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**CHALLENGING THE RHETORIC OF SUSTAINABILITY AND PARTICIPATION:
A CASE STUDY OF THE GHANA UPPER REGION
WATER SUPPLY PROGRAMME**

by

Susan Margaret Roelofs Greenfield, B.A.(Hons)

A thesis submitted to

the Faculty of Graduate Studies and Research

in partial fulfilment of

the requirements for the degree of

Master of Arts

Department of Geography

Carleton University

Ottawa, Ontario

May 30, 1990

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ISBN 0-315-60525-1

The undersigned recommend to
The Faculty of Graduate Studies and Research
acceptance of the thesis
**Challenging the Rhetoric of Sustainability and Participation:
A Case Study of the Ghana Upper Region Water Supply Programme**

submitted by
Susan Margaret Roelofs Greenfield, B.A. (Hons.)
in partial fulfilment of the requirements for
the degree of Master of Arts

Thesis Supervisor

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June 29, 1990

ABSTRACT

This thesis attempts to get beyond the rhetoric concerning 'sustainable development' and 'participation' and examine development programming practices. This is accomplished through a case study of the Upper Region Water Supply Programme (URWSP) in Ghana, a CIDA-sponsored initiative. After an exploration of the concepts of sustainability and participation, the programme is evaluated in terms of three components. First, the degree of participation throughout various phases of the URWSP is assessed in terms of empowerment of rural people, and of the explicit involvement of women (as water managers). Second, the political economy of Ghana serves as a framework in which the programme operates. In view of the crises in Ghana and Africa, the URWSP must be structured to accommodate financial limitations at local and national levels. Third, an environmental impact assessment model is put forth which illustrates the necessity of clarifying links between human activities and the biosphere. Finally, an integrative model for development programmes is presented which argues that only when socio-cultural, economic, and environmental factors inform programme parameters will development be sustainable.

ACKNOWLEDGEMENTS

Having completed this thesis, it now is necessary to thank all of those who helped me get to this point. First and foremost, I couldn't have done it without the support of my husband, Doug, who gave me pep talks and hugs when I needed them as well as some constructive (and 'sustainable') criticism of various chapters. Yes, honey, I promise I now will have time to do my share of the housework!

Second, I would like to thank Dr. Fiona Mackenzie for the tremendous amount of help she gave me from the start to finish of this thesis; her advice and suggestions gave me much food for thought. I have learned a great deal from her, not the least of which is some knowledge about the ins and outs of split infinitives.

Although we did not see eye to eye all of the time, the comments of my second reader, Dr. Iain Wallace, also were appreciated. By challenging some of my opinions, he made me think harder about why I believe what I do.

This thesis could not have been accomplished without the assistance of those people in Canada and Ghana who provided me with hard-to-find sources and answered my many questions. Dr. Jacob Songsore of the University of Ghana, Legon, who was invaluable in finding a research assistant; Rudolph Aneateba, who conducted the interviews; and the women of Zoko-Tarongo and Sumdurungu-Kologo who took time from their busy lives to

ACKNOWLEDGEMENTS

be interviewed all deserve special mention. Gerald Chauvet of the Ghana Desk at CIDA provided me with the URWSP's 1985 evaluation which proved very useful.

In addition, I would like to thank all of those in the geography grad room who provided a listening ear and with whom I could toss around ideas. Megan McKenna and her "pooter" were wonderful, providing the technical assistance which is responsible for the aesthetics of figures 6.1 and 7.1. Finally, I extend my appreciation to Hazel Anderson for her ever-ready (and much needed) assistance in the geography office.

And now it is off to Japan!....

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LIST OF ACRONYMS

AAF-SAP	African Alternative Framework - Structural Adjustment Programme
CIDA	Canadian International Development Agency
CPP	Convention People's Party
CWO	Community Water Organizers
ECA	Economic Commission for Africa
EIA	Environmental Impact Assessment
ERP	Economic Recovery Programme
GDP	Gross Domestic Product
GNP	Gross National Product
GWSC	Ghana Water and Sewage Corporation
IMF	International Monetary Fund
NGO	Non-governmental Organization
NLC	National Liberation Council
PAMSCAD	Programme of Actions to Mitigate the Social Costs of Adjustment
PNDC	Provisional National Defence Council
SAP	Structural Adjustment Programmes
UNDP	United Nations Development Programme
URWSP	Upper Region Water Supply Programme
VLOM	Village Level Operation and Maintenance
WEFH	Water Education for Health
WUC	Water Utilization Committee
WID	Women in Development
WUP	Water Utilization Project

CHAPTER 1

INTRODUCTION

1.1 Goal and Objectives

The goal of this thesis is to evaluate the Upper Region Water Supply Programme¹ in Ghana on the basis of whether it is an example of sustainable and participatory development. Although there are numerous explanations of these concepts to which I could turn, I will define it as the following. Sustainable development is the kind of development in which both the ends and the means of the development initiative are beneficial to marginalized people in rural areas. Gender and class differences are consciously recognized as factors in who gains and who loses from such initiatives. Sustainable development includes not only the awareness of socio-cultural and economic components, but also consideration of environmental constraints, so that the natural environment is not, and will not be, degraded as a result of development activity. I consider participatory development to be a way of carrying out the development

¹ Although the Upper Region Water Supply Programme includes both urban and rural components, this thesis will only deal with those aspects related to rural areas. Henceforth, the terms 'URWSP' or 'Upper Region Water Supply Programme' will only refer to that concerning rural locations.

process which empowers the rural poor and other marginalized people. These people can then play a determining role in how and why their lives will be changed, rather than having such changes externally dictated. Obstacles to participation must be overcome so that power is more equitably distributed and everyone is able to make her or his voice heard. Participation is a critical element of sustainable development, because it is only through such active involvement in projects that self-determined needs can be effectively addressed, and intra-household, local, national, and international resources appropriately utilized to improve long-term welfare.

'Sustainable development' and 'participatory development' have become two of the latest catchwords in development terminology, and CIDA, like many organizations, has emphasized their importance (CIDA, 1987b:3). Despite such rhetoric, however, evidence suggests that there is frequently a gap between policy and practice (Redclift, 1987). This stems partly from an inability to understand how these ideas can be operationalized. I would also argue that to a large extent sustainable and participatory development have not occurred because it would mean challenging conventional notions as to how the 'aid' process should be carried out. It would necessitate the breakdown of social, political, and economic vested interests which exist at local, national, and international levels. In this

thesis, the Upper Region Water Programme will be used as a case study to investigate whether CIDA's stated commitment to sustainable development is reflected in the way in which its projects are designed and implemented.

1.2 Water Supply in the South

Concerns about inadequate water supply and sanitation in the South² have received much attention in the past several decades, particularly because of the detrimental impact on health and productivity³. Constraints to greater supplies of pure water in the form of land relief, aridity, dispersed populations, and financial and technological limitations exist to various extents throughout the South (United Nations, 1983). Rural areas are hardest hit, as urban areas tend to receive more than their proportion of

² In this thesis, the terms 'South' and 'North' will be used to designate two different geographic and socio-economic areas. Expressions such as 'Third World/First World' or 'developing/developed' will not be used because this author believes that these are not always appropriate descriptions. It is felt that the former phrase creates the impression that countries in the North are first in importance, while those in the South fall far behind. By the same token, this author does not support the argument that the South should make every attempt to 'develop' to the position which the North has reached. Rather, global sustainability in a way which achieves the greatest benefit for all people requires that there is international development - all countries have a responsibility to transform themselves in order to increase equitable distribution of resources.

³ High child mortality rates, high levels of debilitating or life threatening illnesses, and low productivity can all stem from poor access to potable drinking water (Bourne, 1984).

services. For example, access of rural populations in the South to safe drinking water was estimated at only 14% in 1970, 22% in 1975, and 29% by 1980 (Bourne, 1984:8). The United Nations International Drinking Water Supply and Sanitation Decade (1981-1990) brought many of these issues to the forefront. It challenged governments and international institutions to provide 'water and sanitation for all by 1990', and a great deal of research and financial support have gone into attempts to do just this.

1.3 The Ghana Upper Region Water Programme

The Ghana Upper Region Water Supply Programme (URWSP) was launched in 1973 when CIDA and the Ghana Water and Sewage Corporation (GWSC) signed a Memorandum of Understanding with the aim of improving water supply in the Upper Region⁴. Quality and quantity of the water which people used were found lacking (the latter during the dry season), and this was suspected to be a significant contributing factor to people's poor health.

However, the water technology which was used in this project was, and to a lesser degree still is, transferred from the North without awareness of its local social context. Unless this is explicitly recognized, it is difficult for technology to be successfully relocated in the

⁴ The Upper Region became the Upper East and Upper West Regions in 1983. In this thesis, the term 'Upper Region' will be used to designate both of these areas.

recipient community; modifications to serve new cultural patterns, needs, and constraints will not readily be understood or tolerated by donors. Originally, the URWSP consisted simply of the provision of approximately 2,500 boreholes fitted with hand-pumps as a means of providing "an assured supply of potable water" (Malone Given Parsons 1986a:1). There was neither acknowledgement of less technically-oriented routes to better health nor of the importance of connections between hand-pump technology, education, and culture. It was not until 1979, with Phase I of the Water Utilization Project, that there was some attempt to incorporate educational aspects of hand-pump use and health, albeit using a very teacher-centred approach⁵. The mind set prevalent amongst the architects of the URWSP - that all technology works equally well in completely different contexts - obscures the alterations and adaptations which are necessary for successful transference. Links between the historical, cultural, and social particularities regarding the creation of technology cannot be ignored if technology is to positively affect recipient societies. As Stamp (1987) describes,

⁵ A teacher-centred approach assumes that the teacher is all-knowing and is employed to tell others how a particular subject is to be understood. A learner-centred approach, on the other hand, suggests that the learner defines her/his own goals as much as possible, allowing for interaction between a learner and a 'facilitator', so that each gains from the search for knowledge and understanding (Rogers, 1980).

Each element of technological innovation that has been introduced, whether transferred from the western technology complex or designed for the perceived needs of Third World communities - carries with it assumptions regarding the proper social organization for its use.... Only where the technology transfer has been designed on the basis of real needs, as perceived by the recipients, and on fully understood social relations, has it clearly achieved its purpose. (Stamp, 1987:2)

1.4 Criteria for Evaluating the URWSP

In view of the importance of establishing a context within which a particular initiative occurs, it becomes clear that an evaluation of the URWSP cannot merely focus on the 'nuts and bolts' of the project as though it exists in a vacuum. Linkages between intra-household, local, national, and international activities must be examined. In this case, in order for the URWSP in Ghana to be a true success, it must be sustainable on several levels. First, people in communities directly involved with and affected by the URWSP must be able to maintain it. This requires meaningful participation - empowerment of the rural poor so that they can gain control over the changes affecting their lives. As women are the primary drawers of water in the Upper Region (Harkness, 1983), and therefore have the most at stake from any changes relating to water, it is these women who should be able to exercise the greatest control over this project. Second, the URWSP must be financially feasible: at the local level as well as by the national government responsible for providing support services. In order for

this to be possible, there must be a recognition of the tremendous financial constraints under which Ghana's citizens live. Third, the existing resource base must be able to support the water supply system so that future generations are also able to take advantage of pure water without environmentally harmful consequences such as lowered water table levels or land degradation around pumps.

On the basis of these tenets, however, the sustainability of the URWSP can be called into question. Meaningful participation, a key requirement for sustainability, has not been much in evidence. In the first place, few local people were involved in the original planning and design of the water project. Although the URWSP has altered its focus periodically, there has been no major revamping of its organization. Thus, the very decisions which villagers were left out of continue to influence the day-to-day operation of the water pumps. In the second place, those most intimately connected with pump use - the women of the Upper Region - have been excluded to a large extent from decision-making processes and committees established as part of the URWSP. Although in some areas attempts are being made to incorporate more women into project operation and maintenance, there is still a large discrepancy between women's use of the pumps and their power to effect change or take an active part in organizational structure.

Financial sustainability is also an issue. The severity of the Ghanaian debt crisis and its impact locally and on the national government put into doubt Ghana's ability to support the URWSP over the long term. The dependence on costly imported parts for repairs or to increase the number of pumps is tenuous at best given the low value of the cedi and Ghana's lack of foreign exchange earnings. As well, the tariff imposed on villages with access to pumps is a strain on those who are least able to afford it. Although rural people may be willing to pay for the pumps, there is concern as to where in the GWSC the money goes. If rural tariffs are used to support and maintain urban rather than rural water supplies, this inequality is not likely to be tolerated for long.

There is greater promise for the environmental sustainability of the URWSP. To date, there has been little evidence of ecological damage as a result of the pumps. Issues which bear examination are aquifer recharge, and the possibility of pump sites becoming areas of desertification as a result of intensified land use and activity. Neither of these have been extensively evaluated by CIDA, and yet they certainly are important to the URWSP's long-term success.

In view of these factors, the overall sustainability of the URWSP bears much closer scrutiny by both Ghana and CIDA. The amount of money necessary to maintain and expand the

project will be a serious burden on the Ghanaian economy. This can be ill-afforded if the URWSP cannot fulfil its promise of providing better quality water to people in the Upper Region. If the URWSP is to be a success, real participation, and financially and ecologically sound development are necessary prerequisites.

1.5 Research Design

The research approach for this thesis has relied on three sources of primary data: field work, archival information, and interviews. Field data were collected in the Upper Region of Ghana through a questionnaire, devised by this author and administered by Rudolph A. Aneateba, a graduate student at the University of Ghana, Legon. The archival source utilized was a 1985 evaluation of the URWSP conducted by a consulting firm for CIDA. In addition, interviews with a number of key informants (at CIDA and elsewhere) who had knowledge of the project were carried out to elicit more recent information or alternative perspectives of the programme.

1.5.1 The Questionnaires

QUESTIONNAIRE AIM

The purpose of the research instrument (see Appendix A for questionnaire) was to gauge attitudes of Upper Region women towards the hand-pumps and to evaluate the extent to

which the new water supply system has positively or negatively influenced their lives. The degree of participation inherent in the various components of the URWSP since its inception was another significant factor which I wished to examine. For this purpose, the topics covered in the questionnaire included:

- 1) socio-economic status
- 2) access to and use of pump and non-pump water sources
- 3) changes in women's lives as a result of the use of pump water
- 4) present water habits
- 5) tariffs for hand-pumps
- 6) maintenance structure of the hand-pump system
- 7) health issues
- 8) effect of pumps on the village

QUESTIONNAIRE DESIGN

The questionnaire was developed over a period of several months in 1989. The survey instrument used in the 1985 evaluation was examined to get ideas for questionnaire format; however, the nature of some questions and the means by which information was gathered did not always correspond to personal beliefs about the use of qualitative and quantitative procedures (see section on questionnaire methodology for a fuller discussion of this). Therefore, this author made decisions concerning questionnaire construction, implementation, and evaluation without a heavy reliance on practices employed in previous URWSP evaluations.

Once a complete research instrument had been formulated, both Alan Etherington, a member of the 1985 evaluation team, and Dr. Jacob Songsore, a professor at the University of Ghana, were asked to evaluate and critique it. Alan Etherington, especially, was able to offer a number of comments and suggestions for improvement based on his experience in the Upper Region. As a result, the questionnaire was shortened considerably and various questions were revised and reworded to make them more explicit. Time and financing were constraints on the design process, and a pre-test could not be conducted. It was hoped that the substantial modifications which had been made would result in an acceptable, useful research instrument.

RESEARCH AREA

Two communities in the Upper Region were selected for study: Zoko-Tarongo and Sumdurungu-Kologo. Figure 1.1 depicts the location of these areas in the Upper Region. These particular villages were chosen by Mr. Aneateba from a selection of about fifteen villages listed in the 1985 evaluation. Twelve interviews were conducted in each place⁶, with only one woman from each yard⁷ selected to

⁶ Although a total of twenty-four interviews was conducted, only nineteen have been used: twelve from Zoko-Tarongo and seven from Sumdurungu-Kologo. This is because not all women interviewed from Sumdurungu-Kologo used the hand-pumps.

FIGURE 1.1
Location of Study Areas within the Upper Region

Sumdurungu-Kologo

Zoko-Tarongo

Scale: 1:575,000 ca

achieve better representation. As instructed, the interviewer attempted, where possible, to interview women of different ages and socio-economic status, as judged by such things as house size and type of materials used in their construction.

Zoko-Tarongo is a village of 441 people. There are five hand-pumps, all of which are functioning. One is located in the centre of the village, the other four are scattered around the community. Alternate sources of water are limited. There is no dam or river nearby, and the small pond and several of the wells which exist have run dry. All the hand-pumps are used by the villagers, but generally each person uses and contributes tariff payments for a particular pump; it is difficult to gain access to another pump.

Sumdurungu-Kologo is the larger of the two villages with a population of 1 202. There are four hand-pumps. Two of these are in the village centre, about 400 metres apart; one of these is quite close to the chief's "palace". Other water sources include a dam, several dug-outs by the dam, and a few wells. One of the hand-pumps has been broken for some time, and villagers have not been able to afford its repair. Women who relied on this pump usually use the dam because other pumps are too far away.

⁷ A yard is the residence of a wife and her children. A compound refers to a collection of yards; each husband lives in a compound with one or more wives, each of whom lives in her own yard.

QUESTIONNAIRE METHODOLOGY

Ideally, the methodology used in this questionnaire would have followed the strategies and goals employed in much feminist research, in which the study of the URWSP would have been done with and for Upper Region women. According to Harding (1984) a feminist methodology is distinguishable from other methodologies by three main features: research is based on women's experiences; this allows research to be for women; and the researcher's socio-cultural belief system is made clear in order to make such biases explicit. A key element is that research is not performed in isolation from the backward and forward linkages of the knowledge which is produced. Research questions are not objective; by the way in which they are formulated, they provide information to certain groups of people, who then can use this information for their own purposes. As Harding states,

Reflection on how social phenomena get defined as problems in need of explanation in the first place quickly reveals that there is no such thing as a problem without a person (or groups of them) who have this problem: a problem is always a problem for someone or other....Feminist challenges reveal that the questions that are asked - and, even more significantly, those that are not asked - are at least as determinative of the adequacy of our total picture as are any answers we can discover. (Harding, 1987:6-7)

This issue can be seen in the different types of research questions which have been directed at the URWSP.

In designing and evaluating the programme, CIDA has tended to confine its questions to such things as "How can access to potable water be improved in the Upper Region?". Other issues remain unexplored, such as "Why can rural people not meet their basic needs (for example, potable water)?" or "What structures (socio-cultural, political, and economic) have a bearing on or mitigate against this?". The nature of the question which is posed has a direct influence on the extent to which the 'bigger picture' (which places the Upper Region into its global context) is examined, as well as the methods which are used to gather information.

Because I see inadequate access to potable water as a problem particularly for rural women⁸, this questionnaire has been given strictly to women. In accordance with feminist methodology, this problem will be explored as perceived by women through their experiences. In this way, this research attempts to be research for women, attempting to find answers to things that they want and need to know.

Another important element relates to the way information is obtained and analyzed. Mies (1983) discusses

⁸ Although some may claim that focusing primarily on one gender is sexist, I feel a strong argument can be made for working with women in this case because they have responsibility for water management activities. As well, they have been disempowered by the introduction of the hand-pumps, since it is men who are in control of most aspects of the URWSP. On the whole, women in the South have been affected negatively by the development process, and research thus should make a greater effort to give them a voice to express opinions, concerns, and knowledge.

how positivist methodologies, which are based on claims of objective, value-free research performed by a researcher detached from the people and problems being investigated, are not useful in exploring issues of concern to those not part of the dominant societal sector: white, urban, male. For this reason, it is vital to replace the "view from above" with a "view from below", so that people are no longer the objects, but the subjects, of research. This viewpoint is supported by Oakley (1981) who advocates the use of very loosely structured interviews, in which women are free to ask personal questions and information of the researcher.

If I had been able to conduct fieldwork personally, this is the path which I would have chosen to follow. Funding constraints, which did not permit me to go to Ghana, meant that the nature of the research had to be altered; it was neither possible nor feasible for me to conduct in-depth interviews long-distance, or to have another person do this for me. In the end, a questionnaire was devised which could be administered by someone else (Mr. Aneateba) who did not necessarily understand or share my methodological concerns. Some questions had to be structured in a more formal fashion. Despite this, an effort was made to leave a number of questions open-ended in order to gain some sense of what the words and thoughts of the women interviewed actually were.

In keeping with the concerns raised above, data were analyzed qualitatively rather than quantitatively. While some researchers are concerned with 'objectivity' (theoretical as that may be), I agree with Mies (1983) and Oakley (1981) that people's attitudes and opinions are inherently subjective, and must be dealt with as such. It is this subjectivity of which a successful development programme must take account if it is to serve people's needs accurately.

In keeping with this, data were analyzed qualitatively rather than quantitatively. Tables and percentages have been used, but any greater quantification has been avoided for two reasons. First, it would have obscured the very essence of what I was trying to discover: people's perceived needs and constraints, gender relations, and power relations from the intra-household to international levels. Second, in view of the small sample size, it would be inaccurate to give the appearance of generalizing to all of the Upper Region; instead, this thesis focuses on process: how a development programme is carried out and the way in which this influences a society. While quantification certainly has its place in analysis, it would not be wholly appropriate to the goals of this thesis because:

while measurement presumes the precise definition of social phenomena, the social world is inherently ambiguous....[Quantitative] assumptions tend to ignore social context and the complexity of social phenomenon. They may make it difficult to investigate social structure and the processes

of changing interaction. (Driscoll and McFarland, 1989:189)

PROBLEMS WITH QUESTIONNAIRE DATA INTERPRETATION

I believe that a fair degree of confidence can be placed on the analysis of the questionnaire data. At the same time, there are a number of constraints on interpretation which must be made clear from the outset.

The first problem is that of language. Fra-fra is the language spoken in this part of the Upper Region, and as neither myself nor the interviewer had fluency in it, a translator was required. Questions had to be translated into Fra-fra and the responses translated back into English and written down (see Appendix B for a translated version of the questionnaire). It is impossible to say how much has been lost in this process, but there is room for error, misinterpretation, and simplification of answers.

A second issue is that of the measurement of time and distance. As many of the women have little formal education and no need for such things as watches, calculations in units as precise as those with which the West is familiar (minutes, hours, metres) are difficult. Thus, in questions which required measurement of time or distance, the interviewer calculated this himself based on observations.

The most critical limitation on interpreting questionnaire data was external influences on the interview by village officials, spouses, and the interviewer himself.

Mr. Aneateba was taken to each interview by a member of the local Water Utilization Committee, which the chief had arranged in order to introduce the interviewer and establish his legitimacy. While this was a necessary step, the presence of this official may have influenced some of the answers, particularly those which pertain to maintenance and the work of the committee.

A second external influence was the presence of the spouse. Neither the women to be interviewed nor their husbands would allow the interview to take place unless the husband was in attendance. It is quite likely that women felt constrained by this in their responses. Women may have answered some questions in accordance with what they felt their husbands would condone, rather than expressing their own beliefs and thoughts.

A third impediment was the fact that the interviewer was male. It would have been preferable to have a woman carry out the field work, but this was not feasible. It is highly probable that Upper Region women would have felt freer to discuss water-related issues and problems with another woman, who could have established a relaxed atmosphere more easily. Mr. Aneateba's lack of familiarity with informal data gathering may have compounded this. As well, a female interviewer probably would not have necessitated the husband's presence during the interview process.

One question in particular which illustrates the difficulty with a male interviewer concerned why husbands generally were listed as the ones to pay the pump tariff (although responses to other questions indicated that some portion of women's income-earning activities often went toward the tariff). A majority of women responded by saying that a husband's duty is to provide for his family. While this likely was affected by the husband's presence during interviews, the response echoes the words of Mr. Aneateba in his notes to me, indicating that he believed that indeed husbands were the family's providers. This also supports the findings of Vaughan (1983) in reference to a study of the family in Malawi. She discussed the "lack of 'fit' between socio-economic realities and their cultural expression" (Vaughan, 1983:278). Since changes in economic realities take some time to be consciously recognized by people in that situation, they will not always be articulated to researchers.

1.5.2 Other Primary Sources

The 1985 evaluation (Malone Given Parsons, 1986) was conducted by a Toronto-based consulting firm, Malone Given Parsons Ltd., and provided data which were used to support various arguments of this thesis. This evaluation consisted of six reports covering topics such as political and economic context, an analysis of the water supply system's

technology, and programme organization. It included a Social Survey of Water Drawers, which was an extensive examination of about fifteen villages during both the dry and wet seasons. Although the data in this evaluation are problematic in two respects (its lack of data interpretation and its datedness), it is a fairly comprehensive source of information about the URWSP.

The final source of primary data consisted of interviews with some of the people who had previously evaluated the URWSP. These included:

Gerald Chauvet (Ghana desk at CIDA)
Alan Etherington (evaluated various components of the URWSP)
Linda Moffat (evaluated gender issues in the URWSP)
L. Lee Parsons (part of the 1985 evaluation team)

Rose Mae Harkness, who had examined the role of women in the programme in her 1983 M.A. thesis, has been out of the country and so could not be interviewed. However, her thesis was closely examined.

1.5.3 Overall Conclusions about the Research Design

The various primary data sources used in this thesis have been introduced above, along with some of their limitations. While the constraints of data used to support this thesis should not be overlooked, it is important to place them into context. The sample size used in the questionnaires (twenty-four people), and the limited number of key informants interviewed indicate that wide-ranging

conclusions about the URWSP cannot be made. The value of this thesis is in pointing out certain areas of the URWSP toward which further research should be directed. I would not attempt to say that what seems to be true for the limited number of people questioned is necessarily true for all those under the jurisdiction of this water supply system. In spite of this, what these women have to say is quite valid, and problems which are identified by them should provide a basis for analysis and commentary, since they may well be problems for others as well. The next step is for URWSP management to investigate impediments to the sustainable development of the Upper Region water supply system on a far wider scale, perhaps using some of the types of data collection used in this thesis. Consulting rural women about their problems is critical to establishing the basis for positive changes in the URWSP.

1.6 Thesis Organization

In order to obtain a clearer understanding of what is meant by 'sustainability and participation', the second chapter serves as a literature review of these concepts. It examines various perceptions of development and participation and how these can lead to sustainable development. As well, the role of women in the development agenda, and the specific relationship between women and water, are examined. Chapter three illustrates the critical

necessity of placing development projects into an overall context. In this case, the severe crisis faced by the whole of Africa, and specifically Ghana, is explored with reference to social, economic, and political issues. Chapter four then presents the background of the URWSP, and analyzes its performance in terms of financing and appropriateness of technology in relation to the Village Level Operation and Maintenance concept. This is concerned with the ability of communities to repair and maintain a water supply system themselves, and for that system to meet community needs adequately and effectively. Chapter five assesses the level of participation, particularly the role given to women, over the history of the URWSP. The results of the questionnaire carried out with women in two communities in the Upper Region are analyzed to see how such participation - or a lack of it - affects the sustainability of this project. Chapter six discusses the environmental sustainability of the water project, examining its place in the planning, implementation, and monitoring of the URWSP. An environmental impact assessment is performed (at a conceptual level) to pinpoint any present or future ecological problems. Finally, chapter seven serves to address the conclusions which I have reached, and the results of the evaluation of the URWSP serve to illustrate the necessity for finding a different path to sustainability than the one taken by CIDA. Thus, an alternative model for

development programmes is proposed which focuses on three key components: (1) socio-cultural context; (2) financial constraints; and (3) environmental support systems. It is argued that only when all of these factors form the basis for programme parameters will development efforts be sustainable.

