the total amount of money collected in the form of taxes by the agency involved falls. If earnings by government remain low, it becomes difficult for the health ministry to provide required infrastructure for healthcare delivery. In the absence of such facilities, diseases and malnutrition continue to plague society and the cycle continues.

Figure 3

THE VICIOUS CYCLE OF POVERTY



Source: Burkey S. op.cit., 1993. p13

It is our view that participatory forms of research and development which allow full involvement of the rural poor as local beneficiaries would help identify their real needs and would help provide solutions according to the priorities spelt out by the people themselves. Throughout this chapter, we have pointed out the inherent problems with the modernization approach to development in the Volta river basin and showed why the initiative did not yield expected results. We have also argued the case for participation by the beneficiaries of change in the process.

Finally, this chapter has also shown that understanding the culture of the people for whose benefit projects are designed is an important factor for the success of any development project.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

Throughout this study, we have dealt with various issues regarding technology transfer and its impact on rural development. Using the case study of the Volta River Project, we have demonstrated that the transfer of skills, methods of production and equipment (which together, we prefer to call technology), alone will not meet expected objectives, no matter how well meaning planners and development workers might be.

In Chapter one, we described the strategy underlying the construction of dam projects in many countries including Ghana. The literature available to us was overwhelmingly supportive of the argument that the modernization approach to development had been the guiding principle in this regard. Although other schools of thought such as Depen-dency and Ecodevelopment have emerged as a challenge to Modernization, planners in many countries continue to view dam projects as a pivot for economic growth and development. We then proceeded with a discussion about the meaning of 'technology' as has been used by many writers. We pointed out that 'technology' not only refers to machines and equipment but includes methods and skills which enable individuals, groups and societies to achieve various ends. The impact of techniques and methods

such as irrigation, plantation agriculture, the use of fertilizer and ferry transport, among others, in transforming the lives of the rural communities in the Volta river basin was the focus of this study. These techniques which became necessary after the construction of the Volta dam were expected to facilitate a transition from traditional ways of life to improved living conditions in the river basin. We have argued in Chapter two that the poor results of development projects stems from the fact that planners usually adopted either inappropriate technology or a wrong combination of available technology. Terms such as Rural Development and Integrated Rural Development as well as some causes of rural poverty were also discussed in some detail.

Various aspects of the Volta River Project - politics, funding, as well as some of the consequences of the project were reviewed. It was necessary to deal with those factors in order to show that, an effective combination of physical technology (embodied in machines and equipment), as well as social technology (embodied in human skills and expertise, infrastructure, local as well as state political and institutional support), are required for the successful implementation of any development project.

Chapter four provided further discussion about the effects of the Volta basin project. It provided support to our thesis by pointing out the inherent problems in the modernization approach to development which was adopted in the

Volta river basin, and which rendered the project a failure. These problems included inadequate infrastructure, skilled personnel and logistics (which could have ensured a successful transition) poor environmental protection and management, to mention a few. The importance of cultural sensitivity and participation by local people in projects which are intended to benefit them, was reiterated. By tying our theoretical analysis into the actual situation in the river basin, we sought to prove the case that the rural people who live in the Volta river basin are confronted with diseases, malnutrition, inadequate housing, and poverty as a result of the application of the 'modernization' approach to the development of the river basin. What follows below is devoted to conclusions arising from the study.

First, we must emphasise that technology transfer has become a common phenomenon as a result of increasing interdependence in the global political economy. In some cases, the importation of technology by developing countries from developed countries has provided an opportunity for development and economic growth without 're-inventing the wheel'. The caution, though, is that such transfer must always be preceded with careful research to determine how appropriate and applicable such technology is to the conditions prevailing in the adopting country. This is necessary because incompatible combinations of imported technology with local conditions could yield devastating consequences as in the case

of the Volta River Project.

Second, 'development' must be people-oriented and therefore, efforts must be made to assess the long-term effects of development projects to ensure that the benefits to be derived from such initiatives would be long lasting, giving adequate attention to its effects on the local environment.

