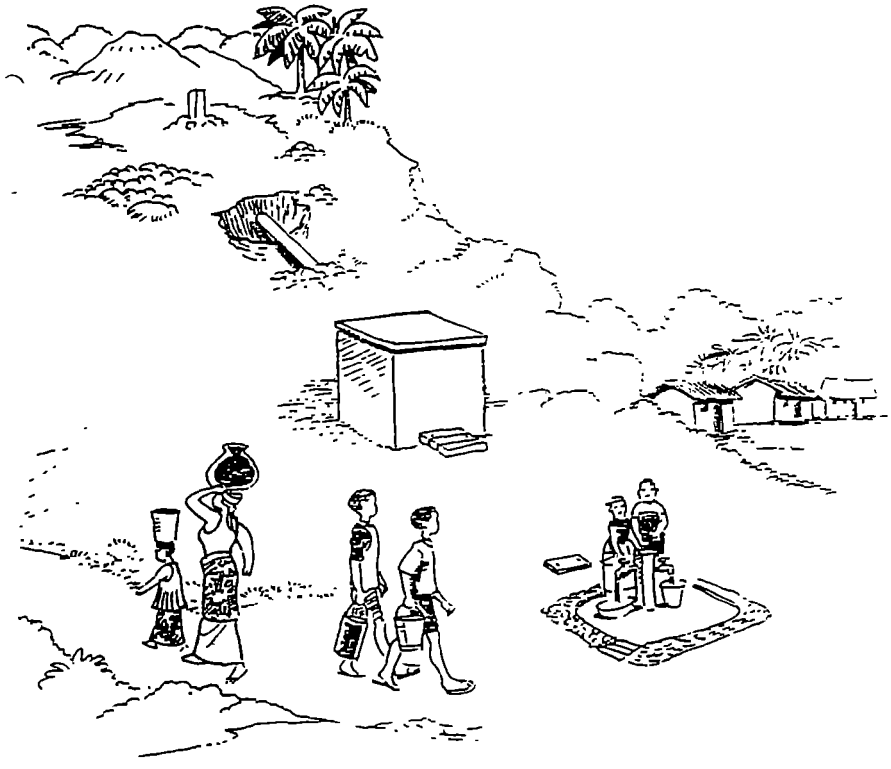
KUNGL TEKNISKA HÖGSKOLAN

TOWARDS SUSTAINABLE WATER SUPPLY AND SANITATION PROJECT MANAGEMENT IN RURAL GHANA: A CASE OF THE DANISH WATER PROJECT IN THE KPANDO DISTRICT

John Ernest, Koku



Stockholm 1997

Master of Science Thesis Report Thesis Report Series 1997:21
Division of Land and Water Resources
Department of Civil and Environmental Engineering
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Supervisor
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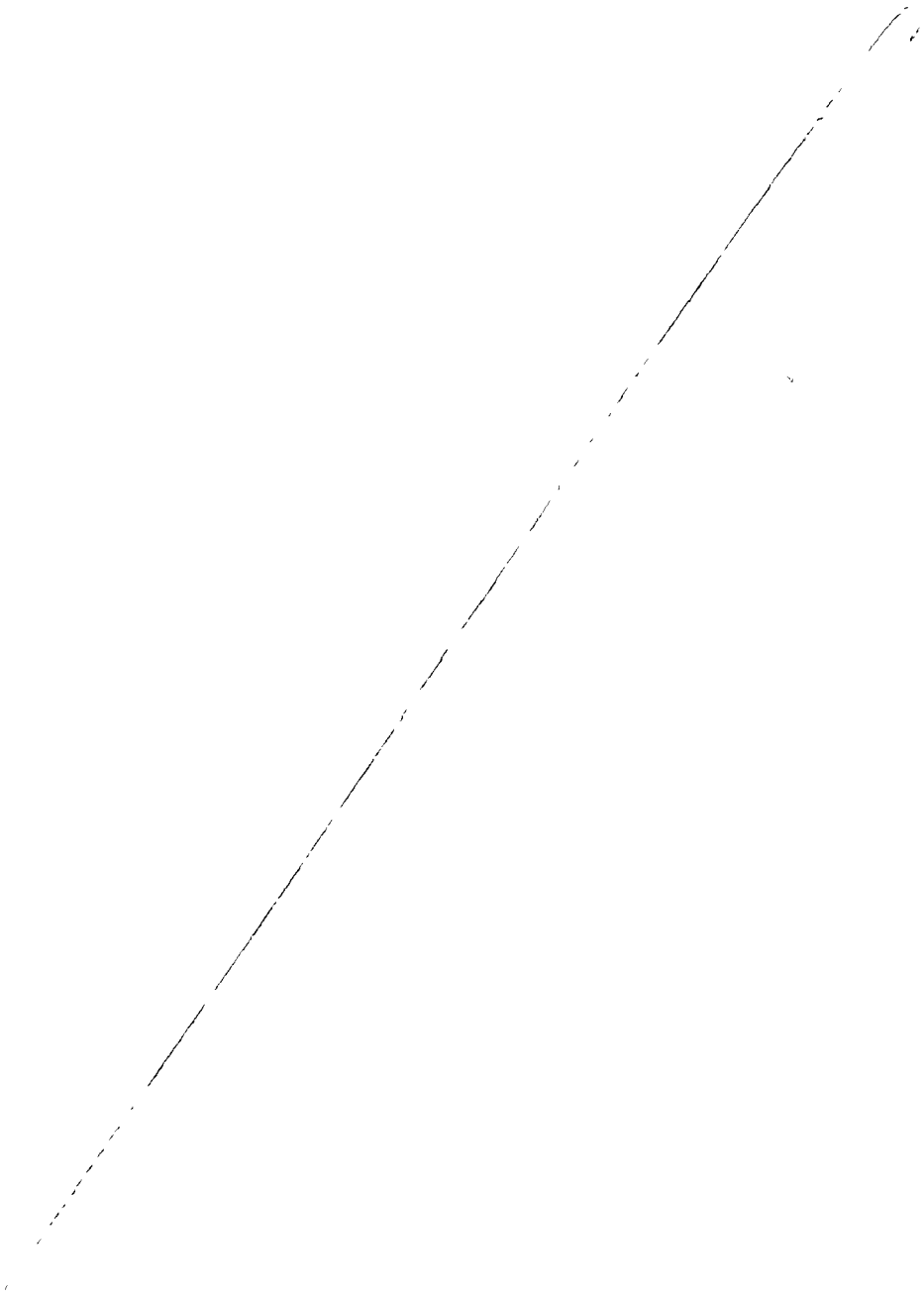

FIGURES

PLATES

PREFACE

This report is an outcome of a thesis work carried out at the Division of Land and Water Resources within the Royal Institute of Technology(KTH), Stockholm-Sweden It was presented in partial fulfilment of the requirements for a Master of Science (Environmental Engineering and Sustainable Infrastructure) Degree Data for the compilation of the report was acquired from a field visit to Ghana during the period January-March 1997 Write up of the final report was completed in Stockholm in August,1997 The choice of the Danish Water project for the study was self-motivated and not requested by any specific organization It came out of the interest the author has in its activities within the Kpando District from where he originates Thus, the viewpoints and conclusions presented in the document are those of the author and do not necessarily reflect those of the Division It is hoped that findings from this study will sensitize the Danish Project to pertinent issues affecting its activities within the Kpando District It is also the author's hope that issues discussed in the document will equally serve useful purposes for rural water supply project planners, policy makers and others working in water, sanitation and its related fields in developing countries

TABLES

ABBREVIATIONS AND ACRONYMS

DANIDA - Danish International Development Assistance

DCD - District Community Development

DKK - Danish Kronor

CIDA - Canadian International Development Agency

EAP - Environmental Action Plan

EHA - Environmental Health Assistants

EIA - Environmental Impact Assessment

EPC - Evangelical Presbyterian Church

EPI - Expanded Programme on Immunization

ESA - External Support Agency

EU - European Union

GDP - Gross Domestic Product

GWSC - Ghana Water and Sewage Corporation

IRC - International Water and Sanitation Centre

LFA - Logical Framework Approach

MOH - Ministry of Health

NGO - Non-Governmental Organization

ODA - Overseas Development Administration

SIDA - Swedish International Development Cooperation Agency

UN - United Nations

UNCED - United Nations Conference on Environment and Development

UNDP - United Nations Development Programme

UNICEF - United Nations International Children's Fund

USAID - United States Agency for International Development

US$ - United States Dollars

VRWSSP - Volta Rural Water Supply and Sanitation Project

WATSAN - Water and Sanitation

WATSANEWS -Water and Saitation News

WVI - World Vision International

ABSTRACT

Ghana is one West African Country that is endowed with a relatively abundant water resources But, until recently ineffective water resource planning and management, complicated by the high per capita cost of water supplies, has made potable water supply a big problem The result is that a large proportion of the country's population, particularly the rural dwellers, hardly have access to safe potable drinking water In most rural districts of the country including the Kpando District where this project was carried out, the situation has resulted in all forms of water resource misuse and abuse which have impacts not only on the environment but also on the health status of people. Recently, the government of Ghana, aware of the gravity of the problem, has initiated several rural water and sanitation projects in conjunction with many international organizations towards addressing the crisis

One such co-operation is the Danish Water Project (also referred to as the Volta Rural Water and Sanitation Project) in the Kpando District This study seeks to evaluate the Danish Water Project from the point of view of sustainability In that context, it examines the level of public participation, public health and environmental education and other components of the project's demand-driven strategy for rural water supply and sanitation management Problems hindering the smooth running of the project, its socio-economic impact and prospects were also given special focus The study provides useful recommendations that could guide future policy formulation towards attaining sustainable water project management in the Kpando District

Keywords: ***Sustainability, Demand-Driven Strategy, Public Participation, Project Planning and Management.***

ACKNOWLEDGEMENT

The dream of compiling this thesis report which marks the completion of my MSc studies could not have become reality without very significant contributions from several persons who deserve special mention In that regard, my most profound gratitude goes first and foremost to Ms Karin Dif and the entire Board of the Swedish Institute for sponsoring my studies All the contributions and care enjoyed from them throughout my study period have been very much appreciated It is my hope that such a kind gesture of sponsoring my studies for an Msc (Environmental Engineering and Sustainable Infrastructure) Degree will mark the beginning of a more organized research co-operation between the Royal Institute of Technology (KTH), the Swedish Institute and the University of Ghana, Legon-Accra Having said this, I specially wish to acknowledge with gratitute the valuable assistance, care and concern enjoyed from Dr Jan-Erik Gustafsson, my supervisor and Direstor of Studies (EESI Programme), and Dr Nils Viking (former programme Director). The useful guidance and insights given me on this subject constituted an important motivational factor that has kept me all through. Dr Gordon McGranahan and Ms Marianne Kjellen all of the Stockholm Environment Institute (SEI) also deserve special words of thankgiving Their critical comments and useful literature on methodological approaches are very much appreciated They have greatly contributed to giving the document its final shape

My words of acknowledgement will be incomplete without extending very special words of gratitute to the entire staff of the Danish Water Project for the great co-operation received from them, which greatly facilitated my work during the field study period In this connection special thanks go particularly to Ms Mette Baekgaard, Messrs Joseph Afedo and Augustine Fornyikpor all of the Regional Project Office (Ho) as well as Messrs Forster Soley(District Project Engineer), John Dzoboku (District Project Administrator) and all staff of both offices who contributed in diverse ways towards successful acquisition of data for this report To all these people I say: ***"Akpe kakaka"*** which, in my dialect means "thanks so very much" and wish all of them many rewards and success in their endeavours Finally, to my beloved parents Lordson and Gifty Koku, I offer them a very special place in my heart in appreciation of the incessant moral support and inspiration enjoyed from them all through my educational years which has kept me forging ahead on the academic ladder for all these years To all these persons and several others including colleagues and friends who contributed in one way or the other towards this successful end, I say a big THANK YOU

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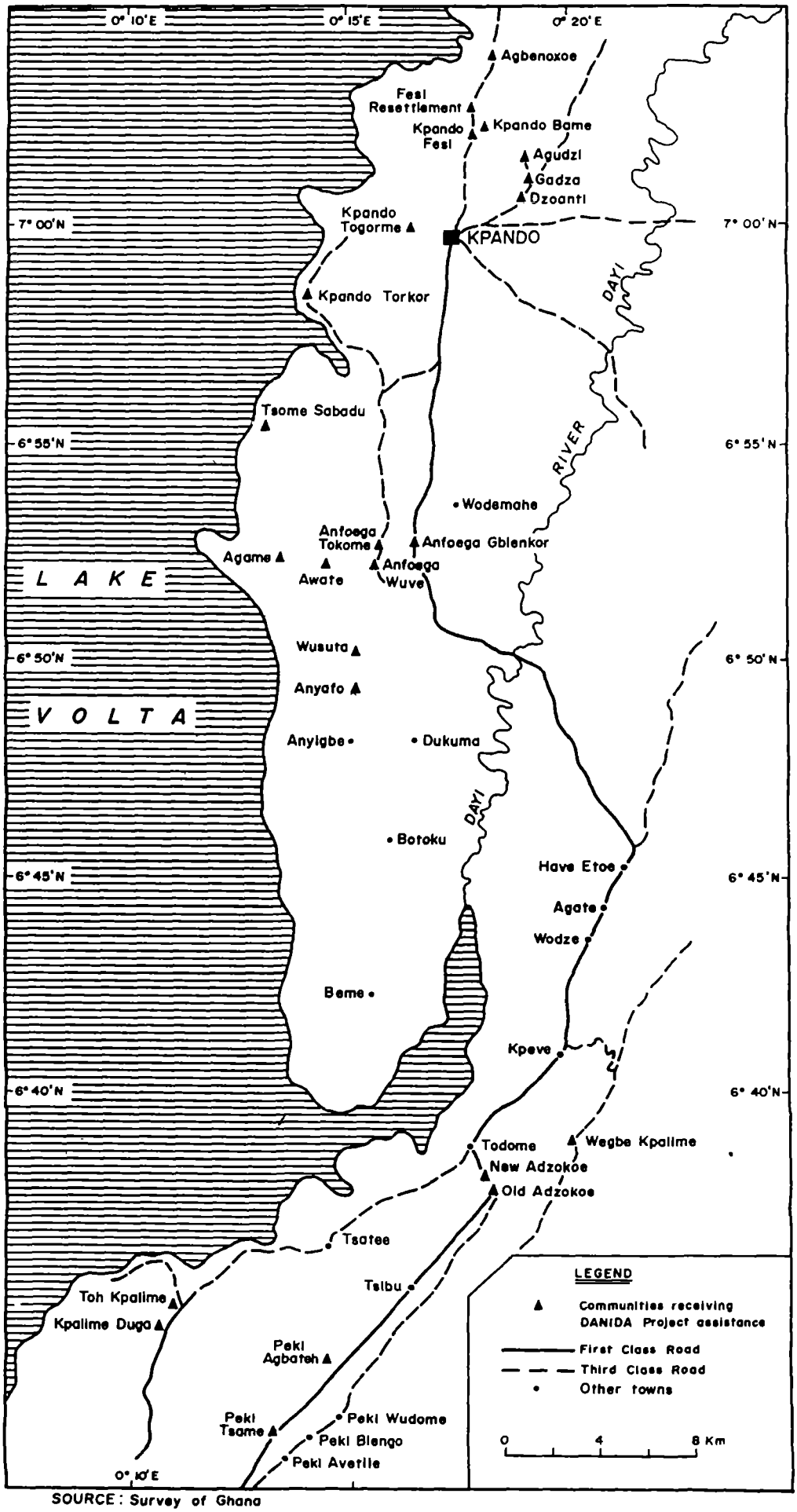
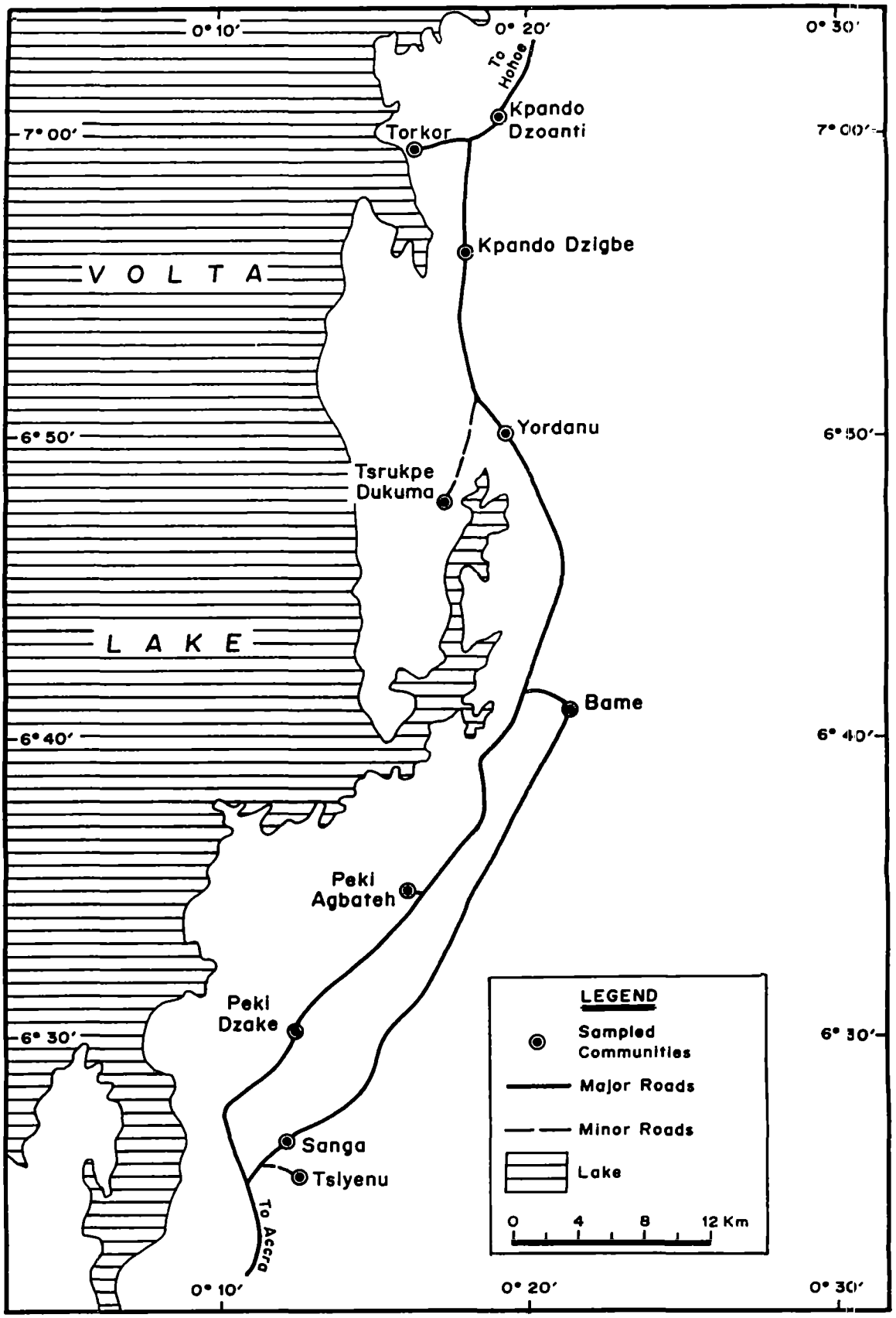


SOURCE: Survey of Ghana

Fig. 2 SAMPLED RESEARCH COMMUNITIES WITHIN THE KPANDO DISTRICT



Source: Survey of Ghana.

CHAPTER ONE

RESEARCH PROBLEM AND DESIGN

1.1.0 Introduction and Statement of Research Problem

Sustainable water use and management has for various reasons become an issue of great concern in many countries the world over in recent times While increased awareness about scarce water resources coupled with their intricate relationship with the environment have been major driving forces behind the growing concern enjoyed by this resource, demographic factors have compounded the above to necessitate a more urgent attention for water resource management in most nations of the world In most third world countries, especially in Africa, rapid population growth together with lack of effective and holistic water management policies have combined to make the problem a little more complicated Since the beginning of the 1980's concerted efforts have been made by many governments to respond to the water problem, including access to safe drinking water, which led to increased coverage within the period However recent experiences are suggesting that more still remains to be done for the desired impact to be felt in most countries In fact, it is estimated that about two-thirds of Africa's rural population are still without access to improved water supplies due primarily to high per capita cost of water supply systems (World Bank 1989)

Ghana is by no means an exception in the above situation. The country is endowed with abundant water resources which served as a spring-board for its socio-economic development efforts after attainment of independence and still remains one of the fundamental endowments from which the nation's people derive their livelihood Ideally, given the relative abundance of water resources in the country, especially in the study area (Kpando District), it should be possible to make water available not only in a potable form for the entire population with minimal effort, but also that its availability on a sustainable basis should be guaranteed Yet, for reasons related to inappropriate planning and management, weak water resource management institutional frameworks as well as limited use of appropriate technologies (which of course hinge on inadequate financial resources available to government to meet adequate water needs of its growing population) shortages are quite common and most people, particularly in rural areas do not have good access to potable water

Government's responsive efforts in terms of potable water provision to ameliorate the situation dates back to the late 80's. However, attention seemed to be more concentrated on the urban sectors to the neglect of the greater Ghanaian rural populace Consequently, the situation in the rural areas became so baneful much to the extent that only about 15% of the rural communities with population below 500 persons have access to potable water (Ghana EAP,1989) Under the circumstances many useful man-hours are wasted daily by the rural people in search of water. And in cases where easy access is not available these people have no option than to resort to drawing water from unhealthy sources which expose them to several airborne and

water-related diseases like *guineaworm, schistosomiasis, dysentery, typhoid, etc* thus posing significant threats to human health (McGranahan G, and Songsore J (1994). Today, the enormity of the water issue in the country has begun to attract a more serious attention than it did in the past Government, fully recognizing the future implications of the water supply crisis in rural Ghana especially its impact on the socio-economic development of the country has entered bilateral co-operation with a number of international organizations such as the World Bank, UN Organizations, Canadian International Development Agency (CIDA), United States International Development Agency (USAID) etc , all of which have initiated rural water supply projects in several parts of the country to alleviate the problem The Danish Rural Water and Sanitation Project is one such recent international co-operations which is currently providing water and sanitation facilities for people in the Kpando District Although this water project has been underway in the Kpando district for three years now the coverage is very low. Besides, there seems also to be very low adoption of facility-use due to low economic status, lack of adequate education on the part of the inhabitants to enable them appreciate the essence of good portable water/hygienic practices and perhaps lack of adequate public awareness among people in the district concerning the project These factors deserve serious consideration for the future sustenance of this project in the district.