CHAPTER 2

EXAMINING THE CONCEPTS OF SUSTAINABLE DEVELOPMENT AND PARTICIPATION

2.1 Introduction

Central to this analysis of the Ghana Upper Region Water Supply Programme (URWSP) is an understanding of two key concepts: sustainable development and participation. As both of these terms have come into vogue in development literature within the past few years, there is a tremendous volume of material which has been written on them. As can be expected, however, there is little agreement as to a precise definition for each; the difference in viewpoints often depends to a large extent on the writer's attitude concerning what 'development' is and the process by which it should occur. Institutions such as the World Bank or CIDA tend to try to "add-on" such new concepts without examining their full significance for present policy and action. Thus, rather than requiring fundamental shifts in organizational structure or project design, sustainable development becomes merely a label which these institutions tack on to initiatives that have been modified in only a minor way, if at all. An opposing perspective holds that the development process as it currently operates is counterproductive to improved welfare both on a global level and to people in the South; that indeed there is a fundamental contradiction in describing present efforts as

'sustainable development'. Following the latter line of thinking, one must examine exactly what real development programming is all about; whom it should serve and how, and in what ways this differs from what now happens. A serious analysis of the past few 'development decades' reveals that much of what has passed for development has served predominantly the North and vested interests globally. It has not been the concerns of the poor which have predominated; instead, global economic interests have been reinforced, leaving those without access to national and international power structures out in the cold.

If development is to have any connection with justice and equity, such structures must be dismantled. Marginalized people in the South will not gain if they are not made a priority; the trickle-down of benefits is usually a theoretical illusion, with little reference to actual reality. The question of empowerment of the poor thus becomes critical. If the poor are to reap the rewards of development, they must be able to guide the process so that it meets their own self-determined needs. For this reason, full participation, in which local people have a key role in decision-making, is a pre-requisite to the success of an initiative, and the lack of any meaningful degree of participation has led to the failure of all-too-many projects. The emergence of the 'sustainable development' concept, touted as a panacea to the many ills which have plagued the development process, has

often been too constrained to consider issues of this magnitude.

The predominant concern has been with ecological degradation and ways of shoring up the critical linkages between development activities and the environment. There is no doubt that this matter has been neglected for far too long, and the current rate of environmental degradation suggests that environmental ramifications of economic and political activities need to be considered. As concern about the environment has been incorporated into mainstream politics in the North (at least at the level of rhetoric), there has been a correspondingly greater emphasis on the need for development to be sustainable in this regard.

However, I would argue that a definition which only considers the environment is far too limiting. Environmental problems are by no means the only obstacles to improving long-term welfare for people in the South. As Redclift (1987) argues, the fact that the majority of people there have not been able to take control of their lives and direct their own, and their nation's, course of development has had a negative impact on their welfare, and this is reflected partly in the degradation of their livelihood base. If this is to change, people in the South must play a much more important role in development initiatives, both in terms of making known their needs, knowledge, and opinions, and taking part in the decision-making process.

The opportunity for active participation should be available to all citizens; thus, far greater efforts are needed if this opportunity is to be extended to presently marginalized people, particularly the rural poor. Within this category, it is necessary to ensure that 'development' does not become accessible only to males. Women in the South are already at a disadvantage in terms of their access to and control of resources, as well as with respect to the attitudes of development agencies (Robertson and Berger, 1986; Rogers, 1980). Especially in the case of an initiative such as the URWSP, the role of women as water drawers and managers should mandate that their knowledge and needs receive priority. Truly sustainable development requires more than lip-service; it needs to empower people to allow them to shape the development process, with due consideration for the context in which such development occurs.

This chapter examines the concepts of sustainable development and participation, and their link with the issue of water resource development. Rather than attempting a definitive review of these subjects, I draw on works as appropriate in order to develop criteria with which to evaluate the URWSP.

2.2 Perspectives on Development - For Whom and to What End?

The vast majority of development efforts over the last several decades have been under the control of relatively

conservative international and governmental organizations, operating on the basis of what Chambers (1986) refers to as 'normal professionalism'¹. The pre-eminent paradigm under which 'normal professionalism' has been operating is that of neo-classical economics, based on Western experiences of development. Within this paradigm, development is equated with economic growth, to be achieved through 'modernization' and industrialization, which is examined in virtual isolation from all other societal influences. Rostow's Modernization theory is an example of this type of thinking, in which the path of a nation from 'traditional' to 'advanced and modern' was considered straightforward and unilinear (Rostow, 1971). No room is allotted for the possibility that other strategies also have potential for national development.

Theories of this type, which in one form or another continue to be the perspective held by 'normal professionals', hold that greater integration into the world economy is the best (and likely the only) course for a country. To this end, the emphasis is on lowering trade barriers, giving markets greater freedom in allocating goods and services and

¹ 'Normal professionalism' refers to: the thinking, values, methods and behaviour dominant in the [development] professions and disciplines and reflecting 'core' or 'first' biases....[It has] built-in stability from its link with knowledge and power, its reverence for established method, its capacity to reproduce itself and its defenses against threat. It is sustained by the core-periphery structure of knowledge and knowledge generation, by education and training, [and] by organisational hierarchy. (Chambers, 1986:ii,4)

determining their prices, and increasing export levels. While such "laissez-faire" policies encourage a degree of competition, this is at the expense of small-scale, indigenous enterprises, which fall prey to transnationals (Songsore, 1990). In addition, these capitalist relations of production result in inequalities between regions and classes. Governments in Africa often have neither the will nor the ability to legislate protection against such problems. Thus, there has tended to be few positive results have emerged from the (at times forced) implementation of this strategy.

As is discussed further in chapter three, economic and financial conditions across the South have reached crisis proportions. Social indicators, particularly for Africa, indicate that far from improving, the well-being of many people is coming under increased threat (ECA, 1989b). To a large extent, the problem is that inequalities in wealth distribution due to the 'development' process have been ignored by policy makers under the assumption that these were a necessary evil to be tolerated until modernization was achieved, at which time such problems would be tackled. As the trickle-down of wealth, information, and technology was expected to occur, everything could and should be managed from the top down, in order to benefit people over the long-term. The health of the nation's economy was considered to be the only issue of immediate relevance to the development process,

and all other aspects of society could be subordinated to this.

As Chambers (1986) describes, development as ascribed to by 'normal professionalism' is heavily dependent on positivistic quantification techniques to determine progress; however, these techniques tend to obscure rather than clarify. Statistics like gross national product (GNP) are the most frequently referred to, but as Redclift (1987) and Rogers (1980) attest, instead of telling the whole story, GNP has only limited use. By its very nature, GNP or GNP per capita is a very inaccurate calculation for two reasons. In the first place, GNP underestimates the total value of a country's production, because a number of important activities are completely left out of the equation. Particularly in the context of the South, the exclusion of household and informal sector production, both of which are dominated by women, seriously underestimates the real monetary worth of a nation's production. As well, this type of indicator completely ignores distribution of wealth, only producing figures for the statistical average per capita income. Thus the reality of the tremendous inequalities in asset distribution that often exist, in which an elite minority of the population owns and controls a substantial proportion of the country's resources, are all too readily obscured.

The substantial criticisms of mainstream economic thinking which have emerged have led many people to search

for alternative ways of carrying out the development process. It is no longer universally accepted that before a condition of development can be reached, some inequalities must be endured. There is wide recognition that the means by which the development process is carried out reflect the ends which ultimately will be achieved.

Stohr (1981) echoes such sentiments in his advocacy of a bottom-up, periphery-inward development paradigm. This 'development from below' has as its basic objective the

full development of a region's natural resources and human skills,... initially for the satisfaction in equal measure of the basic needs of all strata of the regional or national population, and subsequently for development objectives beyond this.
(Stohr, 1981:43)

The importance of equity and autochthonous motivation for development in Stohr's model is a much-needed change from the tremendous disparities wrought by centre-down models. The de-emphasis on macro-economics and a greater concern for the welfare of the populace is a large step forward in efforts to improve conditions in the South. Stohr is quick to point out, however, that development from below is not at odds with growth, but that growth should be based on the use of a wider selection of resources than the narrow few usually determined by the world economic system.

He advocates the idea of selective closure, which is not supportive of whole-hearted integration in the world market. As Stohr (1981) describes, a system operating under selective closure would be decentralized, with power and decision-making

devolved to lower levels of the hierarchy. Within each region, small areas would be able to determine how all their resources could be made use of most effectively, and would have some control over demand. "Barriers to free resource withdrawals, negative terms of trade, and to a further concentration of power would be drawn along territorial lines at different hierarchical levels" (Stohr, 1981:96). Higher levels would base their own development on that of the smaller units, not in a parasitic fashion but in a more stable manner by responding to the requirements of these lower levels rather than the reverse. From here comes the name 'bottom-up and periphery-inward'.

At the same time, Stohr takes care to mention that there are definite benefits to be had from the integration of some less developed areas with more developed regions, especially concerning access to technological innovations and potential product markets. He points out that development from below does not assert a complete rejection of economic growth, for the tremendous gaps in basic physical needs of many in the South dictate that growth will be necessary to improve their lot. However, such growth cannot be controlled and exploited by the world market. Selective spatial closure becomes necessary to allow people in a particular area to command their own development. At one level, such a theory seems to have much potential to lead to beneficial development. From a less idealistic view, though, Stohr's analysis suffers from

two problems. The first issue concerns the very general nature of many development from below strategies, a situation which has both positive and negative connotations. Stohr emphasizes that development from below cannot offer only one (or a limited number of) universal strategy to work for all communities and nations. Indeed, it is the tremendous diversity in strategies which leads to success, for each area then has the freedom to tailor an approach which utilizes the particular human and physical resources within that area to the fullest. Cultural, historical, economic, political, and social factors which are very place-specific can be kept in mind. All of this is very necessary, but at the same time, it leaves development from below strategies at a very general level, which makes this difficult to implement. Although some may support development from below as it is conceptualized, the means by which it can be put into practice remain somewhat nebulous.

A second critique relates to this same notion of how to enact development from below. Although Stohr discusses some problems in the transition from development from above to development from below, these are primarily internal spatial constraints related to such things as transportation systems. There is not a sufficient examination of what is likely to be the greatest difficulty - internal and external opposition.

The devolution of power away from the larger scale as well as the notion of limiting resource exploitation may pose

a direct threat to many vested interests. National and regional government structures are unlikely to accommodate demands for greater local-level decision-making and control over resource use willingly, and few areas have the capability to challenge those presently in command. In addition, the strong links between the South and the North in terms of dependency and underdevelopment cannot be overlooked; the global power structure may be an even greater obstacle than that at the intra-national level (Redclift, 1987). The organization of the world economic and political system is such that access to power is weighted in favour of urbanites and elites. The debt crisis (discussed in more depth in chapter three) provides an example of the dependent situation in which the South finds itself. As the North gains greater control over economic policies within the South as a result of its debt burdens and structural adjustment programmes, there is less lee-way within which the South can attempt alternative development strategies.

Gore, in his 1984 book Regions in Question, discusses various regional development strategies, and offers a critique of those which rely too heavily on spatial analysis. As Gore states, even with the emergence of non-neo-classical models which focused on rural development, many theories continue to be based on notions of economic growth, urbanization, and industrialization, although rural areas are now included in such strategies. Most of these theories are merely spatial

policy, in which attempts to change spatial patterns of development are implemented through spatial means. These means include altering "the spatial distribution of infrastructure, economic activities and urban population or...changing the spatial pattern of interaction between areas" (Gore, 1984:211). The problem can be pinpointed as the 'incomplete relational concept of space' inherent in such theories; that is, the underlying processes which determine the way in which relationships between areas will be manifested are ignored. Gore objects to the manipulation of space as though it could solve non-spatial constraints in the development process, rather than simply resulting in a rearrangement of existing wealth and resources. Accordingly, "the basic reason why spatial policies can only achieve spatial redistributions in 'development' is that such policies do not affect the underlying determinants of social and economic change" (Gore, 1984:217). There can be a redistribution of growth, say, from urban to rural areas, but this will be at the expense of urban areas; there will not be an increase in the overall level of growth for the nation.

On these grounds, Stohr (1981) also can be criticized, although his ideas about devolving power to lower levels and allowing them some self-determination in decision-making are valuable. As Gore mentions, spatially-based theories such as this do not deal with the real constraints on social and economic improvement. If one assumes a broader perspective

on the development process it seems clear that unless built-in structural imbalances are dealt with and corrected, little in the way of improvements in welfare will occur.

In response to such criticisms, Taylor (1989) has modified the idea of development from below, which he agrees has been plagued by the diverse meanings attributed to it, a lack of a strong theory, and its co-optation into more orthodox perspectives without necessarily affecting substantial change in them. Taylor acknowledges Gore's support for territorial - rather than spatial - regional planning, so that the emphasis is no longer on 'space' but on 'place'. This allows for the uniqueness of place-specific environment, history, culture, and the social relations between people to be given due consideration. Despite the fact that such an approach still leaves a number of important questions unanswered (Whose territorial interests will be served? How are these to be determined?), it provides a better opportunity to face the critical issues discussed above in regards to intra- and inter-national structural limitations.

Taylor refers to his concept as 'development from within' in which "strategies are defined, motivated and controlled by the rural population itself" (Taylor, 1989). There are a number of similarities to Stohr (1981), but Taylor attempts to offer a more concrete foundation for his perspective. The stress on the importance of local level power over the

development process and the need to recognize the non-universalizing, place- and time- specific nature of each community are shared features. However, Taylor's development from within sets itself apart for two reasons.

First, there is a more realistic emphasis on the need to empower people politically at the local level and to take account of the social relations and power distributions affecting the territorial unit under consideration. This is a step towards solving the ineffectiveness of spatial policies, which did not deal with social and economic change. Second, Taylor makes mention of the imperative of recognizing that "within communities there is considerable differentiation based on issues such as class, religion, [and] gender" (Taylor, 1989:7). As later sections in this chapter point out, gender and class differences must be consciously recognized in any development initiative, because they fundamentally shape the distribution of positive and negative results. Although this subject requires further investigation than the brief treatment given to it by Taylor, it is significant that he draws attention to an area ignored in many theories - heterogeneity at the local level.

2.3 Sustainable Development: A Novel Approach or Empty Rhetoric?

2.3.1 The Brundtland Report's Contribution

The term 'sustainable development' was popularized by the Brundtland Report of the World Commission on Environment

and Development (WCED, 1987). The Commission focused on the linkages between environment and development, emphasizing that the latter's strategies should begin to examine their impact on ecological systems. The definition put forth is that "sustainable development seeks to meet the needs and aspirations of the present without compromising the ability to meet those of the future (WCED, 1987:40). Two of the primary hypotheses are that: (1) greater concern must be devoted to environmental conservation so that the destruction which has occurred to date can be halted or reversed; and (2) poverty cannot continue to be ignored; only by eliminating wealth disparities will the poor no longer be forced to 'mine' their environment for survival. The proposed mechanism through which these changes are to happen is primarily institutional policy modification. National governments and international agencies should strive to reach a mutual level of understanding about how to reach the above two goals. They then should work to educate the populace about their value.

While the Brundtland Report has served a useful function in terms of raising the level of awareness of environment and development issues, it can be critiqued in a number of fundamental areas. Goodland (1988) closely examines the rather superficial definition put forth by the Commission on several grounds. First, he questions what the "needs of the present" are to include. Do these refer to luxuries and excessive commodity consumption as currently practised by the

North, or to the basic needs which have yet to be met of poor people in the South? This is an important distinction which is not recognized explicitly; it is important because this world cannot support the global population if everyone 'needed' to attain or retain the consumption patterns of the North. This inequality has to be dealt with: does it mean that need perception has to change in the North, or that the South will have to be satisfied with a lower level of consumption? Is the latter realistic or fair? The second point made by Goodland concerns "the ability of the future to meet its own needs". How will these be met: through a reliance on the natural environment in which natural resources are used with care, or through the application of technological 'solutions'? Goodland argues that the latter tends to be environmentally destructive because even assuming that the necessary knowledge will be available, nature cannot be replicated easily without substantial cost and stress on the biosphere. Another point of contention which Goodland brings forth relates to the level at which sustainability is to occur. The various contexts in which it is possible include: international, national, regional, local, and intra-household. It is relevant to note that the strategy employed to meet the goal will differ greatly depending upon which level one focuses. For instance, sustainability at a macro level could still imply tremendous disparities at the micro-scale. The general nature and breadth of topic of the

Commission's report mean that these issues could be avoided.

A significant problem with the WCED report is that while many topics were addressed, there was still little attempt to analyze the underlying constraints to convergence of environment and development goals. Quite likely this can be related to the origins of Commission members, many of whom had strong connections to government. Because of this, there was less probability that findings and recommendations would really challenge current governmental perspectives. While the Commission's view would not be defined as conservative, it did not 'rock the boat' too harshly. The suggested "policy guidelines" are based on the assumption that ultimately businesses and governments want to alter their practices and readily can be made to see the wisdom in this. In reality, this is a very idealistic and perhaps dangerous assumption on which to base future hopes, on which is unlikely to result in meeting the objectives which the WCED set out.

What WCED's view of sustainable development does not do is to focus on the structural change which will be necessary. Political and economic concerns are separated neatly from environment and development concerns, when the objective should be to integrate political economy with environmentalism. Unfortunately, there is a critical difficulty with using mainstream thought to do this.

2.3.2 The Place of Growth in Sustainable Development

A key issue which necessitates analysis is the role which economic growth is to play in achieving better welfare for the South. The perspective held by the Commission is that while growth can have certain drawbacks if not managed correctly, it is essential to diminishing the wealth gap between South and North:

Far from requiring the cessation of economic growth, [sustainable development] recognizes that the problems of poverty and underdevelopment cannot be solved unless we have a new era of growth in which developing countries play a large role and reap large benefits. (WCED, 1987:40)

But how compatible is economic growth with long-term sustainability? Goodland (1988) asserts that one must first recognize the difference between 'growth' and 'development'. While

growth refers to the expansion in the scale of physical dimensions of the economic system....development refers to qualitative changes (improvement or degradation) of a physically non-growing economic system in dynamic equilibrium relative to the environment. (Goodland, 1988:1)

In his view, 'sustainable growth' is a contradiction in terms; people exist on a finite and non-growing earth, and therefore their actions must reflect this. Economic growth cannot be a basis for improved well-being because it relies on continually greater exploitation of limited resources.

This position is supported by Chambers (1986), who identifies the 'new professionalism' alternative (in contrast to normal professionalism as discussed in section 2.2). Here,

the goal of development is not growth as defined by normal professionals, but well-being as defined by the poor for themselves. Development is not movement towards a fixed goal but continuous adaptation to maximize well-being in changing conditions (Chambers, 1986:20).

The focus for this novel development paradigm is decentralization of power and resources, and empowerment of particularly the poorest people. These two factors will then enable poor people to have control over and make the best use of resources in their surrounding physical and social environment, meeting their own needs rather than those dictated externally.

Accordingly, policy suggestions such as those of the Brundtland Report are unrealistic, because included in their basic design is the incongruity between a sustainable society and economic gain. The motivating mechanism for capitalism is exploitation of resources for profit. Continuous growth cannot be supported on the one hand while on the other hand environmental issues are to be made a priority. The societies propounding sustainable development tend to be those who certainly will not readily slow down or relinquish economic motivations, and yet such a total change in the global system is needed if the world is to be sustainable over more than the next several generations.

To overcome this problem, Goodland (1988) points to improved well-being as dependent on the promotion of three types of values: economic efficiency; equitable resource distribution; and integration of non-material values,

including "religio[n], spiritual[ity], dignity, esteem, aesthetics, and liberty" (Goodland, 1988:4). Although Goodland does not take his argument this far, the implications are that sustainable development must necessarily be very culture- and society-specific, for interpretation of the above values will not be identical between different peoples. By the same token, class, race, and gender specificity also become important factors. How, then, can one particular government or aid agency justifiably set development decisions and priorities for another nation? It calls into question the premise of austerity programmes, conditional arrangements for debt repayments, and the control of projects in the South by the aid business in the North.

At the same time, while Goodland acknowledges the incongruence of economic growth with development, his solution lies in the re-definition of theory. "Possibly the single most influential change towards sustainability is to revamp neo-classical economics to accommodate environmental sustainability, including ethical and non-human values" (Goodland, 1988:6). However, the very nature of this stream of economics is such that there is sufficient argument for believing that it is neither able nor willing to accommodate such changes.

Redclift (1987) makes a valued contribution to this debate in his work, Sustainable Development: Exploring the Contradictions. One salient contradiction which he discusses

is that of the role of economic growth in ensuring development. In his view, we have reached the point at which environmental destruction has greater costs than any benefits to be gained from continued growth. Piecemeal adjustments will no longer suffice; fundamental change is required in the very way in which our world operates.

Development [must] be subjected to redefinition, since it is impossible for accumulation to take place within the global system we have inherited without unacceptable environmental costs. Sustainable development, if it is to be an alternative to unsustainable development, should imply a break with the linear model of growth and accumulation that ultimately serves to undermine the planet's life support systems. (Redclift, 1987:3-4)

In this respect, he is in agreement with Goodland. However, he goes on to take this argument to its more logical conclusion. Economic growth has led to tremendous inequalities between countries in terms of who gains and who loses from international trade, and there is no process in place to reduce or eliminate these inequalities. Indeed, there is no reason to believe that such a process could or would be implemented, since capitalist growth necessarily rests on exploitation of other resources and regions; it is inconsistent with equality. Redclift argues that when growth does occur, it is beneficial only to a limited few. It is illogical to assume, as the Brundtland Report does, that aid agencies and governments will operate on a different basis, because elites and the North as a whole profit from international economic disparities. The only way this

situation can change is if there is a recognition that continuous growth is not compatible with development, that inherent structural constraints - political and economic, not just environmental in origin - have to be illuminated and dealt with. Environmental concerns cannot be integrated into current theory and practice; they require a new vision of development which recognizes this incongruence and the presence of vested interests.

In order to deal with environmental issues properly, Redclift argues that a second contradiction has to be recognized. This is that environmental concerns differ between North and South, and in fact may be antagonistic, because the environment is viewed differently and desired for different ends. In the North, the environment is used principally for leisure and aesthetics, and attitudes toward it tend to be that of environmental 'managerialism' - the government and other elites 'manage' the environment for the rest of the population. As environmentalism has gained support in the North, there have been many attempts to transfer this concept into the South. Such a move ignores the alternative perspectives held by people in these nations. The environment in the South is not merely a retreat, but the basis of livelihood for a great many people. In the South, many people deal with ecological systems on a regular basis, and cannot abstract themselves from this so easily.

However, the link between environmental exploitation and poverty is such that the rural poor cannot act as they necessarily would choose towards ecological systems. While they rely on the environment for subsistence, and so realize that activities which degrade it are harmful to them, the immediacy of their poverty (and its structural determinants) sometimes forces poor people to undertake such detrimental actions. In Redclift's words,

the distribution of resources, especially land, is critical in determining the scale and incidence of poverty which, by pressing further on resource endowments, threatens to upset the ecological processes on which the societies of the South depend. (Redclift, 1984:59)

As well, as Redclift (1984; 1987) points out, while the South may want to practice environmentally beneficial policies, it often is prevented from doing so by political and economic policies enforced by the North. For instance, the debt crisis, which has its roots partly in oil price rises and interest rate surges of the 1970s as well as in unprofitable investments by governments in the South (George, 1989a), has resulted in enormous debt service ratios. In order to obtain foreign exchange for this, people in the South are forced to mine their resource base so that their governments can export primary commodities such as cocoa, coffee, and timber; the environmental degradation left in the wake of such activity is disregarded out of necessity. Given this context, these countries and their citizens have little motivation or money to support conservation of the sort

supported by the North; the future gains to be had from a stable biosphere are outweighed by the present necessity to exploit one's livelihood base in order to provide for subsistence.

At the same time, Tisdell (1988) explores the issue of whether sustainable productive systems would be more suitable to the critical conditions in the South than others which are more risk-prone. He puts forth a number of reasons as to why sustainability is an appropriate strategy in the context of these countries, which are summarized below.

(1) Alternative employment sources are limited, and ability to find other sources of income constrained by the financial and social adjustment difficulties of moving elsewhere to find work.

(2) Failure of productive systems poses a serious threat (perhaps even death) to people in the South because of the very low incomes and lack of financial support systems for those experiencing economic hardship.

(3) People in the South have far more interaction with the environment, and depend on it as a basis of livelihood to a much more significant degree than in the North. Anything which undermines environmental stability will have profound ramifications for much of the economic activity throughout society.

(4) There is a substantial lack of information about local knowledge systems concerning agricultural production; about effects of production systems transferred from the North; about the impact of new technology; and about the role of local plants and animals to the environment.

The influence of these factors on indigenous strategies "would suggest that greater risk conservatism would be rational in [countries in the South]" (Tisdell, 1988:380). Because people here have such a heavy dependence on the environment as a livelihood base, with few other support

networks in place, they have the most to gain from utilizing strategies which contribute to long-term environmental health, and the most to lose from environmental deterioration. Given that this seems to be an accurate reflection of reality, enacting sustainability in the South would be possible if people in these nations are able to exert an influence over the development process. Unfortunately, this does not happen presently; policies relating to the environment have been taken out of the hands of rural people and put into those of governments of the South and North.

One remedy to this problem is to institute a new method of relating to the natural world. Redclift (1987) supports the use of collaborative environmental management over environmental managerialism, illustrated in figure 2.1. This alternative would not be imposed upon people in the South, but rather would rely on local knowledge systems and self-determination of needs and priorities. Such a system would take into account the various perceptions which exist of the environment, and what constitutes abundance or depletion. In this way, the environment is not managed by a minority who have control of the power structure. Instead, those who regularly interact with and depend on the environment are drawn actively into discussions about how human-environment relations within that particular context are to be organized.

FIGURE 2.1
Two Approaches to the Environment

SOURCE: Redclift, 1987:158

In putting forth the above views, Redclift has made a substantial contribution towards the debate on sustainable development. Both his 1984 and 1987 works stress the importance of regarding the environmental crisis as due to political and economic constraints, rather than technical ones. Integrating political economy with the environment is likely to result in more realistic efforts at development because this better reflects the variety of factors which impinge on such a process.

In spite of the merits of his position, Redclift does ignore several salient factors. His use of dependency theory fleshes out North-South disparities, but he does not analyze power differentials at a smaller scale, including local or regional elites. His analysis focuses mainly on the position of the poor vis-a-vis international power structures.

For sustainable development to become a reality it is necessary for the livelihoods of the poor to be given priority, but how can this priority be pursued at the local level while the effects of international development systematically 'marginalizes' them?...It is just as necessary to put political economy first as the real-world thinking and priorities of the poor....Unless we pitch our conception of sustainable development at a level which recognizes international structures, it is in danger of being yet another discarded development concept. (Redclift, 1987:36)

Although this is one necessary facet of the discussion, it is important to take the argument a step further, to examine the power structures which exist within the South. Redclift's analysis of power structures do not reflect the wide range of vested interests which exist. Tisdell also does

not adequately discuss what prevents societies in the South from implementing sustainable productive systems. In order to determine what these are, a number of questions should be considered.

(1) Who decides what areas of the environment will be or are being affected?

(2) Who influences the decision-making process about risks and benefits of various alternatives?

(3) For whom does the system work and in what ways? To whom is it detrimental or advantageous?

(4) Who decides on the criteria which will be used to determine whether a given action or policy should be implemented?

The domination of some people over other at the regional, local, household, and intra-household levels all affect the outcome of development initiatives, both on people and on the environment. Those who play the most significant role in identifying problems and prospects can make a system work to their advantage, and can ignore too easily the very real concerns of the politically less powerful. The choice becomes not just one of dealing with crises, but of determining who will deal with them: North or South; elites or the populace; urban areas or rural; rich or poor; solely men or also women. While Redclift tends to view the poor as relatively homogeneous, in actuality this class consists of many different groups, some with vested interests in maintaining the status quo. Pinpointing how these different societal groups interact with each other and work to affect the process of development will lead us a good way towards sustainable

development. If this concept is to avoid becoming empty rhetoric, the broad masses of people must play a significant role. Without active participation by all segments of the population, 'development' will never meet the disparate needs of the various marginalized people. It is to this concept of 'participation' that this chapter will now turn.

2.4 What is Participation?

Section 2.2 discussed various ways in which the development process could be carried out. The literature concerning development from below (or within) incorporated notions of including the people targeted by development programmes in project structures (see Chambers, 1986; Stohr, 1981; Taylor, 1989). References to such 'participation' are increasing in development programming, largely because evidence is growing that a lack of participation often means failure for a project (Oakley and Marsden, 1984; Cohen and Uphoff, 1980). White (1981) summarized some of the possible benefits often cited in development theory and project literature on incorporating participation into projects. These include: reducing project costs; increasing appropriateness of technology; meeting people's needs; and conscientizing people. As White points out, these are all very theoretical. The actual benefits would depend very much on the nature of the specific problem, the agencies involved, type of technology used, availability of community resources,

and existing constraints (White, 1981; Van Wijk-Sijbesma, 1981). All too often, the type of participation incorporated into projects is of a very limited nature, and does not intend to tackle any of the underlying problems.