Finally, it is our firm conviction that the consequences of the Volta Basin Project would have been different if planners had given enough attention to the culture of the local people and involved them in the planning, implementation and periodic evaluation of the project especially in issues relating to resettlement. Unfortunately, these vital components of the process were ignored. It is in the context of these conclusions that the following suggestions are made. It is our hope that these suggestions if followed by the Government of Ghana, will at least to set the stage in dealing with the current predicament of the rural people who live in the Volta basin.

We propose that an independent Project Monitoring Unit be set up to work with the Volta River Authority in researching the effects of the Volta River Project on the rural communities up to the present day. The unit which must as a matter of necessity have local representation will go a long way to help identify the specific problems which confront the local people. At that point, the government should arrange to provide financial and institutional support for dealing with

such problems according to the priorities set by the local people.

Government officials should explore the possibility of re-negotiating aspects of the agreement with VALCO to the extent that the company will share the responsibility of dealing with the socio-economic consequences of their operations. Given that the company has had an unfair deal in place since 1965, this will not be too much for the government and people of Ghana to demand.

As regards to further research, it would be revealing to conduct research on various project agreements involving multinational and transnational companies in order to fully comprehend the aspects of such agreements which relieve them of the burden of contributing to the social and environmental effects of mega-projects. Usually, such lenient agreements are made to attract foreign investment in order to foster economic growth. Unfortunately, the case of the Volta River Project has demonstrated that this does not always happen. This could be part of a full-scale investigation in many other areas regarding foreign investment in Ghana. Hopefully, planners would begin to notice where such investments are not viable either socially or economically. Adequate knowledge in this area will put Ghanaian planners in a better negotiating capacity for future projects. Certainly, the problems confronting the rural people in the Volta river basin are grave and require immediate attention. This study is a

contribution to their cause and it is hoped that their plight will be judged with liberty and justice in the near future.

BIBLIOGRAPHY

Abdalla I., "What Development? A Third World Viewpoint", in International Developemnt Review, Vol. 22 (2/3), 1980. p13-16.

Ackermann, White and Worthington., (eds) Man-made Lakes: Their Problems and Environmental Effects, 1973.

Afriyie E.K., Resettlement Agriculture in Ghana: An experiment in innovation, in Rural Development in Ghana (ed) C.K. Brown 1986. p229-234.

Ahiakpor J.W., Do Firms Choose Inappropriate Technology in LDC's, in Economic Development and Cultural Change, The University of Chicago,1989.

Ahooja-Patel K., Drabek A.G., Nerfin M. (eds), World Economy in Transition, Ashish Publishing House, 1991.

Albrecht G. and Jackson D.C., The Social Context of Policy Research. In Sociological Methods and Research, Vol.13(3), 1985. p275-287.

Assibi O., Economic Impact of the Volta River Project, in Proceedings of the West African Conference, 1976, p131-137.

Annis S., "The Next World Bank: Financing Development from the Bottom Up", in Grassroots Development Vol.11, Inter-American Foundation, 1987. p24-29.

Balachandra K., Participatory Strategies in Water, Health and Rural Development Programmes. In Waterlines Vol.10(2) 1991. p2-5.

Balon E., "Kariba: The Dubious Benefit of Large Dams" AMBIO Vol. 7, 1978, p39-48.

Belshaw D., "Taking Indigenous Technology Seriously: The Case of Inter-cropping Techniques in East Africa", in IDS Bulletin, 10, (2), 1979. p24-27.

Benneh G. and Dodoo R., The Impact of the Volta River Project on the Life Style and Population Distribution in the Volta River Basin, in Proceedings of the West African Conference, 1976, p131-137.

Blake D. and Walters R., The Politics of Global Economic Relations, 1983.

Borstein M., "The Influence of Visual Perception on Culture", in American Anthropologist, 77, 1975. p774-798.

Breslin P., "A Sense Of Identity", in Grassroots Development, Vol.10(2), Inter-American Foundation, 1986. p12-21.