Sustainability of a community based project of this kind requires a well crafted strategy which fully integrates beneficiary community in all phases of its planning and management. To this end, many international water projects have adopted different approaches with varying degrees of impact Indeed, the Danish Water Project has since its inception recognized community participation as a key to sustainable project management and had tried to translate this belief into action in its activities. However, the integration of community participation per se in project activities alone without periodic small-scale evaluation does not guarantee sustainability Small scale periodic evaluations on the performance of a project are necessary ingredients for sustainable project management. It provides useful feedback to project officials which enable them rectify any existing or potential organizational and managerial lapses associated with their projects Against this background, this thesis sets out to provide a small scale evaluation report on the Danish Rural Water Supply and Sanitation Project in the Kpando District. It examines among other issues: the project's strategies for rural water supply and management, public opinions and suggestions for improved management of the project, its impact and prospects as well as pertinent problems encountered. It finally concludes with recommendations which can facilitate future policy formulation towards attaining sustainable project management in the district

1.1.1 Rationale and Scope of the Study

The linkage between water supply, health, and the environment, has made water resource management a crucial issue in the socio-economic lives of many countries. However, the issue becomes more crucial and sad for a district like the Kpando District, which shares borders with the largest lake in Ghana, and yet majority of its population, especially the rural folks who constitute the main agricultural work force of the nation do not have adequate access to safe drinking water. Today, the District is privileged to be selected as one of the areas to benefit from the Danish Rural Water Project. Accordingly, for the past three years it has been receiving assistance from the Danish International Development Agency (DANIDA) Rural Water Project However, since the inception of this project in November 1994 no thorough evaluation study has been conducted on its performance to assess its future sustainability Caincross et al (1985) emphasized an ex-post evaluation for an effective project management To them, sustainable project management can be promoted by carrying out of a thorough systematic review of a project from time to time. Thus, within the context of an ex-post evaluation they outlined a number of issues which need major attention in any evaluation study on rural water supply projects Among them are the following

- *assessment of the degree of service of completed water supplies, and,*
- *finding out how this might be increased through improvement in operation and maintenance,*
- *provision of feedback on appropriateness of current strategy for the water programme in terms of resource allocation, village selection, choice of technology, etc in the light of its current objectives and observed benefits;*
- *justifying the efforts being made with a view to attracting further resources;*
- *indicating areas where complementary inputs such as health, education and agricultural extensions could improve the overall efficiency and effectiveness of rural water investments*

Certainly, an evaluation which addresses these issues could provide useful feedback for planning and design It helps keep water projects on a sustained path and ultimately makes them attractive to central government as well as bilateral aid donors who are the main financiers of such projects. It is in view of the above that this study becomes justified as a framework within which the future of the project can be mirrored It is hoped therefore that findings from this field will serve two important purposes Firstly, it will seek to provide feedback information to project management on its performance Secondly, it will suggest alternative strategies (where appropriate) for a more sustainable water project management in the district.

1.1.2 Specific Objectives of the Study

Given the evaluative nature of the study a critical assessment of the performance of the Project had been carried out from a sustainable viewpoint However, the author wishes to acknowledge from the outset that the evaluations documented in this report do not include technical issues The discussions are restricted to administrative/managerial issues, environmental and health impacts as well as village level issues e g the effectiveness of local level organizations, extension, responses and feedback as well as distribution of benefits Further, the study seeks to establish causal relationships underlying findings from the research In pursuit of the above, the study was guided by the following objectives·

1. To examine the spatial distribution of the various Danida Water and Sanitation Services within the District.

2. To examine public opinion and the impact of the Danish Water and Sanitation Project among beneficiary communities within the District

3. To assess the sustainability of the Water and Sanitation Programme by critically examining among others

- *Criteria for selecting beneficiary communities, the element of public participation, project finance and maintenance, public education, use of unemployed labour etc all in the context of their demand driven approach*

4. To identify and suggest strategies for solving pertinent problems confronting the Danish Project in the Kpando District

1.1.3 Research Methodology

The fieldwork for this thesis project lasted three months(January-March 1997) During this period, field data were gathered both from *Secondary* as well as *Primary Sources* in support of the project write up First, the *Secondary Data* which constitutes basically written documents were obtained from Annual Reports of the Danida Regional and District Offices at Ho and Kpando respectively. Other related written documents pertaining to Water Supply and the Sanitation situation were also drawn from the Kpando District Health Administration, and the Water and Sewerage Corporation Additional secondary data also came from libraries of the University of Ghana, and from libraries of NGO's involved in the rural water /sanitation programmes all of which provided useful references for the study. *Primary Data* on the other hand which gives empirical support to the research were derived by using structured questionnaires administered in the field. By use of such questionnaires, information gathered from the secondary sources were verified in the field through direct interview with the public, and officials involved in the water and sanitation sector to give empirical validity to findings documented in this final report.

Research Instruments - Two basic research instruments were used in collecting the primary data They are *(i). Self-Administered Questionnaires* (for literate respondents), and *(ii). Interview Questionnaires* (for illiterate respondents)

Respondents for the Study - Respondents for the study comprised **(a).** Officials working on the Danida Water Project both at the District and Regional Level as well as those working with organizations that deal with water and sanitation related issues, e g the Kpando District Assembly, the District Health Administration etc **(b)** Respondents from the General Public especially those from the outreach villages where the Danish Water Project is being carried out were sampled for study

Sampling Technique - At the time of this study, there were about 22 communities within the district where the project activities were actively being carried out However in view of the limited resources and time constraints, the questionnaire survey could not cover all these communities Consequently, the researcher had to adopt a *Systematic Random Sampling Technique* (Twumasi,1986) in selecting 10 representative communities By using this technique, the researcher numbered all the twenty-two communities serially And, with a random start, he selected every 2nd village numbered serially on the list until he arrived at the 10 systematically sampled communities (figs 1 & 2).

Within each sampled community, *Purposive Sampling Technique*(Twumasi, ibid) was adopted to select 24 respondents until all the ten communities were covered. Thus, in all a total sample size of 240 persons were selected from the general public for the questionnaire survey It is worth acknowledging at this point that the sampling technique adopted in the present study has some inherent weaknesses For instance, given the limited time and resources available to the researcher at the time of the study, the study was restricted to cover only a small sample size of 240 persons which might not be too adequate to form a good bases for any generalization concerning the entire district. Besides, a combination of *Systematic Sampling with Purposive Sampling Technique* can creat room for biasis when adopted by someone who is not familiar with the District

Stratified Sampling Technique could have been more appropriate. But, given the above mentioned contraints it was not convenient for the author to use it However, conscious attempt has been made during the study to guard against such biases In fact, the researcher in the case of the present study originates from the study area (Kpando District) and has lived there for over twenty years As such, he is equipped with reliable information on the study area which he has tried to incorporate, dispasssionately, into the study to make up for such weaknesses. Furthermore, in addition to questionnaires administered in the field, *Focus Group Discussions* and *Informal Interview Schedules* were also held with suitable persons who by virtue of their profession have knowledge and information on Water Supply and Sanitation activities going on in the district to complement data obtained from the sources enumerated above Finally, with regards to testing of hypothesis, data analysis and interpretation, data generated from the field were analyzed using *Spearman's Ranked Order Correlation Coefficient*, as well as *Descriptive Statistical Techniques e.g. Simple Percentages, Graphs, etc.*(Walsh, A 1990 ,Chava and Nachmias D 1996)

1.1.4 Problems of the Study

The major problems encountered in the field relate to lack of adequate funds Unfortunately no research funding had been allocated for the field studies As such the researcher was compelled to limit the scope and areal coverage for the study as much as possible in order to manage with the little funding he was able to raise from his little savings as a student The other problem encountered during the research had to do with fears on the part of some respondents which made them a little bit hesitant in giving responses to questions posed since they were not very sure of the purpose of the research In such a situation, the researcher had to take time to explain the purpose of the study to the conviction of respondents to alley all fears. Initially this had not been easy but with time it became easier for the researcher to establish good rapport with the people hence the interview session proceeded smoothly. On the whole, apart from the two basic problems identified the study could be said to have been successful since the level of cooperation from the Danida project staff and the general public had been quite high Consequently, all the relevant data needed for the write up of the thesis report had been acquired to meet the intended purposes

1.2.0 CONCEPTUAL FRAMEWORK- HÄGERSTRAND'S DIFFUSION THEORY OF SPATIAL INNOVATION AND SUSTAINABILITY IN A RELEVANT CONTEXT

1.2.1 HÄGESTRAND'S DIFFUSION THEORY IN PERSPECTIVE

Human Spatial Behaviour in terms of adoption of newly introduced innovations varies and depends on a number of factors There are a number of theories applied in the social sciences to understanding spatial behaviour One such theory which can provide a useful framework for analyzing human spatial behaviour in the particular context of the newly introduced Danish Water Supply and Sanitation Project is the *Theory of Spatial Diffusion of Innovations.* This theory was propounded by Torsten Hagerstrand - a swedish geographer and has been in use since the second half of the present century Rogers(1983) in one of his early writings on the subject distinguished between innovation and diffusion To him, *Innovation* refers to "an idea perceived as new by an individual" whereas *Diffusion* implies "a process by which an innovation spreads". Combining these two definitions he therefore defined the concept ***Diffusion of Innovation*** simply as

> ***"the process by which an innovation is communicated through certain channels overtime among members of a social system" (Rogers, E.M 1983).***

It follows from this that an essential medium of a diffusion process is the human interaction in which one person communicates a new idea to another person Thus, at the most elemental level of conceptualization, the process of innovation diffusion consists of three cardinal components

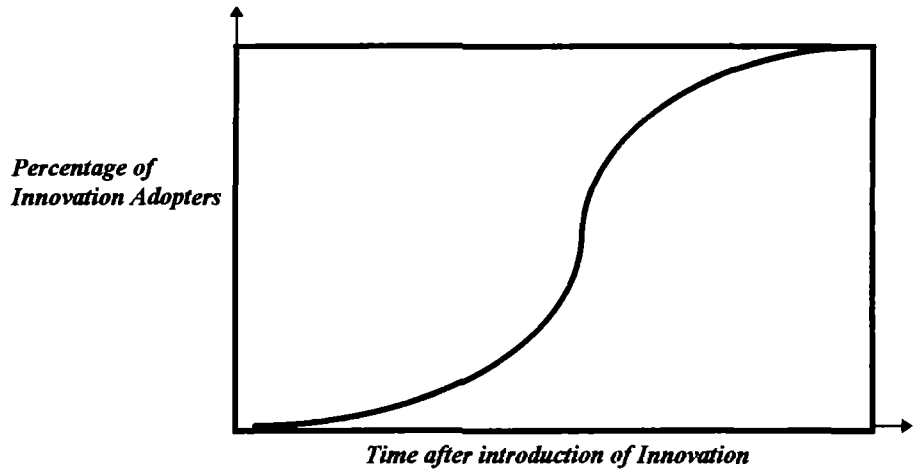
1. *A **New Idea***
2. *An **Individual "A"** who knows about the innovation; and*
3. *An **Individual "B".***

The social relationship of "A" and "B" has a great deal to do with the conditions under which "A" disseminates information about the innovation to "B" In the context of the newly introduced Danish Water Supply and Sanitation Project the educational activities of agents of change are very important at the early stages of the project As with any newly introduced innovation in a typical rural community, people might be skeptical about the usefulness or importance of the newly introduced water project, and thus might feel reluctant to adopt It is therefore important for the innovator to strive at exciting the interest of potential adopters to keep the level of information flow high (positive) through for example, innovation evaluation information which helps reduce uncertainty about the innovation's advantages and consequences At any rate there are always different types of adopters and their behaviour varies differently along a time continuum as discussions in the next subsection will illustrate.

Adopter Categories and the S-Shaped Diffusion Curve

A number of adopter categories can be identified in the life cycle of any innovation process since not everyone adopts innovation at the same rate Basically, people adopt innovations in a time sequence that classifies them into about five(5) categories namely. ***1.Innovators, 2.Early Adopters, 3.Early Majority, 4.Late Majority, 5. Laggards*** These five categories of adopters form a bell-shaped frequency curve, which when converted into a cumulative curve showing adopter distributions gives a classical S-Shaped curve as indicated below in Figure 3.

Figure 3 : The S-Shaped Diffusion Curve



Source: Adapted from Rogers E M (1983) Diffusion of Innovations

This S-Shaped curve provides a useful illustration of the diffusion of an innovation. It shows when for instance the diffusion of an innovation can take off. For instance from the S-Shaped curve one could observe that the area under the curve after about 15% to 20 -25% adopters is the heart of the diffusion process. After this point on, it is probably impossible to stop further diffusion of an innovation even if one wishes to do so especially when adequate information network is set in place to allow adoption of the innovation to catch on strongly.

In essence this theory provides a conceptual framework for analyzing and evaluating the Danish Water Project. Since its inception in the Kpando District, adopter behaviour of community members seems to follow closely the exposition outlined above. For example, in most of the beneficiary communities the percentage of adopters is currently quite low for reasons enumerated in the earlier discussions. Besides, the water supply and sanitation concept being introduced in the communities appears quite new to the people As such, the current adopters in the communities could be classified mainly into the second category (early adopters). However, with intensive dissemination of project information backed by effective health education, the adoption rate is gradually pushing its way into category three(early majority). There is therefore a need for a greater effort in propagating project information among recipients The success of this

depends largely on the strategies adopted in that direction It is in view of this that regular evaluation of the communities receptiveness becomes a necessary tool if project management wishes to keep track of the adoption trend and adjust its strategies appropriately In summary, the relevance of applying *Hagerstrand's Theory of Innovation Diffusion* in analyzing a project needs no further emphasis It can provide clues to determining what phases of the diffusion cycle the project has reached at a particular moment, or within what time the adoption rate will reach a certain level by a particular time period

1.2.2 SUSTAINABILITY IN A RELEVANT CONTEXT: SUSTAINABLE RURAL WATER SUPPLY

The concept of ***Sustainable Development*** has flooded many development writings in recent times and had enjoyed special attention since its advent on the development scene. The position it enjoys reflects the recognition of its importance for the future welfare of human societies at large In view of this recognition, attempts have variously been made to apply the concept in practical realms to all forms of activities which relate to human interaction with the physical environment, and how such an interaction could affect resource use and the people within the environment where these activities take place However, given the varied levels of socio-economic development in many societies the concept conveys different meaning and has consequently been applied variously in many geographical settings For instance, whiles the problem of the North(developed countries) centers around factors such as the scale of resource use, wastes and greenhouse gas emissions resulting from their high consumption lifestyle, that of the South(developing countries) revolve around lack of development, the degree of poverty perpetuated by decades of unsuccessful development planning approaches adopted by these societies These and their associated factors have culminated in unsustainable levels of resource use, the effect of which are the environmental problems that confront societies in the present decade Deliberating upon these for some time, the Bruntland Commission in its report "Our Common Future" published in 1987 summarizes explicitly the tasks required of all nations with regards to reversing the current trends With concern for the future in mind, the commission defines the concept ***Sustainable Development*** to imply

"***the meeting the needs of the present generation without compromising ability of the future generations to meet their needs***"(Brutland,1987)

Today many governments in third world countries are reshaping their socio-economic development efforts with special focus on the *future* Accordingly, many of them have incorporated sustainability demands into their development projects in various fields e g. agriculture, industrialization, housing, etc. However, the applicability and the import of this concept apply exclusively to Water Resource management issues. Over a decade ago, Water and Sanitation projects are equally getting keyed towards sustainability In pursuit of this task, several issues are being highlighted with concern for sustainable water resource management In the particular context of rural water and sanitation project management, a number of issues and factors have been identified and applied in many countries depending on prevailing conditions for the attainment of sustainability Key among issues identified are· ***Public participation*** which according to Mwami (1995) implies "*a learning process by which communities control and deal with technology, change and development*", and *Empowerment* These key factors are crafted and applied successfully in a ***Demand-Driven Approach*** in many community based projects.

The Demand-Driven Approach (as opposed to the previously adopted supply driven approach which lays more emphasis on meeting only physical targets in water supply provision), has proven to be a more sustainable approach It is essentially an operational strategy in which planned activities are determined by the people's demand, willingness and ability to participate in the implementation process as well as in the operation and maintenance of water supply system Thus, the approach refers to a "development strategy where the people themselves are expected to take initiative and the responsibility for improving their water supply situation rather than being passive recipients of the government services"(Rosendahl,1996). In practice therefore, support is given only to activities that are genuinely requested by beneficiary communities With such a demonstrated interest one expects beneficiaries to take responsibility for managing project facilities, paying for construction, operation and maintenance costs. This is where public participation as a tool of sustainable rural water project management derives its greatest expression and relevance, and thus needs to be encouraged. Furthermore, a community with a demonstrated interest and preparedness to own and maintain facilities provided them is likely to do all it can in its power to ensure that the facilities provided them is sustained and continues providing the benefits envisaged However, its worth cautioning that public participation per se can not be achieved without a carefully planned integrated action which takes into account changes in people's behavioral patters In a typical rural setting where most water projects are carried out, people's perceptions and attitudes are to a large degree influenced by prevailing economic and socio-cultural situations Any change in such conditions is likely to be reflected in a corresponding change in attitudes and the way they relate to the water and sanitation facilities provided In this regard, there is the need for a closer interaction with the rural folks to identify their needs and tastes to be able to adjust strategies accordingly. An important way to achieving this as practiced by most projects is to foster participation at the lowest possible level in all phases of whatever project strategy one adopts

Finally, since water and sanitation facility provision alone does not guarantee improved quality of life, there is the need to incorporate environmental demands into project activities through public education using the various forms of media to ensure that people's behavior in relation to interaction with the physical environment are in harmony with acceptable health standards Such an integrated approach to water and sanitation project management could be a viable way to achieving sustainable development in rural communities

CHAPTER TWO

GENERAL CHARACTERISTICS OF THE STUDY AREA

This chapter provides a background information on the study area, touching on its socio-economic status, environment, infrastructure, and the health status of its inhabitants It is hoped that, insights into such characteristics will enhance the readers understanding of pertinent issues which influence the water and sanitation situation and consequently affect sustainable project management in the district.

2.1.0 Location and Socio-Economic Information on the Study Area

Kpando District is located in the central part of the Volta Region of Ghana, on the South Eastern border of the country It is bound in the north by Paprawusi, which shares boundary with the Jasikan District, and to the southern part, by Asikuma Finally, it is bound in the east by the Ho and Hohoe Districts(fig 2).

Geographically, the area is located approximately between longitude 0°10' and 0°25' East, and between latitude 6°30' and 7°05' North. It covers an area of about 1229.5 km² (Volta Regional Health Administration,1994). It is a relatively dense populated area with about 124.000 inhabitants as at 1990 However, this figure is estimated to have increased by 4 8% thus putting its 1995 population estimate at 129.916(Disease Control Unit, Kpando District, 1995) About 80% of the population live in rural communities with less than 4000 people The average population density of the district is about 115 people per km² However in the typical rural areas the density is estimated at about 60 per km²(Kryger Consults,1995)

Ethnically, the area is predominantly occupied by Ewe-speaking people who constitute over 90% of the population There are other smaller groupings like the Akans, Hausa and the Fulanis. Many of the inhabitants are Christians belonging to a diversity of denominations However, from the survey there are a few others who are traditionalists (table 1).

Table 1: Percent Distribution of Respondents by Ethnic and Religious Affiliation

Ethnic Affiliation	Number of Respondents	Percentage (%)	Religious Affiliation	Number of Respondents	Percentage (%)
Akans	08	3 3	Orthodox	156	65
Ewes	216	90 0	Pentecostals	68	28 3
Hausa	12	5 0	Traditionalist	16	6 7
Others	04	1 7			
TOTAL	**240**	**100**	**TOTAL**	**240**	**100**

Data Source: Author's Questionnaire Survey, 1997.

Questionnaire survey conducted in the study area revealed data which portrays the distribution of ethnic and religious affiliation in the district From table 1, about 90 % of respondents interviewed were Ewes By the same token, a large proportion of about 93% have affiliations with christian religious sects, with the remaining 7% being traditionalists Religious affiliation might not instantly be considered as a major factor which can influence project performance in some communities However, its unifying factor seems to be playing a crucial role in project implementation in Jordanu (one of the beneficiary communities) as discussions in chapter 5 will exemplify

2.2.0 Economic Characteristics of the Study Area

The economic livelihood of most people in the area is centralized around rain-fed subsistence agriculture Petty trading is another important economic activity which comes quite close to farming in the district(table 2)

Table 2: Percent Distribution of Occupational Category in the Study Area

Occupational Category	Number	Percentage(%)
Artisans	40	16 7
Civil Servants	42	17 5
Farming	90	37 5
Trading	54	22 5
Others	14	5 8
TOTAL	**240**	**100**

Data Source: Author's Questionnaire Survey, 1997.

Both sexes participate in all the two activities. But petty trading appears to be most popular among females. Major crops produced in the locality are Maize,Cassava,Yam, Sweet Potatoes and Vegetables like Tomatoes, Okro etc. These crops are produced on seasonal basis following the annual agricultural cycle which consists of *Land Preparation* (April-May), *Planting* (May-July,) and *Harvesting* in July-October. Periods outside these seasons especially between November and March are dry periods during which no farming activity take place because of the heavy reliance on rain-fed agricultural practice adopted in the area For those living close to the Volta lake, a more practical solution would be to provide them with irrigation facilities to promote continuity of their farming activities without reliance on rainfed agriculture But this is not the case there The seasonal farming practice does not guarantee continuity and does not also generate any substantial income for those who rely on farming as their only means of livelihood In periods of severe drought seasonal farmers and their dependants are the most affected since their mode of production does not allow them to gain much and even save any income for their maintenance Perennial tree cropping such as Oil-Palm and Citrus Fruit cultivation are also practiced in some communities. However, only about 5% of the farmers are employed full-time in this sector. The farm sizes of a typical family is about 2 0-2.5 ha (Berendt N and Rasmussen ,1997)

Fishing is another major economic activity practiced among communities living along the shores of the Volta Lake Typical fish species such as Tilapia, Mudfish and several others abound previously in the lake to promote this activity But, recently there has been a decline in harvest resulting in lesser income from fishing far from supporting family maintenance Consequent to this decline in income from the fishing sector, most fishing families are now practicing additional farming types for subsistence An extension to the farming and fishing activities is the trading of fish and agricultural products However, this activity seemed to be most popular among women and younger children There are about 9 major markets in the district with their days of operation rotated on every 4th or 5th day Generally, the occupation of the population in and around Kpando, and other towns in the district can be characterized as service-oriented Most economic activities operate in the sectors of food and beverage services, tailoring and sewing, small-scale repair services and roadside vendouring of agricultural products There are also groups of artisans who specialized in trades like carpentry, masonry, building construction and machines In Kpando (the capital) and its neighborhoods, there are a number of public employees working with government institutions e g the health centers, educational departments and in other ministries (Kruger Consults, 1995) From the questionnaire survey, 17.5% of the respondents fall in this category However, their activities are mostly concentrated in and around the District capital(Kpando)

The socio-economic life situation of people in the district had to a great extent been affected by the construction of the Akosombo Dam in 1964 The impoundment of the Volta River resulted in the resettlement of several thousands of people and their communities(Derban,1975,Odei,1994) Consequently, many of the villages in Kpando District are communities which were originally forced to move to resettlement sites scattered around the newly formed lake. Housing, water and sanitary facilities were provided in the new settlements, but communal latrines soon ceased to function as a result of lack of proper maintenance Also, the piped-water system originally provided and operated by diesel engines in many of the settler communities failed For the resettlers, it has taken a long time to re-establish their subsistence farming and fishing to a reasonable level of efficiency, thus leaving a negative effect on their economic base Indeed, for most of them, the initial period after the creation of the Volta Lake was a period with the greatest social and economic distress (Derban,1975) Nevertheless, many of them are making personal efforts through fishing, trading and other small scale activities to revamp their economic base At present, the general water and sanitation situation is still relatively poor, even though different national and bilateral organizations have tried to improve the water supply and sanitation coverage throughout the years. The Danish Water Project, Kryger Consults A/S and Ghana Water and Sewerage Corporation are the next in the series, currently implementing a new water supply and sanitation facilities in the district. It is expected that the new approaches and strategies they adopt will change situations and eventually improve the life conditions of people in the area

2.3.0 Environmental, Infrastructural and Health Status of the Area

This section outlines the existing environmental and infrastructural conditions in the study area and how that effects the health status of its people

2.3.1 Housing

On the whole, housing conditions in the study area are hygienically unsatisfactory Most houses in the district are constructed out of sun-dried mud bricks They are closely built, rectangularly shaped without any proper plan and are roofed with corrugated aluminium sheets or thatch in the very poor communities where people can not afford to buy roofing sheets In most cases, such houses are poorly maintained and left in very bad shape typified by cracked walls These housing conditions coupled with the tendency of keeping windows shut for security reasons or for preventing entry of mosquitoes, result in poor ventilation which constitutes a serious threat to human health.