The lack of agreement as to a universal definition of participation has made it possible for it to be harnessed to a variety of causes, many of which have done little in the way of giving people an adequate voice. For example, Uphoff, Cohen, and Goldsmith (1979:4) provide a very general definition, describing participation as "the involvement of a significant number of persons in situations or actions which enhance their well-being, [such as] for example, their income [or] security". The broad scope of definitions like this one make it easier for aid agencies and institutions to co-opt the essence of participatory development, using it to describe initiatives which avoid challenging hierarchical project structures. Such actions do little to give the poor or other marginalized people a greater voice in decision-making and do not allow their self-determined needs and constraints to become determining influences. Many advocates of participation acknowledge this problem, and will accompany their definition with the qualification that the complexity of this issue cannot be expressed adequately in a few sentences. While this is true, it has contributed to the plethora of rhetoric which is beginning to make 'participation' an empty catchword.

In response to problems of this sort, Cohen and Uphoff (1980) have developed a model which can be used to evaluate participation. The basic framework which they have devised for describing and analyzing rural development participation is illustrated in figure 2.2.

Although this framework is designed to enable participation to be assessed, it is not intended to be reduced to quantitative measurement.

We have chosen to treat [participation] as a rubric under which a number of clearly definable elements can be assembled...It would be quite misleading to try to define the framework in such a way that a summary measure would result. Rather empirical indicators of different dimensions are sought. In this sense, participation is an overarching concept best approached by looking at specific, more concrete components. (Cohen and Uphoff, 1980:218)

These components can be broken down into two main elements: dimensions and contexts of participation. The various dimensions examine first what kind of participation occurs. This could be in any or all aspects of a project: decision-making, implementation, benefits or harmful consequences, or evaluation. Cohen and Uphoff specifically make mention of the need to examine detrimental impacts, since these often are overlooked.

A second dimension concerns who participates. This could include local people, as well as those at various levels of national and international hierarchies. It is important that these people are not considered homogeneous; various personal and economic characteristics come into play.

FIGURE 2.2

Basic Framework for Describing and Analyzing
Rural Development Participation

SOURCE: Cohen and Uphoff, 1980:219

A third dimension examines the process of participation occurs. The basis, intent, and effect of participation are considered here.

These dimensions affect and are influenced by different contexts of participation. The first of two contextual components is project characteristics which incorporates the various requirements necessary to begin an initiative, the way in which possible benefits are shared, and the way in which local structures are integrated into project design. The second element, task context, takes account of physical factors of the local environment, as well as historic factors and social structure. It is the comprehensiveness of this model makes it such a worthwhile tool. Since it does not attempt to define participation in a few words, it came much more fully the real nature of participation given development programme.

Unfortunately, Cohen and Uphoff see participation as something which can be "managed" by someone in charge of a project. The implication, therefore, is that it is not local people themselves who have control of the initiative; rather, participation is encouraged only when it fits into the strategies of project officials, who retain overall responsibility for design, implementation, and evaluation. Here, participation is in limited terms, in that it is not seen as a means by which rural people can

take control of their own lives and the development process. Cohen and Uphoff state that "it may well make a crucial difference whether the participation is voluntary or coerced, continuous or intermittent, and effective or not" (my emphasis) (Cohen and Uphoff, 1980:219). Is this to say that if people are forced to become involved in projects controlled by others that this might not necessarily be detrimental, that it could actually be positive? Without explicit recognition of the ramifications of the different types of participation which can be employed in a particular programme, the 'participation' concept is vulnerable to co-optation by donor agencies and project staff.

To overcome this obstacle, Oakley and Marsden (1984) provide a clarification of the many ways in which participation can be interpreted. Views on participation are organized into a continuum, the boundaries of which range from a very limited, token involvement of people to a much more meaningful kind of participation. The former might include such things as providing labour for a project with no input into its planning, design, or implementation. Here, participation is regarded as a one-time event, which finishes once people have performed the requisite task. At the other extreme, participation is viewed as an active process, in which people begin to take control over resources and institutions in their environment. It is not so much involvement in a particular project which is important here;

instead, it is the fostering of self-confidence, skills, and an awareness of the causes of their underdevelopment, so that poor people can then go on to take action to improve their own situation on a continual basis. Thus participation becomes an end in itself, rather than simply a means of assuring the success of a particular project.

Oakley and Marsden's work is insightful in that it sets forth the varying degrees of participation. They emphasize that as long as marginalized people are dictated to, and are not actively involved in attempts to improve their own lives, it is unlikely that beneficial changes will result. Vested interests of local organizations and in institutions carrying out projects aimed at development probably will be reinforced, and the structural causes of underdevelopment and inequitable resource distribution will not be addressed.

McCall (1988) contributes to this body of literature by differentiating between the various purposes, rather than the forms, of participation, which are identified as facilitation, mediation, and empowerment. The following table demonstrates his approach.

McCall (1988:41-43) describes the difference between the various purposes of participation in the following way. It can be the facilitation of externally imposed interventions; a mediation during the decision-making process so that an initiative better reflects the needs and opinions of the local people; or the empowerment of the most marginalized so that

TABLE 2.1
Overlap between the Three Purposes of Participation

LESS	<u>Facilitation</u>	<u>Mediation</u>	<u>Empowerment</u>	MORE
<ul style="list-style-type: none"> - Explicit recognition of socioeconomic groups; - Emphasis on self-reliance; - Emphasis on action, especially collective action; - Emphasis on internal process; and - Requirement for political commitment; <ul style="list-style-type: none"> - Emphasis on inputs to decision making from lowe down the power hierarchy (bottom-up); and - Participation as a process, having its own inherent value 				
<p>* As participation moves from facilitation towards empowerment, the above points take on more importance.</p>				

SOURCE: McCall, 1988:43

they achieve better access to and control over resources and their distribution. These reflect and enrich the continuum developed by Oakley and Marsden. In the case of empowerment, this would coincide with participation as an active process, in which people gain control over their lives and can direct the development process to overcome their own problems. As demonstrated by McCall, the end result of a 'participatory approach' thus depends quite heavily on why a participatory component was advocated: whether it was merely added-on in order to pass superficial scrutiny, or whether it was an integral part of the project, basic to its design, implementation, and evaluation.

The approaches discussed above are useful in describing what kinds of, and to what ends, participation exist. However, if one is to be able to evaluate participation in development, a more specific tool is needed; Cohen and Uphoff (1980) make a very valuable contribution in this regard.

2.4.1 The Role of Local Knowledge Systems

Participation can only be successfully achieved if local people are viewed as having something of benefit to share; otherwise, there is little to justify interactive discussions. Unfortunately, many analyses of rural areas imply that indigenous people, particularly those without much formal education, have little useful knowledge or skills; their intricate knowledge about the social or physical environment

is often ignored or contradicted. This frequently results in the failure of a particular project, for 'experts' in the North or the South usually do not have all the necessary information regarding a particular area or activity, leading to errors in the design or implementation process.

Bell (1979) provides a useful definition of indigenous technical knowledge (ITK), stating that

To be indigenous, technical knowledge must be not merely present within the given socio-economic and spatial boundaries, but also an active component of the culture of the social group concerned, being stored, communicated, and used by its members to serve some purpose in relation to productive activity within the society....ITK [includes] not merely the existing stock of knowledge, but also the indigenous capabilities to add to that stock and to use it. (Bell, 1979:45)

While ITK has been given greater respect and credence in the development process recently, there is a danger that this knowledge base will be exploited to the benefit of exogenous forces. Bell points out that non-rural specialists cannot be allowed to appropriate ITK in order to develop new techniques for rural people. Instead, rural societies have to be able to expand their body of knowledge on a continual basis so that they can take control over the process of technological change as it affects them. If this is to occur, "concern about the technological relations between rural society and the rest of the world would have to shift its focus from the flow of techniques to the flow of technical knowledge" (Bell, 1979:50).

McCall (1988) re-affirms the importance of relying on ITK, and the long-term benefits to rural people of fostering it.

The argument behind ITK...is that the active processes of indigenous research, and [the] release of inherent knowledge, themselves provide the initial self-belief and confidence needed to counter the culture of poverty and lead to some form of self-development. (McCall, 1988:55)

He feels that ITK can be a critical element in local-level development for two reasons. First, it is a resource which rural dwellers already possess; it is ready and able to be put to constructive use by providing something of which outsiders may not be aware. Second, putting ITK into practice can tangibly demonstrate the capabilities and value of local ITK to sceptical 'experts', who are then more likely to lend their support and assistance.

Richards (1985) also advocates the support of local knowledge systems. Speaking particularly in reference to agricultural production, Richards describes the rich systems of experimentation which rural peasants have practised. Intercropping strategies, crop rotation, the use of new types of plants, and testing common plants in different types of soils and climatic conditions have long been a part of indigenous knowledge. The information which small-scale farmers have and continue to acquire about their environment and how to achieve the best yield without risking large losses is very valuable. It readily could form the basis of a development strategy which incorporates knowledge from the

North about various technology and agricultural techniques with knowledge from the rural poor in the South.

However, as Watts (1983) points out, Richards' analysis suffers from over-generalizations about African farmers. Watts defines Richards as a populist, in favour of small-scale peasant production which makes use of ITK and distributes wealth more equitable and equally than large-scale agriculture. Through his whole-hearted support of ITK, Richards does not put peasant farmers or their knowledge into appropriate social, political, and economic contexts. Thus, the variety of factors which impinge on farmers' ability to enact the risk-averse strategies they may prefer is ignored. The relationship between small-scale agriculture, industry, and the state is not explored, giving the impression that peasants and peasant knowledge exists in a kind of utopian isolation. As well, all farmers are painted with the same brush, without a recognition of class and gender differences which accounts for different sorts of ITK, or which create inequalities among peasants.

In spite of these problems, Richards' advice generally is well taken. Giving ITK the respect it deserves, and giving it its proper place in the development process would ultimately benefit both South and North. The implementation of ITK in all areas, not just that of agriculture, would result in the support of practices which recognize the demands and limitations present in rural environments, and also would

provide the North with new knowledge of which it could make use.

2.4.2 Obstacles to Participation

Obstacles to meaningful participation in local-level development are numerous. McCall (1988:44-47) lists some of the more significant ones. A key problem is the resistance of governments to the idea of participation. It may be seen as a threat to those in power, who fear the consequences of local people taking development into their own hands, perhaps creating organizations outside party control.

An illustration of this is the experience of the Kamiriithu popular theatre in Kenya (Kidd, 1982). The Kamiriithu Community Educational and Cultural Centre (KCECC) evolved into an organization controlled by and working with and for Kenyan peasants and workers. It became an example of empowerment, of a kind of development which the rural poor directed to their own benefit. Through the development of two dramas written by peasants with the help of Ngugi wa Thiong'o and concerned with the oppressive conditions which affected their lives, literacy increased, alcoholism was reduced, and confidence was increased measurably. However, the perceived threat of rural people understanding and confronting the problems they faced from neo-colonial structures led the Kenyan government to take drastic action. Initially, the plays were banned and the theatre license revoked, and

ultimately, the theatre which rural people themselves had funded and built was destroyed. Although the Kamiriithu experience was a vivid portrayal of the tremendous benefits which could result from meaningful participation of the rural poor, it could not help but confront the elites who perpetuated and further entrenched underdevelopment.

Another issue which McCall raises as an impediment to participation concerns access to and control of resources. For those with very little access to physical and human resources, usually the very poor, it may be quite difficult to participate in certain programmes. Rules which make it necessary for those involved to have land, for example, may eliminate the landless, or those who do not 'officially' control the land, as is often the case for women. As well, those who do not have much formal education or have little status in the community may not feel comfortable or have the necessary skills to attend public meetings and make their opinions known.

Outsiders may also become an barrier to achieving the full participation of people, for their attitudes and actions may inadvertently exclude some members of the community from participating. In order to avoid this, McCall suggests that a full understanding of local customs and the socio-political situation is necessary before anyone from outside the community can readily facilitate the participation of all the residents.

Finally, McCall (1988) and Oakley and Marsden (1984) describe the special problems faced by women, particularly rural women, in fully participating in development projects. Socio-cultural obstacles which impede women's participation, and the patriarchal nature of both that society and of aid can be serious impediments. Part of the difficulty lies in the absence of knowledge about rural women and the plentiful experience which they possess. As McCall describes, there has been a

...poverty of efforts to investigate rural women's needs, resources and skills. Case studies also show the detrimental effects this ignorance has, not only on women's potential, but also in terms of lost production and chances for the whole population. (McCall, 1988:45)

Before rural women can adequately take part in and benefit from development opportunities, this neglect must be addressed. The issue of women's participation in the development process is vital to this thesis, and it is to this body of literature that I will now turn.

2.5 Participation of Women in the Development Process

Given the primary role of women as waterdrawers, and the previously described importance of participation, it is vital that women have the opportunity and ability to actively participate in the URWSP. Although more lip-service is now paid to the merits of water supply and sanitation projects, few projects have been truly successful (Elmendorf, 1981). This is largely because those with the greatest role as water

managers - rural women - are all too often excluded or relegated to the sidelines of planning, implementation, and maintenance. Women in the South tend to face discrimination locally and internationally, and there is a lack of understanding of the real roles performed by women. An emphasis on their reproductive tasks and an ignorance of productive ones produces a distorted picture on which too many development institutions rely.

Moser (1987) argues for a recognition of the triple role of women in production, reproduction, and as community managers. Their reproductive role is often perceived to encompass most of women's activities, and tends to be the only one recognized. Any awareness of women's tasks tends to focus on reproductive duties - their 'domestic' tasks within the household. Their significant productive responsibilities are ignored.

This is particularly evident in regards to agriculture, for although African women perform upwards of eighty per cent of agricultural labour, it is to men that credit, extension services, and crop research are directed (Stamp, 1987; Rogers, 1980). At the same time, while women do not benefit from such programmes, their work burdens usually increase (Uphoff et al., 1979). Women's third role, that of community managers, involves "organizing at the community level in relation to the provision of items of collective consumption" (Moser, 1987:13). This could include upkeep of water facilities,

labour contributions to community projects, or child care. It is important to acknowledge these roles, for they have a significant impact on women's needs and their uses of space, technology, and time (Moser, 1987).

Another problem is that even when participatory development is included in project strategy, all rural dwellers tend to be treated as a homogeneous group. Robertson and Berger (1986) and McCall (1988) emphasize the need to recognize that gender and class differences are significant factors in determining the socio-cultural structure of a community. Women and men have different bodies of knowledge, perform different tasks, belong to different types of organizations, and have different levels of influence and access to project officials and elders. As well, elite women and poor women do not have the same priorities and goals, and so cannot be lumped together. The gap between their social and material environments may lead to contradictory strategies for survival, and as a result, elite women cannot be assumed to be looking out for, or representative of, the interests of poorer women. A case in point is Stamp's (1987) exploration of the Kenyan concept of matega, originally a mode of cooperation such as for a woman after childbirth. Matega has been redefined as a strategy through which women could improve their welfare, with each woman contributing a specific amount of money to be used to the collective benefit of the group. However, in one case, identified by Stamp in Mitaro location,

Kiambu, matega was co-opted by elite women who used the funds for their personal gain.

Moser (1987) and Molyneux (1985) provide a useful analysis of the specific needs of women. At a very basic level, women's interests are common concerns which all women share. However, it is more helpful to focus on strategic and practical gender needs. Strategic needs stem from "the analysis of women's subordination and from the formulation of an alternative, more satisfactory set of arrangements to those which exist" (Molyneux, 1985:232). These interests are necessitated by the relative position of women vis-a-vis men in a society. Practical gender needs are defined by specific problems which face certain women, which may stem from the requirements of roles which women perform according to the sexual division of labour. These may not be problems only for women, but it is often women who take collective action to combat them, such as with concerns over household welfare. As strategic gender needs attempt to alter conditions of subordination, these are usually considered 'feminist'. Opposition to change required to meet strategic needs may come from policy-makers, or from other women, whose status is based on their fulfilment of duties as defined by the sexual division of labour.

A key difficulty is that development agencies have been very slow to recognize any of these issues. That the complex matter of how gender affects one's ability to participate in

development initiatives is ignored has meant that women are often left out, and the detrimental effects of such projects on women overlooked (Moser, 1987; Rogers, 1980). An important reason for this is the sexist, patriarchal nature of international institutions, and of the policy makers, planners, and project officials who work there (Stamp, 1987; Rogers, 1980; Uphoff et al., 1979). As it is primarily men who staff such decision-making arenas, it tends to be men's views which form the basis for programme design and implementation². Misconceptions concerning African gender behaviour and social structure go unchallenged, making it very difficult for women and their concerns to be recognized (Rogers, 1980).

As well, Rogers (1980) describes how the very type of analysis used in planning obscures socio-cultural realities as they concern women. The statistics usually relied upon, such as GNP, do not include informal sector or non-monetary activities, both of which are an important part of economies in the South, and both of which are heavily dominated by women. Since much of the work done by women does not fall into (Western-based) definitions of labour force activities, women are then classified as non-participants in the labour

² Rogers (1980) describes in detail the discrimination against women which is evident within international agencies. Few women are employed at middle or upper levels of the corporate ladder, and so have little power to affect their views.

force. Despite their substantial work responsibilities they are described as unpaid family labour and reduced to 'dependents'.

It is, then, men who are assumed to be the only 'breadwinners', who are classified as head of household. This erroneously reduces the complexity of the African family, with its very different social relations between a wife (or co-wives) and a husband and its extended family structure, to inappropriate Western notions of nuclear families (Stamp, 1987). As Berry (1984) discusses, Western and African households have very different inter-relationships between household members. In Africa, men's and women's earnings finance different purchases, and each has responsibility for providing certain goods or services. For instance, Harkness (1983) found that women in Ghana's Upper Region had sole responsibility for providing the various ingredients of the daily soup, the staple food upon which families relied.

Berry states that in Africa, households cannot be depicted accurately as single units of production, consumption, and accumulation. There are culturally-specific relationships between family members which need to be taken into account. There has not been adequate recognition of these gender-specific differences, and men tend to be viewed erroneously as 'head of the household', in a carry-over of Western stereotypes. Thus, as it is to male household members that advice, information, credit, equipment, and extension

services are channelled, women are effectively marginalized from development efforts (Rogers, 1980; Stamp, 1987).

Not only are women excluded from initiatives which could help them in their daily activities, but their traditional roles may be undermined. Discrimination against women, whether based on sexism or the assumption that as 'dependents' they are merely unskilled assistants to men, distorts the technology transfer process. When new technology is introduced, regardless of who has been traditionally responsible for that area of production, it is usually provided to men, and explained to men, for women are expected to be unable to operate it or make repairs (Uphoff, et al., 1979; Stamp, 1987). The technology transfer process also has resulted in an expropriation of the benefits of production from women to men, particularly when such technology concerns agriculture. Many projects have been implemented without an understanding of the gender-based differences in labour responsibilities and remuneration for cash and food crops, and women have usually been quite detrimentally affected.

Watts (1984) explains how this has occurred in Senegambia, with the imposition of a scheme to increase rice production. Despite donor requests that women be integrated into and made beneficiaries of the programme, the end result has been that women have been marginalized even further. Local programme officials did not pay sufficient attention to gender-specific practices as they related to farming

responsibilities within households, and only consulted with rural men. 'Tradition' and 'custom' were co-opted to the detriment of women, who despite being registered as land owners in the scheme, found themselves with greater workloads while men received most of the remuneration. The consequence of these disparities was that women withdrew their labour from the project and rice production yields fell significantly.

It is this patriarchal element of societies in the North and South which is a serious limitation to the ability of women to help guide development, and which assures 'maldevelopment' (George, 1989a). As Robertson and Berger (1986) discuss, although such problems now exist in the South, it was European colonialism which initiated or intensified such conditions through the imposition of new economic and political regimes. As well, middle class Victorian attitudes towards appropriate sex roles compounded patriarchal elements already present in some cultures, and resulted in decreased political, economic, and social power for women.

'Tradition' and 'custom' as appropriate to a particular group of people have become sufficiently blurred that it is now possible for these to be manipulated to the benefit of a select few, usually men, who can gain access more readily the necessary authority. Of particular concern are the changes in African society which have resulted in women's decreased access to and control over critical resources. This has made it very difficult for women, particularly rural women, to reap

any benefits from the many projects which have been initiated; at the same time, they have borne an unfair proportion of the costs.

The central point that emerges is that...during the course of the twentieth century,... whether the economically significant resources in question are land, cattle, labor, or education, women's access to them has been substantially reduced....[Women] have considerably less access than related men to the resources necessary to improve, or sometimes even to sustain, their economic situation. (Robertson and Berger, 1986:10,14)

Ownership of resources, an alien concept to most African cultures, is not the most significant variable, and a focus on this may actually obfuscate reality. It is the access to and control over resources necessary for daily survival and well-being which are key. Credit, technology, and particularly remuneration for agricultural production are often mediated through such access and control. This fact must be explicitly recognized and addressed before women can successfully take an active part in determining the future of their society.

2.6 Participation of Women in Water Supply and Sanitation Projects

Despite all of the money and time which has gone into the International Drinking Water Supply and Sanitation Decade (1981-1990), the goal of providing pure water for all remains elusive. There has been a very high failure rate for water supply and sanitation initiatives, and many communities are not experiencing social or economic benefits from such

projects³. This strongly indicates that there is something fundamentally wrong with the way in which water supply projects are designed and implemented. Elmendorf (1980;1981) suggests that the knowledge of engineering, planning, and economics 'experts' is not enough. Projects must deal with socio-cultural issues which influence the way in which the design, implementation, maintenance, and evaluation process is mediated through a community; in the end this will determine success or failure. Women, as primary waterdrawers and managers, are vital to the achievements of the Decade's goals. The structure of projects aimed at meeting these ends must be re-thought; women themselves should have control over decision-making, and must be able to define the parameters concerning how to gain access to pure water.

Van Wijk-Sijbesma (1985) explains that women have long had an important role as water managers, but this has not been fully appreciated in many of the water supply and sanitation projects which have emerged in the last decade. Women have a rich history of activities in all aspects of water

management, including communal efforts and user agreements, arrangements by particular women or women's groups for the upkeep of shared facilities, and the exertion of influence on male community leaders and owners of source sites. (Van Wijk-Sijbesma, 1985:2)

³ In 1976 it was found that in some countries in the South, water projects were failing at a faster rate than they were being implemented, and in 1980, thirty per cent of water systems were not functioning (Van Wijk-Sijbesma, 1981:4).

It would be a mistake to overlook the water management-related knowledge and experience of women; it would be more effective to allow women to make use of these, empowering them to design appropriate strategies.

Elmendorf (1981:3) details the four key roles of women in water supply and sanitation:

1. Acceptors of existing water services and sanitation customs;
2. Users of new water and sanitation facilities;
3. Managers of household and community water resources, and socializers in sanitary practices; and
4. Change agents in breaking the faecal-oral route of infection through better use of water and sanitation facilities.

As this demonstrates, it is through women that water supply and sanitation services are mediated. Women have the power to accept, alter, or reject new technology and hygiene habits for both themselves and their children. If better health and welfare are the goals of water supply and sanitation projects, women's above-mentioned roles must be recognized, and there must be an opportunity for them to play a significant role in new projects.

Some planners believe that it is partly because women have no awareness about water as it relates to health that there is so much illness. As a result, programmes are implemented with the aim of completely changing presently 'incorrect' habits. Van Wijk-Sijbesma (1985) believes that although health education is necessary to ensure that

unhygienic behaviour is modified, this should not be the only area in which women are involved. Nor should such education be of a formal nature, in which the outside 'expert' imparts her or his wisdom without fully listening to or examining the reasoning behind local practices. Women's knowledge and habits concerning water and health must be uncovered, and credence given where due. For example, it is incorrect to assume that women are not concerned with water quality, although criteria used to determine this quality may not coincide with Western 'scientific' methodology.

Nowhere did we find widespread casual or indifferent evaluations of water sources. Most users had evaluative judgements and most were interested in ways of improving their supplies. If they appeared to act contrary to the judgement of an expert it was for reasons convincing to them. The gap between the two judgements does not seem to rise from the lack of motivation to gain healthful supplies; it comes from differences in information and its assessment. (Van Wijk-Sijbesma, 1985:13)

Participation and education then become a crucial part of any water supply and sanitation programme, so that people's knowledge is disseminated to non-local project officials. As well, rural people can be informed about various options available, and can make informed choices. By determining the thrust of health education strategies, by defining what their requirements are, the kind of external help which would be of use to them, and by deciding on the structure of operation and maintenance activities, rural communities have control over changing their water- and sanitation-related access and habits.

In order for women to be able to become actively involved, a knowledge of local social structures is required so that obstacles to their participation are recognized and overcome. Many of these obstacles relate back to the earlier discussion about impediments to women's participation discussed in sections 2.4.2 and 2.5. Oakley and Marsden's (1984) discussion of the various degrees of participation are valid here as well. Development which works to the benefit of women rather than to their detriment requires meaningful participation of the sort which empowers them. In this way they can take an active part in water projects so that their problems, needs, and knowledge contribute to and form the basis of the structure of the water supply system.

If projects are run by males, and links to a community are via male leaders, it is difficult for women to be integrated into and empowered within the project's structure. Women's role as water managers must be recognized, and there need to be discussions with women about issues of concern to them; information and opinions should not be mediated through male elders or husbands. Project officials must ensure that community decision-making adequately includes women, and that they are provided with an appropriate context within which to make themselves heard, because gender-defined roles may conflict with women's involvement or active participation in public organizations.

Van Wijk-Sijbesma (1985:59) recommends the following to increase women's participation. Community leaders must be made explicitly aware of women's contributions and the value of their participation. Meetings with project officials should be at a time and place convenient to women. As well, apart from community-wide meetings, separate meetings for women only may need to be held. This would allow women to be free to express their needs and opinions without the cultural constraints which may occur if husbands or other males are present. It must also be ensured that poor women are included in all discussions.

At a more general level, at the 1977 UN Water Conference in Mar del Plata, thirty non-governmental organizations (NGOs) recommended that countries' national plans include the following (Elmendorf, 1980:9-10):

1. Strategies to develop human resources at the community level to meet local needs;
2. Ensure equal access of women with regards to the maintenance, management, and technology of water sources and supplies;
3. Ensure that women be included in any education programmes on the use of water and its protection from contamination.
4. Ensure the participation of women in local councils and planning boards responsible for making decisions on community water supply;
5. Recognize the increasingly effective role that women, NGOs, and other women's organizations can play in the education of public opinion for needed change.

Unfortunately, many water supply projects have not achieved any positive results for the community, and indeed

have been detrimental to some women. As table 2.1 demonstrates, unless the socio-cultural position of women in relation to their water management role is completely investigated, there is a serious risk that women's lives will be worsened.

At the same time, Van Wijk-Sijbesma (1985) also suggests that the possible benefits from a well-running water supply programme in which women actively participate are many. Presently, a great deal of time and energy is required of women for water collection activities. This reduces the time and energy available for other tasks performed by women, and often negatively affects the health and nutrition of women and their children, lowering economic productivity. If a water supply project can decrease the burden of collecting water, women may be able to put more time into child care, educating children, housework, agricultural work, community development activities, or even much-needed leisure time for themselves, thus benefitting themselves, their family, and community. In addition, as purity of water and hygiene increase, diseases may become less prevalent, reducing their physical and financial cost. However, in order for such benefits to be realized, women must play a significant role in water supply and sanitation programmes, so that their needs and their knowledge concerning water management become an integral part of the project.