Brokensha D., Warren D. and Werner O. (eds), Indigenous Systems of Knowledge and Development, University Press of America Inc., 1980.

Brokensha D., The Volta River Project. In Proceedings of the West African Conference, 1976. p119-123.

Brown C.K. (ed), Rural Development in Ghana, Ghana Universities Press, Accra 1986.

Brown G., The Volta Basin Project: An examination of its contribution to Economic Growth and Dive.sification in Ghana. Unpublished MA thesis submitted to Dalhousie University, Halifax, Canada., 1988.

Burkey S., People First: A Guide To Self-Reliant, Participatory Development, 1993.

Butcher D. and Amarteifio G., Volta River Project Resettlement Social Survey Forms. Faculty of Agriculture, University of Science and Technology and VRA. Resettlement Office. 1962.

Chambers R. (ed), The Volta Resettlement Experience, Proceedings of the Symposium held at the University of Science and Technology, Kumasi, March 21-27, 1965.

Chambers R., Managing Rural Development: Ideas and Experiences from East Africa, Scandinavian Institute of African Studies, Uppsala, 1974.

Chambers R., Rural Poverty Unperceived: Problems and Remedies, Washington D.C., 1980.

----------, Rural Development: Putting the Last First, Longman Scientific and Technical, 1993.

Cheru F., Structural Adjustment, Primary Resource Trade and Sustainable Development in Sub-Saharan Africa. In World Development. Vol.20(4) 1992. p497-512

Cheryl P., The World Bank: A Critical Analysis, Monthly Review Press, 1982.

Chinnebua A.A., Designing Rural Development programmes - The Atebubu Rural Development Project, in Rural Development in Ghana., Brown C.K. (ed) 1986.

Cohen J., Administration of Integrated Rural Development Projects: Cambridge, Harvard Institute for International Development, Development discussion paper No.79, 1980.

Cohen J. and Uphoff N., Rural Development Participation: Concepts and Measures for Project Design, Implementation and Evaluation", in Rural Development Monograph No.3 (2) Centre for International Studies, Cornell University, New York, 1977.

Cohen J., "Integrated Rural Development: Clearing Out the Underbrush", Sociologia Ruralis, XX (4), 1980. p195-212.

Cohen J.M., Integrated Rural Development. The Ethiopian Experience and the Debate. The Scandinavian Institute of African Studies, Uppsala, 1987.

Cole S., The Global Impact of Information Technology. In World Development Vol.14(10/11) 1986. p1277-1292

---------- Creating A Progressive Rural Structure To Serve A Modern Agriculture, 1969.

Davies Oliver., Special Exhibition of Archaeological findings from the Volta Basin Report., Accra, 1965.

Debelian L., The Volta River Resettlement Programme. In Proceedings of the West African Conference, 1976. p18-35.

Dene Rights: Supporting Research and Documents. Vol.4. Dene Development.

Dharam Ghai., Participatory Development., Some Perspectives from Grass-roots experiences., United Nations Research Institute for Social Development (UNRISD), 1988.

Dixon Chris., Rural Development and the Third World, Routledge, 1990.

Dube S., Modernization and Development - The Search for Alternative Paradigms, 1990.

Edquist C. and Jaccobsson S., Flexible Automation: The Global Diffusion of New Technology in the Engineering Industry, 1988.

Elliot C., Patterns of Poverty in the Third World: A Study of Social and Economic Stratification, New York, 1975.

Ernst D. and O'Connor D., Technology and Global Competition: The Challenge for Newly Industrialising Economies, OECD 1989.

Ernst D., Automation and the Worldwide Restructuring of the Electronics Industry: Strategic Implications for Developing Countries. In World Development Vol.-----19?? p333-352.

Ernst D., "International Transfer of Technology, Technological Dependence and Underdevelopment - Key Issues", in Ernst D. (ed), The New International Division of Labour, Technology and Underdevelopment, 1981.