2.3.2 Sanitation and Water Supply

The Volta Region of Ghana within which Kpando District is located has the poorest facilities for human excreta disposal in the country In 1992 only 9% of the rural population in the district had access to sanitary facilities (MOH,1994) It is no surprise therefore to identify poor sanitary conditions as one of the major problems confronting the Kpando district Efforts have for some time now been made by health authorities within the district to create sanitary awareness among communities through community and public health activities. But, for reasons related to high illiteracy rate compounded by inadequate financial and logistic support from government to boost activities of the health units, very little results have been achieved. Consequently, most people especially children resort to using unauthorized places for waste and excreta disposal as most communities in the district still remain without access to hygienically sustainable places of convenience and waste disposal The case of domestic waste water disposal seems to be a serious problem prevailing in almost all communities in the district hence equally deserving attention(table 8).

None of the ten sampled communities studied indicated having any hygienically appropriate places for waste water disposal (section 5 1 1). The effect is that most inhabitants of these communities dispose of their domestic waste water indiscriminately either behind their houses or in some cases on the open spaces of their dwelling compounds With regards to place of convenience, three basic types are commonly used in the communities These are the *Pit Latrine*, the *Free-Range* (the most commonly used by children) and the *Ventilated Improved Pit (VIP)* Latrine. There is a full description covering each of these in chapter five However, in most of the communities these places of convenience are often poorly maintained, liberating offensive odours Also, in some communities to encounter maggots are common in the pits developing into flies which may contaminate drinking water and food with human excreta (Echeverria et al , 1993, Khin Nwe Oo et al 1989). These are potentially serious health hazards which need not only urgent attention but also very pragmatic solutions as discussions in chapter six will propose.

2.3.3 Education

A number of educational facilities have been identified in Kpando However given the large population of the area such facilities can be considered inadequate in meeting educational needs of the population The educational institutions identified in the field survey can be classified into two main categories, namely *First Cycle* (elementary and junior secondary schools) and *Second Cycle* (senior secondary schools, technical and teacher training institutions) Most of these schools are public-owned (government assisted) with a few others being run by private individuals. Some religious and charitable organizations also operate day nurseries to relieve working mothers of the task of taking their wards along to work These organizations also run adult literacy programmes for illiterate adults to cut down on the level of illiteracy among the inhabitants

Nevertheless, these institutional facilities are mostly located in the District Capital (Kpando) One is confronted with a different picture as one moves out into the hinterlands. Apart the district capital where schools of comparatively better standards can be found most of the schools identified in the hinterland are of poor standards in many respects Most village schools lack basic infrastructure like shelter and furniture Even in cases where these exist, they are either almost collapsing or of a substandard quality Further to this, lack of adequately qualified teaching staff is an issue that needs serious attention Worse still, enrollment into these schools, particularly the first cycle institutions, is also quite low, consequently affecting the educational status attained by people in the district In fact, the questionnaire survey reveals over 50% of the respondents attaining levels not higher than elementary education (table 3)

Table 3 : Percent Distribution of Educational Status of Respondents

Educational Status	Number of Respondents	Percentage (%)
None	36	15 0
Elementary(First Cycle)	120	50 0
Secondary etc.(Second Cycle)	44	18.3
Higher (Tertiary Cycle)	40	16 7
TOTAL	**240**	**100**

Data Source: Author's Questionnaire Survey, 1997

However in spite of these problems, the Ministry of Education is doing its best within the available means to alleviate the situation. Health awareness and for that matter attainment of improved health status and quality of life, are contingent upon good education of people in a community. As such, it is imperative for the government to give special attention to improving educational statuses of people in the district, so as to facilitate adoption of good hygienic practices Adoption of good personal hygiene and sanitary decency will go a long way to improve the quality of lives of people in the district

2.3.4 The Health Status of the Study Area

The health status of people in Kpando District is no different from the general national situation Generally life expectancy is low In 1992 the national life expectancy (which is equally applicable to the Kpando District) was estimated at about 52 years for males and about 56 years for females This level of life expectancy could to some extent be attributed to the high poverty level coupled with the low level of health service provision But, to a large extent it also depends on the way people live their daily lives in relation to environmental resources, particularly water This subsection throws light on the health conditions of the study communities with special focus on the following indicators Morbidity, Mortality and Nutritional Status On the whole, malaria has been identified as the most prevailing disease, especially among children, in the Kpando District This situation is not surprising if one considers statistical figures compiled on diseases (incidence) reported to the out patient departments of health institutions in the country at the national level (table 4)

Table 4 : Selected Major Water and Environmental-Related Diseases Recorded in Ghana in 1994

DISEASES	% OF TOTAL CASES REPORTED
Water & Environmental Related Disease	
Malaria	40 3 %
Diarrhoeal Diseases	5 1 %
Intestinal Worms	2 9 %
Skin Diseases	5 1 %
Upper Respiratory Infections	8 1 %
Acute Eye Infections	2 5 %
Others(non-water/environment related diseases)	36 0 %
TOTAL	**100.0**

Source: MOH, Top-Ten Diseases 1994

It is evident from Table 5 that Water and Environment-related diseases account for about 64 0% of major diseases reported in the country, with Malaria taking a share of 40 3% of this total The high incidence of this disease can to a great extent be explained in terms of the poor environmental conditions existing in communities Often, uncovered stagnant water bodies in the communities as well as bushes left uncleared, served as breeding places for mosquito larvae resulting in the high incidence of malaria within the communities The two basic vector species of Malaria parasites identified in the Volta Region are ***Anopheles gambiae s.l.*** and ***An. Funestus*** (Appawu et al 1994; Volta Regional Health Administration,1994) These vector species are common in the Kpando District especially in areas of close canopy forests, and infest houses which offer no protection against them

Other forms of diseases commonly found in the study area and which relate very closely to water use and personal hygiene are diarrhoeal diseases and intestinal and skin infestations These infections are quite common among children under 5-years of age since they are most vulnerable and have lesser resistance to disease

In the Kpando District in particular, researches conducted by experts in the past have revealed a high prevalence of Schistosomiasis (Bilharzia) The impoundment of the Volta River has created habitats for intermediate host snails responsible for transmission of *S. Haematobium* (Paperna,1969; Odei 1973, Chu & Vanderburg,1976, Klumpp & Chu, 1977) However, the dominating host snail specie (*Bulinus truncatus ruhlfsi)* are more widely established all over the Volta Lake (Odei,1972) For over a decade now attempts have been made to eliminate this species so as to curb the incidence of bilharzia among communities located along the lake Nevertheless, a number of urinary schistosomiasis cases are still being encountered in communities such as Agbenoxoe and Todome(Nielsen S.B and Rasmussen M, 1997) Table 6 (Nielssen *et al,* ibid 1997) provides a broad overview of the current health status in the study area It shows a summary of disease conditions prevailing in communities within the study area, the environmental factors promoting them, community vulnerability as well as capacity of health institutions to control identified water/ environmental related diseases in the district

Table 5 Summary of Water Related Diseases in the District

DISEASE CONDITIONS	ENVIRONMENTAL FACTORS	COMMUNITY VULNERABILITY	CAPACITY OF HEALTH PROTECTION AGENCIES
Malaria	Farming plots and scattered trees and high vegetation of grasses and bushes surround the study villages In this environment numerous temporary water pools ideal for mosquito breeding are created during rainy season. No major breeding habitats exist inside the villages. The houses are not mosquito proofed.	Despite a relatively high level of knowledge, most of the communities are highly vulnerable to infection as people cannot afford to buy bednets, mosquito coils and/or repellants Some people expressed a resigned attitude towards control of mosquitoes	**Curative:** High, as chloroquine is available at all health agencies serving the villages Chloroquine widely available in local shops Also second line drugs (quinine) are present at Margaret Marquat Catholic Hospital, St Patrick Hospital and Peki Government Hospital for treatment of severe cases **Preventive:** Low No extensive programmes and activities. **Surveillance:** Low No field surveys, only registration of recorded cases at government health institutions Microscopists present but this capacity is not fully utilized. No monitoring of drug resistance **Vector control:** None
Urinary Schistosomiasis	Potentially good snail habitats present at the shore of lake Volta. The habitats are located very close to working environments and domestic areas in Agbenoxoe and Todome Fesi is located 3km from the lake, but a number of farming plots owned by farmers from Fesi are located on the shore Gadza is located 5km from the lake and no snail habitats exist in immediate proximity of the village In	All villages in Agbenoxoe and Todome have close contact to Lake Volta either through occupational practises,domestic work, recreational activities or maintenance of personal hygiene The population in the two lake shore villages are highly vulnerable to infection. In Fesi only farmers working in farming plots near the lake shore and children who play in the lake are at a risk of getting into contact with infested water	**Curative:** Low Microscopic diagnostic available at Kpando Health Center, Margret Marquat Catholic Hospital, St Patrick and Peki Government Hospitals Low availability of drugs for treatment. **Preventive:** None **Surveillance:** Low No field surveys, only registration of recorded cases at government institutions **Vector Control:** None

	general, all villages have poor water supply and sanitation.	sources The total population of Fesi have therefore low vulnerability to infection. Limited knowledge on the causes of the disease and how to prevent it. In Gadza, no member of the community has contact with the infested water sources Thus, the population in Gadza in not vulnerable to infection	
Intestinal Helminth Infections	Poor supply of safe water Rain water containers uncovered Unprotected water sources Very inadequate sanitary facilities create risk of contamination of domestic areas Unopened livestock. The identified environmental factors favouring disease transmission are the same in all study villages	Most of the villages have high vulnerability to infection because of open defecation and relatively poor personal hygiene People prefer unsafe water sources for drinking Drinking water is handled in an unhygienic manner General low level of knowledge on transmission routes of intestinal helminths Worms are sometimes regarded as a natural thing that is impossible to avoid Insufficient use of protecting footwear	**Curative:** High Drugs for treatment available in all health institutions serving the communities Microscopic diagnosis performed at Kpando Health Center, Margret Marquart Catholic Hospital, St Patrick Hospital and Peki Government Hospital **Preventive:** Low The VRWSSP is not fully implemented in villages in the study area and no other extended education programme on personal hygiene exist in the district. **Surveillance:** Low No field surveys, only registration of recorded cases at governmental health institutions
Diarrhoea	Inadequate availability of safe water Rainwater catchment uncovered. Water sources unprotected. Extremely low availability of sanitary facilities creates a risk of contaminating domestic environments Unpenned livestock. The identified environmental factors favouring disease transmission are same in all study villages	Knowledge on the relation between environmental / personal hygiene and diarrhoea varies between the study villages but all study communities practice unhygienic handling of drinking water, open defecation, poor personal hygiene and prefer unsafe water sources for drinking	**Curative:** High. Oral rehydration salts and antibiotics available at all health service agencies **Preventive:** Low. The VRWSSP is not fully implementing in all villages in the study area and no other extended education programmes on personal and environmental hygiene exist in the district. **Surveillance:** Low No field surveys, only registration of recorded cases at governmental health institutions
Measles	The transmission of the measles virus easily takes place in almost any type of domestic environment.	Due to low efficiency of EPI the numbers of all study villages are highly vulnerable to infection. Immunization coverage of measles is only 45% Close contacts between people and gathering of children in kindergaterns favour high transmission of the virus Risk of complicating secondary infections due to malnutrition. Low knowledge on how to prevent complicating conditions	**Preventive:** Low Low coverage of measles by EPI Limited efficiency of governmental maternal and child welfare programmes **Surveillance:** Low No surveys, only registration of recorded cases at the governmental health institutions Relatively good reporting system of coverage by EPI
Eye Problems	Unprotected water sources Flies breeding in communal trench latrines create risk of spreading of pathogens The identified environmental factors favouring disease transmission are same as in all study areas.	Again, vulnerability to infection is high in the villages Low level of knowledge on transmission of eye infections unsafe water used for bathing and people have relatively poor personal hygiene Blur vision among elders are probably caused by cataract	**Curative:** High / Low Antibiotic eye ointment available for treatment of eye infections No ophthalmologist present in the district. **Preventive:** Low The VRWSSP is not fully implemented in all villages in the study area and no other extended education programme on personal and environmental hygiene exist in the district. **Surveillance:** Low No field surveys, only registration of

			recorded case at governmental health institutions
Skin Conditions	Hot and humid environment Plenty of biting insects, Unprotected water sources The identified environmental factors favouring disease transmission are the same as in all study villages	High vulnerability in all study villages due to relatively poor personal hygiene and use of unsafe water for bathing Mishandling of pesticides in relation to agricultural practices.	**Curative:** Low Very limited possibility for treatment **Preventive:** Low The VRWSSP is not fully implemented in all villages in the study area and no other extended education programmes on personal and environmental hygiene exist in the district. **Surveillance:** Low No field surveys only registration of reported case at the governmental health institutions
Pain in Joints	Poor working environment, due to lack of mechanized tools.	Occupational health risk Manual farming practices cause mechanical attrition of joints No knowledge on how to improve farming practices and thereby prevent straining of joints High vulnerability in most villages	**Curative:** Low Painkillers available **Preventive:** None **Surveillance** Low No field surveys, only registration of recorded cases at governmental health institutions.

Data Source: Adapted from Rasmussen.M and Nielsen S.B (1997)

The Health Institutions together with the Environmental Health Assistants are putting in place efforts to control water/environmental related diseases in the District through various programmes (curative, preventive and educational programmes).

CHAPTER THREE
THE DANISH DEVELOPMENT POLICIES AND MANAGEMENT STRATEGIES

This section reviews the Danish Government's Development Aid Policy which guides activities in developing countries With this, the background is prepared for further discussion of the water supply policies and strategies adopted by the Danish Rural Water Project in Ghana as we shall see in chapter four

3.1. 0 Introduction

Major changes have occurred in both developing and industrialized world over the past decade As part of these changes, major political balances have shifted, power blocks were dissolved, trading agreements have been reached with new ones underway By the same token, regional integration processes are increasingly gaining momentum, thereby giving birth to new forms of international cooperations between nations Indeed, such rapidly occurring changes have meant a lot in the socio-economic lives of many thirdworld countries, especially those without any strong economic base. In most of the developing world where lack of financial capacity coupled is with ineffective policies to meet the demands of the changing world economy, poverty and underdevelopment have become very visible.

In the particular case of sub-Saharan Africa, poverty has been noted as one fundamental factor behind most of its problems. This poverty factor has in many instances given rise to social deprivation, persistent population growth, environmental degradation at various scales, increasing migration and local conflicts, among others. These problems, when allowed to persist produces impacts with far-reaching implications not only for the developing countries where they occur, but also in the developed countries, given the current global integration of the world economies It is against this background that the Danish Government has drawn up a Development Assistance Policy Strategy towards the year 2000. By this strategy, it sets out to extend development assistance to third world countries through a number of aid programmes to boost socio-economic development, improve on their standard of living and consequently alleviate the plight of the poor. The following sections outline components of the Danish Aid Policy strategy by focusing on its administrative aid structure, staffing, aid policies with specific reference to water and sanitation, irrigation and the environment, water resource management, its intervention tools in the water sector, as well as volume and the sharing of its aid resources

3.1.1 Administrative Aid Structure

The beginning of the 1990's witnessed structural changes in the organization of the Danish Foreign Service As part of the change, the Danish Ministry of Foreign Affairs is currently divided into two main groups- the north(covering the industrialized countries, Central and Eastern Europe and most of the Former Soviet Republics) and the south(covering all developing countries) The regional divisions in the south group are responsible for all Danish bilateral relations with a given developing country. political, economic, commercial and development assistance In January 1993, a Minister for Development Cooperation was appointed to steer affairs relating to development assistance as well as assistance to central and eastern Europe The Minister for Development cooperation is advised by a board on International Development Cooperation consisting of nine members (IRC,1994) Before financial commitments are made, all major proposals are expected to be submitted to the board for consideration The composition of the board ensures a broad contact with organizations and groups of central importance for Denmark's participation in international development A process of decentralization to embassies was initiated in the late 1980's Accordingly, embassies are now authorized to approve small projects and enter into contracts with e g local private companies, local NGO's etc in amounts up to DKK 3 million (US$ 500,000) The embassies however, are expected to report back to the Board on how the funds are being spent Between 1988 and 1994 the number of embassies with development cooperation personnel have increased to about 18 (IRC 1994)

3.1.2 Staffing

Danish development assistance personnel have been integrated in the unified foreign service, effective 1 september 1991 By July 1993 the south group in total employed a full time staff of 382, out of which 117 were on assignment abroad There is a Technical Advisory Service which as of 1994 had a personnel comprising about thirty sector professionals These professionals provide the South group with professional assistance especially in relation to feasibility, appraisal and review of development assistance projects in the third world In the technical advisory service, three engineers and an anthropologist deal with drinking water and sanitation projects. Additionally, three technical advisors are dealing with environmental issues, two technical advisors with natural resources and one technical advisor(agronomist/male) with agricultural and irrigation projects

Water Resource activities are generally handled together with water supply, agricultural and environmental issues In certain cases, technical advisors are posted at Danish Embassies to assist with preparation of proposals and implementation of projects in sectors of key priority in the agreed Danish development assistance in that particular country By 1994 three such postings were made and the officials were subsequently sent to DANIDA receiving countries to man water-related projects Besides the permanent staff in the Technical Advisory Service, a large number of consultants are employed on short term assignments to supplement the in-house professional skills

3.1.3 Aid Policies and Strategies

The basic objective of the Danish development assistance is poverty alleviation through promotion of economic growth and social development, protection of the environment, participation of women in development, as well as promotion of human rights, democratic values and processes Key principles in Danida's policy for development assistance are partnership and participation as well as replicability and sustainability of the development programmes and projects A strategy for Danish Development Policy towards the year 2000 "A World in Development" was endorsed by parliament in 1994 Main elements in this strategy are concentration of Danish development assistance on 20 countries and within these countries on a few selected sectors, increasing support to programmes and sector programmes at the expense of project support; promotion of ownership on the side of the recipient country through partnership and dialogue, more active involvement from and support to the private sector and the voluntary sector as well as support to the public sector

Water, Sanitation,Irrigation and the Environment

According to Danida's sector policy document for water supply and sanitation the objectives for Danish support to this sector are provision of equal access to water supply and sanitation facilities for as many people as possible within identified poor areas, while at the same time safeguarding the environment for future generations Danida's sector-specific guidelines are followed while planning and implementing water projects The guidelines address the following key issues provision of technical and financial aid (support) for water supply and sanitation to rural, small towns and peri-urban (slum) areas, management and institution building to strengthen local organizations, use of simple and affordable techniques, community participation, promotion of sustainability of water projects through cost recovery, involvement of women, promotion of coordination of water project with other donors.

Water Resources Management in relation to Dublin and Rio

Danida fully endorses the principles for water resources management as developed in the Dublin conference and the UNCED conferences in Rio. Danida together with the other Nordic donor agencies, actively supported the preparatory work for these conferences, for example through the Copenhagen Informal Consultation on Integrated Water Resources Development and Management in November 1991 As a follow-up to the Copenhagen-Dublin-Rio process, Danida has since entered into agreements to finance a Water Action Plan for a number of countries in Africa It has also initiated Action Plans for Water Resources development in Upper Srepok Basin in Vietnam under the Mekong Secretariat

3.1.4 Intervention tools in the Water Sector

The following section describes "tools" Danida uses to orient policies and programmes in the assisted countries

Policy Level

Annual negotiations are held between Danida and the 18 programme countries as a follow-up on ongoing projects and to discuss new project proposals Normally, ideas for projects are formulated by the programme country Danida however, comments on the ideas The appropriate person/institution in the programme country is then provided with the water sector policy guidelines of Danida as a help to develop the idea further into a proposal. For each of the 18 programme countries Danida prepares rolling five-years plans, where the key sectors mutually agree upon for collaboration are indicated.

Project Level

Like Sida, Danida applies the Logical Framework Approach (LFA) along with "Guidelines for Project Preparation" which were revised by Danida in January 1992 They specify among other things, the format required for a project proposal to be appraised for Danish financing They also specify the format for a project document, which is the basis for the formal agreement between the two governments and which consequently serves as a guide for the implementation of projects

The "Guidelines for the Project Preparation" together with Danida's Sector Policy document for water supply and sanitation are the basic tools to be followed while formulating, appraising, implementing and reviewing water and sanitation projects Water resources and environmental aspects represent one of the eight focal points mentioned in Danida's Sector Policy The Dublin Statement is also used as guidelines for project preparation together with EIAs in a dialogue with the programme country Usually, in situations where the recipient country cannot do it, the desk officer in charge at the Embassy carries out the project identification and formulation, which results in a standard Danida format For those developing countries without a Danish Embassy, the desk officer in the regional division at the south group will undertake this assignment. Appraisals are carried out under the responsibility of the Technical Advisory Service (in the South Group) Appraisals are normally carried out by a team headed by one of Danida's technical advisors and comprising external consultants and resource persons from the assisted countries.

Technical Assistance

As part of its technical support, Danida offers scholarships for training in Denmark as well as seminars, study tours etc, to staff involved in project planning and implementation In 1992 Denmark provided support to 422 students and trainees from developing countries as part of its human resource capacity building programme, to come to Denmark for studies in fields relevant to its areas of cooperation in their countries To this is added 93 others supported in other european countries and 1923 for studies in thirdworld countries Danida also provides training for staff at various levels within ministries/agencies to strengthen their capacity in managing water issues

3.1. 5 Volume and Share of Aid Resources

Denmark's development assistance reached a level of 1% of GDP (disbursements) by 1992 From 1985 to 1992 Denmark had spent between DKK300-450 million(US$50-70 million) per year in the drinking water supplies and sanitation sector This figure constituted about 10 to 15 % of the total Danish bilateral assistance Within the period, 63 percent of its development assistance went into rural water supplies, 34 percent was devoted to urban water supplies, with only about 3% for urban sewerage Sanitation and Water resource management allocations had until recently been very little But with the current considerations given to sanitation as an important component of their rural water supply programmes, budgetary allocations are expected to increase in the near future Following the Rio conference, the Danish Parliament had in December 1992 decided to establish a special programme of assistance for environmental and emergency purposes Starting from DKK 100 million (US$15million) in 1993 and an estimated DKK 1 billion (US$147.8million) in 1994, the financial allocations for the programme are scheduled to reach 0 5% of GDP by the year 2000 The allocations for the programme are additional to the development assistance budget amounting to1 percent of GDP

3.1.6 Countries where Aid is Concentrated

As at 1994 Danida's aid support had extended to cover 18 programme countries including Ghana. These countries are Bangladesh, India, Nepal, Bhutan, Thailand, Vietnam, Mozambique,Tanzania, Zimbabwe, Kenya, Egypt, Eritrea, Uganda, Benin, Zambia, Burkina Faso, Nicaragua

3.1.7 Partners in Project Planning and Implementation

The main partners in project planning and implementation are the institutions at central and lower levels and the communities of the recipient countries Apart from these, Denmark is also cooperating with multi- and bilateral organizations and private institutions Currently, its aid programme is distributed more or less equally between UN Agencies, World Bank Agencies, Regional Development Banks and the EU. The funds channeled through Danida to NGOs have continued to grow since a decision was made in 1987 to increase the cooperation between Danida and the NGOs It now makes up 11 percent of Danida's total aid Consequently, the NGOs are encouraged to build elements to strengthen the capacity of their local partners in all project cooperation

3.1.8 Coordination

Danida gives high priority to coordination between relevant recipient country institutions and the donors at the national level Apart from this, Danida also coordinates several water-related projects with other External Support Agencies(ESAs) and particularly with the Nordic countries Moreover Danida participates actively in the Water Supply and Sanitation Collaborative Council The Nordic water sector specialists have been consulting each other for a number of years In the beginning of the 1980s these sector professionals took the initiative to informally meet once a year together with World Bank representatives and later the secretariat of the Collaborative Council. In 1991, Danida and the other Nordic agencies developed the Nordic Fresh Water Initiative, where they together identified key principles for effective water resources management A result of this initiative was that the Nordic agencies coordinated their financial support to the Eastern African Water Resources seminar which took place in Entebbe in May 1993.