TABLE 2.1
Reduced Benefits to and Negative Impacts on
Women of Domestic Water Supply and Sanitation
Projects

1. Certain categories of women are excluded from access:
 - poor
 - minority groups
 - women heads of household
2. Greater benefits and development spin-offs have accrued to women from wealthier households, thus widening the gap between rich and poor
3. Workload of women is increased by:
 - voluntary labour for collection
 - loss of assistance in water collection
4. Poor women and/or their husbands have lost employment or resources in:
 - water collection
 - water collection and reuse
5. Women have no control over income from economic use of time and energy gains or increased availability of water and waste for economic purposes:
 - agriculture
 - horticulture
 - dairy cattle
6. Special needs of women are not met:
 - laundry and bathing facilities
 - service operating hours
 - privacy
 - alternatives for meetings and social learning
7. The involvement of women has been relegated to:
 - health education
 - special projects
8. Improved facilities have led to reduction of:
 - traditional spheres of influence
 - organizational skills
 - social status

SOURCE: Van Wijk-Sijbesma, 1985:105

2.7 What This Means for an Evaluation of the URWSP

This chapter has served as a review of the wide bodies of literature on the topics of sustainable development; participation, especially that of women; and the role of women in water supply projects. The linkages to Ghana's URWSP must now be made so that a framework for this thesis is devised. A number of the perspectives examined in this chapter will be utilized to arrive at a concept of sustainable development which this author believes to be appropriate for an evaluation of the water supply system under consideration here.

Sustainable development in this case has to rest on three factors: substantial participation of villagers, particularly rural women (explained below); sufficient examination of the environmental systems which impinge on or are influenced by the hand-pump programme; and the ability of Ghana's national government and local communities to support the URWSP financially long after CIDA has terminated its aid.

For the purposes of this thesis, the URWSP will not be judged to be participatory in nature if the type of participation espoused can only be regarded as the facilitation of an externally imposed venture. To be truly sustainable, participation must imply at the very least mediation, and hopefully some degree of empowerment. Women's expertise in the area of water management, their needs as water carriers, and their productive and reproductive duties must be given full consideration so that the URWSP works for

them rather than against them. Participation must be meaningful in that the women of the Upper Region play a vital role in determining the course of the project: its on-going design, implementation, maintenance, and evaluation. Only then can the URWSP be considered to be part of that small group of development initiatives that are sustainable, and which actually do work for the benefit of the people.

The second issue, that of the environment, is based on the premise that the biosphere upon which peasants base their livelihood should not be degraded by any attempts at development. The intimate connections between water resources and the water supply system indicate that the latter cannot operate effectively or without a damaging impact unless there is adequate knowledge about hydrological systems. Too many so-called development projects have impoverished the fragile African environment, and further increased the vulnerability of the rural poor who depend on a stable biosphere. Before the URWSP can be termed an example of sustainability, it must be ensured that the long-term implications of the utilization of Ghana's water resources are considered fully.

The final criterion, financial feasibility, is also critical. If an initiative designed to improve rural people's welfare rests on unrealistic assumptions about its economic viability in the context of the nation in which it operates, any potential welfare improvements will not be realized. For Ghana, it is important that the specific difficulties which

2

it faces at both a national and local level are taken into account in all phases of the URWSP. It is this crisis in Africa and especially in Ghana which is the focus of the following chapter.

CHAPTER 3

POLITICAL ECONOMY OF THE CRISES IN AFRICA AND GHANA: ESTABLISHING AN APPROPRIATE CONTEXT FOR AN EVALUATION OF THE URWSP

3.1 Introduction

Having examined the concepts of sustainable and participatory development, it should be clear that a project such as the Upper Region Water Supply Programme (URWSP) cannot be evaluated strictly on the basis of its various components. It must be placed into a broader setting which reflects the strong (though not always readily visible) connections between actions taken at the intra-household or local level, and opportunities and constraints at the national and international scale. This chapter is devoted to examining the context within which the URWSP operates, linking it to the crisis in Africa generally, and in Ghana more specifically, in order to determine the impact of these conditions on the URWSP's sustainability.

The reader must keep in mind that the severe constraints which will be discussed can neither be ignored nor viewed as peripheral to the question of sustainability; these limitations are part-and-parcel of development ventures. In Africa, 'development' projects cannot be divorced from the reality of the crisis which must be faced: a growing debt burden, the impact of International Monetary Fund (IMF) and World Bank Structural Adjustment Programs, environmental

destruction, and increasing poverty. An understanding of the crisis in Africa, and more particularly the Ghanaian crisis, is fundamental to a comprehensive evaluation of sustainability and participation as they relate to this project. It is within this context that initiatives such as the CIDA-funded URWSP in Ghana must be understood and analyzed.

3.2 The African Crisis

During the initial Development Decade in the 1960s it was assumed, particularly by the North, that Africa would soon be able to join the ranks of the "First" World, given sufficient technological inputs, economic growth, and industrialization. The feeling was one of hope and confidence, which almost thirty years later has altered a great deal. Not only has Africa not succeeded in obtaining a higher standard of living for its people, but there has been substantial deterioration since any initial gains made during the 1960s or 1970s.

There is general agreement that Africa is currently in a state of crisis (ECA, 1989b; Loxley, 1988b; Haynes, Parfitt, and Riley, 1987), but the light at the end of the tunnel has not yet shown itself. The crisis is not a sudden occurrence. It is the manifestation of many decades, even centuries, of North-South interaction and government policy on both sides, and as such there can be no sustainable 'quick fixes'. The situation will take many years to correct.

Particularly since independence, much emphasis has been placed on neo-classical economic theory by institutions such as the World Bank and IMF, by donor countries in the North, and (at least initially) by a number of Africans. It was believed to be a means of achieving greater prosperity for Africa under the mistaken assumption that what has worked for the North will also work for the South. After independence a number of countries protested the colonialist yoke and tried to close themselves off from the rest of the world (primarily the world capitalist market) in order to concentrate on internal rejuvenation. Unfortunately, Africa's particular history (colonial policies and their effect on the economic and resource base) and geography (small, artificially created nation-states with similar resources and adverse terms of trade) made this type of policy difficult if not impossible. It was abandoned often out of necessity rather than choice.

By the early 1980s things had come to a head, and for most African countries the present, if not the future, looks very bleak. Symptoms of the African crisis are easily found: twenty-eight of the forty-three Less Developed Countries are now in Africa; the continent's Gross Domestic Product has averaged only 0.4% growth per year between 1980-1987; and per capita income has declined 2.6% per year over this same period (ECA, 1989b:5). Other indicators also are telling: agricultural and more importantly food production have declined, failing to keep up with population growth; most

industries are operating well below capacity; and physical and social infrastructure is rapidly deteriorating (ECA, 1989b:i). As well, ever-growing debt burdens are straining many countries to their limits. Estimates of total African debt for 1984 range from US\$78.4 billion to US\$158 billion; the latter accounting for 36 per cent of Africa's 1984 Gross Domestic Product (Haynes et al., 1987:343). Unless drastic steps are taken to eliminate or substantially ease the debt burden, African governments will have less and less room within which to manoeuvre their nations onto firmer footing.

Unfortunately, this does not seem at all likely. Thirty-six African countries are now implementing IMF/World Bank-supported structural adjustment programs (SAPs) (Loxley, 1988b), which emphasize liberalization of economies. The (North-supported) international financial institutions and donors have consistently ignored the enormous problems created by Africa's export orientation. The focus on a relatively small range of commodities leaves foreign exchange earnings vulnerable to the tremendous vagaries of the world (capitalist) market and eliminates national financial stability. The emphasis on laissez-faire economic principles by most international development organizations and inherent in "development" projects, has been based on the notion that because such neo-classical theory seems to work in the "modernized", industrialized, wealthy North, it not only will work in the South but is also the solution to its past and

current problems. The very different structure of Africa's economy, its position in the world market, and its specific history and culture are not brought into consideration. The result has been quite detrimental, with the growing debt only one indication of this.

In general, the overarching commonality of IMF/World Bank-type SAPs is their stress on the need to "earn more, spend less" (George, 1989a). This is generally done through a series of measures which are aimed at: devaluing currency, increasing production for export in the expectation that this will increase export earnings; liberalizing trade; decreasing the size of the civil service; eliminating price distortions; and cutting government expenditures¹. These conditionalities must be adhered to in return for the IMF/ World Bank seal of approval, which is the pre-condition for much-needed foreign financial assistance. However, the result has tended to be that economic control is wrested from the hand of the national government, leaving only a minimal number of alternative courses of action from which indigenous people can select their future path. As Loxley (1988b:2) states,

It is a measure of the severity of the economic crisis that so many African countries should acquiesce in the wholesale encroachment on national sovereignty which is implied by conditionality.

¹ Unfortunately, a key area generally targeted for this reduction has been social services. Military budgets tend to remain untouched, or even may increase as the social instability created by SAPs fosters a greater reliance on force by the ruling government (George, 1989b).

The effect of the SAPs for the majority of the African populace has been almost entirely negative. Poverty and suffering have increased as governments, squeezed by the debt burden and economic constraints, in turn squeeze their citizens. The pressure to produce subsistence crops for daily survival or for sale as farmers are forced to give up even more of their meagre incomes to the state has resulted in an inability to safeguard their livelihood base. Farmers can no longer afford to invest in the future, for their present survival depends on mining their natural resources; at the same time, this seriously strains their future well-being.

Opposition to SAPs, especially by (to this point) relatively privileged urban populace, has become increasingly evident as food riots, or "anti-IMF" riots occur in country after country (George, 1989a). In response to criticisms about the deteriorating human conditions, UNICEF and many other institutions have advocated "adjustment with a human face" (Cornia, Jolly, and Stewart, 1988). This is a series of measures designed to be added on to orthodox SAPs to lessen their toll on social welfare. However, as it is the basic thrust of such austerity programmes which is at the root of the problem, until fundamental shifts in policy occur few meaningful improvements can be made.

Debate about structural adjustment, both its ends and its means has resulted in two opposing camps. On the one

hand, institutions such as the World Bank continue to support orthodox SAPs. It is thought that the emphasis on price movements and balanced budgets as a way of both inducing and evaluating growth will correct existing problems and eventually create well-functioning, competitive economies, similar to those which exist in the North (World Bank and UNDP, 1989; World Bank, 1989).

External factors tend to be marginalized in favour of internal reasons for African economic ills. Explanations relating to an

adverse international economic climate, low commodity prices, or dwindling foreign assistance [are rejected in favour of]... domestic difficulties, including structural rigidities and institutional weaknesses, as well as poor [Sub-Saharan African] policies. (World Bank and UNDP, 1989:2)

It is primarily macroeconomic data which are then used to gauge the progress of the orthodox SAPs. As it is 'adjustment with growth' which is expected, the focus is on such things as export growth, agricultural growth (although not always disaggregating for food rather than export crops), growth in GDP, and level of investment. Other non-economic data are rarely examined, and the negative implications of austerity programmes for human resource development are often ignored. As government expenditure is slashed, massive public sector retrenchment often occurs, and large cuts in social sector expenditures, notably education and health (ECA, 1989b). Even if efforts are then made to maintain these levels, they are

already so abysmally low that the future development potential of Africans is severely compromised.

Compounding this is the reality that even the limited scope of indicators used by most international financial institutions and donors to determine progress of SAPs reveal that structural adjustment is by no means the panacea which it was touted to be. As figure 3.1 indicates, there have been few resulting improvements from enacting SAP policies.

SOURCE: ECA, 1989b:23

In contrast to supporters of current SAP models, an alternative to such orthodox measures has been put forth by the Economic Commission for Africa in the form of the African Alternative Framework Structural Adjustment Programme (AAF-SAP) (ECA, 1989b). The dichotomy between the two approaches

is evident immediately, for the understanding of the roots of the crisis are very different. The ECA argues that current SAPs are flawed because they do not recognize or attempt to deal with structural deficiencies which characterize African socio-economic systems and are at the root of the problem.

The model which underlies orthodox stabilisation and structural adjustment programmes emphasizes almost exclusively the use of competitive - domestic and external -market forces. Such a model is essentially not adapted to the African situation which is characterized by weak production structures and imperfect markets. Also, the programmes' concentration on achieving internal and external financial balances ignores basic structural factors that are important for both economic growth and socio-economic transformation. (ECA, 1989b:26)

Figure 3.2 depicts the outcome of this approach.

FIGURE 3.2
Conventional Structural Adjustment Programmes

SOURCE: ECA, 1989b:29

The detrimental effects of ignoring domestic demand by a strict focus on exports; ignoring distribution of income; and not taking into account critical domestic needs compound the crisis. There may be temporary relief of financial

imbalances, but structural deficiencies are aggravated.

What is needed instead, and what AAF-SAP attempts to do, is to enact a transformation from an exchange to a productive economy with the active involvement of socio-economic groups (ECA, 1989b). While general policy directions and instruments are discussed, it is made clear that these are to be tailored to the individual needs of each country, taking into account the uniqueness of that society's socio-cultural, political, and economic background.

Figure 3.3 illustrates the potential result of this proposal.

FIGURE 3.3
The AAF-SAP Alternative

SOURCE: ECA, 1989b:29

Poverty, low productivity, inadequate development of human resources, and a lack of physical infrastructure and technology are dealt with to reach sustained development, in which societies have the ability to adjust to changes in internal and external circumstances.

According to the ECA, "the path of adjustment with transformation should aim at simultaneously strengthening the process of the generation, distribution and expenditure of national income" (ECA, 1989b:28-29). The three primary factors on which adjustment and transformation are based are: (1) operative forces - political, economic, sociological, cultural, scientific, and technological; (2) available resources - human, biophysical, and financial; and (3) critical need - vital goods and services (i.e. non-luxuries) (ECA, 1989b). The operative forces determine the level and structure of production as well as its distribution between various socio-economic groups. Through AAF-SAP policies, there is feedback between the nature of the operative forces, the resources, and meeting critical needs. The following are the major policy directions which would lead to adjustment with transformation (paraphrased from ECA, 1989b:33-34):.

(1) Enhanced production and efficient resource use so that production capacity is not limited solely to balance the budget.

(2) Greater and more efficient domestic resource mobilisation. Financial leakages are to be stopped so that there are sufficient internally generated funds to support AAF-SAP policies.

(3) Human resources capacity is improved by devoting at least thirty percent of annual government expenditure to the social sector in order to develop an enabling environment.

(4) Scientific and technological bases are strengthened so that there is an endogenous capacity to transform resources into necessary consumer goods and services for domestic and export markets.

(5) Vertical and horizontal diversification takes place so that Africa becomes more self-sufficient in producing needed goods and services and the instability of foreign earnings is reduced.

By targeting the deeper structural weaknesses which the ECA believes to be the real problem in Africa, rather than dealing exclusively with macro-economic figures, 'adjustment with transformation', which seeks to establish a solid basis for development, is more likely to come about.

3.3 The Crisis in Ghana

3.3.1 From Independence to the Early 1980s

In 1957, at the dawn of Ghana's independence, no one foresaw that a mere twenty-five years later the 'Black Star of Africa' would have joined the dismal ranks of others on the continent. At that time, the future looked quite bright. Plentiful natural resources, a higher per capita income than elsewhere in inter-tropical Africa, and a larger base of skilled and schooled people appeared to be more than enough to ensure Ghana's development (Green, 1988; Killick, 1978).

Kwame Nkrumah, leader of the Convention People's Party (CPP), evolved a plan for Ghana based on rapid industrialization and socialism, believing that it was colonial exploitation which had held back his country. A key tenet was the fostering of import substitution industries as well as the development of numerous parastatals, necessitating heavy state investment in infrastructure and capital stock. Apart from Nkrumah's emphasis on state farms and their rapid

mechanization, however, the agricultural sector was virtually ignored, and there was an explicit rejection of small-scale, 'traditional' production (Ewusi, 1985). The end result of these policies was a rising import bill (since Ghana had few indigenous producers of capital equipment from which industries could purchase), a rapid decrease in consumer imports, and low levels of food production (Killick, 1978). It was during the period of 1961-1966 that things began to go seriously wrong for Ghana (Green, 1988a; Killick, 1978), as a drop in the world cocoa price and declining exports compounded a worsening balance of payments problem. The CPP steadfastly refused to acknowledge the mounting crisis, rejecting IMF conditions for financial assistance. The outcome, in 1966, was the first in a series of military coups and short-lived governments.

Initially, governments made some attempt at reform. Between 1966-1969 Ghana was led by two military regimes which attempted to follow at least part of an IMF/World Bank stabilization plan. However, from this period onward there were substantial contradictions and reversals in policy between governments, and from 1973-1981 no coherent economic policy can be found (Green, 1988).

It was not until the early 1980s that Ghana again experienced longer-term governmental stability. In 1981, Flight Lieutenant Jerry Rawlings and the Provisional National Defence Council (PNDC) returned to power in Rawlings' 'second

coming', resolving to deal with Ghana's many problems and return it to a stable, more promising course. Initially, the PNDC attempted its own version of a structural adjustment programme. However, a severe lack of foreign exchange and decreasing supplies of food could not be rectified. These were the two main causes of the 1983 crisis which the 1982-1983 drought, the worst in living memory, effectively brought to a head (Loxley, 1988a; Ghana, 1987).

Conditions over the past two decades have steadily deteriorated. Between 1970-1982 per capita income had fallen 30%, the import volume had declined by 33%, real export earnings were down 52%, inflation had averaged 44% per year, and the index of real minimum wage had dropped from 183.4 to 38 (Ghana, 1987). Food production had also suffered considerably: by the end of 1983, cereals, cocoyams, and cassava were only 26%, 45%, and 52% respectively of 1970 levels (Loxley, 1988a:1). As Tables 3.1 and 3.2 indicate, Ghana had reached a state of crisis, with socio-economic conditions declining, and nutrition, infant mortality, and poverty all getting worse (Ghana, 1987).

3.3.2 Living Under the Austerity Programme: Ghana Since 1983

With the Ghanaian crisis brought to the fore by the 1982-83 drought, the PNDC had little choice but to admit that its programme was not working. An overwhelming need for foreign

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TABLE 3.1
Selected Trends in the Economy of Ghana 1970-83

	1970	1975	1980	1981	1982	1983
Real GDP (1975=100)	100	100	105	101	94	89
Real GDP Per Cap. (1975=100)	114	100	92	87	79	73
Inflation Rate (% p.a.)	9	30	50	117	22	122
Balance of Payments: Current a/c (\$m)	-81	-51	-55	-508	-158	-230
Payments Arrears (\$m)	n.a.	161	n.a.	512	577	440
Merchandise Exports (\$m)	481	728	1104	711	641	439
Merchandise Imports (\$m)	449	651	972	1021	631	539
Cocoa Production ('000 tons)	413	396	258	224	179	159
Export Quantity (1968=100)	129	56	40	41	46	33
Import Quantity (1968=100)	(1971) 86	62	40	45	26	18
Government Revenue and Grants (cm.)		870	3279	4856	5254	10241
Revenue and Grants as % GDP		17	8	7	6	5.5
Government Expenditure (cm.)		1439	7719	9529	8846	14,755
Expenditure as % GDP		27	18	13	10	8
Development Expenditure (cm.)		441	1390	927	817	1354
Development as % Total Expenditures		31	18	10	9	8
Real Development Expend. (1980=100)		-	100	39	29	30
Overall Deficit (cm.)		-842	-4707	-4847	-3966	-4934
Overall Deficit as % GDP		16	11	7	5	3
Minimum Wage (cedis/day)	0.8	2.0	5.3	12.0	12.0	25.0
Minimum Wage (cedis/day) (1977=100)	25	68	178	400	400	725
Real Minimum Wage (1977=100)	183	225	44	46	38	32
Real Average Monthly Earnings (1977=100)	315	285	88	62	n.a.	n.a.

SOURCE: Loxley, 1988a:2

TABLE 3.2
Some Factors Explaining Ghana's Economic Performance 1970-83

	1970	1975	1980	1981	1982	1983
Official Exchange Rate (c per \$)	1.02	1.15	2.75	2.75	2.75	3.45
Real Exchange Rate (1970=100)	100	106	378	850	1,020	1,700
Parallel Rate (c per \$)	1.64	1.99	15.87	26.25	61.67	76.58
Differential Parallel/Official Rate	1.6:1	1.7:1	5.8:1	9.5:1	22.4:1	22.2:1
Cocoa Exports (Metric Tons)	362	322	240	201	160	148
Cocoa Producer Price (Cedis)	293	597	4,000	12,000	12,000	20,000
Real Producer Price (1972=100)	106	90	45	62	49	34
% F.O.B. Receipts to Cocoa Farmers	46	42	86	267	38	24
% F.O.B. Receipts to Cocoa Farmers at Parallel Market Rate	27	26	14	28	9	6
Terms of Trade (1986=100)	(1971) 81	96	95	62	48	48
External Debt (Excl. IMF and Arrears) (\$m.)	489	676	1,099	1,111	1,117	1,132
Debt Servicing (% of Exports)	5.0	5.4	7.7	6.4	8.3	20.9
Changes in Broad Money Supply (M2) (% p.a.)	10	39	34	51	23	38
% Change M2 explained by Govt. borrowing			81	101	15	45

SOURCE: Loxley, 1988a:5

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exchange and Ghana's inability to attract lenders² made it almost impossible to continue rejecting an IMF structural adjustment package. Thus, in April 1983, the first phase of the Economic Recovery Programme (ERP) was launched. The goal of this initial phase, which lasted until 1986, was to stabilize the economy and halt decline. Phase II of the ERP (1986-1989) consisted of structural adjustment and development initiatives designed to make the most of any gains from ERP Phase I (Ghana, 1987). The measures taken under the ERP bear a great deal of resemblance to most other such SAPs: massive currency devaluations; an increase in producer prices for the principal export crop in order to encourage greater production; an increase in taxation and implementation of fees for such services as health and education; cuts in the size of the civil service; privatization of numerous parastatals; trade liberalization; and a removal of price controls and subsidies (Loxley, 1988a). All in all, this programme was based on neo-classical theorizing concerning the ability of the market to be an efficient determiner of supply, demand, and the true worth of goods and services. Ghana's future is now firmly dependent on the success of the ERP.

There is definite lack of agreement as to the progress of Ghana's ERP to date. On the one hand, many people,

² Ghana's financial instability and particularly the lack of an IMF/World Bank-approved structural adjustment programme meant that few donors were willing to take the risk associated with lending the country any money (Novicki, 1987).

including the IMF and World Bank, contend that Ghana is well on the way to making a substantial recovery³. In fact, post-1983 Ghana is often held up as "the very model of a modern stabilization and adjustment programme (IMF/World Bank variant)" (Green, 1988:7)⁴. If the ERP is to be evaluated solely on the basis of improvements in macroeconomic variables, such an opinion might have some support. As Table 3.3 indicates, a number of these variables showed improvement in the early years of the programme.

Real wages, per capita consumption, and per capita incomes also rose, although the latter is still 20% less in real terms than in 1975 (Loxley, 1988b:30). An increase in imports in addition to this growth has alleviated some of the supply side problems which had been plaguing Ghana's industries (Hodges, 1988).

However, even such a restricted analysis of the ERP points to a number of problems. Inflation has begun to climb again, reaching 39.0% in 1987 (table 3.3), per capita output of all major food staples fell by 30% between 1984-1986 (Loxley, 1988b:11), and the heavy cuts in state employment - 45,000 civil servants and teachers as well as 20,000 people from parastatals between 1987-1989 (Ghana, 1987:5) - indicate

³ However, there have been some suggestions that much of the improvements are simply a result of good weather, rather than the ERP (Loxley, 1988a; Green, 1988).

⁴ See for example Green, 1988; Novicki, 1987; Loxley, 1988b; Hodges, 1988; Haynes et al., 1987.

TABLE 3.3
Ghana: Economic Indicators 1983-87

Indicator	1983	1984	1985	1986	1987
GDP at current market prices (bn cedis)	184.0	270.6	373.1	511.2	700.1
Real GDP growth (%)	0.7	6.8	5.1	5.3	4.0
Overall government deficit/GDP (%)	-2.7	-1.8	-2.0	0.1	0.4a
Inflation (%)	122.8	39.7	10.4	24.6	29.0a
Exports (\$ mn)	441	567	633	749	787
of which: cocoa (\$ mn)	279	382	412	503	465a
gold (\$ mn)	102	103	91	106	140a
timber (\$ mn)	15	21	28	44	90a
Imports (\$ mn)	500	616	671	733	764a
External current account (\$ mn)	-174.1	-75.3	-156.6	-84.5	-97.7a
External public debt (\$ bn)	1.50	1.79	2.13	2.66	2.84a
Debt service ratio (%) b	26.0	36.2	54.1	47.8	62.6
Agricultural production (1979-81=100)	88	105	123	123	123
Food production (1979-81=100)	89	131	122	131	131
Food production per capita (1979-81=100)	81	115	104	107	105
Cocoa production ('000 tons) c	158	175	219	218	185a
Exchange rate (cedis per \$)	3.4	35.3	54.1	89.3	147.1

Notes: a Preliminary estimate
b Including IMF repurchases and charges
c Crop years beginning in October of year indicated

SOURCE: Hodges, 1988:16

that by no means is all well.

The logic of Ghana's emphasis on export orientation seems questionable considering the number of other countries which are pursuing similar policies⁵. The many other countries under SAPs are also devaluing their currency to make themselves more competitive and increasing production of export crops. Ghana has raised cocoa producer prices⁶, resulting in more output to formal market channels and greater production, as well as enacting the tremendous devaluations of the cedi which are evident in Table 3.4.

At the same time, however, Malaysia has entered the cocoa market and Cote d'Ivoire is increasing production. It therefore should be little surprise that world cocoa prices have fallen. Between 1983-1987, world cocoa supply has increased by about 33%, while world prices have dropped 19%, well below the floor set by the International Cocoa Agreement (Loxley, 1988b:15). Given Ghana's dependence on cocoa as a foreign exchange earner, this has serious implications for sustainability of the ERP.

This loss of foreign exchange is particularly crucial given Ghana's growing debt, a result of the ERP's dependence

⁵ This is referred to as fallacy of composition. SAPs, despite their neo-classical underpinnings, fail to recognize the basic premise that as supply increases, price decreases. Cocoa, Ghana's principal export crop, has been found to be highly susceptible to this.

⁶ Cocoa producer prices were increased to 45% of world price in 1988, still quite a bit below a fair distribution of revenues (Hodges, 1988).

TABLE 3.4
Changes in Key Policy Variables Under the ERP

Key Policy Variable	1983	1984	1985	1986	1987
Exchange Rate End Period (C per \$)	30.0	50.0	59.9	152.0	171.0a
Exchange Rate Period Average (C per \$)	34.5	35.3	54.0	98.9	162b
Cocoa Producer Price ('000s C per ton)	20	30	56.6	85.5	140
Interest Rate on Six Mos. Deposits (end period)(%p.a)	11.5	15.0	17.0	19.0	22.0c
Average Maximum Lending Rate (%p.a.)	19.0	22.5	23.0	23.0	26.0
Number of Items Under Price Control	23	17	8	8	
a September b World Bank (1989:2) c March					

SOURCE: Loxley, 1988a:15

on large amounts of financial investment. Although before 1983 debt did not appear to be a significant problem, Ghana's finance minister now concedes that the country is in a "debt trap" (Hasch, 1989:26), as table 3.5 indicates. The rise in debt service ratio to 62.6% of exports in 1987 (Hodges, 1988:16), a figure which is expected to continue rising, puts tremendous stress on the Ghanaian economy and its citizens.

TABLE 3.5
External Debt and Annual Debt Service
Ghana 1983-1987

	1983	1984	1985	1986	1987
External Debt, Including Oil Credits and IMF (\$m)	1552	1860	2051	2163	2202
Debt Servicing as % Exports (excluding arrears) (%)	26.0	36.3	53.4	46.5	53.0

SOURCE: Loxley, 1988a:44 and World Bank, 1989:2

The ERP has had significant ramifications for agriculture. Higher producer prices for cocoa mean that more farmers are turning to cocoa in order to earn more money, without necessarily having the means or opportunity to take care of their land properly. As the relative price of food crops vis-a-vis that of cocoa has fallen sharply since the ERP was enacted, the incentive to grow food has declined⁷.

⁷ The IMF and World Bank believe that production for export should take priority; food production is expected to work itself out once the former is operating 'properly' (Loxley, 1988b).

Indeed, per capita output of all major food staples fell by 10%-30% between 1984-1986 (Loxley, 1988b:11). If the result of limited food supply is higher food prices, as it is likely to be, people will be forced to squeeze even more from the land they farm.