Esman M., Landlessness and Near-Landlessness in Developing Countries, Rural Development Committee, Centre for International Studies, Cornell University, 1978.

Fagerling I. and Saha J., Education and National Development, Pergamon press 1991.

FAO, The Peasants' Charter: The Declaration of Principles and Programme Of Action of the World Conference on Agrarian Reform And Rural Development. Rome, 1981.

FAO, Rural Developemnt, FAO and The United Nations ACC Task Force on Rural Development. Special Feature - Participation in Practice. July - December 1990 No.12.

Fitch B and Oppenheimer M., Ghana: End of An Illusion, Monthly Review Press, 1966.

Frank A., Sociology of Development and Underdevelopment of Sociology, London, 1971.

Fransman M., Technology and Economic Development, Westview press, 1986.

Galbraith J., The Nature of Mass Poverty, Havard University Press, Massachusettes, 1979.

Galtung J, Preiswerk R and Wemegh M., "A Concept of Development Centred on the Human Being: Some Western European Perspectives", in Canadian Journal of Development Studies, Vol.11 (1) 1981. p134-163.

George S., How the Other Half Dies: The Real Reasons for World Hunger, U.K., 1976.

Goldsmith E. and Hildyard N (ed), The Social and Environmental Effects of Large Dams, Vol.2. Case Studies, Woodbridge Ecological Centre, 1984.

Graham R., The Aluminium Industry And The Third World, 1982.

Gran G., Development By People: Citizen Construction of A Just World. New York, 1983.

Griffin K. and Khan A., "Poverty in the Third World: Ugly Facts and Fancy Models", in World Development, 6 (3), 1978. p295-304.

Grindle M., "Anticipating Failure: The Implementation of Rural Development Programs", in Public Policy XXIX, (1), 1981. p51-74.

Gustavo E., 'Development'. In The Development Dictionary: A Guide to Knowledge as Power, Wolgang Sachs (ed), 1992. p6-25.

Hart D., The Volta River Project: A Case Study in Politics and Technology, Edinburgh University Press, 1980.

Hart D., Environmental Aspects Of A Large Tropical Reservoir: A Case Study of the Volta Lake, Ghana. Office of International and Environmental Programmes, Washington, D.C. 1980.

Hellwege J., "Underdevelopment, Dependencia and Modernization Theory", in Law and State Vol. 17, 1978. p45-69.

Herbolzheimer E. and Ouane H., The Transfer of Technology to Developing Countries by Small and Medium Sized Enterprises of Developed Countries, in Trade and Development. An UNCTAD Review No.6, 1985.

Hills Jill., The Telecommunication Rich and Poor. In Third World Quarterly 12(2) 1990. p71-83.

Hirschman A., Development Projects Observed, The Brookings Institution, Washington D.C., 1967.

Hoffman K., Microelectronics, International Competition and Development Strategies: The Unavoidable Issues - Editors Introduction. In World Development Vol.....19?? p263-272.

Holzman F. and Portes R., The Limits of Pressure, Foreign Policy No.32 (81), 1978.

Howard R., Colonialism and Underdevelopment in Ghana, 1978.

Howes M and Chambers R., "Indigenous Technical Knowledge: Analysis, Implications and Issues", IDS Bulletin, 10 (2), 1979. p5-11.

Hunter G., Modernizing Peasant Societies: A Comparative Study in Asia and Africa, Oxford University Press, 1969.

Hunter J. "Man-Made Lakes and Man-Made Diseases: Towards a Policy Resolution". In Social Science and Medicine, Vol.16. p1127-1145.

IDS., "Rural Development: Whose Knowledge Counts?", in IDS Bulletin, 10 (2), Institute of Development Studies, University of Sussex, Brighton, January 1979.

ILO., Poverty and Landlessness in Rural Asia, International Labour Office, Geneva, 1977.

Inkeles A and Smith D., Becoming Modern: Individual Change in Six Developing Countries, Harvard Univ. Press, 1974.

Inkeles A. and Smith D., Becoming Modern. London, 1974.