CHAPTER FOUR
THE VOLTA RURAL WATER PROJECT HISTORY AND PLANNING STRATEGIES

4.1.0 Introduction

This chapter gives a brief overview of the Project History, its goals and principles as well as its organization and planning structure It also sheds light on policies and strategies which guide its management operations Finally it examines the water supply and sanitation facilities provided in the Kpando District

4.1.1 Background of the Project

The DANIDA Water Project, otherwise referred to as theVolta Rural Water Supply and Sanitation and Project (VRWSSP), is part of the development cooperation between the Government of Ghana and the Government of Denmark. The project is being implemented by the Ghana Water and Sewage Corporation (GWSC) and Kruger Consults, a Danish Consulting Engineering firm It has as its objective the betterment of living conditions of people in the Volta Region of Ghana It purports to achieve its objective through a number of activities as outlined below

- *the provision of reliable and easily accessible potable drinking water, which are managed and sustained by the community*
- *the reduction in water and excreta related diseases by improving sanitation and health related behaviour through health education and household adoption of improved latrines.*

The project whose implementation started in March 1993 in two districts has now extended to cover all districts including the Kpando District of Ghana To promote sustainable management of the project in the district, it sets out its operation on principles which try to relate activities to the grassroots level through involvement of communities at every stage of its activities as subsequent discussions in this chapter will reveal

4.1.2 Principles of the Project

A number of principles have been outlined to guide project implementation in all beneficiary districts in Ghana Accordingly, the Kpando District follows these underlisted principles in its operations

- *Decision making and mobilization at the lowest possible level*
- *Transparency and accountability in all planning and financial transactions*
- *Close co-operation with the target communities and communities approval of each major step in the process*
- *Maximizing health benefits by promoting sanitation along with safe water*
- *Flexibility in the definition of largest groups and establishment of village level management organization*
- *Maximizing the role of the private sector*
- *Promoting equal participation of men and women in planning, management and owning and management of water and sanitation facilities*
- *Contributing to the national efforts in the rural water and sanitation sector by maximizing collaboration with relevant organizations in the sector*

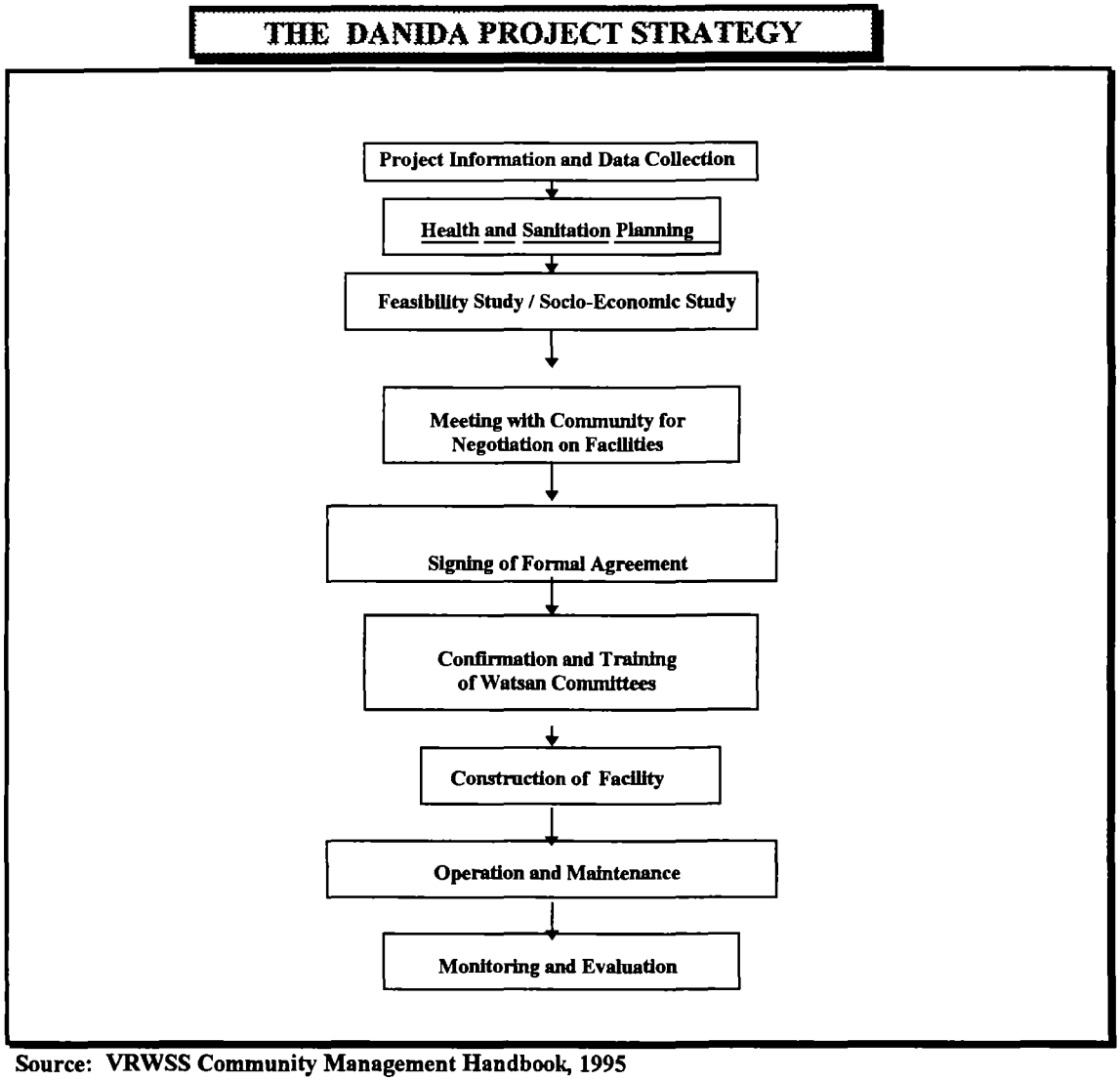
4.1.3 PLANNING AND MANAGEMENT STRATEGIES - INVOLVEMENT OF COMMUNITY PARTICIPATION

Recognizing that community participation could play a potential role in propelling the project towards a sustainable future, management of the project has carefully entrenched it in all stages of their project cycle as outlined in the discussions below (fig 5)

4.1.4 Project Information and Data Collection

This marks the beginning of the project planning process(fig 5). Based on demand driven principles, the project staff conveys project information to the local communities and explains conditions under which they benefit from the project. Usually a meeting is convened during which project information materials and application forms are given out. Having understood the conditions of service provision, communities requesting project assistance for water and sanitation improvement apply by forwarding their completed application forms through the Environmental Health Assistants (EHA) to the District Project Office Upon satisfactory evaluation of applications, the existing staff together with community members/groups set out to collect information about existing water and sanitation facilities and general situation in the community. For this, questionnaires supported by community profiles and baseline studies are used. In some cases, community registers are also compiled by the community leaders to facilitate the planning process Buam (1994) reiterated the relevance of community involvement in such need identification exercises from the very beginning. The strategy has the advantage of arousing some sense of responsibility among project beneficiaries Ultimately this approach will wield greater public interest and support

Fig. 5 The Phases of the Project Strategy



Source: VRWSS Community Management Handbook, 1995

4.1. 5 Health and Sanitation Planning

To ensure proper integration of water, sanitation and health education, communities in which feasibility studies have been completed are encouraged to develop their own health and sanitation plans. These are often based on the community profiles administered jointly by the project staff and the community The plans, in essence, identify health and hygiene related problems in the communities and serve as guides in designing appropriate measures for addressing the problems

The planning exercise within beneficiary communities is carried out by the Watsan (Water and Sanitation)Committees They are helped by project extension staff acting as facilitators until the community develops its own planning capability The Watsan Committees are also provided with training that enables them to support the Environmental Health Assistants (EHA's) in health and sanitation education delivery.

This strategy facilitates the sanitation component of the project objectives and raises environmental health awareness in project communities Under the guidance of the EHA's a number of communities in the district have already developed and are implementing their own sanitation plans The contents of these sanitation plans include among other things

- *major health problems identified by the communities,*
- *priorities set by the communities to tackle their problems;*
- *contributing factors to the problems identified, and,*
- *who should be responsible for tackling the problem and needed inputs etc*

4.1.6 Feasibility and Socio-Economic Study

To attain a sustainably planned water supply and sanitation services based on appropriate technologies as outlined in the New Delhi Proclamation (Center for our Common Future, 1994 p 125), the Project recognizes feasibility studies as an indispensable component of its strategy. Through the studies they are able to identify and respond to the needs and constraints imposed by existing conditions of the communities concerned Besides, feasibility studies facilitated by mobilization of community members ensure that the activities and technologies proposed and chosen by the project are appropriate, acceptable and affordable to the community But, before starting such studies it is expected that communities fulfill the following participation requirements

- *that, project assistance has been applied for and applications are processed and approved,*
- *that, a community register showing the total population has been completed together with a community profile form; and also,*
- *that, there is awareness and acceptance of the purpose of the feasibility study*

Having satisfied itself that communities fulfill the above requirements, the project management organizes a focus discussion session on the study results The Watsan Committees and Opinion Leaders are here encouraged to play major roles in providing information through focus group discussions Later, the group participates with staff to inspect existing water supply and sanitation facilities in the community to complement its data-base. Such information are very relevant for planning purposes.

4.1.7 Meeting with Community for Negotiation on Facilities

This is one stage of the project strategy where community participation finds its greatest expression. Usually after the feasibility study, a meeting is held with the concerned communities to inform them about the different options for water and sanitation improvements, or in the case of entirely new facilities, the estimated construction and maintenance costs of the proposed facilities Prior to this meeting, copies of draft reports are given to the community to study before meeting the project representatives who are also part of the community This arrangement facilitates easy negotiation as communities have enough time to discuss among themselves and make decisions about their choice of option facility long before the proposed date for the meeting.

4.1. 8 Signing of Formal Agreement

This is the stage when a written agreement between the community and the project is signed The contents of this agreement describes the water supply and sanitation facilities which have been agreed upon It also includes the prescribed 5 % of the total cost which communities are expected to pay to the contractor when construction work is completed This 5 % contribution is to make beneficiaries develop a sense of ownership and thus participate effectively in the sustainable management of the facility

4.1.9 Confirmation and Training of Watsan Committees

It is recognized that basic accounting skills together with effective decision making are relevant for the smooth performance of the project In this regard, the Watsan committees are provided with some level of training to enhance their performance A District Community Development(DCD) staff is also seconded to the Danida Project to assist in organizing communities in the use of water and sanitation facilities. The Watsan committees are then required to open a Bank Account and to collect funds for the 5 % contribution

4.2.0 Construction of Facility

Before construction starts, the project arranges a tendering procedure in which the Watsan committee elects a person to represent the community at the opening of tenders After tendering, a planning meeting is arranged when contractor is introduced to the community From this point on, the contractor and the Watsan committees together begin work on a plan preparation which describes the activities to be carried out by the contractor, the project and the community The contractor who wins the award builds the facility under the supervision of the technical staff from the district office, and in cases where manual labour and/or materials are available in the community, the contractor hires manpower or purchases such materials from the community. During the construction stage, the beneficiary roles change from active to less active participation However, the Watsan committees attend site meeting, and are obliged to report lapses observed in the construction to the project staff. Meanwhile as construction is in progress the Watsan committees select a caretaker to undergo an ***on the job training*** with the contractor Operationally, on the job training could be defined in this context to mean "*someone working with a project or an organization as staff while at the same time understudying another person with a more superior expertise to improve the trainees own competence*".

4.2.1 Operation and Maintenance

This is the period when completed facility is handed over to the beneficiary community which now takes full responsibility for the operation of the facility and makes sure it will last for a long time To facilitate operation and maintenance, the project identifies and trains *Area Mechanics* in each zone These undertake both preventive and repair works as and when needed.

4.2.2 Monitoring and Evaluation

Monitoring and evaluation is considered an essential part of the project Such measures are put in place to ensure joint participatory monitoring and evaluation of water and sanitation facilities The EHAs work in the project areas and assist communities with whatever problems that arise with regard to management, operation and maintenance of the project

The above discussion outlined the various stages of the Danish project development strategy. As could be discerned from this discussion, the strategy recognizes community participation as key to sustainable management, which indeed it has sought to incorporate in all phases of its activity However, in the context of water and sanitation project special emphasis needs to be placed on the involvement of women in planning and implementation phases since they have the potential of being effective managers Many rural water and sanitation projects have failed in the past as sustainable ventures due to lack of effective, planning and management practices, compounded by inability to adopt need-based appropriate technologies. It is in recognition of this that the Danida Rural Water project has carefully designed its elaborate planning and management strategies to embrace, *inter alia*: Information and Data Collection; Feasibility and Socioeconomic Studies, Negotiation on Facilities; Operation and Maintenance; Monitoring and Evaluation. Each component of its strategy analogous to the recommended *World Bank Project Cycle* (Buam 1994 ibid) has a strong element of community participation. The inclusion of community participation will in the long run render the project very sustainable if it can be implemented

Another important means by which community participation is invoked in most phases of the Danida Project cycle lies in the establishment of Watsan committees, formed by the communities themselves, and charged with major roles These pave the way to successful project implementation. One such role is the raising of funds towards meeting the cost of constructing, repair works, improvement, expansion or replacement of parts tools or maintenance and other pertinent costs associated with the operation and maintenance of the facilities. Apart from involvement in these tasks, the committees also plan and carry out health and sanitation activities to improve health conditions in the communities They also help to ensure that work is done on time and according to the expectations of the project staff. Experience from project reports indicate that incorporation of such committees in the project implementation strategy is a useful tool in attaining sustainable project management Through the work of these communities, public participation is facilitated from the inception of the project with reasonably successful results. For example, a number of water and sanitation facilities has already been provided in some of the deprived communities and the number of applications for project assistance is increasing Seemingly, the only major obstacle to project adoption in most communities is lack of financial resources on the part of individuals as discussion in section 5 4 1 will elucidate further However, once a more suitable alternative to financing project adoption is arrived at, greater results can be expected and project goals should be well on their way to being achieved.

CHAPTER FIVE
DATA ANALYSIS, RESULTS AND DISCUSSIONS

5.1.0 Introduction

The preceding four chapters of this report touched on a number of issues which are primarily intended to serve as explanatory background to the entire study. The issues among others elucidate the problem at stake, giving as a result the rationale and justification of the study They also outline the objectives of the study with special focuses on the Danish Government's Development Policies and Project Strategies which guides its activities in the Kpando District Against this background, the current chapter provides an analysis of data generated from the field and discusses results of its findings in relation to the set objectives of the study To this end, it focuses on water supply and sanitary facilities in the district vis-à-vis the distribution of the Danish project facilities and what impact that could have on water related disease control It proceeds further to discuss problems of project delivery, public opinions and suggestions for improved service provision in the district. Lastly it examines the project's socio-economic impacts and future prospects in the district

5.1.1 Water Supply, Sanitation and Ancillary Facilities in the Project Communities

The general water and sanitation situation in the Kpando District can be considered relatively poor (section 2.3.2). Most communities in the study area do not have adequate hygienically suitable waste disposal facilities and good drinking water sources that enhance public health conditions Caught up in such a situation, communities without access to adequate good portable drinking water resort to drawing water from unhygienic sources like rivers, streams, lakes or ponds to meet their basic daily requirements(table 6). Yet, findings from the study confirmed that, inadvertently or otherwise, these very sources of water from which they draw water are abused and not properly maintained in accordance with any environmental health standards

Plate 1. An illustration of water source abuse in communities without adequate portable water facilities (Watsanews,1996)

As portrayed in plate 1 one often encounters a situation where people wash clothes and even bath in the sources of water they rely on for their domestic use in communities without any form of planned potable water supply

Table 6 Percent Distribution of Water Supply Source in the Study Area

Main Water Source Used	Frequency Distribution	Percent (%)
Streams and Rivers	78	25 3
Volta Lake	30	9 7
Boreholes	102	33 0
Tap Water	60	20 0
Others(Springs,Dams,Ponds,Catchment etc.)	38	12 0
TOTAL	**308**	**100**

Data Source: Author's Questionnaire Survey, 1997
NB: Totals are greater than sample size(240) because of multiple responses

The picture becomes more illustrative when one examines water use even within the domestic setting Results from the questionnaire survey carried out in the field suggest that some members of the community are either not responding to the sanitation message being spread by the project, or that there are still some inhibiting factors which make adoption of proper hygiene practices a little bit problematic For instance, results from the survey also revealed that a substantial proportion of personal and clothes washing activities take place in the home. However, lack of adequate waste water disposal systems in the communities make majority of the people dispose their domestic waste water in the immediate environs of their homes(tables 7 and 8)

Table 7 Percent Distribution of Personal /Clothes Washing Places by Communities

Name Of Community	In the Home	Stream, River, or Lake	Near the Borehole	Total
Bame	24 (100%)			24
Dzoanti	10 (41 7%)	14 (58 3%)		24
Torkor	6 (25 0%)	18 (75 0%)		24
Dzigbey	14 (58 3%)	10 (41 7%)		24
Peki-Agbateh	20 (83.3%)	4 (16 7%)		24
Peki-Dzakeh	16 (66.7%)	8 (33 3%)		24
Sanga	24 (100%)			24
Tsiyenu	24 (100%)			24
TsrukpeDukuma	24 (100%)			24
Yordanu	4 (16 7%)	20 (83 3%)		24
TOTAL	**166 (69.2%)**	**74 (30.8%)**		**240 (100%)**

Data Source: Author's Questionnaire Survey, 1997

Table 7 indicates that a relatively large proportion (69 2%) of the respondents carry out their personal and clothes washing activities in the home with the remaining 30 8% carrying out theirs at streams, lakes and rivers in the communities This distribution pattern means much and has implications particularly for domestic waste water disposal in the communities Table 8 illustrates in details the situation with waste water disposal in homes within the study communities As could be seen from that table, a pattern is conveyed signifying clearly the extent and consequences of lack or inadequate waste water disposal facilities in the communities For example, 71 7% of the respondents indicated disposing their domestic waste water behind their houses and in the compounds surrounding their homes due to lack of appropriate disposal places, whereas the remaining 28.3% dispose theirs either in the neighbouring bushes or in drainage pits and gutters in the communities

Table 8 Percent Distribution of Waste Water Disposal Places in Study Communities

NAME OF COMMUNITY	Behind the House	Surrounding Bushes	Drainage Pits /Gutters	Surrounding Compounds	TOTAL
Bame	10 (41 7%)	2 (8 3%)	4 (16 7 %)	8 (33.3%)	24
Dzoanti	8 (33.3%)	4 (16 7%)		12 (50.0%)	24
Kpando-Torkor	6 (25 0%)			18 (75 0%)	24
Kpando-Dzigbey	12 (50 0%)		8 (33 3%)	4 (16 7%)	24
Peki-Agbateh	6 (25 0%)	4 (16 7%)	10 (41 7%)	4 (16 7%)	24
Peki-Dzakeh	6 (25 0%)	8 (33 3%)		10 (41 7%)	24
Sanga	6 (25 0%)		4 (16 7%)	14 (58 3%)	24
Tsiyenu	6 (25 0%)		6 (25 0%)	12 (50 0%)	24
Tsrukpe-Dukumah	16 (66 7%)	6 (25 0%)	2 (8 3%)		24
Yordanu	14 (58.3%)	4 (16 7%)	6 (25.0%)		24
TOTAL	**90 (37.5%)**	**28 (11.6%)**	**40 (16.7%)**	**82 (34.2%)**	**240 (100%)**

Data Source: Author's Questionnaire Survey,1997

Disposal of waste water into pits and gutters as practiced in communities like Yordanu, Tsiyenu and Peki-Agbateh is not in itself a bad practice compared to throwing it behind houses etc However, without periodic desilting of the gutters and pits this practice might lose its advantage There is therefore the need for Watsan Committee members in those communities where the practice is popular to ensure that desilting becomes an integral component of their communal work programmes if such gutters and pits are to continue serving those purposes Furthermore, it is equally advisable for communities adopting the use of pits as a place of waste water disposal to cover such pits to avoid rendering them as eventual mosquito breeding grounds

Nielsen and Rasmussen(1997) reported the prevalence of malaria and mosquito infection in some communities covered in their study (including communities where pit and gutter systems of waste water is practiced) Possibly, neglect of such precautionary or preventive measures like desilting explain the prevalence of malaria cases in those communities There is therefore the need for a more serious attention on such issues

Refuse disposal and latrine facilities are also issues of importance worth considering in any discussion related to sanitation in project communities. The problem with refuse and latrines in the study communities does not appear as serious as experienced in bigger urban communities However, existing facilities are equally inadequate and peoples activities related to handling such facilities are improper in many instances(chapter 2) Similar to what had been pointed out earlier, lack of suitable places of refuse disposal in most of the communities has resulted in a practice of throwing refuse in bushes behind houses There are instances where communities have specific places as incinerators for depositing refuse However such facilities, uncovered as they are, expose people living in such neighborhoods to air and water related diseases and as such require attention by Watsan committees Addressing these issues requires very pragmatic efforts both on part of Watsan committee members as well as environmental and health related officials. The project recognizes however that intensive public education, and video shows are useful working tools in correcting such practices There is therefore the need to carry out regular activities in line with this for a far reaching impact to be felt Further to this, project facilities provided in the district need to be promoted so that adoption rate among communities can improve health standards. The next section will describe project facilities provided and how that might impact on water-related disease control in the District.

5.2.0 Water Supply Facilities and Caretaker Responsibilities

In response to water and sanitation needs, the Danish Project provides a number of facilities (depending on the population) to communities as well as individuals who meet the laid-down requirements for project assistance This section provides a brief description of the major water and sanitation facilities currently being provided in the communities. It also goes further to examine the spatial distribution of these facilities and how such a distributional pattern could impact on water related disease control.

5.2.1 Water Supply Facilities-Three basic types of water supply facilities are currently being provided in the communities. They include *Boreholes, Spring Catchment and Rain Water Catchment* facilities (see Community Management Handbook, appendix). Beneficiaries opting for boreholes have the chance of choosing between those fitted with handpumps, electric pumps or solar array

5.2.2 Boreholes with Hand Pumps *(Ghana Modified Indian Mark II Hand Pumps)*

This type of facility is provided in communities without any good spring but have underground water resources Usually, after successfully assessing the suitability of the chosen site for this facility, boreholes are drilled into the ground from where water can be drawn by means of a handpump installed on it (Community Management Handbook, appendix) The ***Ghana Modified Indian Mark II*** is a typical deep well handpump It is a lever-action handpump made of galvanized steel It has light stainless steel drop pipes with connecting rods, and also a brass cylinder With these component parts made from metal substances that are not susceptible to corrosion the livespan of the pump is estimated to extend to about 12 years or more, provided proper care and maintenance work is carried out on it The project acknowledges however that community caretakers are not always capable of carrying out repair works on the installed pumps In view of this, it provides special training to local mechanics who are often resident in the communities to take care of any eventual repair work that might crop up. Notwithstanding this arrangement, caretakers are assigned a number of responsibilities to perform which are vital for the sustainance of the facilities. In the particular case of the hand pumps the following, are the responsibilities expected of caretakers.