The ERP and its subsequent debt burden have also put a great deal of stress on the environment. The emphasis on export promotion as a means of generating revenues and foreign exchange has resulted in a number of unsustainable activities. The export of timber, the value of which jumped from US\$15 million to US\$90 million within four years of the launching of the ERP (as seen in table 3.3) has created an all-too-real threat of deforestation. Ghana's forest cover since the turn of the century has fallen from 8.2 million km² to only 1.9 million km² (Loxley, 1988b).

Environmental degradation such as "...overuse and misuse of the soil, poor conservation policies, overgrazing, [and] deforestation..." (ECA, 1989b:4) has worsened as a result of structural adjustment in Ghana and elsewhere, and is not likely to right itself unless more fundamental questions regarding distribution of the costs and benefits of austerity programmes are addressed. One must re-examine the framework within which the ERP has generally been evaluated to achieve a more accurate portrayal of its opportunity costs. Macroeconomic indicators alone obscure much of the reality for Ghana's citizens, since they ignore the fact that foreign

monopolies and private business interests have gained (through cheaper raw materials, privatization, and de-nationalization) while rural areas and lower income groups have lost (through further entrenchment of poverty, user fees in health and education services, and inadequate incomes) (Songsore, 1990). The issue brings to mind the discussion in the previous chapter concerning whether economic growth can mean anything unless it is accompanied by social growth.

In examinations of Ghana and its ERP, particularly by the IMF and World Bank, concern about social conditions tends to be marginalized or ignored. The ERP has had very negative effects on social infrastructure (ECA, 1989a; Green, 1988; Ghana, 1987). Social services have been hurt by a lack of funds, decreasing the already minimal service provision which had been in effect. Health and education services which were previously free are now provided only for a fee. Fulfilment of basic needs such as these should be at the core of any "recovery" programme, for an ability to meet the fundamental needs of the people in such things as health care is a much more accurate judge of long-term progress and human resource development than macroeconomic indicators. "Growth" means little unless it is accompanied by equitable distribution, and the latter has not occurred. In fact it is those people already having the greatest difficulty surviving who have been

forced to bear a large part of the structural adjustment burden⁸.

It was not until 1987, four years after the ERP was implemented, that the impact of the adjustment programme on human conditions was seriously studied and an attempt made to integrate some concern for social welfare into the structural adjustment initiative. The result was the Program of Actions to Mitigate the Social Costs of Adjustment (PAMSCAD). This US\$70 million programme, all to be financed by foreign donors, consists of a series of initiatives focused particularly on poverty alleviation. For the most part, however, projects are expected to have high economic and social rates of return and require little in the way of institutional support (Ghana, 1987:1). As PAMSCAD is considered by its creators to be a short-term solution to short-term problems⁹, there is little

⁸ The government of Ghana indicates that as it believes the ERP will succeed, short-term sacrifices in social conditions should be tolerated under the assumption that expected ends justify the means: "...there is little doubt that the majority of the population is likely to be better off in the medium to long term ... [although] certain groups, including at least some of the poor, will have to bear the costs of adjustment in the short-term" (my emphasis) (Ghana, 1987:4-5)

Given the already precarious position of the poor, and the tremendous burdens which the ERP is imposing, this is a very cruel position. When one considers whether the ERP indeed will succeed, the notion that any costs will be only for the short-term seems highly debatable. Are the poor to bear the brunt of structural adjustment indefinitely?

⁹ It is expected that after a short period in which the ERP causes difficulties for various parts of the population, the ERP will then take off and everyone will reap the benefits of growth brought about by the adjustment programme (Ghana, 1987).

motivation to recognize and take action on the structural flaws built into the ERP. As a mere 'add-on' - an afterthought - to the structural adjustment programme, it will be almost impossible for PAMSCAD actually to improve human welfare.

This concern is borne out by Table 3.6, in which some indicators of Ghana's social situation are presented.

Poverty has either worsened since the 1960s, or has regressed from its earlier recovery in the 1970s. Infant mortality, child malnutrition, and the proportion of the population below the absolute poverty line have all risen, while the health budget, available calories, and education budget have all suffered. As well, rural conditions tend to be even worse than in urban areas due to urban biases in planning and spending. Looking at these statistics, the lack of sustainability of the ERP becomes even clearer.

As internal opposition to the ERP mounts, if the national government continues to place its faith in this course of action political repression may become a necessary tool (Rado, 1987:567). The decay of social conditions means that there is less and less upon which future hopes can be based. This is the real signal of Ghana's crisis: a downward spiral of increased poverty, an ever-greater debt burden, and no alternative course of action readily available.

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TABLE 3.6
Selected Human Condition Indicators
Ghana 1960-Mid 1980s a

	1960	Ghana 1970	Late 1970s	1980s	Low Income SSA 1982
1. Average life expectancy at birth	45	49	55	53	48
2. Infant mortality rate	132	107	86	107-120	118
3. Child death rate	27	21	15	25-30	24
4. Access to health facility b	--	--	--	30	45
5. Public health facility visits per person per year	--	--	0.7	0.4	2f
6. Health budget as % of GDP	--	1.2	--	0.26	0.95
7. Access to pure water c					
Rural	--	14	14	48	14
Urban	--	86	86	75	62
Total	--	35	35	60	22
8. Access to excreta disposal d					
Rural	--	40	40	30	25
Urban	--	92	95	65	69
Total	--	55	56	44	32
9. Average calorie availability as a % of requirements	92	97	88	68	91
10. Child malnutrition (moderate/severe)	--	--	36	50-55	40
11. Primary education enrolment ratio e	38(46)	64(75)	69(80)	-(80)	69(-)
12. Adult literacy	27	30	--	35-45	44
13. Education budget as a % of GDP	--	3.9	--	0.85	2.81
14. Proportion of population below absolute poverty line f					
Rural	--	--	60-65	67-1/2- 72-1/2	65
Urban	--	--	30-35	45-50	35

Notes: a 1960 data refer to a year between 1959 and 1961;
1970 between 1969 and 1971;
late 1970s between 1975 and 1980;
1980s to 1982, 1984 or 1985

b Defined in terms of location within a 5 kilometre
radius. May overstate for urban population when
facilities are small to serve the entire population
nominally within reach of them.

c 1970 and late 1970s urban figures may be overstated
by failing to relate number of water points to
population.

d 1970 and 1978 figures for urban and possibly rural
areas overstate by failing to relate number of
drop-holes to supposed user population.

e Adjusted for length of primary cycle. () are
unadjusted figures. Because of the primary/middle
school division Ghana has a shorter primary cycle
than most SSA countries.

f Estimate made by author on basis of fragmentary
data.

3.4 Implications for Sustainability of the URWSP

Given the above examination of the crisis in Ghana, it becomes increasingly apparent that "development" projects cannot exist in a vacuum. Social, financial, economic, and environmental problems worsened or engendered by the adjustment programme provide a context within which all activities take place. Ghana cannot afford the cost - either monetarily or in human terms - of supporting a development initiative unless its sustainability is paramount in project planning, implementation, and assessment. The Lagos Plan of Action (1980) adopted the notion of self-sustained development as the only way to attack mass poverty successfully (ECA, 1989b:9). As many people have begun to recognize, unless development is sustainable, it is not development (ECA, 1989b; Green, 1988; Loxley, 1988b). Slowly, international organizations such as UNICEF, CIDA, and the ECA are starting to acknowledge this fact.

The URWSP is important in that it is aimed at meeting one of people's basic needs: pure water. However, the project raises a number of concerns in regards to its sustainability. The 'per pump and borehole' cost is quite high¹⁰ in absolute terms; relative to the financial condition of Ghana it is astronomical. Ghana's commitment to the URWSP is precarious

¹⁰ This amount has been estimated at between \$60,000 and \$100,000, including costs encountered during planning and implementation (Chauvet, 1989).

even while CIDA continues to fund it, and this is likely to worsen once CIDA pulls out.

The following chapter explores the way in which the water supply system has been organized financially. This is discussed in terms of the hand-pump technology chosen and the ability of villages and the Ghana Water and Sewage Corporation to continue funding the URWSP without external assistance. Given the above analysis of the Ghanaian economic climate, it is imperative that the water supply system be based on realistic assessments of how much people are able and willing to pay for potable water.

CHAPTER 4

FINANCING THE URWSP: IMPLICATIONS FOR COMMUNITIES AND THE NATIONAL GOVERNMENT

4.1 Introduction

Much of the concern about sustainable development, as discussed in chapter two, has focused on the need for both an awareness of the relationship between environment and development, as well as community participation in the development process. These are certainly necessary components (and will be discussed in chapters five and six), but they are not enough; for a particular venture to continue to exist over many years, it must be economically viable on both national and local scales. To assess a development programme without considering its broader financial implications is self-defeating. If sufficient funds are not available to support a project well into the future, then it is likely to collapse or be severely curtailed.

The context for the Upper Region Water Supply Programme (URWSP) is Ghana, a country which has been subject to many of the underdevelopment influences of other nations in the South. The current Ghanaian crisis, which stems both from historical economic problems and the IMF/World Bank-administered structural adjustment programme (in place since 1983), has ramifications for social, financial, and political aspects of

Ghanaian life. A mounting debt burden (62.6% in 1987 according to Hodges, 1988:16) is quickly relegating all non-foreign exchange earning activities to the background, and forcing rural areas into ever-greater poverty. The national government cannot afford to provide large sums of money for development within the country, particularly in areas that do not have a strong political voice.

Although improving water supplies in the Upper Region has the potential to benefit rural people, the vast expenditures which this would require (particularly relative to Ghana's financial constraints) suggest that all aspects of the URWSP must be economically justifiable. Ghana cannot afford to support such a programme unless the most cost-effective (as viewed over the long-term) and efficient (relative to villagers' needs) routes are taken.

A useful concept to help analyze prospects for financial sustainability is that of Village Level Operation and Maintenance (VLOM). VLOM is based on the principle that successful water supply systems require community involvement in and responsibility for many aspects of water supply projects so that user needs and control influence technology choice (UNDP and World Bank, 1987). While not an explicit methodology per se, VLOM provides a loose framework within which the URWSP's financing can be examined, including issues such as choice of hand-pump technology and tariff collection from communities.

In the search for a sustainable water supply system for the rural Upper Region, technology selection and financing necessitate due consideration. It is important that the needs of Upper Region residents for clean water and improved health are met within the severe financial constraints which exist currently (and are likely to exist for some time). The purpose of this chapter is to examine the appropriateness of installed hand-pumps as well as the financial structure in the URWSP. It is necessary that the water supply system be organized in such a way that continued provision of water to rural areas will be viable without much non-local support. The limited funds likely to be available from the Ghana Water and Sewage Corporation indicate that communities will have to bear much of the organizational and financial responsibility for hand-pump maintenance and repair, especially in the post-CIDA years. What changes must be made now in the programme's structure so that the water supply system technology can be adequately operated, repaired, and monetarily supported by rural villages?

4.2 Background to the URWSP

By the early 1970s, the inadequacy of potable water provision to both rural and urban Ghanaians was brought into focus. As table 4.1 shows, rural-urban disparities in water service provision were quite substantial, with the proportion

of rural dwellers served by potable water far less than that of urbanites.

TABLE 4.1
Proportion of Ghana's Rural and Urban
Populations with Access to Clean Water

Segment of Populace Served by Clean Water ('000s)	1975	1980
Total Population	9 680	10 900
Total Served	3 695	5 306
Percent of Total Population Served	38.2%	48.3%
Urban Population	2 756	3 156
Urban Population Served	2 547	2 970
Percent of Urban Population Served	92.4%	94.1%
Rural Population	6 924	7 800
Rural Population Served	1 148	2 336
Percent of Rural Population Served	16.6%	29.9%

SOURCE: United Nations, 1983:Annex 11,12,13

Cornia, Jolly, and Stewart (1988:102) also estimated that by 1983, coverage had been extended to about 38% of rural populations, and 94% of urban ones. Thus, although the situation has improved slightly over the years, a significant proportion of rural people have not had access to water.

In response to this problem, the government of Ghana approached CIDA to ask for assistance in improving Ghana's water supply. CIDA responded with a programme targeted at the Upper Region, an area of Ghana which had been relatively impoverished vis-a-vis the southern part of the country.

Historically, both during colonialism and after independence, the south of Ghana had been favoured more strongly than the north¹, largely due to the perception of greater resource values in the south (Malone Given Parsons, 1986b). The ability of the north to attract government attention and finances depended to a large extent on the power and status of northerners within the national government. Initially at odds with Nkrumah's post-independence rule, it was not until the 1972 coup of General Acheampong's Progress Party that the north became a focus for national development efforts (Malone Given Parsons, 1986b).

It was in this more positive climate that on July 23, 1973 a Memorandum of Understanding was signed between the Ghanaian and Canadian governments for the Upper Region Water Supply Programme (URWSP). The URWSP affected both urban and rural populations of the Upper Region. This region comprised an area of 27,300 km² with a population of approximately 1.3 million, about 80-90% of whom are rural dwellers (Moffat, 1988:1). The location of the Upper Region of Ghana is shown in figure 4.1.

The urban component of the URWSP was aimed at improving water supplies in larger communities, primarily Bolgatanga, Wa, and Bawku. The rural component, with which this thesis is concerned, was directed at the installation of hand-pumps.

¹ The north of Ghana is assumed here to include both the Northern and Upper Regions.

[illegible]

Both aspects of the URWSP were designed to provide people in the Upper Region with an "assured supply of potable water" in order to alleviate the many problems associated with poor water quality and quantity (Malone Given Parsons, 1986a:1).

Table 4.2 outlines the various phases of which the URWSP has consisted:

TABLE 4.2
Components of the URWSP

Project	Time Period
Upper Region Water Supply Project Phase I	1973-77
Upper Region Water Supply Project Phase II	1977-81
Water Utilization Project Phase I	1979-84
Maintenance/Stabilization Project	1982-86
Water Utilization Project Phase II	1985-88
Water Utilization Project Phase II Extension	1988-90

SOURCE: Malone Given Parsons (1986d) and Etherington (1989)

The focus of the URWSP has changed a fair amount since its inception. The programme was initially designed merely to install the hardware without the benefit of any support systems. The installation of the hand-pumps took place during the two phases of the Upper Region Water Supply Project, in which boreholes were drilled and fitted with Beatty hand-pumps, Canadian-made technology. About a decade later, the maintenance and stabilization project replaced many of these hand-pumps because they had been found to be unreliable and ill-suited to conditions in rural Ghana. It was not until 1979 that suggestions from a mid-1970s evaluation were put into practice and an effort made to respond to the need for

education about water, health, and pump maintenance.

These issues were introduced through the Water Utilization Project (WUP). WUP's responsibilities have been multi-faceted, concerned with everything from training caretakers about pump repair to giving lectures on the treatment of diarrhoea. As more was learned about appropriate methods for helping to improve the health of people in the Upper Region, the URWSP attempted to adapt. Each subsequent component of the programme has targeted new areas which were found to be related to improvements in both health and water supply system organization.

Both CIDA and the Ghanaian government have committed significant resources to the URWSP. However, the reality is that at some point in the future CIDA will terminate its financial assistance, and Ghana will have to support the hand-pump system independently. How feasible is this? In order to assess the potential for the URWSP to be financially sustainable, the Village Level Operation and Maintenance concept will be employed to examine the water supply system technology used and URWSP financial structure.

4.3 An Evaluation of the URWSP Using the Village Level Operation and Maintenance (VLOM) Concept

4.3.1 What is Village Level Operation and Maintenance?

As water supply and sanitation issues in the South have come into focus, particularly during the United Nations

International Drinking Water Supply and Sanitation Decade, the United Nations Development Programme (UNDP) and World Bank have done a great deal of research concerned with improving the performance of hand-pump projects through the UNDP/World Bank Hand-pump Testing Project. The Project has coined the term 'VLOM' (Village Level Operation and Maintenance) to describe projects which use water supply technology appropriate for the particular community in which it is to be used, taking into consideration the benefits and costs which that community has the desire and ability to maintain.

The aim is that the technology chosen should give the community the highest service level that it is willing to pay for, will benefit from, and has the institutional capacity to sustain. (UNDP and World Bank, 1987:2)

The VLOM concept was initially applied only to hardware, but now also emphasizes user community involvement. Table 4.3 describes characteristics which the UNDP and World Bank believe encompass a VLOM approach.

If a water supply system is to be sustainable, an emphasis on the community's ability to operate and maintain the hardware and have some control over its organizational structure is a necessary and solid base upon which other features of a project should be built. This requires that villagers are brought into discussions about the water supply system on a consultative basis. As water drawers and managers, women must be able to participate actively in

TABLE 4.3
Characteristics of a VLOM Approach
to Hand-pump Projects

Hardware Issues

Hand-pumps are:

- easily maintained by a village caretaker, requiring minimal skills and few tools;
- manufactured in-country, primarily to ensure the availability of spare parts;
- robust and reliable under field conditions; and
- cost effective

Organizational Issues

- * community choice of when to service pumps;
- * community choice of who will service pumps; and
- direct payment to repairers by the community

* These two issues will be discussed in chapter five.

SOURCE: UNDP and World Bank, 1987:4

determining the type of technology which they are to use, as well as the programme's financial structure. By giving villagers more control over the management of their water supply system, it is much more likely to be adapted by them to fit their perceived needs and constraints. Limited financial resources will be most effectively utilized if hand-pumps can be maintained fairly easily at a local level, without necessitating external intervention or costly repairs.

The remainder of this chapter will be concerned with assessing the so-call 'hardware' issues presented in table 4.3. The two most critical issues are: (1) choice of an appropriate technology which stands up to community use and is readily maintainable by villagers; and (2) ability of the national government to afford support services, and of rural people to contribute financially to the upkeep of the water supply system.

4.3.2 Hand-pump Technology Choice

The concept of 'appropriate technology' is a fairly well researched area, and much has been said on the need for development programmes to use technologically suitable equipment with regard to the end purpose and amount of time, energy, and money which a community is able and willing to devote. For the people affected by the URWSP, an appropriate hand-pump choice would likely be one which is:

1. manufactured in Ghana or a nearby area, in order to minimize foreign exchange expenditures for parts and maximize its suitability in terms of climate and user demands.

2. easy for villagers to use and repair.

When the URWSP began, it was primarily Beatty hand-pumps which were installed. These pumps were manufactured in Ontario, and were designed for a relatively low level of use on Canadian family farms (Malone Given Parsons, 1986a). Beatty pumps met neither of the above two criteria and indeed were quite ineffective. They were unable to keep up with the demands of hundreds of users and often broke down, necessitating costly repairs. During the maintenance and stabilization phase, GWSC replaced the Beatty pumps with the three types of hand-pumps now installed in the Upper Region: Moyno, Monarch, with a small number of Sholapur/India Mark II. Although the Moyno and Monarch are certainly much more reliable than the Beatty, they are not VLOM pumps. Moyno pumps in particular are hard to use, difficult to repair, and have a relatively low yield, resulting in long waiting lines at the pump site (Malone Given Parsons, 1986a). Although these pumps are reputed to be relatively durable, the numerous disadvantages cast a doubt on GWSC's 1982 decision to expand the number of Moyno pumps in operation. Other hand-pump models exist, such as the India Mark II, which are more appropriate in terms of cost and meeting needs of Upper Region residents.

In view of Ghana's severe lack of foreign exchange, which is a necessary prerequisite for the purchase of pumps and spare parts, it would be ideal to use a hand-pump which is manufactured within Ghana. Although there is presently no such existing production facility, there are several pumps produced elsewhere in Africa. The Afridev, produced in Kenya, and the Maldev, produced in Malawi, are both similar in design to the India Mark II, and there is also the Volanta pump, partially manufactured in Malawi (Malone Given Parsons, 1986a). The India Mark II and derivations of it deserve serious consideration when new pumps are required, as they are likely to be more acceptable on both financial and practical grounds.

There are two impediments to the integration of the VLOM concept with hand-pump choices for the URWSP. First, hand-pump selection has tended to be restricted to Canadian-made technology (Malone Given Parsons, 1986a). Government agencies in the North often have a policy of tied aid. For CIDA, tied aid accounts for a large proportion of aid dollars, and according to Sharing our Future, "the Government will hold to its current practice of purchasing competitive Canadian goods and services for its bilateral aid programs" (CIDA, 1987b:51). While it therefore is expected that CIDA promotes the interests of Canadian businesses, one must question the wisdom of doing this at the expense of a nation such as Ghana, which cannot afford to purchase anything other than the lowest cost

technology appropriate to the needs of Ghanaians. 'Sustainable' development should work to the benefit of underdeveloped areas, not to reinforce the already-distorted international economic order.

Another problem is that there seems to be a tendency to rely on more sophisticated technology choices, with little reference to user requirements or situational constraints. For instance, an earlier study strongly recommended that the number of moving and wearing parts in a hand-pump be reduced in order to make village-level repairs easier and cheaper (Malone Given Parsons, 1986a). In spite of this, a newer version of the Monarch hand-pump was accepted by the GWSC (on the recommendation of results obtained by a hand-pump testing programme) in which "the number of parts increased from 24 to 77, and the wearing points from two to six" (Malone Given Parsons, 1986a:62). Clearly, this move seems counterproductive to effective long-term operation of the URWSP.

The VLOM approach is one which relies on community participation and responsibility in a water supply system. This type of water supply system places the onus on the community to care for pumps. Furthermore, it is more feasible for Ghana than relying on complicated technology which drains national resources. The economic difficulties under which the Ghana Water and Sewage Corporation operates (see below) suggest that pump maintenance and repair are best undertaken

by communities. Once CIDA has withdrawn, the infrastructural capacity to respond to malfunctions in the water supply system in all likelihood will diminish. If villages are not to be left without readily accessible potable water, they must have the knowledge and ability to keep hand-pumps in good operating condition. The more complicated a hand-pump, the more difficult this will be; villagers will not have the skills, tools, or time necessary for such work. Implementing VLOM-style hand-pumps is an alternative which would have long-term benefits for the URWSP.

In this vein, CIDA may be taking some positive steps. Fifty VLOM pumps developed in the UNDP/World Bank Hand-pump Testing Project were to be installed in the Upper Region in the latter part of 1988 under total community responsibility. As well, CIDA apparently has intentions of replacing all URWSP hand-pumps with VLOM technology by 1994 (Etherington, 1988). Assuming that villagers have been adequately advised on their maintenance and repair, VLOM hand-pumps offer the promise of reduced repair expenditures and increased effectiveness of the water supply system. If a commitment to this is made by the URWSP, it is much more likely that hand-pumps will be maintained, and will lead to better health for people in the Upper Region. In addition, VLOM pumps, especially if they are produced in the South, tend to be more reasonably priced relative to what Ghana can afford (Etherington, 1988). This is an important consideration, since the water supply system

will require periodic replacements of worn hand-pumps. Moreover, the government of Ghana may also want to expand the number of pumps to keep pace with population increases in the Upper Region.

4.3.3 Financial Condition of the URWSP

Two tenets of the VLOM concept, cost effectiveness of the water supply system and user responsibility for the cost of repairs, are equally important in assuring the sustainability of the URWSP. An evaluation of the costs of the URWSP must include two components: 1) the ability of GWSC to maintain the hand-pump system and associated programmes financially, particularly once CIDA's support has been terminated; and 2) the ability of the villagers to pay costs levied on them. If the URWSP is not making the most of available monetary resources with a keen eye to what the future holds, the programme may collapse due to lack of funds.

The aims of the URWSP fall within the goal set by the United Nations International Drinking Water Supply and Sanitation Decade of water and sanitation for all by 1990. As table 4.1 indicated, at the start of the Decade there was a large portion of the Ghanaian rural population without access to potable water. The estimated cost to alter this situation substantially is quite high, as shown in table 4.4.

TABLE 4.4
Estimated Cost of Improving Ghana's Water Supply
Over the Decade

Year	1980	1981	1982	1983	1984	1985
Millions of \$US Needed	0.11	3.1	1.45	4.91	33.82	33.45
Year	1986	1987	1988	1989	1990	
Millions of \$US Needed	34.55	31.64	28.28	27.27	18.18	

SOURCE: United Nations, 1983:Annex 54

The United Nations (1983:Annex 55,56) also estimated that for Ghana, US\$72 million, or 35% of the total investment necessary, would have to come from foreign sources, leaving a substantial proportion to be financed by the government of Ghana. Apart from the cost of improving the water supply, a serious problem seems to be the lack of skilled people to carry out operation and maintenance activities that such a system would require (Bourne, 1984; United Nations, 1983). The ability to pay for a water supply system and to provide the necessary trained labour are threatened by the Economic Recovery Programme, which has been in place since 1983. Human resource development has suffered drastically as education and other social service expenditures are severely curtailed (Loxley, 1988a). As Bourne (1984) describes, while foreign aid may pay for the capital costs of a water supply programme, it does not often pay for training and skills development.

The operation of the URWSP cannot be separated from national financial concerns, or the social fallout from the ERP. Long-term sustainability will rest on the capacity of Ghanaians to support a venture such as the URWSP by themselves, rather than by relying on external financial support. Adequate thought needs to be given to these issues at the present time so that programme costs do not get out of control, and potential problems are dealt with before they escalate.

FINANCIAL DIFFICULTIES WITHIN THE GWSC

The Ghana Water and Sewage Corporation (GWSC) is the Ghanaian agency responsible for providing technical and logistical support to the URWSP. Given this role, it is necessary that GWSC is in a secure financial position, so that when CIDA pulls out rural and urban water service levels will be maintained. A cursory examination of GWSC's current financial status, however, reveals that GWSC is experiencing a large deficit. It is unlikely that the government of Ghana will be able to continue subsidizing GWSC, even though it is politically undesirable to reduce water service. GWSC has already had difficulty meeting its financial commitments as originally agreed to by CIDA and the government of Ghana, causing CIDA to assume a greater share of URWSP expenses. This does not bode well for the continuation of the programme without CIDA support, and suggests that Ghana has overextended itself on a project of this magnitude.

A great deal of money has already been put into the URWSP by all parties. From 1973/74 - 1984/85, the amount invested by CIDA was approximately CDN\$38 million, and that by Ghana C700 million or about CDN\$17.4 million² (1984 prices) (Malone Given Parsons, 1986b:v). The poor financial condition of the GWSC creates difficulties both for maintaining and for expanding levels of water service to rural areas. In 1985, the GWSC was running a C0.5 billion (CDN\$12.4 million - see footnote 2) annual deficit, which does not show much hope of diminishing (Malone Given Parsons, 1986b). It has had to rely more on government subsidies and less on revenue; the subsidies increased from a low of 39% in 1975/76 to a high of 63% in 1980/81 as a proportion of expenditure, and although this has since decreased, the GWSC is still heavily reliant on such support (Malone Given Parsons, 1986b:26). Ghana's current financial limitations, which show little hope of abating, cast significant doubt on GWSC's ability to continue to support the URWSP. The requirements for foreign exchange, particularly for new pumps, spare parts, replacements, and infrastructure, will be increasingly difficult to meet as the cedi loses value and Ghana's export earnings suffer. This highlights the importance of choosing a reliable, low-cost hand-pump, simple enough to be repaired by the community at a low cost, and not subject to repeated expensive breakdowns.

² This was calculated at CDN\$=C40.2, Ghana's official exchange rate for 1985 as used by Malone Given Parsons (1986).

The URWSP needs to be organized in such a way that most of the management and fiscal responsibilities rest at the local level. Given the problems to date created by inappropriate technology and a top-down decision-making pattern, it is vital that communities are sufficiently involved in the project to feel that it is working to their benefit. In this way, the URWSP can continue to operate without draining already scarce GWSC or national resources. These types of linkages make it clear that national financial concerns cannot be separated from externally funded development initiatives if such programmes are to be sustainable over the long-term.

THE HAND-PUMP TARIFF

GWSC's financial difficulties led to the introduction of tariffs on both urban and rural water supply systems in the mid-1980s. When the 1985 evaluation was carried out, the tariff system had not been in place long enough to assess its effects; nevertheless, the evaluation team did raise some theoretical concerns. While Malone Given Parsons (1986b) supported implementation of the tariff, they outlined several potential problems. The first issue was whether villagers could afford to pay for water. The evaluation team suggested that while villagers were not likely to be able to bear the full cost of the hand-pumps, they would be able to pay some proportion. With tariffs kept below 5-6% of the cash income levels of the poorest households, few people should be unable

to pay.