International Association for Impact Assessment (IAIA), Impact Assessment: Whose Rationality? In Capitalism Nature and Socialism. A Journal of Social Ecology Vol.3(1) 1992.

Kalisti E.K., Volta Lake in Relation to the Human Population and some issues in Economics and Management, in Man-made Lakes: Their Problems and Environmental Effects,(ed) Ackermann, White and Worthington, 1973.

Kaplinsky R., Electronics Based Automation Technologies and the onset of Systemofracture: Implications for Third World Industrialization, in World Development Vol.13,No.3,1985. p423-439.

Klumpp R. and Chu Y., Importance of the Aquatic Weed Ceratophullum to Transmission of Haematobium in the Volta Lake, Ghana., in Bulletin of the World Health Organization, Vol.58 (5), 1980.,p791-798.

Korten D., "Community Organization and Rural Development: A Learning Process Approach", in Public Administration Review, Sept./Oct. 1980. p480-511.

Korten D. and Frances F., "Stimulating Community Participation: Obstacles and Options at Agency, Community and Scocial Levels", in Rural Development Participation Review 2 (3), Winter, 1981.p1-6.

Korten D. and Felipe B., Bureaucracy and the Poor: Closing the Gap, McGraw-Hill International Book Co., 1981.

Korten D. and Uphoff N., "Bureaucratic Re-orientation for Participatory Rural Development", in National Association of Schools of Public Affairs and Administration (NASPAA) Working Paper, 1981.

Kurien C., Poverty Planning and Social Transformation, Allied Publishers Private Ltd., 1978.

Lele U., The Design of Rural Development: Lessons from Africa, The John Hopkings University Press, 1975.

Lewis W.A., International Competition in Manufacturers'. In American Economic Review Papers and Proceedings, Vol.47, 1957.

Liddle R., The Politics of Development. In World Development Vol.20(6) 1992. p793-807.

Lincoln Y. and Guba E., Naturalistic Inquiry, Sage publishing, California, 1985.

Lipton M., Why Poor People Stay Poor: Urban Bias in World Development, Temple Smith, London. 1977.

Livingstone J., "On the Concept of 'Integrated Rural Development' in Less Developed Countries", in Journal of Agriculture Economics, XXXX, (1), 1979. p49-53.

Low A.R.C., Small Farm Improvement Strategies - The Implications of a Computer Simulation Study of Indigenous Farming in South East Ghana. In Journal of Development Studies, ---------19??.

Lumsden P., The Volta Project: Animation, in Canadian Journal Of Africa. 1973. p117.

Maguire P., Doing Participatory Research, Centre for International Education, University of Massachusetts, 1987.

Meier G., Leading Issues in Economic Development, Oxford University Press, 1989.

Mendonsa L.E., The Failure of Modern Farming in Sisala-Land, Northern Ghana 1967-1977. In Human Organization Vol.39 No.3 1980. p275-279.

Molyneaux M., "Mobilization Without Emancipation? Women's Interest, The State And Revolution In Nicaragua", in Feminist Studies, Vol. 11 No.2, 1985, p226-254.

Mosher A., Getting Agriculture Moving, 1966.

Mosher A., "Custom-Made Systems", in Career, Vol.4, 1972. p33-37.

Mou Li., Socio-Economic Consequences of Health impacts from Water Resources Development Projects., Unpublished MA thesis submitted to St. Marys University, Halifax, Canada. 1992.

Moxon J., Volta: Man's Greatest Lake, 1969.

Muma P.A., Investment Criteria and Development Policy: An African Perspective, Merlin Books Ltd., 1988.

Nkrumah K., The Autobiography of Kwame Nkrumah, 1959.

--------- , Dark Days in Ghana, New York, 1968.

--------- , Towards Colonial Freedom, memeo.

Oakley P. and Marsden D., Approaches to Participation in Rural Development, International Labour Organisation, Geneva, 1984.

Obeng L., "Health Problems of the Volta Lake Ecosystem", in Stanley N. and Alpers P. (eds) Man-Made Lakes and Human Health, London, 1975.