- *ensuring cleanliness at the pump sites and drains,*
- *checking flow of water for signs of leakage in the foot valve or for less water in wells, greasing the chain and other moving parts when necessary, and*
- *ensuring that the apron and drains are repaired, and keeping records of repairs done by the trained local mechanics*

Apart from these major assignments caretakers are also mandated to collect fees from the users; educate them and report breakdowns and other serious problems to the Watsan committees for immediate action. Such an arrangement of designating someone as caretaker to perform the above stated duties in respect of the handpumps is laudable as it promotes effective use of the facility and hence its durability Besides this, the constant interaction of caretakers in the management of the facilities also has other advantages for the speedy innovation of the water facilities in accordance with Hägerstrand's Diffusion Theory For instance, where Caretakers can effectively collaborate with Watsan committee members in the discharge of their work, the environmental and hygiene awareness building messages can spread through the society faster and ultimately push up the project beyond category three of the diffusion cycle(see section 1 2.0). But to achieve this, it is equally important not to neglect the need for a motivative element which promotes devotion to duty on the part of caretakers. This study did not investigate the type or extent of motivation given to caretakers to perform such duties. It assumes that there is a well laid down arrangement to that effect. Otherwise, then one would seriously suggest some form of remuneration for caretakers who perform those duties Such an arrangement will constitute a very strong motivational factor, boost the morale of the caretaker and consequently excite his devotion to duty With serious consideration to these issues, a maintenance strategy with caretakers as key players, should help ensure sustainable use and management of the borehole facilities

5.2.3 Gravity Flow Piped Water Supply System

This system of water supply relies usually on a spring or a stream as the main source By means of gravity as the driving force, water is transported to the communities through a network of pipelines (Community Management Handbook, appendix) In communities or villages where a well-protected spring with a good water source located on a high ground level exists, ***Gravity Flow Piped Water Supply System*** is considered a suitable choice By this system, water from a chosen spring flows down hill in pipes connected to big storage tanks Usually, a siltbox is built in the network to keep dirt from flowing into the waste tanks From the waste tanks water flows down hill by the force of gravity through the pipes to standpipes located in different parts of the communities from where people can conveniently draw their water supply However, like the Boreholes water supply system, Gravity Flow Piped Water System requires a number of maintenance activities to ensure its efficiency To this end, community caretakers are charged with specific roles which must be carried out in respect of the following components of the water supply system

(i) Stream Intakes - Caretakers are expected to check drains at the various intake points and repair them if necessary. They are also to ensure that bye-laws to protect catchment areas are followed by the community; check and repair *rip-rap* below weir if necessary; and also check all concrete structures for leakage, cracks, and washing away of foundations. Added to these roles, caretakers are also expected to check on the sand filters to see if they are blocked, close the valve on the delivery mains as well as clean the filter sand These activities are essential to maintain water quality as undetected cracks, leakages etc might result in contaminants entering the water supply system

(ii) Spring Catchments - A number of roles are equally demanded in respect of spring catchments For instance, the drainage ditch above springs are to be checked regularly and repaired Caretakers are also expected to ensure that the bye-laws governing use of the facilities are respected. Added to this responsibility, caretakers are expected to check for leakages from the spring catchment area as well as silt chambers for signs of leaks, cracks, washing away of foundations etc. as mentioned in connection with the Boreholes

(iii) Reservoirs, Pipelines and Standpipes - Here again, checking on cleanliness of valves, potential leakages, flow at taps etc., are responsibilities placed on caretakers to ensure that the facilities are well maintained and functioning as expected

5.2.4 Other Water Supply Facilities

Besides the two main water supply systems described above, the project also has some other water supply systems which can be made available to communities on request. These include Hand-Dug Wells (with or without handpumps). This section presents a description on how these facilities function and the specific caretaker responsibilities expected of them to ensure their usefulness

5.2.5 Hand Dug Well without a Handpump - These are typically constructed in areas where the ground water is close to the surface They are built with simple tools and lined with concrete rings to prevent the walls from carving in after excavation is

complete Where the water level is low or falls the wells are drilled deeper to ensure accessibility The digging of the wells is done usually by employing the services of unskilled labourers However, skilled people are often contacted for casting and placing of the concrete rings The wells have a concrete or a masonry wall around them called the *headwall* They have an apron and a drain which usually leads into a soakaway pit There is also a concrete cover slab with a hole through which water can be taken from the well by means of a bucket attached to a rope This water facility has a cover which can be closed and locked when not in use to prevent misuse or any form of abuse(Community Management Handbook, appendix)

5.2.6 *Community Hand-Dug Wells fitted with Handpumps*

In situations where hand-dug wells reach down to depths of about 20 meters they are fitted with low lift pumps such as the ***NIRA AF-85 Hand Pump*** to facilitate drawing of water(Community Management Handbook, appendix) These pumps can work up to 12-15 meters depth At a water level of 10 meters, the pump can give about 33 litres or 9 gallons per minute Most components are made of steel. But it also has a rising pipe and a piston rod which are made up of a very strong plastic. The spare parts of this pump are made and sold in the Ghana Thus they are readily accessible and considered very suitable for use by rural communities. The use and maintenance of this pump is relatively easy and does not pose much problem There might be occasions where the cylinder would need repairs However, this can simply be done by pulling it out through the pump body

Certain parts of the pump such as the *sealing ring,* the *collar bearing* and the *valve bobbin* wear out in course of its use There is therefore a need for occasional inspection and replacement However, repair activities related to these are quite easy and requires only a few simple tools. To this end, the project in principle provides beneficiary communities who opt for this facility with sets of tools to facilitate such repair works after pumps are installed Again, these water facility also requires much needed care similar to what is was discussed in respect of the earlier described facilities As such community caretakers perform caretaker and maintenance activities to ensure that pumps are used and handled properly without any form of abuse It becomes clear from these discussions that the sole maintenance and monitoring activities in respect of the water facilities rest largely on caretakers In a sense, as indicated earlier, this arrangement has the advantage of ensuring that caretaker responsibility lies in the hands of a particular person who is accountable for any negligence and misuse identified with the facility However, the weakness in this arrangement is that an attractive incentive must be made available to motivate the person playing such roles In absence of this there is the likelihood of him/her giving up the job for anything else that might appear more attractive with greater incentives

5.3.0 Danida's Sanitation Facilities

To promote good sanitary conditions in the communities, the project provides low cost and affordable latrines for households and institutions (schools and clinics) We discuss below the types of latrine facilities provided in the communities and where possible, the relative advantages and disadvantages associated with each

5.3.1 Sanplat Latrine

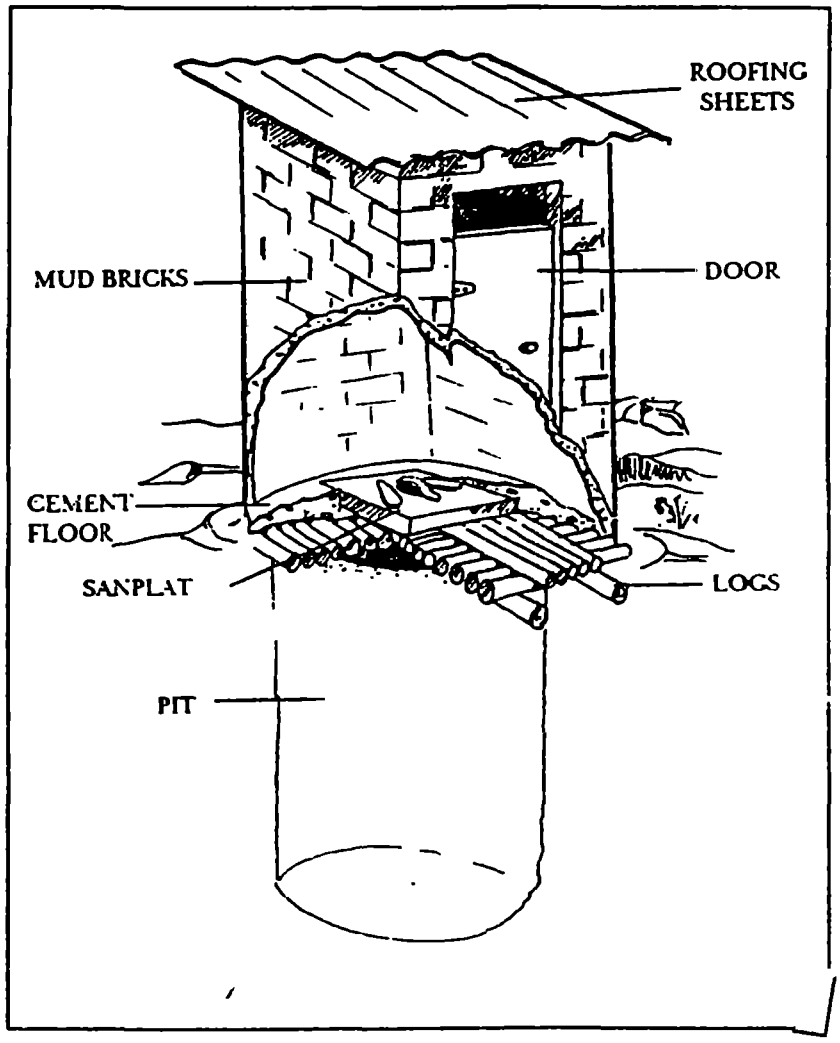
This is an example of a low cost household latrine whose construction can be carried out under the supervision of Watsan committees using locally available materials (plate 2) The beneficiary provides all the essential construction materials required for this facility and informs the Watsan committee who arranges for the construction of the facility Essential materials required for the construction of this facility comprise a sanplat, roofing sheets, cements and some reasonable quantity of assorted roofing/building nails Table 9 1 shows a summary of the construction materials usually used and the respective quantities required of each

Table 9.1 Materials required for the Constructing a Sanplat Latrine

	Sanplat	Cement	Roofing Sheets	Roofing Nails	Assorted Nails
Quantity Required	1	1 Bag	2	½ Ibs	2Ibs

Data Source: Watsanews(1995)

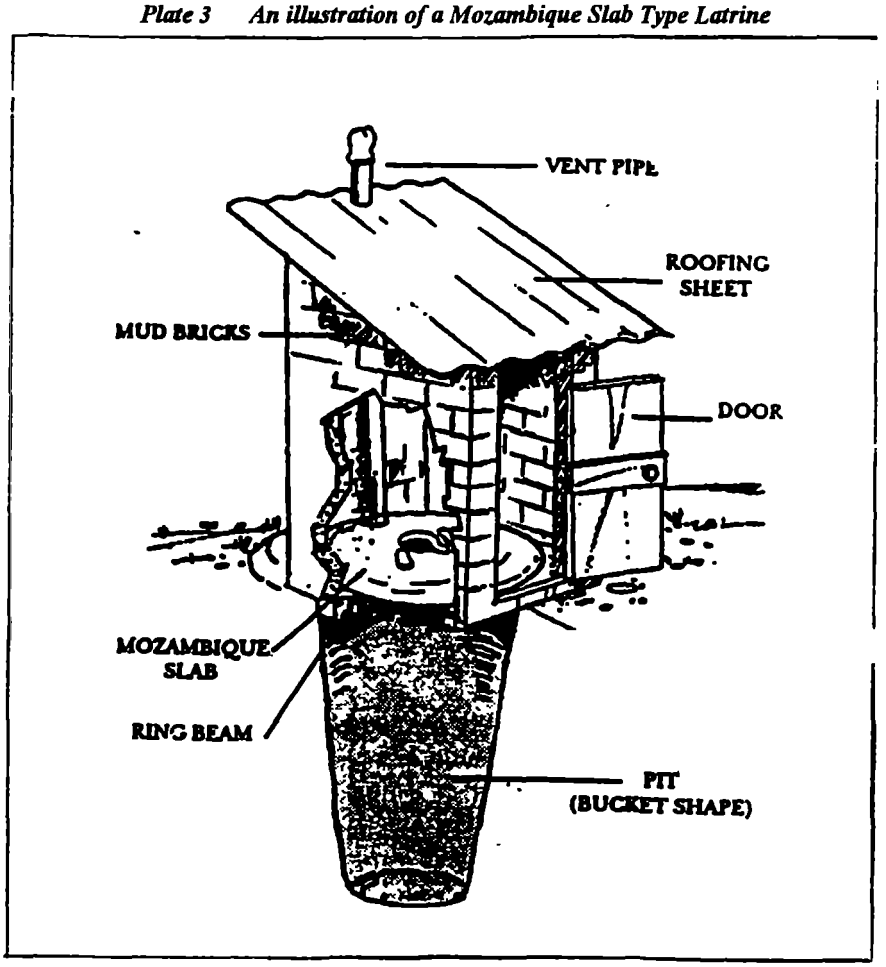
Plate 2 An Illustration of a Sanplat Household Latrine



There are a number of advantages associated with this latrine type. For instance, the construction cost is very low thus making it affordable and the sandplat can be re-used when the pit if full Besides these, the facility also provides privacy and it is odour free There are nevertheless some disadvantages associated with the facility For instance, the lifespan of the facility is not very long compared to others It is estimated that the pit can get full within 4 years when used by an average of ten persons in a house In that case, there would be a need for the user to move to a new site This movement certainly implies that a new plot must be sought, which in itself constitutes problems particularly in communities where access to land is a difficult issue. Added to these inconveniences, the use of embedded wood in the installation of the facility calls for a constant check on their conditions to ensure that they do not rot and predispose users to the risk of sinking into the pit as a result of collapse Finally, the facility is not suitable in sandy or loose soil areas, unless some fortification measures are adopted to strengthen the supporting soil This again will imply use of some extra materials which will add to the cost of construction. Whether the poor rural dwellers are able to accomodate such added costs is an issue which deserves serious consideration in recommending this facility to beneficiary communities. In effect, care must always be taken to ensure that such added costs do not deter them from adopting the facility

5.3.2 Mozambique Slab Type Latrine

Plate 3 An illustration of a Mozambique Slab Type Latrine



This type of latrine is similar to the sanplat in structural composition. The only difference is that the Mozambique Slab Type Latrine has a beam ring which serves as a

foundation for the slab The slab is made of concrete to prevent surface and rain water from running into the pit - a situation which usually causes collapse of traditional trench and pit latrines during rainy seasons. In exception of a PVC pipe, the materials used in constructing this latrine type are similar to that of the sanplat Table 9 2 details out materials and quantity required of each in the construction of the facility

Table 9.2 Materials Required for the Construction of a Mozabique Type Latrine

	Cement	PVC-4' (100mm) Diameter pipe	Galvanized Roofing sheet(3'x 8')	Roofing Nails	Assorted Nails 2',3', 4'	Aluminium Mosquito Net
Quantity Required	2 Bags	1	3	½Ibs	2Ibs	½ yard

Data Source: Watsan News(1996)

This latrine type has a deeper pit and is estimated to take about 5 years to get full for an average of 10 users Like the sanplat, the slab, roofing sheets as well as the vent pipe can be reused on a new pit This is a cost effective element that saves users from spending extra resources on these materials when constructing a new facility In addition to this advantage, the facility equally provides privacy and controls flies and odour But as usual, the disadvantages associated with this also is that a new land has to be acquired for a shift of facility when the old pit fills up Again this poses problems especially in areas where easy access to new plots is a difficult problem. Otherwise, it is a relatively appropriate facility worth recommending for use in local communities

5.3.3 Rectangle Single Pit Latrine

Compared with the previously described latrine types, this one appears to have a longer lifespan of about 7½ years for an average of ten users after which it could be moved to a new site In terms of composition this latrine type has a rectangular beam made of concrete which serves as a foundation for the slabs and also prevents loose top soils from caving into the pits(plate 4) The slabs placed on the beam helps prevent surface/rain water from running into the pit to cause collapse of the facility This facility appears to be an improvement upon the previously discussed ones However, it has its associated merits and demerits as outlined below

Merits

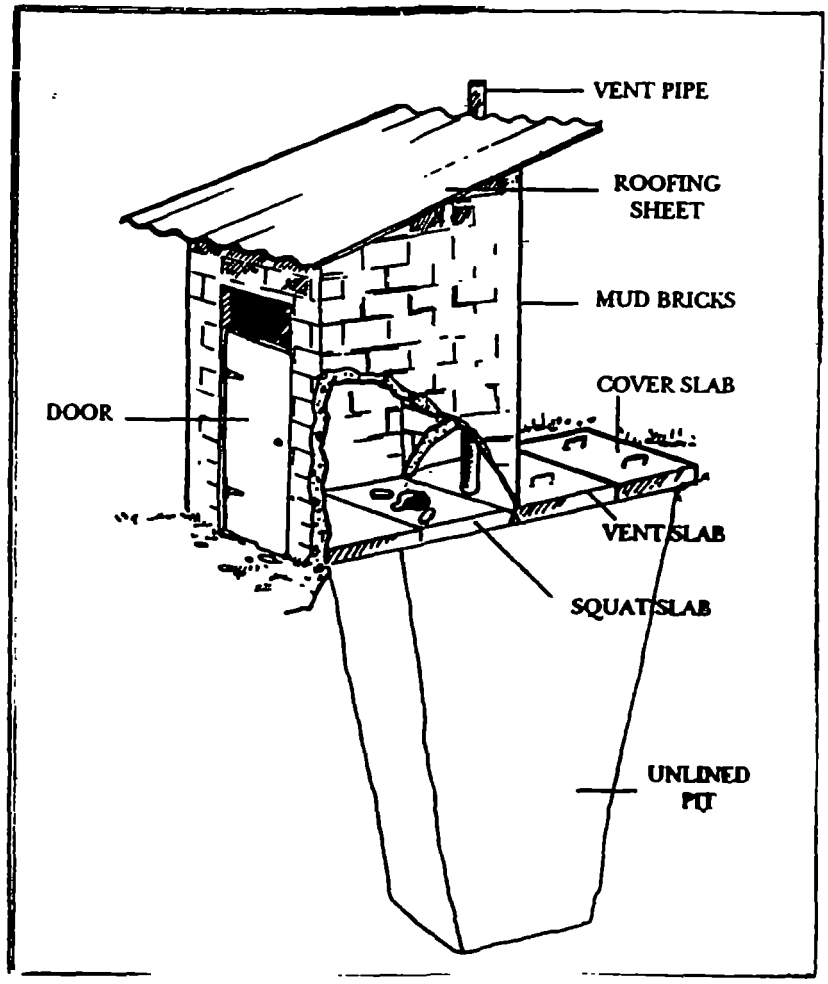
- *vent pipes, slabs and roofing materials can be re-used on a new pit*
- *cover slabs can be removed to check conditions of the pit.*
- *flies and bad odours often associated with traditional pit/trench latrines are controlled in this case*
- *privacy is provided.*

Demerits

- *availability of land for the construction of a new facility when old one fills up could constitute a problem in some communities*
- *re-use of old pit can not be guaranteed*
- *cost of construction is slightly higher*

The three sanitary facilities described above are cost effective and designed to suit local communities As noted earlier the current adoption rate appears to be quite low for financial and other reasons. However, it is envisaged that the rate of adoption will increase when communities are able to secure suitable means of raising funds to pay for the facilities

Plate 4 An illustration of a Rectangle Single(Ventilated Improved) Latrine



5.4.0 Spatial Distribution of Project Facilities in the District

Project facilities are not uniformly distributed across the district This distributional pattern is accounted for largely by the criteria set by project to be met by the communities and also to some extent, the weak financial position of residents within the project area. In principle, the project facilities are provided in the communities based on a demand-driven approach. However, a number of activities including feasibility studies, training of Watsan committees, designing of facilities etc are equally expected to be completed before the project starts in communities These basic requirements take quite some time to be met Consequently, distribution of project facilities as well as activities are at varying stages in communities as discussions in this section portrays.

As at the end time of the field study only three communities, namely Sanga, Tsiyenu and Peki-Agbateh (fig 2), have had project facilities successfully installed for them The first two are benefiting from a ***spring catchment water supply*** facilities whereas the latter(Peki-Agbateh) had been provided with an ***electricity-driven piped water facility.*** Apart from these communities which are directly benefiting from project facilities, there are some other four(4) communities which have also had what could be termed ***indirect assistance*** from the project These communities are Dzigbe, Yordanu, Tsrukpe-Dukumah and Peki-Dzakeh In these communities, piped water supply facilities have previously been provided by the Ghana Water and Sewerage Corporation (GWSC), World Vision International (WVI) and the Environmental Presbyterian Church (EPC) But owing to managerial problems, the facilities ceased to function and had been abandoned. However, through an arrangement between the communities as well as the original providers of those facilities the Danish Water Project had taken over those facilities and through its Pump Conversion Programme have revived them for use in the communities

Currently, under the Hand pump conversion programme four(4) such hand pumps have been identified and repaired to serve a population of about 1200 people in Peki-Dzakeh Two out of the four identified in Tsrukpe-Dukumah have equally been re-activated for use in the community, and those in Dzigbe and Yordanu have also been repaired to serve their population Several communities have also been earmarked to benefit from the Handpump conversion programme(table 10) Arrangements are underway towards this end, which when completed will place those communities also under the Handpump conversion programme.

Table 10 Communities Earmarked for Hand Pump Conversion

NAME OF VILLAGE	PUMP ORIGINALLY INSTALLED BY	NO. OF PUMPS EARMARKED	POPULATION SERVED	REMARKS
Dzigbe	GWSC-1, EPC-1	2	300	Pump repaired(1)
Fesi	GWSC-1, WVI-1	3	-	-
Fesi Resettlement	VRA-1	1	-	-
Agbenoxoe	GWSC-2	2	-	-
Old Abanu	GWSC-2	2	-	-
Daffor	GWSC-4	4	-	-
Bame	GWSC-1	1	-	-
Dzewoe	GWSC-1	1	-	-
Gadza	WVI-1	1	-	-
Dzoanti	GWSC-2	2	-	-
Agudzi	GWSC-1	1	-	-
Gbefi-Hoeme	GWSC-3	3	-	-
Gbefi-Tornu	GWSC-4	4	-	-
Sovie-Gboxome	EPC-3	3	-	-
Kudzra	GWSC-4	4	-	-
Aveme Gboxome	GWSC-1	1	-	-
Dra	GWSC-2	2	-	-
Beme	GWSC-5	5	-	-
Danyigba	GWSC-2	2	-	-
Toveme	GWSC-1	1	-	-
Dzeme	WVI-2	2	-	-

Tsome-sabadu	WVI-2	2	-	-
Akukorme	EPC-1	1	-	-
Dzana	GWSC-1, EPC-1	2	-	-
Wadamaxe	GWSC-2	2	-	-
Wuve	GWSC-2, EPC-1	3	-	-
Tokorme	GWSC-2, EPC-1	3	-	-
Agata	GWSC-2	2	-	-
Agatanyigbe	GWSC-2	2	-	-
Gblenkor	EPC-1	1	-	-
Awate Todzi	GWSC-4	4	-	-
Agame/Dzifadzi	GWSC-1	1	-	-
VakpoDunyo	WVI-2	2	-	-
Vakpo- Afeye	EPC-1	1	-	-
Dzogbati	GWSC-1	1	-	-
Yordanu	WVI-1	1	300	Pump repaired(1)
Botoku Tove. 1	GWSC-3	3	-	-
Botoku Siama 2	GWSC-4	4	-	-
Tsrukpe-Tota	GWSC-3	3	-	-
Dukuma	GWSC-4	4	600	Pump repaired(2)
Wusuta-Resettl	EPC-1	1	-	-
Gboxome	EPC-1	1	-	-
Anyafo	GWSC-1	1	-	-
Dzake	GWSC-2 ,WVI-2	4	1200	Pump repaired(4)
Avetile	WVI-2	2	-	-
Todome	EPC-1, GWSC-3	4	-	-
Wegbe Kpalime	WVI-2	2	-	-
Ahor	GWSC-5	5	-	-
Tsate	GWSC-1	1	-	-
Dzemeni	GWSC-2	2	-	-
Tsanakpe	GWSC-3	3	-	-

NB: (-) implies no data. Population estimates are only available for the four(4) communities currently benefiting from the Hand pump conversion programme.