Support for the implementation of hand-pump tariffs in water supply systems is offered by Okun (1982), who believes that user payments are necessary to ensure that people feel a responsibility for the upkeep of the system. In addition, he states that rural dwellers do not presently have access to free water; the labour and time which women spend collecting water is an opportunity cost, a non-monetary payment for the water. Similarly, Parsons (1989) believes that as long as villagers see the benefits of having access to hand-pumps, they will be willing to make sacrifices in order to bear their expense. It would then seem even more imperative that community education programmes (examined in chapter five) consult with villagers and succeed in convincing them of the value of clean water, and its link to better health.

Concerns about the tariff include difficulty in estimating annual household income, and indirect subsidies of urban water systems by rural areas. Given that many people may well be reluctant to disclose their earnings to government officials, and that these earnings depend greatly on constantly changing produce prices, URWSP management should be careful to ensure that tariffs do indeed stay below the 5-6% limit mentioned above. In addition, although the URWSP has attempted to have each pump serve approximately the same number of people, it is important that the charge per community reflect possible differences in community size.

Taking consideration of these issues requires that communities are invited to discuss problems with the tariff, rather than being dictated to.

Even if the levy is kept below this limit, Malone Given Parsons (1986b) raised the question of inequitable subsidization of urban water supplies. In the first place, while it is estimated that both rural and urban areas are paying approximately the same fee per person for water supply, such estimations do not include other monetary transfers from rural to urban regions. Urban biases in terms of infrastructure, employment opportunities, and government spending challenge the notion that it then is equitable for rural people to have to pay the same price for hand-pumps as their urban counterparts. This is a very complex issue, one which can be all too readily ignored by both foreign aid agencies and national governments. Political motivation for assuring the support of urban areas tends to rule out a fairer distribution of costs and benefits, or changes in national agricultural policies. When determining the capacity and willingness of villagers to pay for the water supply system, these inequities should be addressed.

In the second place, rural areas may also be subsidizing urban water systems in another way, as revenue generated from rural tariffs may end up being used to support GWSC's urban water systems. Because urbanites pose the greatest political threat if water service diminishes, Malone Given Parsons

(1986b) pointed out that GWSC might use rural revenues in urban areas in the face of its budgetary woes. This would clearly be an unsustainable pattern, because rural hand-pump operations would certainly suffer.

Currently, even with the help of CIDA funds, GWSC is spending most of its budget on operations (providing water supply services), with relatively little on maintenance and revitalization of its capital stock (Malone Given Parsons, 1986b). As GWSC equipment enters into disrepair, villagers are likely to oppose continued payment of the tariff. If this is to be avoided, a capital replacement fund as suggested by the 1985 evaluation team, in which rural revenues are invested in such a way as to preserve their buying power against inflation, must be initiated. Only if urban services are not allowed to operate at the expense of rural areas will destruction of the URWSP's rural component be averted. While this might seem logical, the economic and political realities faced by the national government could well result in the choice of an alternative course of action.

It has been approximately five years since rural tariffs were implemented, making it possible to determine to some extent their impact on Upper Region villagers. Some of the theoretical concerns raised above, which were based on interim results, appear to have been well-founded; however, a great deal has changed.

When the rural tariff was introduced in 1985/86, it was set at a rate of C6 000 per hand-pump, an amount calculated "partly on the 1983 estimates of annual hand-pump costs, on a political consideration of what rate would be acceptable, and on a consideration of the current urban tariff" (Malone Given Parsons, 1986b:23). Although Moffat (1988) reported that the tariff for 1988 had been set at C19 500, in the two villages questioned in my survey the rates differed dramatically: C12 000 per pump in Zoko-Tarongo, and C18 000 in Sumdurungu-Kologo. Although the above figures do not take account of inflation, this remains a substantial rise in the amount villagers are required to pay, since it is unlikely that rural incomes would have kept pace with inflation. Tariff increases likely reflect the deteriorating financial capacity of GWSC, as well as the URWSP's attempt to make rural areas assume greater monetary responsibility for the hand-pump system.

Although this tariff rate is definitely a large amount for rural people, such financial contributions still do not come close to meeting the actual costs for hand-pumps. As table 4.5 shows, the expense of operating the URWSP system is much higher.

The use of 'economic cost' rather than 'financial cost' takes into account the difference between the official exchange rate and the 'shadow price' of the cedi in 1985; the latter more accurately describes which inputs are affordable

TABLE 4.5
Annual Economic Cost of Rural Hand-pumps for 1985*

	Economic Cost	Local Costs	Total Economic Cost
Depreciation	12 708	86	12 794
Recurrent Costs			
Pump parts	6 180	--	6 180
Vehicle spares	933	--	933
Fuel and lub.	672	187	859
Other consumables	171	50	221
Direct staff	---	324	324
Indirect staff	---	32	32
Expatriate	(4 605)	18	18
Other	---	10	10
TOTAL ANNUAL ECONOMIC COST PER PUMP			21 371
*per pump, in cedis			

SOURCE: Malone Given Parsons, 1986b:II:18

as it uses the real cost of foreign goods and services. While total annual hand-pump costs could be stated as C7 595 per year³, it is more realistic to express it in terms of 'economic costs', in which case the price jumps to C21 371. It is evident that there was a large gap between the level of tariff imposed on villagers and the actual costs of operating the water supply system. The C6000 levy fell short of covering the financial cost of hand-pumps, and contributed less than one-third of their economic cost. While these figures were accurate for 1985, increasing inflation as well as greater difficulty and cost of obtaining foreign exchange will make imports ever more burdensome to the Ghanaian economy.

Once foreign assistance to the URWSP terminates, it will be much harder for Ghana to find the necessary currency for spare parts, replacement of old pumps, and expansion of the rural water system; villagers will be expected to take on more of the financial burden for the hand-pumps. Although it is part of the VLOM concept, and necessary for continued long

³ 'Financial' Cost of Hand-pumps was determined by the following:

recurrent costs of maintenance	C3 273	
annual depreciation	4 322	
total annual cost per pump	C7 595	OR CDN\$189

(Expressed in 1985 prices using official exchange rate of CDN\$1=C40.2).

SOURCE: Malone Given Parsons, 1986b

-term operation of the water supply system, such an expectation is not based wholly on a realistic assessment of rural capabilities. As economic, distributional, and social problems in Ghana intensify, rural areas will probably find it an increasing struggle to obtain - and pay out - enough monetary resources to support URWSP operations.

Although the 1985 evaluation team concluded that it should not be difficult for most villagers to pay the tariff, more recent information questions this assumption. While 70% of hand-pump communities paid the levy in 1987, this excludes a sizeable number of communities (Etherington, 1988). If this proportion grows, it will be more difficult for the URWSP to operate effectively. But how well can villagers afford to pay for the hand-pumps, even partially? In order to understand the ability of rural area to pay costs levied on them, I draw on data from my questionnaires to examine three issues: whether villagers consider the tariff excessive; who within a compound pays the levy; and from what activities is the money generated.

In both the villages examined, the tariff system has been structured such that all compounds pay the same flat rate regardless of individual capacity to pay or whether a particular compound actually uses the hand-pump. Data from the survey found that compounds paid from C400 (in Zoko-Tarongo) to C600 (in Sumdurungu-Kologo) annually. As well,

those who brewed pito⁴ had to pay an extra C200 (in Zoko-Tarongo). On the whole, there seems to be little significant objection to the level of payment required, as shown in table 4.6.

TABLE 4.6
Reaction to the Level of the Pump Tariff

Do you consider the tariff to be... (%)	Z-T*	S-K**	Total
a reasonable amount	91.7	42.9	73.7
too much	8.3	57.1	26.3
too little	0.0	0.0	0.0
*Zoko-Tarongo n=12 **Sumdurungu-Kologo n=7			

However, closer investigation of the above table reveals that actually over half (57%) of those in Sumdurungu-Kologo view the tariff as excessive. In addition, the large proportion of those in Zoko-Tarongo who seem satisfied with the tariff belies the village's real financial situation; the community is C36 000 in arrears on tariff payments, and a member of the local Water Utilization Committee reported that people find it difficult to raise money to pay.

In the two survey villages, it appeared that a compound's tariffs were most often paid by the husband, or shared between a married couple, as shown in table 4.7.

⁴ Pito is an alcoholic beverage brewed from millet in a similar manner to beer.

TABLE 4.7
Responsibility for Tariff Payment

Person responsible for paying tariff (%)	Z-T*	S-K**	Total
husband alone	41.7a	42.9	42.1
shared between spouses	25.0	28.6	26.3
male adults in compound	25.0	0.0	15.8
woman alone	8.3a	14.3	10.5
father	0.0	14.3	5.3
husband and son	8.3	0.0	5.3
<p>a This includes one instance in which a woman stated that she and her husband each paid for one pump.</p> <p>*Zoko-Tarongo n=12</p> <p>**Sumdurungu-Kologo n=7</p>			

A majority of respondents (57%) replied that these arrangements came about primarily because of the nature of the households, in that one's husband is the head of the household, and it is his responsibility to provide for his dependents⁵.

While men may be the ones to give the tariff money to the appropriate authorities, it would be inaccurate to state that men themselves necessarily raised the money independently of women. As illustrated in table 4.8, the sources of funds for tariff payments are quite varied, and include activities which are usually performed by women.

⁵ This is one area quite likely biased by the fact that the interviewer was male, and that husbands were always present during interviews. See section 1.5.1 regarding problems with questionnaire data interpretation for further details.

TABLE 4.8
Sources of Funds for Tariff Payment

Number of people indicating this income-generating activity****	Z-T*	S-K**	Total
sale of farm produce and/or foodstuffs***	12	6	18
sale of weaving or pottery	6	1	7
sale of pito malt or dawadawa ⁶	2	0	2
government salary	1	1	1
*Zoko-Tarongo n=12 **Sumdurungu-Kologo n=7 ***includes rice, grains, and other foodstuffs, as well as fowl and animals ****as stated by women interviewed NOTE: Respondents could provide more than one response.			

The production of pito malt and dawadawa, weaving, and pottery-making are all activities which women reported performing. In addition, women either labour on plots which yield produce for sale, or are responsible for growing subsistence goods which support the family without draining money resources. Thus, while 42% of respondents reported that husbands paid the tariff by themselves, it would seem more accurate to indicate that women contribute to varying degrees to tariff payment. It would be erroneous to imply that women bear little of the burden for the pump levy. Moffat (1988:8) in fact found that there were reports that women in certain areas were "expected by their families to contribute or pay

⁶ A nutritious substance made from dawadawa seeds and used in the preparation of soup.

for pump tariffs because water is their responsibility".

An issue that should be further researched is whether the money for the tariff is coming from income-generating activities which were already being done, or if villagers have had to take on extra work. While it was not possible to determine this from my questionnaire data, it certainly bears examination.

The present structure of tariffs presents several problems to the sustainability of the URWSP. The use of a flat rate for each compound ignores both differential abilities of compounds to pay and variations in the size of each compound. Survey results show one instance of a woman in Sumdurungu-Kologo whose use of the pump was limited because of her lack of money. As a widow, she had no one else in her compound who would contribute towards the levy. When she did not have enough money to pay her compound's portion of the tariff, she was denied access to the hand-pump by the local chief.

The levy arrangement used in the URWSP can be contrasted with an alternative model employed in a Togo hand-pump project (CUSO, 1987). In this case, communities were brought into discussions about the proposed water supply system well before drilling took place. Before CUSO paid for drilling and installing the hand-pumps, communities had to demonstrate that they had enough money to keep the pumps in good repair. Rather than an annual tariff, each village is responsible for

raising enough money to keep its pumps operational, often through the use of a collective plot. Each family is expected to contribute one day of labour per week, as well as initially contributing money or materials to have the well site prepared. Profits from produce sales go to buy tools and spare parts for the pump.

With the current organizational structure employed by the URWSP, there is a distinct possibility that the tariff levels may eventually outstrip the desire and/or ability of villagers to pay. As inflation and the erosion of GWSC and national finances continues, the real cost of maintaining pumps and operating necessary support services (such as education programmes, maintenance for major breakdowns, replacement of pumps) will escalate. If rural tariffs are funnelled into urban water system operations (as noted by Malone Given Parsons, 1986b), rural service levels may drop to the point where villages will refuse to contribute. After CIDA funding has terminated, a point may be reached at which villagers will not be able to bear all or part of the hand-pump expenses.

4.4 Implications for Sustainability of the URWSP

The above discussion has pointed out a number of problems existing in the URWSP. The critical issue of the overall context within which a development project like the URWSP exists cannot be ignored or sidelined. Linkages between

initiatives taken at the local level, and national and international policy become visible when long-term development prospects are examined. The support of international institutions and other countries for austerity programmes such as the ERP, which lead to declines in human resource development and the crippling of government organizations like GWSC, work to defeat national and international development efforts. The URWSP cannot operate properly without adequate reference to such constraints; limitations inherent in underdevelopment require that this rural water supply system be administered in such a way that it takes into consideration what villagers need and are able and willing to sustain.

Current project planning must make a significant effort to streamline the URWSP. Ghana does not have the money to enable it to finance ventures which do not lead to improved well-being for all involved. Such a view must influence every level of the project, from choice of a VLOM hand-pump so that villagers can maintain pumps at little cost, to an appropriate structure for transferring financial responsibility to communities. A catch-22 exists in that GWSC is in much need of revenues accruing from hand-pump tariffs, yet villagers cannot and will not be able to afford the full expense of the water supply system.

The fiscal problems faced by GWSC and the tariff solution which has been imposed make it critical that communities have an active part in determining how the URWSP is to be organized

and financed. As Okun (1982) states, the implementation of tariffs lends increased urgency to the need for a great deal of involvement in URWSP planning and decision-making.

If the imposition of a local water supply project fully financed by [the] central government without local participation is destined for failure, then the imposition of a project calling for local participation in the financing, without active local initiative in the conception and implementation of the project, is doomed to even more disastrous failure. (Okun, 1982:258)

Although the URWSP has been in operation for almost two decades, there is still a great deal of room for local involvement. As will be discussed in the following chapter, maintenance and education programmes have not tended to be the result of interactive discussions but have been imposed from without.

The financial difficulties of the GWSC and Ghanaian government will not disappear; there is likely to be less and less money to support the URWSP. It will then be up to communities to pay for a greater proportion of operating costs if the water supply system is not to collapse. However, villages have been and will continue to be influenced by national and international economic policies; they are unlikely to be able to raise ever-larger sums, particularly in view of problems with the present tariff structure. If this is to be circumvented, rural people should be made a crucial part of the programme, so that they will be able to determine the most effective and economic paths in accordance with their own needs and constraints.

CHAPTER 5

PARTICIPATION THROUGHOUT THE LIFE OF THE URWSP: AN ASSESSMENT

5.1 Introduction

Much of the literature discussed in chapter two emphasized the value of organizing development in such a way that the target communities play an active role in project design, implementation and evaluation. This research has shown that the presence of a significant degree of participation throughout the life of a particular initiative contributes markedly towards its success. As examination of women and development issues has illustrated, local level involvement must be targeted at all people within a community. The tendency of projects to incorporate largely men has had a negative impact on the quality of life of women in the South. While it is certainly important to involve both men and women in projects, the degree to which each has responsibility for organizational aspects and decision-making should take into consideration the particular roles held by them and the interrelationships between the different type of work each performs within a specific culture or society. Women's responsibility for water management should thus result in women having enough power to determine how water supply projects are to be organized so as to affect them in beneficial ways.

Participation in the URWSP cannot be viewed merely as a 'nicety' which would improve URWSP effectiveness; it is fundamental to the project's ability to improve access to potable water both presently and especially in the years to come after CIDA ends its financial support. Chapters three and four illustrated the dire economic future of Ghana and the GWSC; it would be foolhardy to expect that such non-local assistance to the hand-pump system to continue in adequate amount. The only solution is for villagers to assume responsibility for the water supply system financially, and if such a move is to succeed, these same villagers must be in control of many aspects of decision-making in the URWSP. Only if the programme is organized in a way that it serves the needs of communities, responding to their constraints and opportunities, will rural areas be willing and able to pay for potable water. A corollary to this is that if villagers are to be able to express their needs correctly, those who have the greatest amount of interaction with the water supply system - Upper Region women - should have enough power to affect change in a way which benefits them.

The main focus of chapter five is an examination of the degree of participation afforded Upper Region villagers since the inception of the URWSP. More specifically, it is women's involvement (or lack of it) which will be assessed, because it is felt that the long-term sustainability of this water supply system depends on user control, and it is Upper Region

women who are primary water drawers. The traditional function of women as water collectors, users, and managers indicates that their active participation should be strongly encouraged, elicited, and put to use. In the URWSP, emphasis has been on improving health and productivity through the provision of adequate supplies of potable water; working with and reinforcing women's roles as water managers and in supporting and changing water and sanitation habits are a necessary part of this. In this way, the most effective and efficient use could be made of scarce financial resources (see chapters three and four).

A secondary focus of this chapter is an examination of the effectiveness of various components of the URWSP, in particular education on water, health, and hand-pump use, and organization of maintenance activities, using the Village Level Organization and Maintenance (VLOM) concept developed by the World Bank and UNDP. In the previous chapter, financial issues concerning the URWSP were assessed on the basis of VLOM; here, this will be extended to cover other organizational matters. Adherence to VLOM recommendations tends to result naturally in a greater amount of local participation, and so is quite complementary to an analysis of community involvement.

5.2 Exploring the Participatory Nature of Early Phases of the URWSP

Although the URWSP has been under way for almost twenty years, there is no cohesive set of goals which has provided continuity throughout the project's life. While all components of the URWSP have been aimed at improving supplies of potable water to the Upper Region, each project has had its own goals and objectives which are not necessarily related to those of previous or subsequent phases. It is therefore difficult to assess the URWSP in a comprehensive framework. Nonetheless, since all parts of the programme have been water supply-related, it seems wisest to examine both the current project as well as its historical antecedents. To examine only isolated components would obscure the overall effect on Upper Region villagers and longer-term trends; this would also avoid pertinent issues concerning CIDA's approach to development initiatives.

The URWSP began its attempt to improve the water supply situation in the Upper Region in a very technocratic manner; the level of community involvement in these early phases of the URWSP was minimal. Indeed, the original motivation for the programme had been external, stemming from CIDA and the government of Ghana. The introduction of the pumps was conducted in such a way that the water supply system was imposed from without, having little endogenous origin or connection to villagers' needs. Although collection of water may have been a significant problem for rural women, their

perceived needs, opinions, and knowledge were not addressed during programme design or implementation. Neither were other community members involved to any great degree.

Criteria for determining hand-pump location were not developed through a consultative process with villagers. Between 1973-1979, hand-pumps were introduced to villages by a team of drillers and geologists who drilled approximately 2,500 boreholes and fitted them with hand-pumps. Figure 5.1 depicts the location of the hand-pumps throughout the Upper Region. Site choice was based on project design, which called for one pump for every 400-500 people, and hydrogeological data. It was these criteria rather than local desires which determined where each borehole was to be situated. Once this was determined, information was then passed along to recipient communities through local traditional leaders and their advisors, all of whom were male (Etherington, 1988).

The lack of communication with villagers about the URWSP has led to subsequent problems. In rare instances, hand-pumps were located in totally inappropriate areas, such as in one case in a graveyard (Etherington, 1989; CIDA, 1982). More significant is that pump sites have occasionally interfered with inter-clan boundaries (Etherington, 1989). Members of one clan generally will not use a hand-pump which is located in another clan's area, and this limits access beyond the 'number of people per pump' criterion. Even more critical is that some hand-pumps were located beyond the range of

FIGURE 5.1
Location of the Hand-pumps in the Upper Region

Scale: 1:575,000 ca

convenience, given that distance is paramount in a woman's decision as to which water source to use (Malone Given Parsons, 1986e). Harkness (1983) and Malone Given Parsons (1986e) both found that women tended to rely more on non-pump sources in the wet season if these were closer. Thus because women and other villagers were not consulted on pump location, in some communities there is perhaps less than maximum use because such sources are deemed too far away or are inaccessible due to social constraints.

The limited amount of participation encouraged in the first few years of the URWSP was confined to providing help with construction. Women transported stones and building materials to men, who were responsible for digging and backfilling around the concrete pads surrounding each well (Harkness, 1983). While some literature suggests that carrying out construction-related activities is beneficial in that volunteer labour reduces project costs and helps villagers to feel that they have a stake in the project (White, 1981), this does not seem to have been the case with the URWSP.

The lack of participation in early phases has led to a distorted understanding of the motivation for introducing wells and who has responsibility for maintaining them. Harkness (1983:160) discovered that 54.6% of those she interviewed believed that the village chief had decided that there was to be a pump. She also found that the deciding

force behind pump location was thought to be the village chief (31.0%), GWSC (31.0%), or unknown (33.3%). Without a clear understanding as to the origins and organization of the URWSP, it is little surprise to find that 47.6% believed that the chief was responsible for maintaining the pump and pump site, and 26.2% did not know whose obligation this was. As villagers were not brought into the design and implementation process, it is unlikely that they would consider the hand-pumps or pump sites to be their responsibility. Although women have benefitted in terms of a reduction in the time and energy necessary for water collection, particularly in the dry season (Malone Given Parsons, 1986e), the URWSP was not viewed as an entity for which they should bear the burden of care. The implications of this, especially for maintenance and tariff payments, are not very positive.

5.3 Exploring the Participatory Nature of the Water Utilization Project (WUP)

By the time most of the hand-pumps had been installed, it was becoming obvious to URWSP management that the mere provision of technology was not enough. If the water supply system was to affect improvements in rural health and productivity, education about water, health, and hand-pumps was necessary. Rural people had to gain knowledge concerning proper use of hand-pumps, benefits of cleaner water, as well as how to translate these benefits into better health for themselves and their families. The result was the Water

Utilization Project (WUP), the second component of the URWSP. WUP's original mandate was to "provide training in hand-pump maintenance, community health education, and community development self-help projects" (Malone Given Parsons, 1986d:5). WUP began in 1979 and has continued in various guises to date. The first phase consisted of a community education programme utilizing volunteer educators, which was not very effective. In 1986, phase two of WUP called Water Education for Health came into being, and is attempting to improve on many of the problems encountered in the earlier project.

5.3.1 Community Education

It took until 1981 before the community education component of WUP as it was first conceived was finally under way. By this time, the following objectives had been developed:

- 1) reinforce behaviours that favour health;
- 2) change unhealthy behaviours;
- 3) increase awareness of the relationship between water and health;
- 4) encourage community efforts to care for water supplies and improve sanitation.

(Malone Given Parsons, 1986d:5)

The Village Education Worker (VEW) programme was formed to implement these objectives. This system consisted of about seventy volunteer VEWs, largely civil servants and teachers (Moffat, 1988), who were recruited to visit villages and give a presentation about various water- and health-related issues.

VEWS were expected to reach about 700 villages; each VEW was to give presentations three times per year at each of ten villages (Malone Given Parsons, 1986d). The incentive for becoming a VEW was the loan of a bicycle (an expensive commodity in the Upper Region), which then would be owned after three years of service. The VEW programme began in a number of districts: Lawra, Wa, Bawku, Navrongo, Sandema, and two years later Bolgatanga.

Although the motivation for the inception of a community education campaign was based on a sound principle - that people had to have knowledge about how to make use of the water supply system to improve health - the programme did not achieve many positive results. A number of problems existed with its structure, including: numerical dominance of male VEWs; lack of concern or knowledge about integrating VEW teachings with local beliefs and knowledge about water and health; and inadequacy and inappropriateness of some parts of the presentations (Malone Given Parsons, 1986d).

Women in the Upper Region (as elsewhere in Africa) have predominant responsibility for drawing water, managing water within the family, and caring for children and their health (as supported by literature in chapter two). Despite this, this phase of WUP failed to make women a priority for receiving information about improving health, and about water and health-related behaviour. As well, the people used to disseminate messages were largely male. Of the VEWs trained,

only 13% were women (Malone Given Parsons, 1986d:5). It is unlikely that men would have been able to get across information to women as effectively as other women could have. Also, by not targeting women specifically, the URWSP missed a prime opportunity to contact directly the very people who have the most to do with reinforcing water habits and teaching health-related behaviour to the next generation.

A second problem existed in that education presentations were very one-sided, assuming that VEWs and URWSP management had all the answers about health, and local people's behaviour generally would require modification rather than support. There was insufficient community involvement in the development of VEW presentations in regard to either the information disseminated about better health habits, or beneficial practices currently in use. Malone Given Parsons (1986e3) describes many of the local beliefs held by villagers in the Upper Region and the way in which these might interfere with information presented in VEW talks. For example, local attitudes towards appropriate ways of dealing with human faeces are contradictory to practices espoused by the URWSP, in that faeces are left uncovered and are not concentrated in a small number of locations¹. If such practices are to

¹ Many villagers believe in a very different model of disease transmission, in which it is only through personal contact, not via flies or mosquitos, that one can catch a disease. Faeces in themselves are thought to be harmless, but if the urine of others should come into contact with them, bad luck or illness could well be transmitted (Malone Given Parsons, 1986e3). Such beliefs run counter to those advocated

change, it will require more than imposing education onto communities; it will be necessary to understand what people believe and how this relates to Western 'biologically-based' concepts of health and disease transmission. Unless villagers are actively involved in discussions of water and health, and are not merely recipients of external ideas, it is unlikely that any significant changes in health and sanitation habits will occur.

On the other hand, some rural people are currently practising better health treatments which are consistent with Western medical thought. For instance, diarrhoeal treatment often includes starch-based oral rehydration formulas, the use of which is now supported by WHO and UNICEF (Etherington, 1989). However, WUP health talks usually emphasized the merit of oral rehydration sachets, which were not always available or affordable for villagers. Although certain traditional methods such as withholding breast milk are counterproductive to recovery there appear to be certain positive behaviours which should be emphasized and reinforced (Etherington, 1989).

Finally, the education programme suffered from inappropriate and ineffective presentations. VEWs were to use a standard set of visual aids in village talks, while public information sessions relied on a variety of media, including puppet shows, plays, posters, and calenders. The

by Western medical thought, but must be considered when trying to improve health and sanitation habits to decrease levels of disease.

lack of any degree of participation of the villagers in designing the visual aids or other media seems to have been a significant contributing factor in the failure of the programme to get across its messages. Problems appeared with a number of visuals in that the manner in which appropriate behaviour was depicted was not always understood². Posters used for publication were largely in English, assuming literacy and a knowledge of more than local languages. As well, messages which VEWs were to relate were quite numerous and covered a wide range of topics, making it difficult for people to synthesize and remember all that they had heard (Malone Given Parsons, 1986d).

The VEWs themselves described a number of problems which they had encountered (Malone Given Parsons, 1986d). Some villagers tended to resent the fact that presenters were given bicycles for their work. In addition, because villagers often had more regular contact with VEWs than with GWSC staff (VEWs were also more visible because of their bicycles, t-shirts, and caps), VEWs were sometimes seen as the link between a community and GWSC. Thus, VEWs might be expected to report needed repairs, or be held responsible for pump breakdowns.

² For example, pictures which used an 'x' or a check mark to denote incorrect or correct practices meant little to those who had not attended school, and so were not knowledgeable of the meaning behind such symbols. As well, the use of 'stylistic' drawings (in which hands are shown without being attached to the rest of the body) or demonstrating behaviour which did not accurately reflect local practices sometimes made message comprehension difficult.

All in all, the education component of Phase I of WUP which relied on the VEW system did not achieve much. The 1985 evaluation found that of those with access to VEW presentations, only a small number of people had been influenced by them, as table 5.1 indicates.

TABLE 5.1
Attendance at and Knowledge of VEW Talks

	Wet Season n=112	Dry Season n=109
No knowledge of VEW talk ever in village (%)	74.1	67.3
Knew of VEW talk but did not attend (%)	16.1	20.0
Attended VEW talk (%)	9.8	12.7

SOURCE: Malone Given Parsons, 1986d:29

That only about 10% of people with access to VEW presentations had ever attended them strongly indicates another difficulty. Even if the problems with the VEW programme discussed above were resolved, the presentations would still not have an impact on many people. The 1985 evaluation found that there was not a great deal of difference in the practices of those who had access to VEW presentations compared to those who had not.