Obeng L., Whither Freshwater Biota? Water Pollution, Volta Lake, Ghana. Proceedings of the 2nd International conference on Environmental Future, Nicholas Polunin (ed), 1980. p97-107.

Offenheiser R., "Making Primary Health Care Work: The Case for Fundacao Esperanca", in Grassroots Development, Vol.10(2), Inter-American Foundation, 1986. p12-21.

Okonjo Chukuka., The Concept of Development, in Rural Development in Ghana., Brown C.K. (ed) 1986.

Patel S.J., Technological Transformation of the North. Lessons for the South. In Economic and Political Weekly Vol.XXI(51), 1986.

Perez C., Micro-Electronics, Long Waves and World Structural Change: New Perspectives for Developing Countries, in World Development, Vol.13(3), 1985.p441-463.

Poostchi I., Rural Development and the Developing Countries. An Interdisciplinary Introductory Approach. 1986.

Rhoda Howard., Colonialism and Underdevelopment in Ghana, 1978.

Rubin N. and Warren M., (eds), Dams In Africa. An Interdisciplinary Study Of Man-Made Lakes - Africa. 1968.

Ruttan V., "Integrated Rural Development Programmes: A Historical Perspective", in World Development, XII, (4), 1984. p393-401.

Ruttan V., "Integrated Rural Development Programmes: A Skeptical Perspective", in International Development Review, XVII, (4), 1974. p9-16.

Sachs I., Ecodevelopment, Rome, 1976.

Sachs I., Controlling Technology for Development, Development Dialogue, Uppsala, 1979.

Santoso P., Political Challenges to Sustainable Development in Indonesia, Unpublished MA Thesis presented to Saint Marys University, 1992.

Scott D. Senker K. and England E., Epidemiology of Human Schistosoma Haematobium infection around Lake Volta, Ghana, 1973-1975. In Bulletin of the World Health Organisation 60(1) 1982. p89-100.

Siffin W., Administrative Problems and Integrated Rural Development. Indiana University, International Development Institute, 1979.

Soete L., International Diffusion of Technology: Industrial Development and Technological Leapfrogging. In World Development , 1985.

Sofranko A., Fliegel F. and Sharma N., Comparative Analysis of the Social Impact of a Technological Delivery System. In Human Organisation Vol.36(2), 1977. p193-197.

Stavenhagen R., "Basic Needs, Peasants and the Strategy for Rural Development", in Nerfin M. (ed), Another Development: Approaches and Strategies, Uppsala, 1977.

Stewart F., Technology and Underdevelopment, 2nd ed. Macmillan London, 1977.

The Volta River Project, Vol. 1: Report of the Preparatory Commission. London, 1956.

Tsikata F.S. (ed), Essays from the Ghana-Valco Renegotiations, 1982-1985, Ghana Publishing Corporation, 1986.

United Nations, UN Environmental Data Report, Oxford, 1987.

University of Guelph - Approaches to Rural Development: A Look to the Future, Proceedings of the National Conference on Rural Development, University of Guelph, May 20-22, 1981.

Uri P., Development Without Dependence, New York, 1976.

Vanderpuye C.J., Further Observations of the Distribution and Abundance of Fish Stocks in Volta Lake, Ghana. In Fisheries Research 1(1981/82) p319-343.

Volta River Development Act 1961, Act 46, Accra, Government Printer, 1961.

Wad A., Limitations and Opportunities for Developing Countries of emerging Micro-Electronic Technologies, 1984.

Wienert H. and Slater J., East-West Technology Transfer: The Trade and Economic Aspects, Paris, OECD, 1986.

Wilber C. and Jameson K., 'Paradigms of Economic Development and Beyond'. In Directions in Economic Development, University of Notre Dame Press, 1975. p1-41.

World Bank - World Development Report, Washington D.C., 1981.

World Bank - Rural Development Sector Policy Paper, World Bank, Washington D.C. 1975.