At present, full scale project activities are underway in about thirty-eight(38) communities in the district at various stages. With the exception of Botoku and Wusuta Resettlement almost all the communities targeted for project assistance have gone through the feasibility studies stage and have had Watsan committees established in readiness for full scale project activity. According to activities scheduled for the current year(1997), work on construction of facilities is expected to have been completed in 10 out of the 38 communities representing 26.3%. And by the end of June it is projected that work on construction of facilities would be completed in 14 additional communities Thus, altogether about 24 communities should by that time have facilities installed for their use The remaining 14 communities which are currently at the initial phases of the project planning cycle will hopefully by the end of the year equally have their facilities installed for use(Table 11)

Table 11 Percent Distribution of Planned Project Facilities in Communities in the District During the Period January-June 1997

Type of Facility	Number of Communities to be Served	Total Population
Boreholes with Handpumps	16	13,878
Spring Catchment	2	3,945
Piped Gravity System	3	3,730
Solar Pumping	5	6,814
Electric Pumping	12	16,472
TOTAL	**38**	**44,839**

Data Source Danida District Project Files (1997)

With the present work schedule there seems to be greater achievement in terms of areal coverage when work proceeds uninterrupted according to the schedule The total population out of the 38 communities expected to have been benefiting fully from water facilities provided under the present arrangement by June is 44,839. This figure represents 34 5% of the total population of the entire district estimated at 129 916(ibid,1995) Assuming that this population figure of the district is reliable, the achievement of such a level of water supply coverage within the projected period is quite a positive and an encouraging sign which justifies the project funding.

By the same token, such an achievement has an implication for the prevailing health conditions of people in the communities. For instance, with proper education and good sanitary habits, adequate potable water supply will reduce water related diseases prevailing in the communities and the health status of people in the district will consequently improve

5.4.1 Problems Constraining Water Supply and Sanitation Facility Provision in the District

The study discovered a few problems constraining project management in the district However, these problems are mostly associated with accessibility, facility use with specific reference to currently existing facilities, as well as those affecting potential users From the study, accessibility to facility was indicated as a problem confronting facility use However, it appears to be a minor problem relating to very few communities like Peki-Dzakeh and Torkor A substantial proportion of respondents (about 68 3%) interviewed indicated having no accessibility problems with regards to location of current project facilitiy existing in their communities(table 12) Thus, in exception of Torkor and Peki-Dzakeh all the remaining eight(8) communities sampled for the study are satisfied with the location of the facility and could have easy access to water at any time

Table 12 Problems Constraining Water Facilities in the Communities

Name of Village	Accessibility Problem ?		Specific Problems Confronting Current/Potential Users							
	Yes	No	Dist	Queuing	Finan	Slow flow	Land	Indiscrimi nate Collect.	No probl	
Bame	2 (8 3 %)	22 (91 7 %)			2 (8 3 %)				22 (91 7%)	24
Dzoanti	14 (58 3 %	10 41 7%			14 58 3 %				10 41.7%	24
Torkor	16 66 7 %	8 33 3%			12 50 0 %		4 16 4%		8 33 3%	24
Dzigbe	4 16 7 %	20 83 3%			2 8 3%		2 8 3%		20 83.3%	24
Peki-Agbateh	6 25 01 %	18 75 0%			4 16 7 %	2 8 3%			18 75 0%	24
Peki-Dzakeh	16 66 7 %	8 33 3%	4 16 7 %	8 33 3%				8 33 3%	4 16 7%	24
Sanga	4 16 7 %	20 83 3%			4 16 7 %				20 83 3%	24
Tsiyenu	2 (8 3 %)	22 (91 7 %)			6 25 0 1%				18 75 0%	24
Dukumah	8 33 3 %	16 66 7%			8 33 3 %				16 66 7%	24
Yordanu	4 16 7 %	20 83 3%			6 25 0 1%				18 75 0%	24
TOTAL	**76** 31.7 %	**164** 68.3%	**04** 1.7 %	**08** 3.3%	**58** 24.2 %	**02** 0.8%	**06** 2.5%	**08** 3.3%	**154** 64.2%	**240** 100%

Data Source: Author's Questionnaire Survey, 1997

With regards to problems encountered in using existing facilities in the district, 64.2% of the respondents indicated having no problem in using the facilities This figure apparently looks encouraging However, the researcher is of the view that such a figure could have been different if the same inquiry had been made by someone else not closely associate with the project staff It was suspected that most of the respondents had some slight fears giving out answers to such questions as the researcher was almost always accompanied by project EHA's who for most part assisted in administering the questionnaires Nevertheless, some of the respondents dared express their views without any hindrance To these group, problems of distance to facility, the long queuing time, finance, slow flow of water from pumps, indiscriminate collection of water as well as land for construction of facility (in the case of those individuals contemplating opting for facilities in their homes) are the main problems closely identified with the project in the communities Of these enumerated problems, financial constraints seemed to the major issue representing 24.5% of all responses This problem relates to the charges levied on water drawers as well as to those wishing to benefit from project assistance as individuals.

In a community like Dzoanti, the study revealed that there was no fixed charge on the quantity of water drawn from their existing borehole While some of the respondents indicate paying about 1000 cedis (US$ 0 45) for about 330 liters drawn in a day which is approximately 3 cedis / litre, others indicate paying 800 cedis(US$0 36) for about 196 litres which is approximately 4 cedis/litre The same situation seems to prevail in Bame and even Tsiyenu Such inconsistencies in user fees is perhaps one reason underlying overdrawing of water noted by some respondents as problems confronting their water facilities. An equitable water pricing system is very important to encourage beneficiaries to use water sustainably and economically The other financial problem relates to those who are interested in having project facilities installed in their homes but are constrained by the cash deposit required as a pre-condition for project assistance.

Concerning other problems identified apart from finance, the long waiting time which one often encounters was one issue raised during the study. This factor together with the indiscriminate water collection problem mentioned each represented 3.3% of the total responses given. The last set of problems worth mentioning relates to land for construction of a new facility as well as distance to existing facilities But these problems seemed quite insignificant, thus representing 1.7 % and 3.3 % respectively On the basis of responses given about problems confronting project facilities in all the sampled communities, Bame seemed to have the most favourable conditions relating to their existing facilities. In this community, the study indicates that as much as 91.7% of the respondents have no problems with their facilities On the other end of the scale, Peki-Dzakeh seemed to have a wider range of problems and records the least score (16.7%) for a *"no problem"* response On the whole, conditions relating to use of the current facilities in the communities seems favourable and suggests a better future if efforts are made to correct the identified problems.

5.5.0 Opinions/Suggestions of Beneficiary Communities for Project Performance and Improved Services

Successful participatory project management does not only hinge on the mere physical involvement of project beneficiaries in project activities but goes beyond that. Planners and Managers of projects who run their project activities without involving the beneficiaries often run into problems. Recent managerial experiences on project performance in many countries have shown that rural people's views and opinions about project performance, their interests and expectations, provide useful signals to planners and managers which when taken into serious consideration promotes successful project management. The discussions in this section covers viewpoints, opinions and suggestions put forward by beneficiary communities for the attention of project management(Table 13)

Table 13 Percent Distribution of Public Opinion and Suggestion for Improved Service Provision.

Public Opinions about the Danish Project	Frequency Distribution	Percent (%)
Project activities/facilities are good and suitable for our communities	107	43 5
Project increases sanitation and health awareness in our communities	38	15 4
Pleased with facilities provided We need more	52	21 1
Services are of great help to our communities	35	14 2
Others	14	5 7
TOTAL	**246**	**100.0**
Public Suggestion for Improved Service Provision		
Extension of Project beyond 10 yrs	21	8 1
Increase Health / Hygiene Education, Training, Health Post / Clinic Provision	64	24 6
Provision to meet facility costs through user fees, payments by installment, small scale loans etc.	113	43.5
Reduce cost of facilities /Increase subsidy	36	13 8
Income Generating activities be provided in poorer communities	19	7 3
Others	07	2 7
TOTAL	**260**	**100.0**

Data Source: Author's Questionnaire Survey, 1997
NB Totals are more than sample size(240) because of multiple responses

5.5.1 Public Opinion about the Danish Water Project

Although the presence of the project in the district is fairly recent, a number of viewpoints have variously been expressed by respondents during the study which lends credence to the positive impact the project is making on the lives of people in the communities Responses given to questions posed on impressions, opinions etc have been very positive A great proportion(about 43 5%) of the respondents have indicated that project activities and facilities being introduced in their communities are good and suited to their needs. While the remaining others acknowledge that project activities are of great help to them in the communities and for which reason they demand more of such services, others have stated quite clearly that project activities have contributed to increase health, personal hygiene and sanitation awareness among people in the district In fact responses from individuals in communities where facilities have already been provided reflects clearly this positive view For instance, a thirty five year old woman (a farmer by profession) expressed her sentiments in these words

> *"The Danida people have done a good job by giving us water This time one does not have to walk distances in search of water As for me, I am advising every community where the project goes to accept it so that they can stop suffering "*

Similar sentiments have been expressed in communities who are yet to benefit from the project facilities People in such communities are interested and yearning for project facilities although they have constraining factors For instance a 40 year old lady farmer of Tsrukpe Dukuma, said

> *" we have heard all that the project is doing in communities who were able to afford money for the facility But we here in this community could not have access to these facilities until now because of money problems We are begging Danida to consider we the poorer communities"*

Such are the feelings of people in the communities Many, through information disseminated by the project staff have heard about the project. They are sick and tired of getting up early in the morning only to set themselves up on a distant walk in search of water As such they need project assistance Their handicap however, is lack of funds which when secured could make them have access to project facilities These, indeed, are encouraging signs showing that the project has future in the district More people are likely to adopt project facilities once they are able to discover suitable means of meeting facility costs

5.5.2 Public Suggestions for Improved Service Delivery

Given the positive impressions built by the public about the Danish Water Project they have come up with numerous suggestions which in their judgment could go a long way to enhance service provision and also promote their interest (table 13) As clearly indicated in that table, about 43 5% of the people indicated that their only setback to adopting the household project facilities is finance To this end, they are of the view that if project management can grant them a concession to meet cost of project facilities by means of installment payments, small loans schemes or by means of user fees (in the particular case of the public facilities) many interested individuals /communities will adopt project facilities Beside this category of suggestions, 13 8% of the respondents are also advocating an increment in the current level of subsidy provided by the project to assist beneficiary communities This group acknowledges that the current level of subsidy provided reduces their financial burdens However, they are of the view that further subsidization beyond the current level would ease the financial burden sufficiently for most people to adopt the facilities Added to these views, some other groups have advanced some more views of addressing the financial problem This group which represents just about 7 3% are advocating for the establishment of small-scale income generating activities along side project activities for small groups to boost their economic status. This suggestions is based on the premise that such a venture will enhance the financial capability of the poor and thus solve the issue of the lack of finance which currently appears to be the main limiting factors to project facility adoption.

While the preceding groups concentrate their suggestions around financial solutions, others hold different viewpoints For instance,some other 24.6% of the respondents believed that the project activities and performance in the district can be improved through increased health and hygiene education, using video shows to further promote public health awareness This opinion underscores the impact of the educational activities carried out by the EHA's in the communities, at least on the health awareness

front The very fact that people have been able to recognize increased health educational activities as a facilitating factor for effective project performance is evidence of the fact that the level of awareness in increasing This is illustration of innovation diffusion one expects in the context of a project like this (fig 3) There are some individuals who also believe that Danida should consider establishing health posts in the communities as part of their project activities The logic behind this is that some such action is necessary to compensate for the inadequate level of health facility provision in the communities It is acknowledged that such an extension of activity imposes an extra financial burden on the donor However, should it become practicable it could constitute a more comprehensive health promoting strategy.

The last group's suggestions relate perhaps to the fear of losing much of the perceived benefits of the project should the project assistance end after the 10 year project period This group which represents 8.1% plead for an extension of the project period beyond 10 years so that, more people can manage to seek out alternative sources of funding to enable them go in for the facilities Arguably, all these are good indicators of the relevance of the project in the district, and they tend to justify the investments being made in this project. There is therefore the need for policy makers and management of the Danish project to reconsider these suggestions to see if there is a way of addressing some of the suggestions outlined herein to enhance the projects impact in the communities Notwithstanding all these, some respondents have also identified a few more practical issues which relate particularly to current managerial strategy adopted by the project in the communities Some of these are that·

- *more people be trained in the repair of Boreholes and construction of latrine in the communities*
- *existing waste and dumping grounds in the communities be improved*
- *health and hygiene educators be trained in every community who can solely be responsible for issues*
- *public toilets be constructed and placed under the care of the elders for effective responsibility*
- *project deposits be collected/mobilized during the major crop harvest seasons since that is the period of the year when most of the people make some income from sale of their crops*

In summary, these represent a range of suggestions put forward by communities which they believe could help raise the level of service provision in the district Some of them undoubtedly cannot be met given currently existing policies which guide project activities in the district However some contain some elements of substance and relevance which when considered more seriously could yield greater impacts and effective project performance in the district It is therefore appropriate for project management to explore further into those they consider more plausible to see how best they can be addressed to serve not only the immediate needs of beneficiaries, but also the long term goals of the project.

5.5.3 The Impact and Prospects of the Danish Water Project in the Kpando District

Introduction

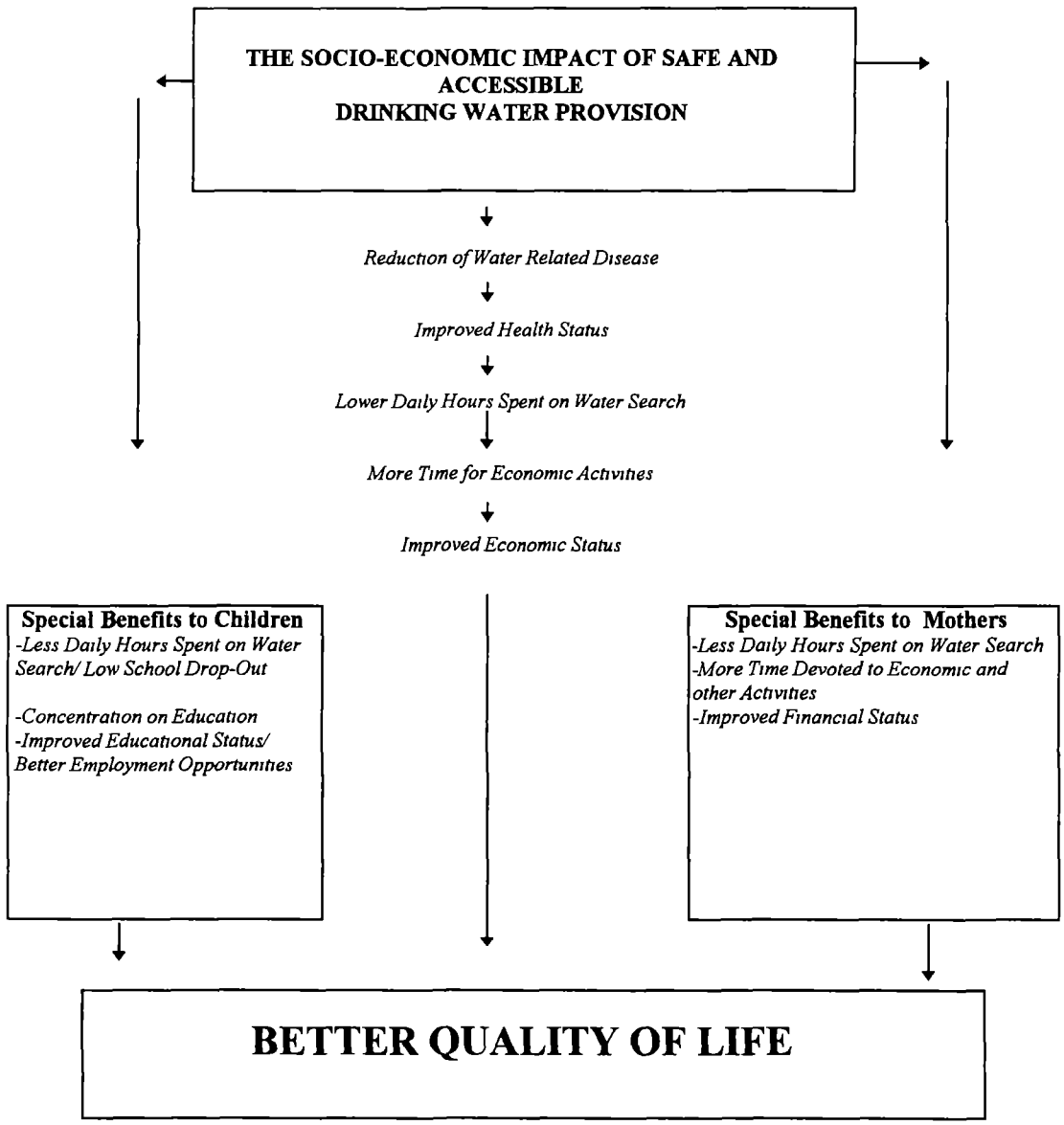
We noted in discussions under section 5 4 0 that the estimated population of the Kpando District as at the time of launching of the project was 129,916(op cit, 1995) Discounting the rate of increase in population we estimate however that 34.5% of this population would have access to facilities provided by the project by June this year(i.e within 2½ years of operation since the project was launched) On the basis of this rate of coverage, and also holding all other factors constant, we hypothesised that the entirety of the above noted total population of the district would be covered within 7 25 years from the date of initial launching of the project Thus by the end of march of the year 2001 almost the entire of the population would have access to drinking water supply Indeed, this picture backed by the rate of progress implies a lot and would have significant implications for the socio-economic and health lives of people in the district as discussed below

Socio-Economic and Health Impacts of the Project

Several socio-economic impacts are envisaged for the people of Kpando District under the current rural water and sanitation project However, these benefits and impacts hold special relevance for mothers and children who are the main water collectors in communities as discussions in this section will illustrate (fig 5) We noted in discussions in the earlier chapters that women as well as children constitute a great proportion of water drawers in most Third World countries. This situation(positive) is typical also for communities in the study area where women and children occupy such positions It implies therefore that all the difficulties one goes through in search of water in communities where accessibility is difficult as well as the negative effects of such a situation are closely associated with them. For instance, in communities where clean potable water is not accessible, women often have to get up early in the morning and walk distances to collect water from streams and rivers which are often far removed from their communities The consequence is that many hours are spent daily on such activities which could have been spent profitably on other activities It is against this background that the current water project launched in the district and its associated activities are considered to have tremendous impacts in providing a better quality of people in the district

In the particular case of children, successful provision of potable water in communities will imply that less time would be spent daily on commuting distances on foot in search of water With such an advantage, lateness to school which in some cases result in drop-out rates will be lowered, and more devotion of time on education could be promoted Under such circumstances, children can concentrate their time on education, improve their educational status which in the final analysis puts them in a better position for better future job prospects and its associated improved quality of life Added to this, one envisages as well that teenage pregnancy which is often associated with school dropouts resulting from lateness due to water collection could be reduced with greater concentration on education.

Fig 5 SOCIO-ECONOMIC IMPACTS ASSOCIATED WITH SAFE POTABLE WATER SUPPLY IN THE KPANDO DISTRICT



The special benefits to women are not too divorced from that described for children Much like the children, it is envisaged that women will also, under the water supply scheme, enjoy the privilege of spending lesser time and effort on water collection Instead, with portable water facility provision in the communities, many useful hours which otherwise would have been spent traveling distances in search of water would be devoted to their income generating activities like trading, farming etc Devotion of time to such activities will promote their economic base, bring additional income that could facilitate a better quality of life for them It becomes evident therefore that the launching of the water project in the district provides many socio-economic benefits for beneficiaries It helps reduce water related diseases, improve the health status of

beneficiaries, re-diverts time wasted on water search into more useful economic and educational activities All these should culminate in enhancing the education and economic status of children and adults, and ultimately promote a better quality of life for people in the District

CHAPTER SIX
DISCUSSION OF MAJOR FINDINGS

6.1.0 Introduction

This study is intended to be a small-scale evaluation carried out to sensitize management of Danish Water Project about its perceived direction and performance in the district A benefit inherent in this sort of study is that findings documented herein can be compared and contrasted with the project management's own observed trends. This way, management would be in a better position to synchronize relevant findings, to guide future strategy adjustments for a sustainable and effective service delivery in the district While, the study sets out to achieve this objective by exploring a number of issues, it recognizes that such an evaluation study ideally embraces a broad spectrum of issues ranging from technical to administrative issues But owing to time and financial constraints the study limits itself to pertinent socio-economic and environmental issues which impinge on management and administrative aspects of the project

Major issues contained therefore in this report include a general appraisal of the socio-economic characteristics of the study area, focusing on environmental, water, sanitation conditions, and other public health conditions in the area With these as relevant background, the study examines the rationale and objectives of the Danish Water Project. It discusses project facilities provided in the district; their spatial distribution as well as service utilization in the district At every level of discussion , attempts have been made to incorporate sustainability demands and how that features in relevant components of the project activities In this regard, public participation which stands out as a major aspect of sustainable water project management was duly considered. Project facility use within the study communities was also investigated to determine how associated behavioural patterns affect sustainable project management Finally, the study investigated public opinions as well as perceptions about the project and relates it to its future sustainance In line with this, problems confronting the project largely from the viewpoint of the public were also investigated. And, on the basis of the findings discovered, useful recommendations were given on how to resolve problems towards a more effective and sustainable service delivery in the district

6.1.1 Major Findings

A number of findings, most of which confirm the suitability of approaches adopted by the Danish Water Project were unearthed by the present study That notwithstanding, there are some other pertinent issues which deserve a critical look for a more effective project results or impacts to be felt The first category of findings relate to perceived problems which in the opinion of community members, currently affect service utilization and in some other respects facility adoption in the district One of the hypothesis underlying this study is the *financial factor* is a major constraint to service utilization and adoption in the district, rather than the *low level of education* among community members To assess this, the structured questionnaire used in the survey explored into the diversity of problems encountered in the study area(section 5 4 1) Meanwhile, results have indeed confirmed *finance* as the most paramount factor (representing about 24 2 %) of all major problems indicated which currently confront

and is likely to affect future facility use in the communities if not addressed early enough(table 13) With the exception of Peki Dzakeh, almost all respondents identified finance as the most critical factor affecting them, although the extent of perception of finance as a serious constraining factor varies across the communities An interview session held with the District Engineer revealed that attempts have always been made to cushion financial burdens with regards to facility provision Currently, project facilities are subsidized to the extent that communities are required to meet only 5% of the total cost of the facilities, whiles the project bears the remaining cost Table 14 shows the various proportions of cost which communities are expected to bear with regards to the various facilities under the current 5% subsidy level

Table 14 Cost Estimates for the Water Facilities Provided.