After two years of the [community education] programme in the Bolgatanga district, there is no evidence that access or exposure to education is associated with improved health promoting behaviours. Before the hand-pumps were installed, people drew water from the most accessible source

and basically they still do, even when the water is unlikely to be potable. (Malone Given Parsons, 1986d:117)

This is a fairly dismal conclusion given the amount of resources which have gone into improving water supplies, and theoretically the health, of rural people in the Upper Region. Although the evaluation team believes that the education programme has made important inroads upon which future work can be based, it would seem necessary to re-evaluate such initiatives. The broad objectives of WUP, limited number of volunteers, and lack of villagers' participation in WUP's structure have led to few gains despite the time and finances involved. Spreading available resources too thinly accomplishes little; it would be perhaps more effective to engineer programmes which have much smaller goals, but can more readily meet these targets. If the URWSP is to make any substantial contribution to the health of villagers, education is crucial. As discussed in chapter one, technology cannot be transferred without helping people understand ways in which such technology can be used and adapted to their lives.

Such a process cannot be uni-directional. If the people of the Upper Region are to be the ultimate beneficiaries - in ways that are clearly visible to them - it is important that the URWSP enables them to take an active part in attempts to improve their lives. Education must be based on the needs and knowledge of rural people, and in order to discover this accurately, villagers need to be involved in programme

planning and implementation. This might avoid the kind of mistakes which have already been made, such as ineffective VEW presentations. Education on water and health also needs to take into account useful knowledge which people presently have. Instead of assuming that all current habits are incorrect and should be changed, education could build on local knowledge about water, sanitation, and health. The aim must be to work with local people, rather than imposing foreign ideas.

Since mid-1986, the second phase of WUP known as Water Education for Health (WEFH) has been under way, with a goal of redesigning URWSP's strategy for community education. WEFH's objectives include (Etherington, 1988:8):

- 1) a focus on five problems - correct pump usage (to minimize repairs) and four major water-related diseases (diarrhoea, guinea worm, schistosomiasis/bilharzia, malaria);
- 2) utilizing extension workers from GWSC and other rural development organizations;
- 3) WEFH training of extension workers in an interactive approach supported by core educational materials developed by WEFH;
- 4) reaching women through culturally appropriate channels.

WEFH has attempted to improve significantly the effectiveness of WUP's earlier attempts at education through an emphasis on certain pedagogical and organizational changes (Etherington, 1988). The latter consists of three primary issues. The first is adequate topic investigation to determine what and how messages should be presented. Research has been done on a continuing basis concerning villagers'

perception as to important health problems, as well as local health-related beliefs and practices. The second concern has been to streamline the number of educational themes, reducing the large variety of topics covered in the previous phase of WUP to a more manageable size. In 1987/88, WEFH focused on pump care, pump site development, and the causes, effects, and treatment of diarrhoea. Third, WEFH has attempted to use more interactive teaching methods which allow for some village discussion about health issues and employ less formal educational activities such as drama and songs.

Organizational changes implemented by WEFH centre primarily on the means by which educational information is passed onto villages. The VEW system is no longer relied upon; instead, extension workers from various rural agencies as well as Community Water Organizers from villages are used to reach Upper Region residents. Community Water Organizers (CWOs) are teams each consisting of one man and one woman who are chosen by each 'pump community'³. After one and a half days of training, they return to their village to pass on what they have learnt, and act as the village link through which various health and pump education messages can be transmitted.

WEFH has been the first component of the URWSP to target women specifically as participants in the water supply system's organizational structure. Three of four education

³ A group of compounds who all use the same hand-pump.

advisors and four of six counterparts are female. About 40% of extension workers and 49% of CWOs are women (Etherington, 1988:13). In only a few communities was there a refusal to appoint a female CWO, and in most cases this difficulty has been resolved. The WEFH project as it is currently organized signifies a possibility for women to regain some of their traditional control over water management. While men still comprise at least half the staff of this component, it is an important step in the right direction for women's position in the URWSP to be upgraded. Early reports indicated that men and women appear to be working well together, and that women are at least as effective at teaching other villagers the educational messages (Moffat, 1988).

Since the WEFH component has only been in operation for a relatively short time, it is too early to determine what results it is likely to have. It would seem that if the project continues to be implemented as designed - with an emphasis on community research and involvement of women - it may impact positively on health and water supply system sustainability. This part of the URWSP bears further observation in order to determine the implications of WUP's modifications, particularly as to whether they can and will be maintained once CIDA has withdrawn.

5.3.2 Hand-pump Maintenance

In this section, the organization of maintenance activities will be examined. While other aspects of URWSP are certainly important as well, this area is felt to be a critical indicator of how sustainable the water supply system is likely to be. As discussed in chapter one, the way in which technology is transferred has a great impact on how much use the recipient society is likely to be able to make of new equipment, and whether such technology will have a generally positive or negative influence. The ability to utilize and control fully the technology upon which one relies has significant ramifications; if people do not have adequate knowledge about maintenance and repair of what they use, they will remain heavily dependent on others to keep it functioning.

In the URWSP, it is vital that the primary hand-pump users - Upper Region women - have adequate training concerning how to operate, maintain, and repair the hand-pumps. Unfortunately, evidence from questionnaires as well as previous evaluations, points to the significant knowledge deficit women have about these matters. Unless this changes, they will have to rely on GWSC, CIDA, and village men to keep the pumps in functioning order. This is a direct impediment to developing a community-operated water supply system. With Ghana's critical financial woes, it is folly to expect that GWSC will continue to have the funds for rural water services,

and CIDA cannot be expected to provide funding for an indefinite period of time. As well, since women have the greatest interest in ensuring the continued viability of hand-pumps, it follows that it would be most effective, efficient, and productive to enable them to care for the equipment which they use. Men may not put as much effort into upkeep because they do not directly benefit from the new technology. Given that external support systems likely will have increasing difficulty providing the necessary labour and finances, if the URWSP is to actually improve health and productivity in the Upper Region, the programme must rely on those who have the greatest motivation to ensure that hand-pumps continue to function well: rural women.

WATER USER COMMITTEES

Apart from water- and health-related education, another goal of WUP is to train communities to maintain their hand-pumps, reducing the need for costly repairs. Water User Committees (WUCs) were established by URWSP management for each pump to appoint and supervise a hand-pump caretaker and support pump-site development activities, including latrine construction and building concrete pads around hand-pumps. These committees are viewed by URWSP management as the "cornerstone of...[WUP's]...entire programme...[W]ithout committees there is little chance of village commitment to care and management of the village water systems" (Malone

Given Parsons, 1986d:15). In view of the importance that the URWSP places on WUCS, it would seem critical that obstacles to their effective functioning are addressed.

One concern is the composition of these committees, since those who are most involved with water management have little to do with this structure. WUCs rarely have women as members; most often they comprise the village chief and several elders (Malone Given Parsons, 1986d). As a result, it would be difficult for them to deal with hand-pump issues in a way that meets the needs of women who regularly use them.

It is not just the village-level operation of WUCs which operates in a top-down manner, but the entire WUC structure. While URWSP management decided that these committees should be established, in practice their function does not justify a separate organization. These groups were neither organized spontaneously as a result of community perceived needs, nor based upon already existing social structures. As a result, although a large number of WUCS have been formed, many are inoperative or ineffective (Malone Given Parsons, 1986d). The former harks back to the lack of active participation of villagers in URWSP decision-making, in regards to both programme design and implementation. Villagers had little opportunity to develop their own support network for hand-pump operations, one which would have been responsive to user needs and suggestions. That WUCs were externally imposed may make it difficult for them to become an integral part of village

structure, particularly because they were developed as entities separate from other local organizations. Given that women are most involved in water drawing and management, an alternative might be for WUCs to become a part of already existing women's groups. Research would have to be conducted to determine the nature of such existing groups. It would also be fundamental to discover whether the women in these groups share a belief in the importance of WUCS, and if the rest of the village would accept such an arrangement.

PUMP CARETAKERS

In terms of pump maintenance, the role of pump caretaker should be crucial to ongoing upkeep of the water supply system. Caretakers are responsible for performing minor repairs, examining hand-pumps regularly to ascertain that they are in good working order, and ensuring that more serious problems are attended to by the appropriate authorities.

The maintenance system as it is presently organized almost totally excludes women; the 1985 evaluation team found that there were no female pump caretakers at all (Malone Given Parsons, 1986d). URWSP management had instigated a system whereby only males were trained, under the assumption that they would have greater mechanical knowledge (two-thirds of those trained had some experience with tools) and that women would not be acceptable choices to village men. Harkness (1983) found that many of the village chiefs to whom she

talked expressed reservations about selecting women for maintenance roles, although these had more to do with how women might behave (as perceived by the chiefs) rather than with skill. Some of these objections included:

- 1) The resultant increase in women's duties without monetary compensation might tempt women to run away.
- 2) The woman responsible might not always be available when a breakdown occurs because she could be away at market.
- 3) Jealousy and quarrelling between women might occur since "women would not like having another woman tell them what to do".
- 4) Illiteracy and shyness might prevent a woman from reporting a breakdown to the (male-staffed) office in Bolgatanga.
- 5) "A woman is more tied to her house and children and [is] not as free to go to Bolgatanga to report a breakdown of the pump".
- 6) Fear of going out at night could prevent a woman from making repairs.

SOURCE: Harkness, 1983:94-95

None of these 'obstacles' seems insurmountable, and their validity is questionable. There would have been a big difference between a village chief (or anyone else) imposing maintenance duties on a particular woman, and village women themselves coming to the conclusion that they want a role in maintenance. If women decide amongst themselves who will be in charge, how the system will operate, and whether they need external assistance (such as perhaps going to Bolgatanga), it is quite feasible that women could effectively carry out caretaker duties.

The primary feature which was lacking in both the URWSP's original plan for maintenance and most of the subsequent

evaluations of the project was direct discussions with women affected by the hand-pump system in order to discover their views and opinions concerning how things could and should operate. Moffat's (1989) research stands out as an illustration of what one finds when rural women are questioned. After talking to village women, she found that there was unanimous agreement that water-related activities had always been very much women's domain, with men having no interest or involvement in that area of village life. If the URWSP had originally been designed and implemented in a consultative manner, current structures relating to hand-pumps would be very different. Although men might have wanted to be involved with the hand-pump technology because of its newness and prestige, women would have had the motivation and ability to retain control over water management.

As long as women are knowledgeable about the implications, about the impact, then women would have fought within their communities and negotiated with their men. And in fact they believe that women should have had not just an equal role but...they should have a dominant role. In fact it should have been absolutely reversed to what it was. So I [asked women] "how could it have happened, how could you have dealt with men?" And they said, "you have to understand that we have our room, we have our negotiation, we have our competition, that we are not strictly under their thumb, that women have always been strong. And if we feel that it is our right then we will do it, so you leave this up to us. All you have to do is give us the opportunity, make sure that men understand that as far as you [URWSP management] are concerned it is alright if we are involved". (Moffat, 1989)

Such information speaks volumes about the active role which women could (and most likely would) have played if the URWSP

had discussed its village-level organization with them.

This is supported by evidence from my questionnaires, which demonstrate that women are not satisfied with current maintenance structures. The unanimous agreement from women interviewed that they would prefer maintenance to be handled by community members rather than GWSC (see table 5.2) suggest that there is indeed support for the type of village-level maintenance espoused by the VLOM concept.

TABLE 5.2
Preference for Maintenance Responsibilities

Response in Percent	Z-T*	S-K**	Total
Do you prefer someone other than GWSC?			
yes	100.0	100.0	100.0
no	0.0	0.0	0.0
Who is preferable?			
any villager	50.0	42.9	47.4
as many villagers as possible	0.0	14.3	5.3
WUC member	50.0	42.9	47.4
Why is someone other than GWSC preferable?			
quicker repairs	50.0	57.1	52.6
trip to Bolgatanga			
no longer necessary	50.0	28.6	42.1
village self-reliance	0.0	14.3	5.3
*Zoko-Tarongc n=12			
**Sumburungu-Kologo n=7			

If the community bears responsibility for operating and maintaining hand-pump technology, and has some control over its organizational structure, this provides a necessary and solid base upon which the URWSP can build to work towards village responsibility of the water system.

Several VLOM issues, including community choice of when pumps will be serviced and by whom directly relate to the degree of participation present in the programme. So far, it has been primarily URWSP management, GWSC, and CIDA who have had control of decision-making. It was they who decided that WUCs should come into existence in all villages, and who strongly influenced the male dominance in many aspects of the water supply system. The VLOM concept is founded on the notion that communities should bear the burden of operating a hand-pump system. In this way, dependence would not be created on scarce financial inputs from the national government and the system is managed largely by the villagers themselves in a way which best meets their needs.

Unfortunately, communities within the URWSP do not have this power. Table 5.3 depicts the tremendous imbalance of knowledge between villages and GWSC; it is felt that only the GWSC has the skills, information, and tools to maintain the hand-pumps.

TABLE 5.3
Current Maintenance Responsibilities

	Z-T*	S-K**	Total
Who is currently responsible for fixing hand-pumps? (%)			
GWSC	100.0	100.0	100.0
other	0.0	0.0	0.0
Why is this so? (%)			
GWSC has the knowledge, skills, and equipment	41.7	57.1	47.4
Villagers do not know how to perform repairs	58.3	42.9	52.6
*Zoko--Tarongo n=12			
**Sumburungu-Kologo n=7			

If one of the purposes of development is local self-reliance (and given the financial crisis in Ghana this is certainly a concern), information about technology must be shared between all concerned parties.

However, the 'community choice' which is referred to must include all members, not just men. Even devolving some of the decision-making power to villages would be only a limited solution, for present structures focus primarily on men as recipients of technological know-how, skills, and tools, while village women are forced to the sidelines. In reality, it is not just about maintenance procedures that women are kept in the dark. As Harkness (1983) found, the imbalance originated when the URWSP was initially implemented. She discovered that instruction on how the hand-pumps should be properly used was not aimed at the water drawers, but often directed at men.

The results she obtained indicated that men had received instruction 57% of the time, and women only 16%; 19% did not know who had been informed (Harkness, 1983:161).

As table 5.4 indicates, women have a startling lack of knowledge about the water supply technology on which they regularly rely. A dependence has therefore been created on village men and GWSC to keep the hand-pumps in good working order.

TABLE 5.4
Women's Knowledge Concerning Hand-pump Repair

	Z-T*	S-K**	Total
Do you know how to perform repairs? (%)			
yes	0.0	14.3***	5.3
no	100.0	85.7	94.7
Do you want to know how to make repairs? (%)			
yes	100.0	100.0	100.0
no	0.0	0.0	0.0
Why do you want to know? (%)			
Could help repair and maintain it	50.0	42.9	47.4
Could then repair it myself	16.7	28.6	21.1
Repairs could be done more quickly	8.3	28.6	15.8
It's important to know how to use/repair technology on which we rely	25.0	0.0	15.8
*Zoko-Tarongo n=12 **Sumburungu-Kologo n=7 ***This respondent is currently being trained to make repairs.			

The organization of the URWSP has been such that control of decision-making and technology have remained largely out of the hands of villagers, and certainly away from women. The responses in table 5.4 demonstrate that women recognize present maintenance structures as a problem, and would like them to change. That a full 100% of women in both villages state that they want to know how to fix the hand-pumps points to a definite need which should be met. Greater acknowledgement and accommodation of such well-founded desires would make the water supply system that much easier to operate and sustain on a long-term basis.

At the same time, the attitude of women towards their role vis-a-vis the pumps seems to have changed compared to Moffat's (1989) findings discussed earlier (in which women stated that had they been given the opportunity they would have retained control over water management activities). A large percentage of women (47.4%) in my survey stated that they would use repair training to provide help, while only 21.1% indicated that such training would enable them to undertake repairs independently. This is interesting in two ways. First, it may indicate the possibility that women no longer feel that it would be feasible for them to assume complete responsibility for this aspect of the water supply system, as perhaps they might have if the URWSP had begun differently. Second, if further research confirms these findings, it opens up possibilities for adaptation of present

organizational structures to include women, without necessarily eliminating men's roles. The 1985 evaluation team discussed a proposal which had been made to have one female and one male caretaker assigned to each pump. The woman would perform minor repairs, and the man would report more serious breakdowns to GWSC (Malone Given Parsons, 1986d). If implemented, this initiative would provide an excellent opportunity to involve more of the primary users. As women see the pumps almost every day, they are most likely to notice problems before they become serious, and they have a vested interest in ensuring that the hand-pumps are well maintained. Since a structure has already been established which incorporates men, it would be very difficult to change completely the caretaker system so that women have sole responsibility for pump maintenance. Such a move probably would not be readily acceptable to many in the community, particularly those men who already were given the duties and status commensurate with the caretaker position. It would be more appropriate to modify the existing maintenance system, and allow both women and men to work together.

Here again, however, it is vital that such changes not be imposed from without, either by URWSP management or by village chiefs. Women must be brought into discussions about these modifications, and should have the power to decide in conjunction with other village women who among them should fill the role of caretaker. This will require that URWSP

management makes clear to communities that such a consultative process is to occur, for as Harkness (1983) discovered, if the participation of women is not specifically requested, it is unlikely to happen.

5.4 Lack of Participation in the URWSP: Missing a Critical Ingredient for Sustainability

Despite the significant merits of community participation, much of the URWSP has occurred in a top-down fashion. Originally, CIDA and the government of Ghana decided that inadequate water supply was a pressing problem for people in the Upper Region, and a programme was then set-up to deal with this. Particularly in the first few years of the URWSP, villagers' only role was as recipients of hand-pump technology; there was little effort to discuss project design or implementation strategies with them. Once it became apparent that education about hand-pumps and water-and health-related issues was necessary, the programme began to deal with communities more directly. However, much of this was done in a very uni-directional manner; volunteers went into villages having all the answers, assuming that rural people had little correct knowledge and that 'traditional' belief systems had to be overcome. Only recently has slightly more credence been given to health-related local knowledge systems.

On the other hand, little has changed with regards to maintenance organization. Much of the responsibility currently lies with GWSC, which has control over most of the

information, skills, and hardware necessary to keep hand-pumps functioning. Those villagers who do know how to maintain and repair hand-pumps are inevitably men. Although women are responsible for water management activities, the URWSP has seriously neglected local realities of gender-specific roles and gender-defined social relations. The result has been that although women are the ones to use the pumps, they have little understanding of the way in which such technology works or can be fixed in the event of a breakdown. Women are heavily dependent on men for this, despite the fact that it is women who have the most at stake; if pumps break down, it is they who must walk further to fetch water, using valuable time and energy which could be used more productively for so many other things.

If the URWSP is to become an example of a well-functioning water system, one which works to the benefit of both women and men, then some fundamental changes must be made. Control over technology and decisions relating to that technology must be put into the hands of those most affected by it. Through greater participation, power must be given to communities in general but especially to rural women. If URWSP were to become less top-heavy it could be guided more readily by the needs and wants of the people it is attempting to serve. The most effective way for this to happen is for villagers to play an active part in the URWSP, to take control of and have responsibility for many of the project's

components, thus assuring that they will be empowered by the development process. Sustainable development in the context of this Upper Region water supply system demands that a much greater degree of participation is allowed for the water drawers and their communities.

CHAPTER 6

ENVIRONMENTAL SUSTAINABILITY: PROBLEMS AND PROSPECTS

6.1 Environmental Linkages within the URWSP

In chapter two, various meanings of sustainability were explored, and emphasis was put on the importance of achieving a development project which works with, rather than against, the environment. The severe environmental devastation in many areas of Africa poses a direct threat to better welfare, particularly over the long-term. It is no longer defensible to suggest that economic development and ecological protection may not be mutually compatible. It is becoming increasingly obvious that sustainable improvements - those which will continue to exist for many years to come - depend heavily on the establishment of harmonious feedback linkages between the many systems at work, including environmental, social, cultural, and economic.

The URWSP's central focus is the development of water resources to benefit the people of the Upper Region, and as such, environmental issues are necessarily of great importance. The aim of the programme is to supply potable water to rural areas of the Upper Regions, thereby improving health and productivity. If this is to occur, and if these benefits then are to extend for many decades, URWSP management needs to ascertain that there will be no harmful current or

3 of/de 3

MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS
STANDARD REFERENCE MATERIAL 1010a
(ANSI and ISO TEST CHART No. 2)

long-term environmental effect as a result of the water supply system.

This chapter focuses on the environmental impact of the hand-pumps, and examines prospects for maintaining and perhaps increasing the number of people served. Although this issue would seem an obvious one, the lack of information held by CIDA is startling; no comprehensive analysis has been conducted as of yet. A brief examination of CIDA's environmental policies suggests that such concerns would be a priority. However, the URWSP illustrates that despite the rhetoric, a great deal still has to change in development practice. Since it is likely that CIDA's participation in this programme will end in the not-too-distant future, it is critical that Ghanaians are fully aware of the ecological conditions involving Upper Region water resources.

Given that I have not had the opportunity to collect data in Ghana, what is put forth is a conceptual model concerning an environmental impact assessment of the URWSP. Four key issues will be discussed: the potential of groundwater resources in the Upper Region to support the URWSP, landscape quality around the pump sites, health of Upper Region residents, and purity of water. The direct and indirect linkages between each of these are identified and discussed with reference to assessing the implications for the URWSP's long-term sustainability.

6.2 CIDA's Commitment to the Environment

Since 1986, the Environment and Development Implementation Strategy has been part of CIDA policy. This strategy was drawn up in response to findings and suggestions of the World Commission on Environment and Development. Its aim was to ensure that CIDA projects do not negatively influence the environment and that more environmentally beneficial projects are funded (CIDA, 1987b). Many policy statements repeat CIDA's apparent environmental concern. Sharing Our Future even goes so far as to say that "without proper respect for the environment, no development strategy can lead to long-lasting, sustainable development" (CIDA, 1987b:44). Environment and Development (CIDA, 1987a), which details CIDA's environmental awareness, is full of positive references to the strength of commitment to human and natural systems, describing the merits of a proactive, rather than reactive, environmental policy. However, reality falls short of this illusion.

CIDA has had trouble finding an effective way to make environmental issues a priority, or at least a key concern, in project planning, implementation, and evaluation. Erhardt, Hanson, Sanger, and Wood (1981) comment that what is lacking is a strong action - not just policy - commitment, as well as regular assessments of risks and damages. A serious dedication to ensuring a development which is viable for the

biosphere has yet to emerge, for too many other factors take precedence.

6.3 Performing an Environmental Impact Assessment

6.3.1 The Premises of an Environmental Impact Assessment

Environmental impact assessments (EIAs) have been widely employed in many disciplines and governmental agencies in North America, primarily during the planning stage of large projects. In 1970, the United States enacted the National Environmental Policy Act (NEPA), and three years later the Environmental Assessment Review Process (EARP) became law in Canada. In part, both of these require that environmental impact assessments and statements be performed for projects undertaken or supported by federal agencies, in order to minimize environmental risks (FEARO, 1978; Jain et al., 1977).

Nonetheless, while it is positive that these policies recognize explicitly that the impact of people's activities on the biosphere cannot be ignored, it is very difficult to ensure that projects are carried out in a way which is not at odds with the environment. This is due both to the way in which EIAs are performed and to their subordinate position on the development agenda. Although many people and agencies speak of concern for the environment, too often it does not result in action; economic criteria are thought to provide more than adequate justification for projects to proceed. CIDA tends to be guilty of this as well. Although policy

statements refer to ecological issues, the practice is quite different. For the URWSP, this has meant a serious paucity of information about the long-term consequences of the hand-pump system.

6.3.2 The Merits and Problems of an EIA

The purpose of an EIA is to minimize environmental damage. As part of an effort to increase awareness about human-biosphere interactions, EIAs play an important role, helping to make governmental agencies and perhaps also businesses aware of the full scope of ramifications which a project may have. From here, steps can be taken during planning and implementation to eliminate or contain damage. When an EIA is performed in conjunction with an evaluation of socio-economic and cultural impacts, the net result (if it then has an effect on programme design and organization) can be extremely beneficial to sustainability.

Unfortunately, EIAs carry with them a number of limitations. The first concerns the way in which many EIAs are carried out. As discussed below in regards to CIDA policy, there has yet to be a recognition that all human activity impacts on the physical environment (CIDA, 1987b). Assessments tend to be done only on those projects which are expected to have some risk for the environment. When dealing with the lack of information which exists concerning environmental, social, and cultural systems in Africa, this

author feels that it would be advisable to make decisions for all initiatives only after a complete impact study has been performed. That this is not very often done (Biswas and Geping, 1987) suggests that important decisions are made based on incomplete analysis; it is unlikely that this can have a positive impact on the development process.

Another problem is the limited type of data of which EIAs can make use. Most EIAs rely on quantification of information (see Munn, 1979; Jain et al., 1977). This limits the type of data which can be addressed; human systems are often difficult to delineate accurately in other than descriptive form. If an EIA is the only type of non-economic evaluation performed in the planning stages, confining such assessments to physical factors involves a serious neglect of social and cultural spheres, which also may be affected by a proposed project. More recently some EIA methodologies have begun to incorporate socio-economic criteria into their formats (FEARO, 1978). This is a step in the right direction, provided that such an approach is adopted by many other agencies as well.

A third problem is that while the environment is gaining wider recognition, economic factors continue to take precedence in decision-making (Biswas and Geping, 1987; Munn, 1979). Attempts to halt an initiative temporarily or permanently on the basis of environmental concerns are often met with a great deal of resistance. Although ultimately a project cannot be economically viable if it continually

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damages the environment on which it depends, economically-based justifications do not tend to look very far into the future. Munn's (1979) comments are particularly relevant in this context.

Environmental management strategies that include estimates of long-term impacts undoubtedly challenge the traditional decision-making process. The political and economic bases for action are tuned to the immediate and short-range influences of the market-place. Here, cost-benefit analyses are based on interest rates related to present-day costs of investment capital, modified to account for uncertainty and risk and thus with a time-scale of 10-15 years. Economic systems aim to maximize gains over the short-term; ecological considerations suggest ways to minimize liabilities over the long-term. (Munn, 1979:8)

Given the limited role which non-economic considerations have played in development projects, it will take some time before governments and institutions fully realize the interconnectedness of environmental stability and sustainable improvements in societal welfare. For example, CIDA policy states that environmental impact assessments are now to be "carried out on all proposed [CIDA] projects that are likely to involve environmental risks" (CIDA, 1987b:45). But who determines whether or not there is a risk? Where does this leave projects already under way? Unfortunately, this nebulous area has the potential to obscure many hazards. For instance, while a project like the URWSP has been in operation for seventeen years, its environmental impact has yet to be adequately assessed, and the current CIDA policy will extend only to new phases or new projects within the URWSP. Thus,

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while new initiatives may be examined, the risks engendered by ongoing projects may remain unchecked. As Biswas and Geping (1987) state,

...there is an urgent need to monitor environmental changes once a project is operational. Such monitoring is necessary not only for those projects in developing countries for which E[nvironmental]I[m]pact]A[ssessment]s were carried out during planning stages, but also for the vast majority of currently existing development projects which have received very little environmental attention during their planning and construction phases. (Biswas and Geping, 1987:191-192)

Despite CIDA's expressed concerns, neither in the planning, implementation, nor evaluation of the URWSP has there been enough attention paid to the links between the biosphere and human activities as they pertain to water supply. To ensure the URWSP's sustainability, a key ingredient is the ability of natural systems to support the water supply project both as it presently exists, and with future expansions in the number of people served. It is this issue which this chapter will attempt to illuminate, using a conceptualized environmental impact assessment model of the URWSP.

Introducing EIAs into the decision-making process is a necessary first step for making environmental issues a priority. However, until the results (especially when negative) can exert a much more powerful influence over design, implementation, and evaluation, such assessments are of only limited use.