Type of Facility	Estimated Cost	5 % proportion to be borne by communities
Borehole + Handpump	12 million cedis(USD 5454)	600 000 cedis(USD 273)
Borehole+Electric Pump	40 million cedis(USD 18181)	2 million cedis(USD 909)
Borehole +Solar Array	60 million cedis(USD 27272)	3 million cedis(USD 1364)
Spring/Rain Catchment	20 million cedis(USD 9091)	1 million cedis(USD 456)

Source Author's Questionnaire Survey, 1997 NB Current Exchange Rate. 1USD = 2200 Cedis

Indeed, provision of such facilities at such a subsidized price is undoubtedly cheap With some form of cooperation communities should be able to raise funds via appropriate means to finance at least one of these facilities But given the pervading poverty level, to think that most individuals can afford to pay for the provision of these facilities at such a rate is quite far from reality In the wake of such a pervasive poverty people in such rural communities place different values on money For instance, people might find it somehow economically irrational to sacrifice as much as 600.000(USD 273) for a borehole with a hand pump. For most rural women, such an amount is more than enough to provide them with about 12000 bags(50kg) of rice which can comfortably put them in a retail selling business and earn them economic livelihood in the long run. This is the plight of the rural poor and it is also the factor that guides economic decision making especially when it comes to paying money for a facility such as water This does not, however, mean that they do not see the usefulness of having a clean potable water The crux of the issue revolves more around varying values.

So far, for most people economic survival is primary, with other issues occupying a secondary position in daily lives In such a circumstance, it might be more appropriate therefore to encourage and concentrate energies on community facility provision at least for the moment, while interested individuals seek out a more suitable way of raising funds to meet costs for such facilities Meanwhile, the general belief among community members is that if project management can address the financial limitation via e g *increasing the level of subsidy; allowing payment for facilities by installments* or even *implementing some form of income generation activity* alongside project activities, the crises can be reduced as the services of the unemployed can be engaged in such projects to enable them improve their present financial base and opt for facilities with ease So far it appears the latter of the proposed strategies suggested

above lies more in the interest of most respondents As such it might be necessary for management to give some thought to it and see how feasible it can be

Equally related to the financial factor is the issue of *unequal rates for water use(pricing)* as far as existing Boreholes are concerned As indicated in the discussions, there is a need for devising an alternative and appropriate pricing system to ensure that everyone pays a fee proportional to the quantity of water drawn This could be achieved by enforcing a policy which allows each and every community to determine what amount people should pay for quantities of water drawn For instance, the various sizes of buckets or bowls normally used for water collection in the villages should be priced differently to correspond to volume of water they can contain By this arrangement, the practice of indiscriminate water collection from taps as identified with some communities can be reduced. However, this strategy can work out effectively, only if someone is assigned the responsibility of checking water drawn to ensure compliance

The issue of accessibility(proximity) also received a serious examination in the study as it has often been considered as one important factor influencing rural people's water use behaviour pattern But, results from the present study suggest rather the contrary in the context of this Water project Infact, over half (55%) of the respondents interviewed indicated clearly that they have easy access to existing water facilities in the communities. However, such a positive response seems to prevail more in some communities than others. Communities with the strongest positive percentage response to easy accessibility are Yordanu, Sanga, Tsiyenu and Agbateh According to the survey most people in these communities spend less than 30 minutes to access water in their communities,although the populations of most of these communities are relatively higher than that of other villages Such an accessibility might perhaps be attributed to location of the facility within points of easy reach which underscores the relevance of locational efficiency or proximity in water point selection. Locating water points in places of easy access in these communities has a time saving advantage with other associated benefits as people might commit useful time saved into other activities On the other hand, the longest accessibility time indicated was associated with Dzigbey and Dzoanti In these communities, about 83% of the people indicated spending between 30 minutes and One Hour to get access to water However, this time duration by all standards can still be considered within appreciable limits since it does not constitute any serious inhibiting factor to water use

Due to policy and the demand-driven approach adopted as a working frame, facilities are not distributed uniformly over the district as one might expect Many communities have one, two or at most three water points on which they depend, which in practical terms is inadequate. As such one would expect and accept such time frames as normal, given the populations served by these facilities and also the location of the facilities in relation to existing houses It is however expected that with time more facilities will be added to currently existing ones in the effected communities as more suitable means of funding facility provision are discovered to enable communities opt for more facilities.

Another issue of interest to the author was to find out how the distribution of project facilities could have an impact on water and environmental related morbidity patters. It became clear from the study that project facilities are still to reach communities identified as having high vulnerability to Bilharzia and other water related diseases For instance, communities such as Agbenoxoe, Fesi and Todome which have been identified to have a close association with Bilharzia deserve more serious attention(Nielsen and Rasmussen,1997) Strict adherence to demand-driven principles which necessarily relies on the expression of interest and initial initiative of beneficiaries might mean that such communities would have to live with their situations until requirements for project assistance are met Practically, such an event might weaken the fundamental goals of the project if suitable steps are not taken to stimulate interest of people in those communities in the project facilities Further to this, previous studies have equally reported the prevalence of Intestinal Helminth infections in communities living around the shores of the Volta Lake Yet, the behavioural practices of children in the areas covered by the present study in terms of personal hygiene is quite not satisfactory, giving cause for one to suspect the existence of such infections in these communities as well There is therefore the need for the EHA's to intensify their educational activities in these communities. Further to this, it would be more appropriate if an exploratory study can be conducted into the incidence of these and other water related diseases across the entire district for the attention of the project management Besides, such a study could serve as a useful epidemiological data base for project planning The present study did not delve into such exploratory studies But, it hopes that at least some form of monitoring measures are being taken to discover occurring incidence of such diseases in the project area This way, one expects that in event of any detected trait of the disease's incidence in any community project management can collaborate with the available appropriate health institutions within the district to apply chemotherapic treatment and snail control(using molluscicides and effective environmental management) practices as recommended by the World Health Organization(WHO, 1993)

Other categories of problems identified in connection with water facility provision are *distance, queuing time,* and *the slow flow of water.* However, these are very rare situations prevailing in some few communities. But, it will be equally important for management to look into these issues to see the extent of the problem for further action. Notwithstanding these identified problems however, the general impression conveyed by the study is that communities do not encounter too many serious problems with the water facilities per se Thus any observed problem is likely to relate more to people's behaviour in accessing the water facilities - a situation that can effectively be controlled by use of institutional and administrative channels In fact, this position is further confirmed by as much as 64.2% of respondents indicating not having any serious problem with the water facilities. But, this does not constitute enough justification for anyone to relax and assume that all is well and will continue to remain as such The implementation of the project in the district is still in its early stages Thus without consistent effective action to monitor the occurrence of these and subsequent problems, the picture is likely to change as the project progresses its way towards the later stages of its implementation.

The final category of major findings identified in the study relate to public/environmental health behavioural practices of people in communities It became evident from the study that although public educational activities are being provided by the project EHA's through their educational activities, peoples perception of what constitute good or hygienically appropriate practice is still very low in the communities This, together with the already mentioned problem of lack of adequate facilities result in inappropriate practices such as indiscriminate dumping of water and household waste in and around the neighborhoods of some villages as indicated in table 8 and 9 There is therefore the need for a continuos intensive environmental educational activities to ensure that the message seeps deeper to affect a change in behavioural practices. In this connection, it would be very rewarding if EHA's seconded to the project are given much the same opportunities to attend short courses, conferences and seminars as often as their other staff colleagues do to acquaint them with current strategies on how to get around educational activities and thus tackle identified problems more effectively Water supply provision alone is not enough to address the water and sanitation crises A well organized and consistent educational programmes is needed in communities to sensitize vulnerable groups about the importance of good behavioural practices that relate to water use and personal hygiene Such a measure will facilitate the diffusion innovation process of the project facilities. It is hoped that findings documented in this report will receive the needed attention to steer the project on a stronger sustainable course for a better quality of life for people in the district.

CHAPTER SEVEN
RECOMMENDATIONS AND CONCLUSION

7.1.0 Introduction

This section presents a number of practical approaches which when applied could help correct some of the problems identified in the study.

7.1.1 *Finance and Land Factor*

Since finance has been recognized clearly as the most pressing problem limiting project beneficiaries, it would be important to reconsider an appropriate financing mechanism pertinent to each community, either through research or consultative meeting on a community level, in the general context of the solutions proposed by the communities (section 5 5 0) But while doing that, special focus needs to be given also to devising an equitable means of imposing fees (related more to volume than fixed rates) for water-use. This will help check the practice of indiscriminate water collection identified in the affected communities Added to this, Watsan Committees should be vested with overriding powers to deny access to those who refuse to comply strictly with the terms and conditions under which water facilities are to be used With regards to the land problem identified in some communities as a limiting factor to latrine facility adoption, it would equally be important to arrange consultative meetings with community chiefs and elders to identify appropriate means of altering existing laws related to land acquisition to favour those members of communities who demonstrate interest in facilities but are constrained by the land factor

7.1.2 *Public/Community Education*

The negative behavioural practices observed in communities as regards sanitation and water, calls for a more comprehensive approach to the environmental/public educational component of the project activities To activate such an approach one might consider the involvement of local religious leaders in addition to the agents of change already being used in the communities Recent experience in typical rural communities where religion usually dominates and as it were vibrant suggest that religious leaders can equally serve as useful catalysts in educating the public By their very nature and office they assume and exhibit authority which by doctrinal teachings, their adherents neither question nor challenge This way, they can easily mobilize communities towards a common goal since their voices are often respected. For instance, within the North Kigezi Diocese Water Programme in Rukungiri-Uganda, an impressive impact was witnessed by adopting this approach(IRC,1994) A similar organizational experience was identified with the Yordanu community in the project area In this community almost every member belongs to the White Cross Religious Sect which dominate the area And, because the church leaders are all aligned to the Watsan Committee, there is an effective organizational network which greatly facilitate activities of the project there Mwami(1995) argues in favour of this strategy by pointing out its two basic inherent advantages first that, mobilizing communities through religious leaders tends to be cheaper(cost-wise) than employing a separate mobilizer, second, that the resultant impacts are bound to last longer since the church as an institution is permanent, at least in the foreseeable future

It might therefore be important to explore the possibility of such networking in other communities to see how the approach might work out in favour of the Water Project in the District

7.1.3 *Future Research and Studies*

In recognition of the fact that facility provision alone without changes in attitudes and behaviour of beneficiaries does not promote the success of water and sanitation projects, Loung T V(1995) outlined certain salient issues which are as well vital for the future sustainability of the Danish Water and Sanitation project and other related projects Key among these recommendations which relate particularly to latrine facility provision are

- *periodic research to generate relevant information for sustained behavioural change and further improvement in technology and environmental safety*
- *mapping of top soil conditions and groundwater level in the district to indicate geological and geographical locations where pit lining is essential*
- *Further studies could also be concentrated on developing pit lining technologies using locally available materials for cost-effectiveness.*

For instance in Bangladesh, burnt clays rings are being used successfully for pit lining as well as for the lining of dug out wells. Clay as a locally available material is in relatively abundance in the Kpando district where the Danish Water project operates It might therefore be necessary for management to explore further into its use in the existing technologies to reduce material cost involved in the latrine facility provision Concerning environmental safety, a *ground water monitoring study on pollution risk from pit latrine* could be conducted to ensure that existing technologies in use in communities are in conformity with acceptable environmental standards.

7.1.4 *Concluding Remarks*

The content and structure of the project strategies adopted by the Danish Water and Sanitation project are very much in line with sustainability demands. Public opinion about the project is also remarkably high and very encouraging But, the most critical issue discovered from the present study which needs serious attention relates to *finance* Objectively speaking, as already noted in the preceeding discussions, the current subsidy level on community water facilities which allows beneficiaries to pay only 5 % of cost of facility is quite low. If this level of cost has truly been determined in consultation with communities as one would expect as an element under a public participation strategy, then it is a little bit doubtful if water provision is the top-most priority of the people. It is without doubt that potable water is among the priorities of the people in the district But perhaps in the meantime, the first priority of some communities might be something else than water One wonders if communities have given the correct signal to project planners what their top-most priority is For instance, the inability of a community to pay a cost of 600 000 cedis (USD 273) representing a 5 % share of the estimated total cost of a *Borehole with a Handpump* casts a bit of doubt if they could be able to raise money to sustain the facility over a long time at the end of the project period

Ideally, one thinks such a cost (if spread over the entire population of a village) should not pose any difficulty. But, it is surprising to note in the present study that people still are expecting an increase in the subsidy level that could make them pay something even lower than the current 5% share Really, these observations are quite critical for the future sustainability of the project and deserves a serious consideration in future policy revisions The World Bank and a number experts have taken keen interest in the problems of financing rural/community water supplies, particularly in the third world As part of the interest and commitment to seeking solutions to the problem, the World Bank Water Demand Research Team(1993) conducted studies into the determinants and policy implications which affect water demand in Zimbabwe and some other developing countries Their study pointed out that effective policies and planning for water facilities must take into account what rural clients want and are prepared to pay for if sustainability of the facility is the long-term goal. In view of this, they have provided insights into how to decide what level of service is appropriate for a particular community and how the improved services should be paid for The team identified four(4) broad categories of village situations, with appropriate policies ranging from the provision of house connections at full cost at one extreme, to no improvement in traditional supplies at the other extreme. The four types of village categories with their policy measures are as follows.

Village Category I : *High willingness to pay for private connections; low willingness to pay for public taps*

Village Category II : *Few willing to pay for the full cost of private connections; the majority willing to pay for the full cost of public taps*

Village Category III : *Households are willing to pay for improved service, but improvement is very costly*

Village Category IV : *Low willingness to pay for improved services.*

The World Bank Research Team outlined particular policy measures worth applying in communities characterised by such financial problems depending a scale. So far, it appears the problem with regards to inability to pay for services in the study area could be classified under category III and IV Thus, it might be important for management to determine which villages fall under the categories and to consider applying policy measures prescribed under such categories. For instance, within communities where households are willing to pay for improved services, but consider improvement cost as being too high, the Bank notes that devising an appropriate policy is not easy It recommends, among others, that the dominant level of service must be public taps, with private connection to the few households who are willing to pay the full cost The team also recommends metering of all private connections as being essential It notes further that a tariff structure be adopted, while cautioning at the same time that application of such a structure and other water regulations should be designed, not to discourage connected households from selling water to neighbours. However, it adds also that in applying these measures effort should be made to discourage beneficiaries from profiting unduly from their connections. But, given the poverty level of most people in the study community, it is difficult to determine at this stage, whether these recommendations can easily be applied in communities classified

under category III All the same, management might have to investigate the suitability of these prescriptions to see how they could contribute to solving the problem

On the financing side, the team notes that it is appropriate that any policy measure adopted recognize first, that the sum of outside resources available to such communities from both internal and external sources is insufficient to meet the long list of their needs and, second that households' needs will be best met if they are able to allocate their limited resources to the projects they consider most important In other words, outside agencies and donors should not take it upon themselves to decide which projects(such as water) are of highest priority for communities if subsidized development funds are available, communities should themselves allocate such funds to the needs they deem most important. The present study did not investigate the extent to which these issues were applied in communities already benefiting from the project's assistance It assumed that recognition was given to these issues But, if they were not taken into account in previous activities then management may have to consider giving special attention to investigating such issues in its future planning activities

With regards to communities which indicate *low willingness to pay for improved water services (category IV)* the Bank notes that it is not feasible to recover the costs of either public taps or private connections provided them A fundamental problem, under such a condition as observed in the Zimbabwean case study, is that people would pay very little for improved services both in absolute terms and as a proportion of income. Besides, it had been determined that in those communities there are simply no financially viable options for improving rural water supply at the present time Thus, providing improved supplies is not likely to induce any substantial change in economic activity or any multiplier effect This situation constitutes a big challenge and often puts project planners and managers in a dilema Often, the dominant response of many donors and governments in the past has been to step in and subsidize as is currently happening under the Danish Water Supply Programme. Several past experiences with water projects have shown that such a strategy has been a dismal failure as many facilities provided under this kind of subsidized arrangement in *category IV* communities have fallen into disrepair, and no one in those communities cares much about making them operational The broken-down pumps in the study area which are now taken over by by the Danish Water Project under its current Handpump Conversion Programme are illustrations of the eventual result of such subsidization

Taking cognizance of such potential dangers inherent in subsidizing water projects, the immediate task would be ensuring that current facilities being provided under the Danish Water does not suffer similar consequences. The World Bank Water Demand Research Team,(1993) is of the view that, the most appropriate policy strategy in communities confronted with such problems described under *category IV* villages is to recognize that the communities are in the best position to decide how available subsidies should be used. The expert team concludes that, improved water services are not a high a high priority in *category IV* communities Perhaps, they have other, more pressing needs for clinics, schools, etc as was indeed reflected in some of the suggestions given by respondents for improved services in the study area(table13)

In subsequent project planning activities, management needs to critically assess these issues and investigate more carefully the willingness of communities to pay for facilities as a reflection of their interest All these are part of the adaptation of project's demand driven strategy to suit socio-economic conditions mentioned later in this section However, if after having considered all these issues in consultation with communities during the planning stage and a community still fails to demonstrate convincingly their willingness to pay, the unpalatable conclusion (in the words of the World Bank Team) would be to defer provision and improvement in water supply until they are wanted In the meantime, in such communities the project should concentrate available resources on higher-priority needs But where it becomes quite clear that, economic life improvement is the top-most priority of communities not willing to adopt the facilities, then there is the need to seriously consider instituting some form of village level small-scale economic activities to assist the poorest of the poor in some of the communities Such an activity could, for instance, be a small scale vegetable irrigation farming in communities living along the shores of the Volta Lake or any activity best suited to the prevailing socio-economic conditions of the villages. As noted above, it might also be more appropriate to adapt the demand driven policy to reflect the existing socioeconomic conditions of particular communities For instance, the demand driven approach could be applied less rigidly in communities living around the shores of the Volta Lake where there are evidence of prevailing water related diseases. In those communities, if possible, the project could allow some degree of flexibility in its demand-driven approach by rather taking a greater interest in exciting the drive and interest in the people there Rigid adherence to the demand-driven principles without some degree of flexibility in such communities might mean that they will be cut out of service and the diseases would continue to prevail, thus eroding one of the fundamental goals of the Danish Water Project.

Effective planning and consequent sustainability of a project depends also on the store of new information concerning changing tastes, and interests of beneficiaries To this end, there is the need for project management to consider making continuous evaluation and research a dynamic component of its strategies This will enable it keep to pace with future changing trends which will certainly unfold as the project progresses For instance, an important future research into morbidity and mortality patterns in the rural communities could help determine how much influence the presence of the project's existence in the District is having on such indicators Such a finding would provide some further sense of direction and focus to project management in its future planning activities. Lastly, since it is envisaged that the project will be handed over to local management after the project period there is the need to place emphasis on local manpower development to ensure its effective management after the project period It hoped that findings documented in this report will be given due consideration for a more effective project planning and management. In the meantime, one could conclude on the basis of findings in the study, albeit the relatively early stage of the project, that it has all the potentials of becoming a very sustainable project in the Kpando District

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APPENDIX

HYPOTHESES

As indicated in section 1.1.0, a number of factors have been predicted as having a retarding effect on project reception in rural communities. Among them are lack of finance, lack of information(education) on the part of rural people, and several other socio-economic and cultural factors Often, writers point to finance, education and population (family size) as some of the common determinants in rural water demand Also, others consider family sizes as direct correlates of domestic water use However, the present study believed that it might not necessarily follow. Even where it follows, the strength of the correlation might vary from one community to another. This implies that other factors also do have a role to play in altering such a correlation In the context of this study, hypothesises that there is no such correlation. And that, even where they exists it is so weak

This way, the study had been guided by two main hypotheses· First that, *there is a weak correlation between family size and water consumption.* Second, that *lack of financial capability constitutes the most important obstacle to project facility adoption than low level of education* on the part of individuals in the study communities It therefore examined the two in each case to determine where the gravity of the problems lies for appropriate action Presented below are results which either confirms or disproves the two stated hypotheses in the context of the present study

TEST OF HYPOTHESES

HYPOTHESIS 1:
That, "there is a weak correlation between family size and water consumption."

By using Spearman's Ranked OrderCorrelation Coefficient(Walsh, 1990 p.206), data generated from the field study on the two parameters were computed to establish justification or refutation of the above statement as outlined below.

RAW DATA FOR THE TWO PARAMETERS				RANKED DATA			
FAMILY SIZE(X)	NUMBER (X)	WATER CONSUMP (Litres/Day)	NUMBER (Y)	X	Y	D (X-Y)	D^2 $(X-Y)^2$
Less than 5 persons	70	*Upto 50 litres*	46	2	3	-1	1
5-7 persons	98	*51-150 litres*	54	1	2	-1	1
8-10 persons	62	*151-250 litres*	66	3	1	2	4
11 + persons	02	*251-350 litres*	26	4	4	0	0
TOTAL	232		192	10	10	0	6

DATA SOURCE: AUTHOR'S QUESTIONNAIRE SURVEY, 1997

By applying Spearman's Ranked Order Correlation Coefficient(r_s) and substituting computed values into the equation

$$r_s = 1 - \left[\frac{6\Sigma D^2}{n(n^2-1)}\right]$$

$$r_s = 1 - \left[\frac{6(6)}{4(4^2-1)}\right] = 1 - \left[\frac{36}{4(15)}\right] = 1 - \left[\frac{36}{60}\right] = 0.4$$

Therefore, Correlation Coefficient(r_s) = 0 . 4

The above calculated correlation coefficient value(r_s) = **0.4** (usually assessed on a scale ranging from +1 to -1) reflects, in deed, a relatively weak but positive relationship between Family Size and Daily Water Consumption. Thus, on the basis of this we accept the hypothesis. But, a weak positive correlation suggests that although there is such a relationship between family size and domestic water use, they are not very important issues which must be taken into account in project planning in the study area, at least in the present time. Thus, other issues might be more critical

HYPOTHESIS 2:

That, " lack of financial capability constitutes the most important obstacle to project facility adoption"

It has not been posible to test this hypothesis quantitatively. However, responses from the questionnaire survey has given proof of finance as one of the limiting factors influencing facility adoption in the study area. The high percentage response given to the importance of finance as a limiting factor to project facility adoption in Table 13 lends credence in support the above assertion.

SAMPLES OF STRUCTURED QUESTIONNAIRES USED FOR THE FIELD SURVEY

DIVISION OF LAND & WATER RESOURCES
ROYAL INSTITUTE OF TECHNOLOGY(KTH)
STOCKHOLM

"TOWARDS SUSTAINABLE WATER SUPPLY AND SANITATION PROJECT MANAGEMENT IN RURAL GHANA A CASE OF THE DANISH WATER PROJECT IN THE KPANDO DISTRICT"

QUESTIONNAIRE FORTHE GENERAL PUBLIC

SECTION A

(1) Name of Village/Community.....

(2) Sex (Male/Female).....

(3) Age

(4) Religious Affiliation/Specify

.....

(5) Educational Status

(i.) None

(ii) Elementary

(iii) Secondary/Commercial/Technical

(iv) Higher(specify) .....

(6) Occupation.....

(7) Marital Status (i) Married ..... (ii) Single .....

(iii) Seperated ..... (iv) Widowed.....

(8) No. of Children (state number)..... .....

(9) No. of Dependants(state number).....

(10) Ethnicity (i.) Ewe ..... (ii) Hausa

(iii) Akan (iv) Other(specify).....

SECTION B

(11) For how long have you been living in this village/community ?..... .....

(12) Where do you obtain your water supply ?*(tick those applicable)*

(i.) Tap Water (ii.) Stream / River (specify).....

(13) If Tap / Borehole, who installed it, and when was it done?

.....

(14) Who collects water normally in the family ?

.....

(15) When is water collected (i.) Morning (ii) Afternoon

(iii) Evening (iv) Other(specify).....

(16) How much time does one spend to get access to the water source chosen in Q12 ?

....

(17) How much water do you collect in a day ? ....

(18) How much do you pay (price per litre) ? .....

(19) What is water normally used for in the community ?.....

....

(20) Where does your personal / clothes washing take place ?

(i) House (ii) Inside/Close to the Stream

(iii) Near the borehole (iv) other(specify).....

(21) (i) If your choice of water source is a borehole/tap, how long (distance) does it take you to get there ?

.....

(22) Where do you throw your waste water ?.....

(23) (a) What type of places of convenience do you have in your locality ?

(i) KVIP (ii) Pit latrines

(iii) Free-range (iv) Other(specify).....

(b) (i) Which of these places of convenience do you use most ?.....

(ii) Why? .....

(24) For the place of convenience mentioned in Q 23 (b),

(i) Do you have an idea who constructed it ? Y es/No.....

(ii) If yes, who are they ?.....

(25) (a) Do sanitary/health workers visit your locality (home) ? Yes / No

(b) (i) If yes, who are they ?.....

(ii) Where do they come from ?.....

(iii) How often do they visit ?.....

(26) (i) What ailments (sicknesses) are common in your locality ?

.....

.....

(ii) Which of these ailments affect children most in the community ?

.....

.....

(iii) What do you think are the causes of the above indentified ailment(s) ?

.....

.....

(27) (a) Have you heard about the DANIDA Water and Sanitation programme ? Yes / No

(b) If yes, do you patrionize their services ? Yes / No

Give reasons.....

(28) (i) Do you have any problems gaining access to the Danida Water and Sanitation facilities ? Yes/ No

(ii) If yes, what problem(s) prevent you from gaining access to their facilities ?

.....

.....

(29) What are your opinions about the services provided by the Danida Water Project ?

.....

.....

.....

(30) (i) What strategies can you suggest to Danida to adopt for people to use their facilities ?

.....

.....

.....

(ii) What other suggestions can you give for the improvement in services provided by the project in your area/community ?

.....

.....

.....

DIVISION OF LAND & WATER RESOURCES
ROYAL INSTITUTE OF TECHNOLOGY(KTH)
STOCKHOLM

"TOWARDS SUSTAINABLE WATER SUPPLY AND SANITATION PROJECT MANAGEMENT IN RURAL GHANA A CASE OF THE DANISH WATER PROJECT IN THE KPANDO DISTRICT"

QUESTIONNAIRE FOR THE DISTRICT PROJECT ENGINEER / ADMINISTRATIVE OFFICER

SECTION A

(1) Name of Engineer / Administrator.....

(2) Sex (Male/Female).....

(3) Age ..... **(4)** Religious Affiliation/Specify.....

.....

(5) Educational Status .....

(6) Position.....

(7) Ethnicity.....

SECTION B

(8) When was the project launched officially in the district ?

.....

(9) What categories of staff do you have? (please indicate staff category/number of staf in the space provided below

STAFF CATEGORY	**NUMBER ON STAFF**
.....	.....
.....	.....
.....	.....
.....	.....

(10) Which outreach villages / communities are currently receiving Danida Project Assistance ? (please specify)

(i) .. .. (ii) ....

(iii) .... (iv) ....

. ...

....

(11) What are the criteria used in selecting beneficiary communities ?

....

....

.....

(12) Below the under-stated heading, specify types offacilities provided by the project in the beneficiary communities:

A: SANITARY FACILITIES **B: WATER SUPPLY FACILITIES**

(i) ..... (i) .....

(ii) ..... (ii) .....

....

....

....

(13) How much does it cost to provide the facilities ?

.....

.....

.....

(14) Who or what group of persons qualify as beneficiaries of the facilities ?

.....

.....

(15) Who decides the choice / suitability of the project facilities for beneficiary ?

... .

(16) List the various components of your project cycle

.....

.....

.....

(17) For each of the project cycle components stated above, list (where applicable) the form of community involvement in them.

(i) ..... (ii) .....

(iii) ..... (iv) .....

.....

.....

.....

(18) Who provides land for the location(construction) of project facilities?

.....

(19) What priority needs do you consider relevant for the efficient running of the Danida Water Project in your district ?

.....

.....

(20) (a) Outline the major problems confronting smooth operation of the project in the district ?

.....

.....

(b) What are some of the possible solutions to the problems outlined above ?

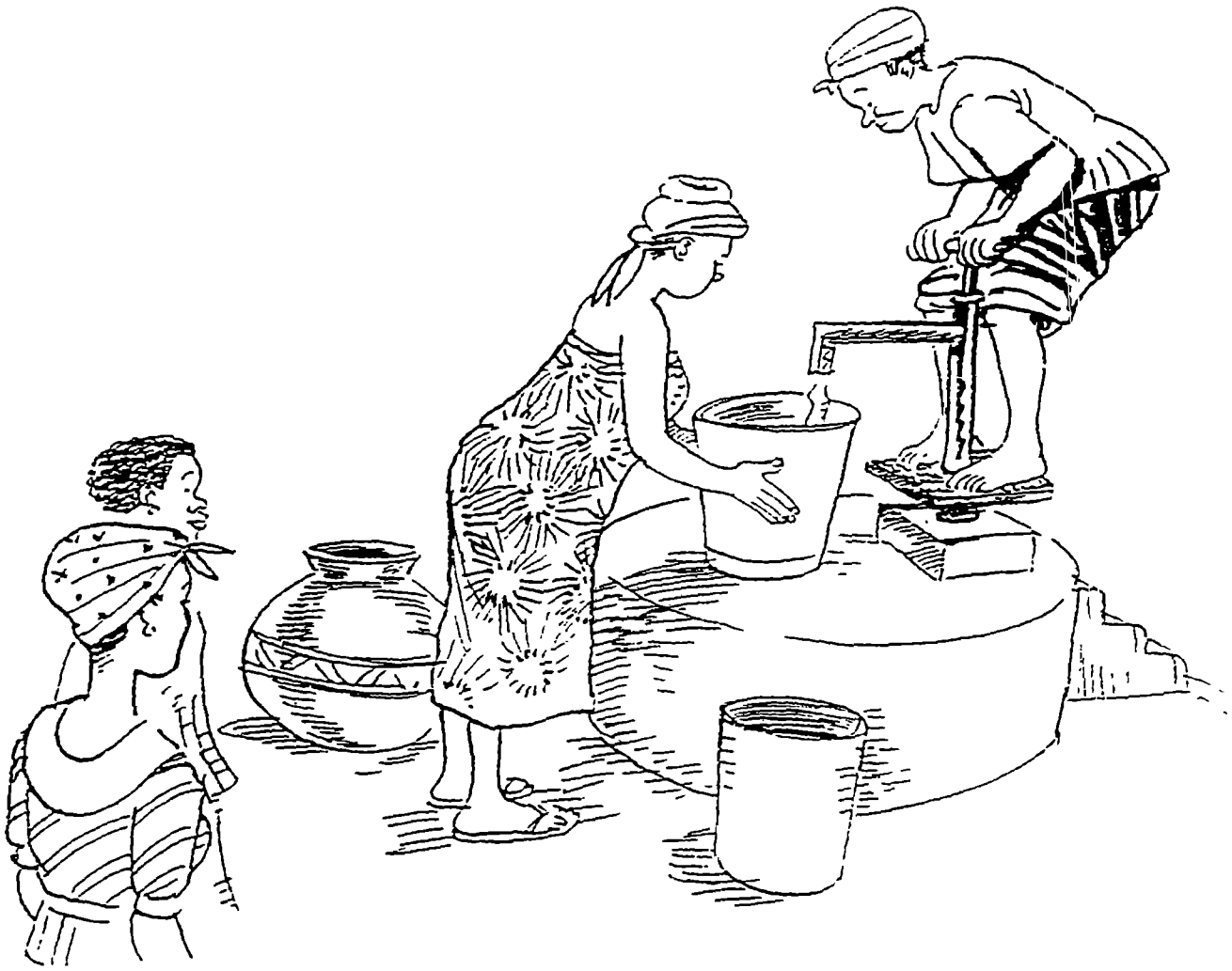
.....

.....

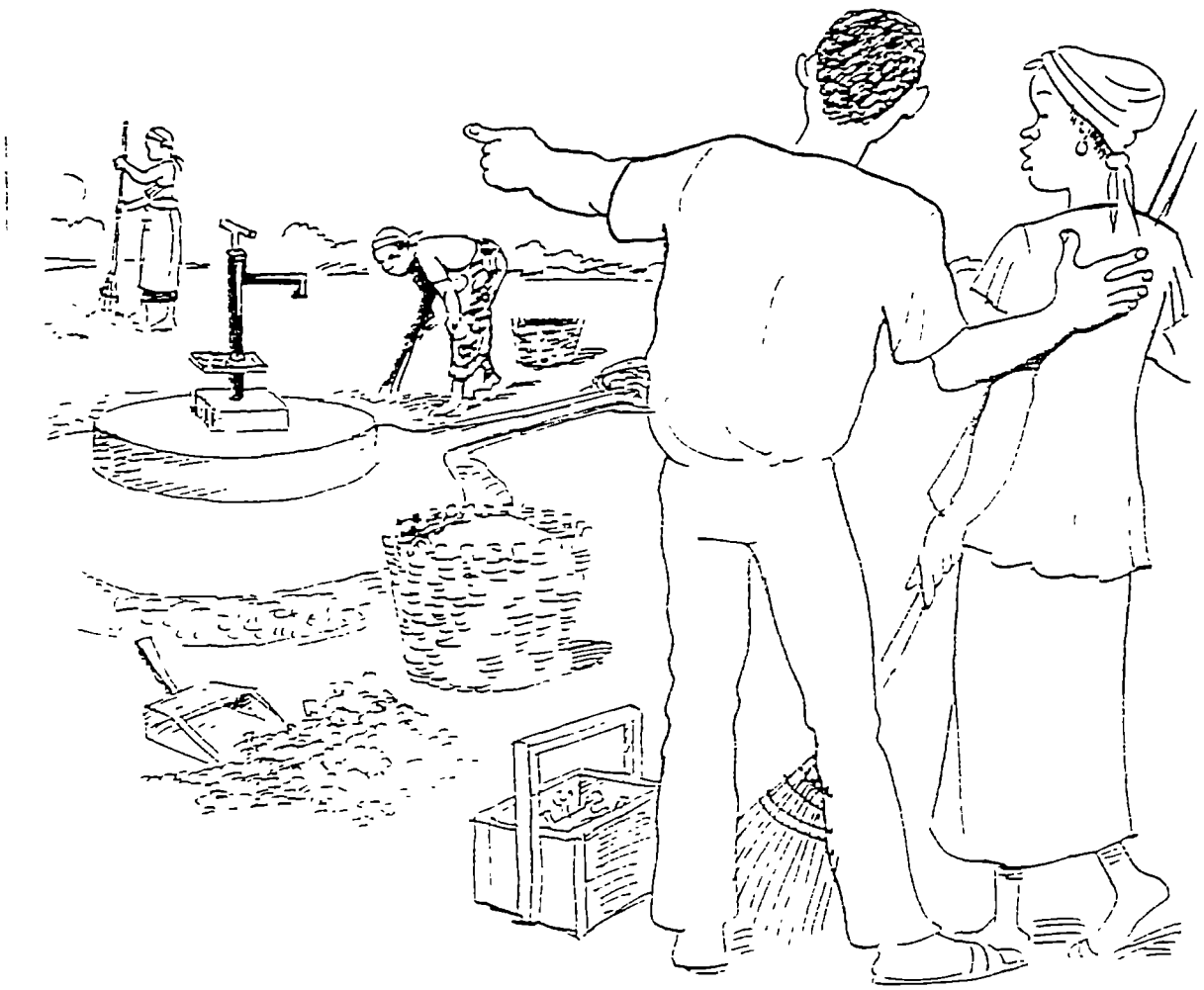
.....

ILLUSTRATIVE SKETCH PICTURES OF SOME WATER SUPPLY FACILITIES PROVIDED UNDER THE DANISH RURAL WATER SCHEME

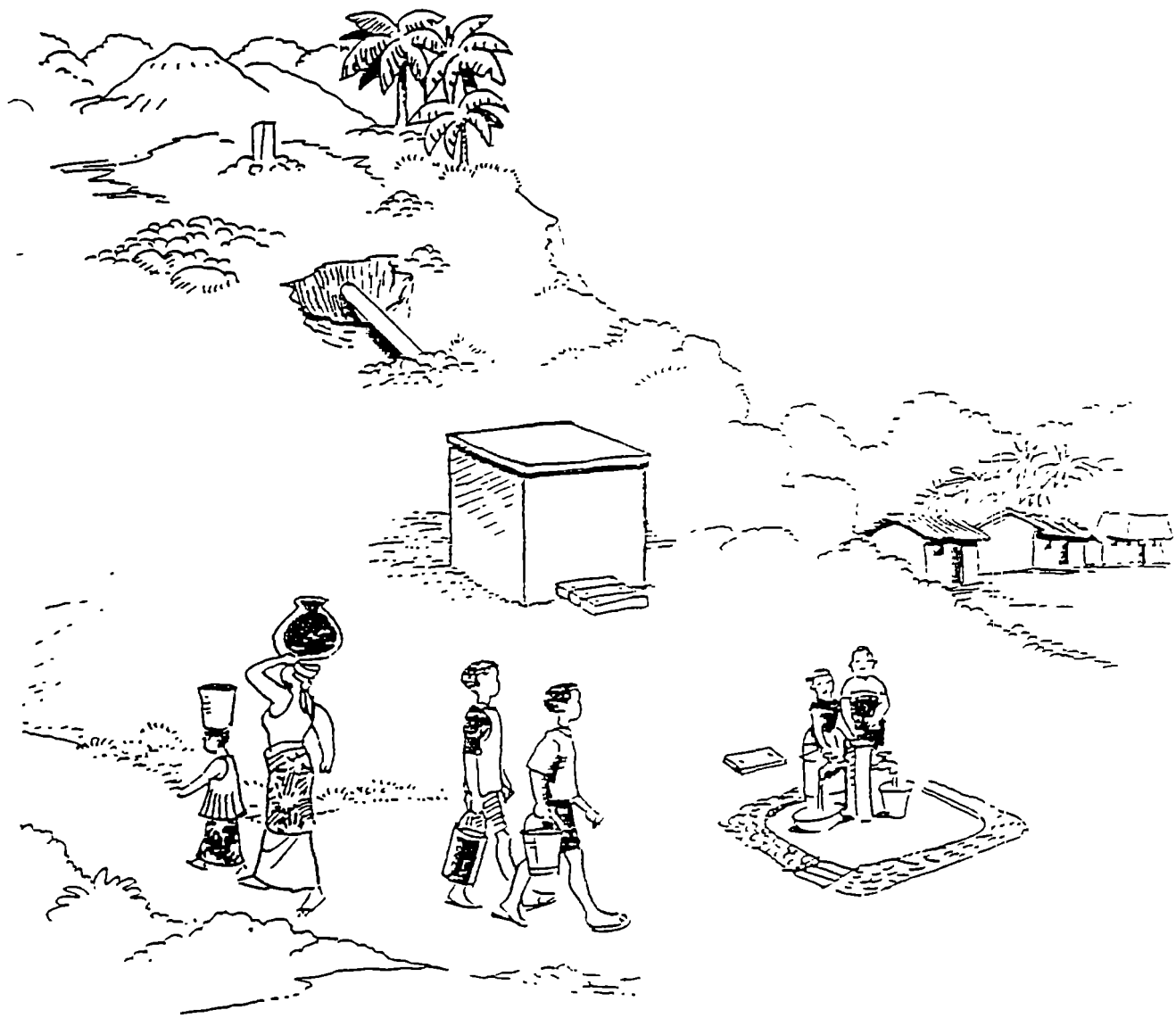
COMMUNITY HAND DUG WELL (*Fitted With NIRA AF-85 Hand Pump)*



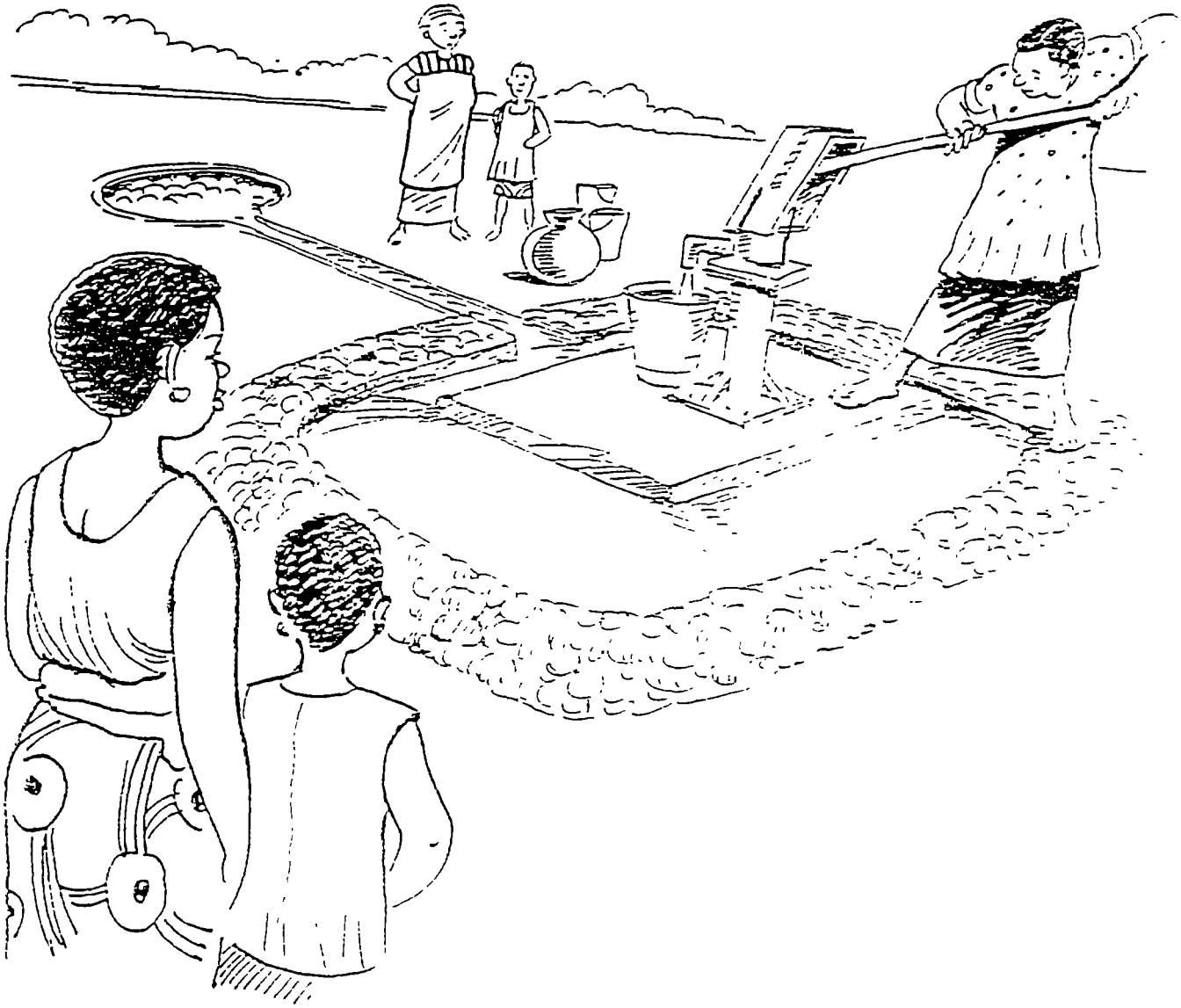
ACTIVITIES EXPECTED FROM COMMUNITIES IN RESPECT OF THE NIRA AF-85 HAND PUMP



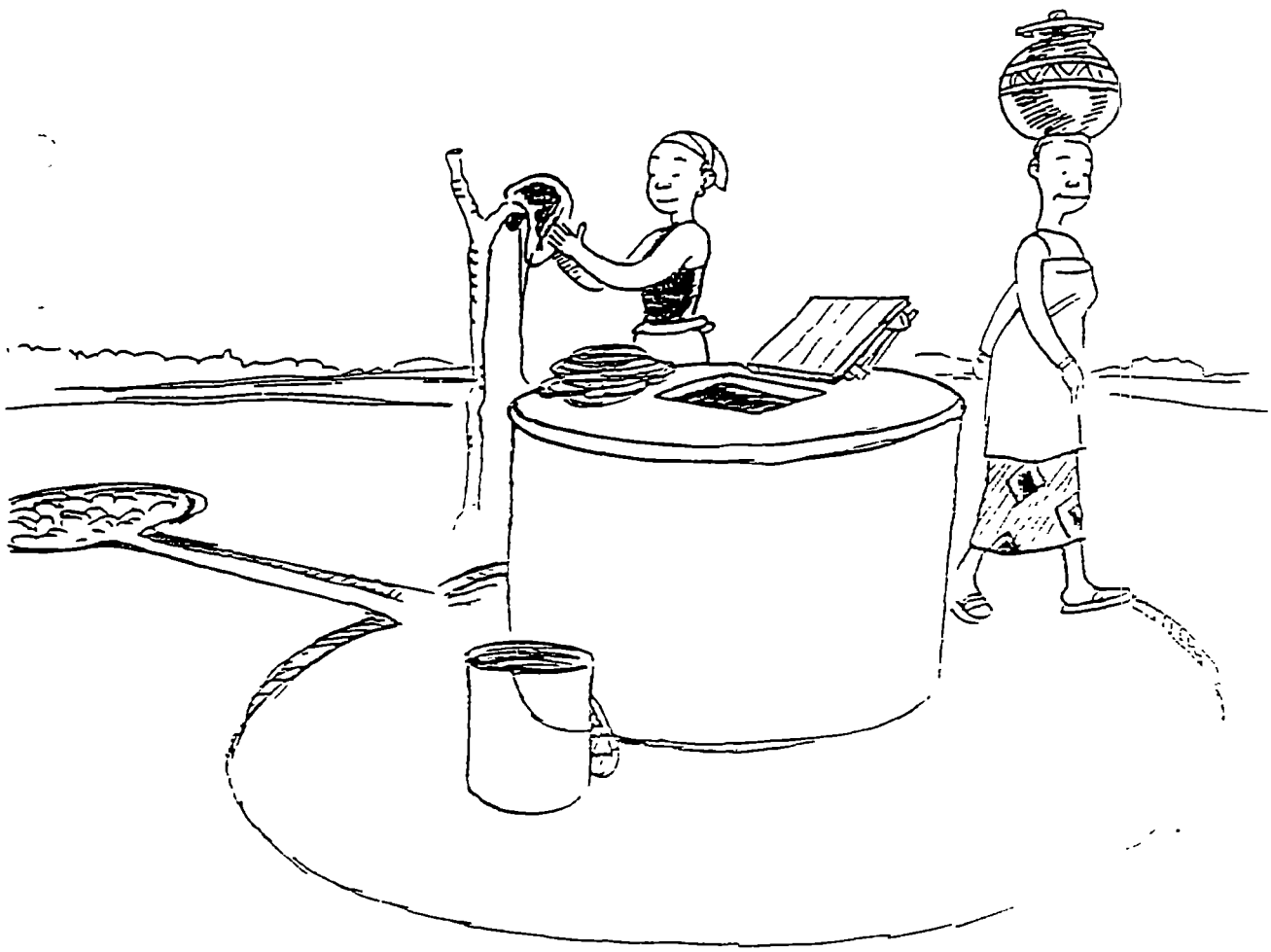
GRAVITY FLOW PIPED WATER SUPPLY SYSTEM
(With A Spring As Source)



BOREHOLES WITH HANDPUMPS
(*Ghana Modified Indian Mark II Hand Pump*)



HAND DUG WELLS WITHOUT HAND PUMPS




ANLÄGGNING OCH MILJÖ