6.4 An EIA Model for the URWSP

In view of the above considerations, the model which I have devised for the URWSP will not attempt to conform to standard EIA formats. The aim is to examine salient factors and their inter-relationships in this water system as an indication of how the URWSP impinges on the environment, and the implications of this for sustainability. While the following discussion relies on quantitative data derived elsewhere, the predominant focus is a qualitative assessment. In addition, because the impact of the URWSP on social, economic, and cultural systems is described elsewhere in this thesis, non-biospheric factors play a less significant role than they would otherwise.

Figure 6.1 presents an EIA model for this water supply programme. Here, the key aspects of the EIA are identified as: groundwater resource potential for maintaining and expanding the water supply system; landscape quality around the pump site; health of Upper Region residents; and purity of water. An examination of groundwater resources includes whether the hydrogeology of the Upper Region is favourable for aquifer development, and current and future implication of the URWSP for water table levels. Landscape quality investigates the possibility of land degradation of the area surrounding the hand-pumps, and the ramifications of this for the Upper Region. Apart from each being directly influenced by the URWSP, these two factors (groundwater resources and landscape

FIGURE 6.1

An EIA Model for the URWSP

DIRECT RELATIONSHIP

INDIRECT OR LIMITED RELATIONSHIP

quality) are also indirectly related to each other, in that desertification can make it more difficult for groundwater systems to recharge themselves. The third issue, health, concerns the impact of the URWSP on physical well being, both with regard to illnesses from impure water, and the physical stress women may experience from walking long distances during the dry season. An indirect relationship exists between health and groundwater resources, since any improvements in health resulting from pumped water depend on the ability of groundwater to maintain water supplies well into the future. The final issue, purity of water, is not impacted on in an immediate way by the URWSP. Rather, it is the resulting increased human activity around the pump site which may lead to contamination. Changes in quality of water would then have a strong bearing on health.

6.4.1 Groundwater Resource Potential

THE HYDROLOGICAL CYCLE

Before an environmental impact assessment of the URWSP is conducted, it is necessary to understand the environmental components of a water system. Figure 6.2 illustrates the various interactions which take place within the hydrological cycle. Sub-surface supplies of water are referred to as groundwater, the amount of which is measured by the level of the groundwater table. In order for boreholes to reach

FIGURE 6.2
The Hydrological Cycle

SOURCE: DANIDA, 1988:13

groundwater, it is necessary that aquifers¹ have adequate quantities of stored water. Once water is withdrawn on a regular basis through hand-pumps, it is important that an aquifer be sufficiently recharged to avoid both significant decreases in the groundwater table and depletion of the aquifer.

Since the level of the groundwater table determines the depth to which a borehole must be drilled to access water, groundwater depletion can be detrimental to the longevity of wells. It is therefore essential that changes in water table levels are measured regularly.

HYDROLOGY OF THE UPPER REGION

Adequate groundwater supplies are essential for water supply system development. Two factors conducive to long-term groundwater resource availability are the degree of decomposition and fracturing of rocks (Bannerman, 1990). The greater the extent and effect of rock decomposition, the greater the porosity, because more pore spaces will be created which can hold water. Fracture openings provide a course through which water can travel. The greater the amount of

¹ Aquifers are bodies of rock or soil which have at least moderate porosity (amount of pore spaces able to hold water) and good permeability (ability of water to move within the aquifer). It is through aquifers that wells can access groundwater (Dunne and Leopold, 1978).

decomposition and fracturing, the more likely it is that aquifers with good porosity and permeability can be found².

Biswas (1987) indicates that while twenty percent of Africa's total water resources lie in groundwater, only ten percent of the land has high-yielding, economically developable aquifers. Fortunately, the situation in the Upper Region may not be so bleak.

Contradictory assessments have been made of the hydrogeological potential of the Upper Region. On the one hand, Bannerman (1990) states that the low levels of rainfall, high amounts of evaporation, and low vegetative cover tend to militate against decomposition of rocks. He estimates that the Upper Region is ninety-eight percent granitic and Birimian rocks (crystalline and metamorphic), and only two percent Voltaian sandstone. As the following table shows, unless rocks are weathered, only sandstone has good porosity and permeability, necessary characteristics in order to be able to access water from aquifers. At the same time, Bannerman also states that there is a well developed fracture system, the existence of which has led to some success in drilling boreholes for the URWSP. At the same time, in his view the amount of decomposition and fracturing varies a great deal across the region, even between very nearby areas.

² Dunne and Leopold (1978) provide a very useful and readable textbook concerning water resources and environmental planning. Readers who wish further information on the groundwater-related topics in this chapter are likely to find this source quite helpful.

TABLE 6.1
Porosity and Permeability of Selected Rocks

<u>Porosity</u> (pore space as a fraction of total volume of rock)	
Sandstone	0.05 - 0.30
Metamorphic rocks	<0.01 - 0.05
Granite	
fresh	<0.01 - 0.05
weathered	<0.01 - 0.10
<u>Permeability (m/day)</u>	
Sandstone	0.3 - 3.0
Granite	0.0003 - 0.003
deeply weathered	0.003 - 3.0

SOURCE: Adapted from Dunne and Leopold (1978:202,206)

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On the other hand, Malone Given Parsons (1986a) present a much more optimistic picture of local hydrogeological conditions. They believe that the Upper Region has a great deal of weathered rocks, and cite depths of up to 60 metres. Although they find that aquifers here have "limited transmissibilities, [are of] limited aerial extent (normally less than one square mile), and low storage capacity", their opinion is generally a favourable one (Malone Given Parsons, 1986a:88). Indeed, according to these authors, this part of Ghana is on the whole "very favourable to groundwater exploitation" (Malone Given Parsons, 1986a:88).

This difference in opinion is cause for some concern. It certainly indicates the inadequacy of knowledge about the Upper Region's hydrogeology, a subject which requires attention if the URWSP is to have a solid foundation on which to base decisions for expansion of its water supply system.

New aids to discovering the water supply potential of the Upper Region are beginning to be utilized, which may increase the chances of finding good sources of water. Innovative technology such as hammer drilling, a technique not available when URWSP drilling was originally carried out, and the use of aerial photographs and satellite imageries to find fracture zones are all promising tools (Bannerman, 1990). Nonetheless, while the University of Ghana's Geology Department and the Water Resources Research Institute in Ghana both have the latter two facilities, cost and availability are

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likely to be prohibitive. GWSC must consider whether, once CIDA has ended its financial involvement, Ghana will have both the finances and enough skilled labour to continue their use. In view of the current economic crisis and the austerity programme, any such capital-intensive equipment is unlikely to be sustainably utilized.

CHANGES IN WATER TABLE LEVELS

A key question in this assessment is whether groundwater resources are plentiful enough, and are recharged at an adequate rate, to support a continual loss of water through pumpage, particularly given that women tend to rely more heavily on hand-pumps during the dry season, when rainfall is minimal or non-existent. As Bannerman (1990) points out, one must consider whether rural groundwater supplies can sustain the approximately 2 500 boreholes over 11,000 km² as well as major urban areas.

A major impediment to discussions on either present or future implications is the scarcity of information on rainfall and recharge, which makes it very difficult to determine long-term trends and possible problem areas. Between 1980 and 1983, there was a total lack of data collection from the observation wells which had been constructed (Malone Given Parsons, 1986a). When assessing groundwater resources a fine line must then be drawn between maintaining appropriate care so that temporary aberrations do not cause panic, and

discovering environmental risks before they become irreversible. Undoubtedly, it is far better to err on the side of environmental concern, which this limited analysis of water table levels will attempt to do.

Recharge rates for the wells were devised not from large-scale evaluation of recharge in the region, which was thought by URWSP management to be too complex and time-consuming, but from studies of the Wa South Well Field (Bannerman, 1990). It was determined that an aquifer would suffer if withdrawal of water was more than five percent of average yearly rainfall. On the whole, recharge rates of under 2.5 percent were taken as appropriate for all the wells, and this was to be considered during design. However, "it is not known to what extent these recommendations have been put into practice, or whether the pumping rates and water levels are still being monitored" (Bannerman, 1990:38-39).

While the 1985 evaluation team seemed optimistic about theoretical hydrogeological capabilities in the Upper Region, they did find that water table levels had suffered since the URWSP began. Of the thirty-nine observation wells which had sufficient data (out of a possible forty-eight), a substantial number indicated a decline, as table 6.2 demonstrates. According to Malone Given Parsons (1986a:90), the average decrease in static water levels of the observation wells has been 3.2 metres over a period of eight to nine years. In view

TABLE 6.2
Changes in Static Water Levels in 39 Observation Wells

Changes in SWL* (feet)	Number of Wells Affected	
Increase + 1 ft.	1	1
No Change < 1 ft. either way	3	3
Decrease	35	
2.0 - 5.9 ft.		10
7.0 - 12.9 ft.		13
16.0 - 17.9 ft.		7
19.0 - 23.9 ft.		3
31.0 - 31.9 ft.		2
Total Number of Wells Affected: 39		
* Static Water Level (SWL) corresponds to level of the water table.		

SOURCE: Adapted from Malone Given Parsons (1986a:89)

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of the fact that average static water levels for the forty-eight observation wells at time of drilling was 6.05 metre (Malone Given Parsons, 1986a:appendix J), this is a substantial drop. As of February 1986, about seven percent of wells (180 wells) had been reported as dry or shorting after good rains, and there was the serious possibility that many wells not presently reporting difficulties might also be on the verge of experiencing supply problems.

Malone Given Parsons (1986a:91) speculate that the lowering of the water table may be due to several factors: (1) some aquifers were very old sources of water and will never recharge; (2) there is inadequate recharge or excessive discharge; (3) sand screens used in wells to filter water may be clogged; (4) wells were drilled when water tables were quite high; as well, the pumping tests which were conducted at installation were brief and may not have been representative of actual rates of pumpage.

All of the factors represent likely, or at least possible, explanations of the decline in groundwater, and data from table 6.2 certainly indicate that a significant problem may exist. Unfortunately, paucity of information significantly hinders attempts to unearth the real, long-term effect of the URWSP. Findings concerning groundwater resources have to be put into the context of a much longer time scale in order to ensure that it is not merely short-term fluctuations which are being measured. At the same time,

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given that the URWSP is increasing villagers' dependence on pump water, it is imperative that these water supplies can be maintained.

PROSPECTS FOR EXPANDING THE RURAL WATER SUPPLY SYSTEM

When the URWSP was first initiated, enough boreholes fitted with hand-pumps were provided such that there was eighty to ninety percent coverage of rural areas, with one hand-pump for every 400-500 people (Chauvet, 1990). Over time, as rural populations have increased, this coverage has been reduced to about seventy to seventy-five percent (Chauvet, 1990). Because CIDA and URWSP consider it unacceptable to have more than 500 people per hand-pump, expansion of the water supply system to new settlements and existing settlements with expanded populations is the only alternative.

As discussed above, the limited data available seem to suggest that current pumpage rates are negatively affecting water table levels. If the number of hand-pumps in operation is going to increase, what effect will this have?

While there is no way to determine exactly what the practical implications of future expansion will be, a model which shows the environmental effects of great numbers of wells in a certain area can prove useful. Figure 6.3A demonstrates the cone of depression which forms in the water table when water is pumped from a shallow well. Figure 6.3B

FIGURE 6.3
Effect on Water Table Levels from Pumpage

SOURCE: Dunne and Leopold, 1978:224,225

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then continues this to examine what happens when more than one well begins to compete for the same water supply.

If a deep well, B, is pumped at a greater rate than well A, then the result is that well A will run dry because it can no longer reach the water table. If those using well A cannot find a way to get users of well B to reduce the pumpage rate, the choice may be made to deepen well A and install a larger pump. The outcome of this would be to depress the groundwater table further. It is this type of situation which must be avoided if the URWSP expands its water supply system. If an increased number of wells contend for the same groundwater resources in the Upper Region, it is uncertain what the outcome will be.

Data indicate that current consumption of water through hand-pumps is resulting in a lowering of the water table. Whether this is a long-term trend or a brief fluctuation is difficult to determine without an adequate data base. However, given that the URWSP will attempt to expand rural coverage, it is imperative that groundwater resources are closely monitored. The vulnerability of the natural environment in general and the importance of water as a basic need strongly suggest that potential long-term risks must be assessed and minimized.

6.4.2 Landscape Quality around the Pump Sites

It is important to ensure that the area geographically contiguous to a pump site also comes under analysis. Hand-pumps are a reliable source of water particularly in the dry season, and so can attract greater numbers of people and animals. The fixed nature of pump sites suggest that increased activity can lead to land degradation, which may have implications for both production and groundwater resources.

LAND DEGRADATION - LIKELIHOOD AND IMPLICATIONS

The environmental conditions of the land surrounding pump sites can be a significant determinant of the degree of infiltration of rainfall into groundwater storage. In a WUSC³ water project in the Sudan, it was found that the increase in and concentration of human and animal populations around hand-pumps had led to such areas becoming "moderately to severely desertified" (Carrier, 1988:10). This would seem of particular concern during the dry season, when reliable sources of water are few and far between, and hand-pumps are a primary choice of water. For the Sudan, much of the problem stemmed from a concentration of cattle at pump sites, a situation which is not really an issue in the Upper Region where nomadic herding is minimal. Nonetheless, there was some concern initially in the URWSP that "increased extraction of

³ World University Service of Canada.

groundwater for human use might result in loss of plant life leading to soil erosion and ultimately to advancement of more arid climatic conditions" (Bannerman, 1990:37). The Upper Region has a delicate environment, and given the growing threat of desertification elsewhere in Africa, it would be wise to attend to this risk.

Degradation is not simply a problem which exists in isolation; it has implications for groundwater resources. Climate, vegetation, and soil have an effect on hydrological regimes, and in this way have implications for groundwater supplies (DANIDA, 1988). The amount of rainfall and evaporation which occur in a region have a direct bearing on the potential amount of water which could enter sub-surface water storage. It is not simply the annual amount of rainfall, but its intensity and periodicity which are important. If rainfall tends to occur in short, intense bursts, the infiltration capacity of soil will be exceeded and run-off will increase, which can lead to excessive erosion.

Soil composition and particularly vegetative cover can work to alleviate this, as the presence of plants and trees and organic matter in soil can increase infiltration and retard run-off. Organic matter consists of large particles which act as a cohesive agent, keeping soil together. Water is more readily absorbed by its 'spongy' texture than by finer grained particles. The primary role of vegetative cover is

to intercept raindrops, slowing them down and dissipating their energy; this prevents particle detachment by raindrops, which would otherwise aid erosion. Vegetation also slows down run-off, giving water more time to soak into the ground, and traps run-off material. Both organic matter and vegetative cover hinder capping, a process in which the soil surface is sealed by fine grained material which washes into pore spaces, and thus allow greater amounts of rainfall to infiltrate the ground (Spivey, 1990).

This interaction between vegetation and water storage is indeed significant for the URWSP. When considering how well the water table can support both present and expanded levels of pumpage, a focus on the effect on vegetative cover near the pumps is important. If too much groundwater is withdrawn, the resulting cone of depressions (see Figure 6.3) may make it difficult for plant roots to get sufficient water (Falkenmark, 1989).

In view of the possibility that current rates of pumpage are leading to declines in water table levels, ensuring that land degradation around pumps does not occur is a salient issue. Protecting surface and sub-surface environments through minimization of erosion, encouraging the growth of vegetation, and maximizing infiltration of precipitation is of great benefit to the long-term maintenance of adequate water supplies for both current and future levels of pumpage.

6.4.3 Health of Upper Region Residents

Improving the health of people in the Upper Region has been a "fundamental goal" of the URWSP (Malone Given Parsons, 1986e:47). In this evaluation, improved health includes two components: reduced incidence of water-related diseases, and lessening the physical stress on women from walking long distances to collect water. In view of the responses obtained from my questionnaires, both components appear to have undergone positive changes during the URWSP; however, some of the results must be viewed with caution⁴.

The questionnaire asked for a report of changes in the incidence of children with diarrhoea, number of cases of bilharzia and guinea worm, and number of times respondent has been sick since the installation of the pump. Table 6.3 portrays the results. As these figures demonstrate, the introduction of pump water appears to have led to declines in the level of illness. While a majority reported that they have been sick less often (63.2%), this is not as significant as reference to less incidence of particular diseases. These findings indicate that the introduction of pumped water has improved health by reducing the level of diarrhoea in children, bilharzia, and guinea worm.

These trends agree with those found by the 1985 evaluation team (Malone Given Parsons, 1986e). Here, only

⁴ See section 1.5.1 for a fuller understanding of the constraints and limitations of the questionnaire data.

TABLE 6.3
Decrease in Illness Since Pump Installation

Percent of respondents reporting a decrease in...	Z-T*	S-K**	Total
Number of children with diarrhoea	100.0	100.0	100.0
Number of cases of bilharzia	91.7	100.0	94.7
Number of cases of guinea worm	100.0	100.0	100.0
Number of times respondent has been sick	66.7	57.1	63.2
*Zoko-Tarongo n=12 **Sumdurungu-Kologo n=7 NOTE: These data includes only those who reported using hand-pumps to some degree.			

diarrhoea in children and guinea worm were examined, and both were found to be less in villages with access to pumps compared to those without such access.

There are limitations to interpretation of these data. Apart from methodological problems with the 1985 data⁵, the improvements in health which were indicated in both assessments would require that people use only pump water for drinking, and that overall personal consumption of water increases⁶. Table 6.4 describes the changes in the amount of water used since the introduction of pump water. These findings indicate that a majority of people are using more water as a result of hand-pump accessibility. However, the 1985 evaluation found that hand-pumps had not led to significant differences in the amount of water consumed (Malone Given Parsons, 1986e). As well, while a majority of people in Table 6.4 stated that the greater abundance of water allowed them to increase their use of water in daily activities, few specific uses were stated. Utilization of

⁵ The 1985 evaluation (Malone Given Parsons, 1986e) obtained its results after examination of five villages with access to pump water, and only one village which did not have such access. That the greater incidence of disease at the village without access to hand-pumps might not be representative of all non-pump areas is also supported by the evaluation team's suggestion that lower levels of such illnesses predate the introduction of the hand-pumps.

⁶ Diseases such as diarrhoea and guinea worm are transmitted through the drinking of impure water, while diarrhoeal treatment requires greater intake of water so that rehydration can occur (the water should contain salt and sugar).

TABLE 6.4
Changes in Amount of Water Used by Those
with Access to Pump Water

Percent of Respondents Stating that Amount of Water Used has...	Z-T*	S-K**	Total
increased	83.3	57.1	73.4
decreased	0.0	0.0	0.0
not changed	16.7	42.9	26.3
*Zoko-Tarongo n=12 **Sumdurungu-Kologo n=7 NOTE: These data include only those who reported using hand-pumps to some degree.			

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water for washing, attending to animals, and building was referred to by several people, but increased consumption of drinking water was not specifically remarked upon.

Apart from increased utilization of water, another important criterion is the amount of pump water collected as a proportion of total water collected. If it is accepted that pump water is of better quality than that from other sources⁷, then it is critical that villagers use only pure water; if other, impure sources are also tapped, people will not be protected from water-transmitted diseases.

Table 6.5 illustrates the reliance on pump water in the two villages examined.

TABLE 6.5
Reliance on Pump Water

Amount of Pump Water Used (%)	Z-T*	S-K**	Total
None	0.0	42.0	20.8
At least some	100.0	58.0	80.0
Dry season			
all	33.3	28.6	31.6
most	58.3	42.9	52.6
some	8.3	28.6	15.8
Wet Season			
all	33.3	28.6	31.6
most	41.7	42.9	42.1
some	25.0	28.6	26.3
*Zoko-Tarongo n=12			
*Sumdurungu-Kologo n=12			

⁷ See Section 6.4.4 on Water Purity for an assessment of whether this assumption may be invalid in certain areas of the Upper Region.

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As depicted, one-fifth of respondents do not use hand-pumps in either season. Of those that do, less than one-third (31.6%) use only pump water. While a substantial number of people (42.1%) rely on hand-pumps for most of their water, this is not enough to eliminate the opportunity to become infected from impure water from non-pump sources. If health benefits are to be reaped, pump water must be the only source used, particularly for drinking purposes. However, the questionnaire did not attempt to discover which sources were used specifically for drinking water. It would be relevant to know this information in order to assess accurately whether the use of non-pump sources poses a threat to improved health. If non-pump sources are used only for purposes other than consumption, the risk of infection will be reduced.

The other aspect of health which is important is the physical stress on women who collect water. Water collection activities often require a great deal of time and energy for walking long distances to water sources. Women then may have neither the time nor the stamina to perform other productive and reproductive activities to their satisfaction, nor the opportunity to regain their strength through rest and relaxation.

The URWSP seems to have had a positive impact on energy expended on water collection trips. Questionnaire data presented in Table 6.6 indicate that women feel that access to hand-pumps has saved them time.

TABLE 6.6
Impact of the Hand-pumps on Length of
Water Collection Trips

	Z-T*	S-K**	Total
Length of round-trip water collection, including waiting time (minutes)			
Dry season	27.9	62.0	29.0
Wet season	21.5	47.0	37.9
Percent stating that access to hand-pumps has saved time	91.7	85.7	89.5
*Zoko-Tarongo n=12 **Sumdurungu-Kologo n=7 NOTE: These data include only those who reported using the hand-pumps to some degree.			

Although collection takes between one-third of an hour to an hour (depending on season and distance from the nearest pump), in total 89.5% of the women interviewed stated that the hand-pumps had reduced the time required to obtain water. This agrees with the findings of the 1985 evaluation, which estimated that women who use hand-pumps benefit particularly in the dry season, at which time they walk about 700 metres less per collection than those without access to hand-pumps (Malone Given Parsons, 1986e:ii).

However, as Table 6.7 indicates, the time saved on water collection is spent on other forms of productive and reproductive work. Of thirty-seven responses, only two

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(socializing, entertainment) mention using this 'extra' time on any form of non-work activity.

TABLE 6.7
Activities on which Time Saved from
Utilizing Hand-pumps is Spent

Activity	Frequency Mentioned
farming	8
weaving	6
gathering stalks	5
child care	4
trading	4
brewing pito	3
collecting firewood	1
cooking	1
entertainment	1
pottery	1
preparing dawadawa	1
repairing home	1
socializing	1
TOTAL	37
NOTE: Respondents could provide more than one answer.	

Given the long, hard work days of African women, non-work activities would likely have a positive impact on women's health. Nonetheless, the responsibilities which women have, particularly in view of the lack of wealth in such areas, undoubtedly restrict the time which women have for themselves. Productive and reproductive activities may take time and energy, but they help to ensure the survival of women and their families.

The URWSP, through the introduction of hand-pumps, appears to have had a beneficial impact on the health of people in the Upper Region. Questionnaire responses indicate

that the incidence of specific diseases has been reduced, and that women now spend less time collecting water. However, interpretation of some of these data requires prudence, for affecting the level of illness would require that pure water is consumed at a greater rate than before, something which did not appear to happen. More in-depth research is necessary to discover how the water supply system has influenced health.

6.4.4 Purity of Water

In order for villagers' health to improve, it is necessary that water from hand-pumps be purer than water taken from other sources. It is thought that this would be a major concern, as otherwise the enormous commitment of time and money over the years would not achieve what had been intended; while women may not have to walk as far for water, the water consumed by the villagers would not improve their physical well-being.

Interestingly enough, the 1985 evaluation found that there was a significant amount of faecal coliform contamination in the wells which were tested. As table 6.8 indicates, non-pump water sources were actually found to be more potable than pump water.

TABLE 6.8
Faecal Coliform Contamination at Pump
and Non-pump Water Sources by Season

	Wet Season		Dry Season	
Degree of Contamination (number of colonies per 100 mls)	No. of Pump Sources	No. of Non-pump Sources	No. of Pump Source	No. of Non-pump Sources
11 - 100	1	0	0	1
1 - 10	6	0	9	1
0	7	14	13	11
Totals	14	14	22	13

SOURCE: Adapted from Malone Given Parsons, 1986d:65

Of those sources tested, about fifty percent of pump sites in the wet season and forty percent in the dry season had contaminated water, compared to none in the wet season and twenty percent in the dry season at non-pump sites. The evaluation team claims that while other analyses tested a variety of non-pump water sources, this team tested only those non-pump sources which were used for drinking water, a distinction which might account for the different results obtained (that is, that non-pump sources were found in 1985 to be less contaminated than pump sources).

While little attempt is made in the 1985 evaluation report to discover the reasons for contamination or to analyze the significance of these results for URWSP operations, if these are indeed correct it would cast doubt on suggestions which are usually made that non-pump sources are heavily contaminated. CIDA, however, seems to disregard these

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findings (Chauvet, 1989), and it is unclear whether this is simply because the results are unfavourable or whether there is a problem with the testing methods used.

If the results from this small number of pumps (only thirteen to twenty-two pump sites were examined) are correct, it would seem critical that the URWSP discover and attempt to rectify the causes of contamination. Ill health of rural dwellers is a serious problem, and a water supply project such as this should make every effort to provide pure, uncontaminated water.

6.5 Implications for Sustainability of the URWSP

This chapter has examined several aspects of the URWSP in an attempt to form an environmental impact assessment which could be used in future evaluations. On the whole, the hand-pump project seems to have provided some benefits in terms of enabling Upper Region residents to obtain access to water and possibly in improving health. However, the overriding conclusion is that a great deal more information is needed in order to determine the full effect of the URWSP. Due to financial, temporal, and structural constraints, adequate databases on many subjects are lacking in much of Africa. This is certainly true for this programme in terms of groundwater resources. Although some hydrogeological studies were conducted at the outset of the URWSP, any attempts to maintain sufficient knowledge concerning the implications of

this water supply system for the water table have not succeeded. While a number of the evaluations which have been carried out on the URWSP have included at least some superficial examination of the natural environment, there has yet to be a full-scale assessment. The limited data which do exist seem to indicate that groundwater is being negatively affected by the hand-pumps, but it is difficult to put this information into an appropriate temporal context. Whether the declines in water table levels are indications of long-term trends, or simply short-term fluctuations, is unclear.

In view of the importance of water to human survival, further investigation into this issue is mandatory. If CIDA and GWSC intend to expand coverage of the hand-pump system, there must be enough information about how this will affect the environment. Making this data-gathering a priority would certainly be a step forward to sustainability, and may assure that future generations also have the benefits of readily accessible water.

A second issue which was examined was that of landscape quality around the pump sites. The fragility of African environments indicates that the risk of land degradation should be addressed, both for its own sake and given the implications for groundwater resources.

Improvement in the health of people in the Upper Region is a key goal of the URWSP. Available data seem to suggest that the impact on incidence of several diseases, and the

amount of time and energy needed by women for water collection has been positive. Nonetheless, there does seem to be some doubt about the reliability of existing information. As well, examination of the purity of pump water has led to the conclusion that some sources of pump water may actually be more contaminated than a number of non-pump sources. If this is indeed the case, the ability of the URWSP to improve physical well-being would be limited.

The environmental impact assessment which has been conducted in this chapter was intended as a conceptual model. The aim has been to pinpoint areas which future EIAs could examine. The results clearly indicate that a major impediment to achieving a greater understanding of the potential environmental impact of the URWSP is a substantial lack of reliable data concerning many relevant topics. Until more resources are directed at bridging this gap, it will be difficult to determine the long-term effect of the hand-pumps, and an unknown amount of environmental damage could occur. If sustainable development really is CIDA's goal, environmental concerns must become a priority in practice, not just in policy.

CHAPTER 7

CONCLUSIONS TOWARD AN INTEGRATIVE MODEL FOR DEVELOPMENT PROGRAMMES

7.1 Results of Research Effort

'Sustainable development' and 'participation' have been discussed widely in issues relating to international development over the last few years, but there have not been very many corresponding improvements in the outcome of the development process. While much has been written about the need to consider environmental implications or the impact on rural livelihoods of development programming little has been put into practice. In the case of the Upper Region Water Supply Programme (URWSP) in Ghana, the sustainability of the hand-pump system operating in rural areas can be questioned on these grounds. The specific socio-cultural, financial, and environmental contexts of people in the Upper Region have not been adequately taken into account. If an initiative such as this water supply system is to be effective for rural people over the long run, alternative approaches to development must be found. The model presented in section 7.3 takes into account the above factors. It illustrates one possible approach which likely will lead to sustainable development programmes, and as such contrasts with the way in which the URWSP has been carried out.

7.1.1 Summary of Research Findings

The literature examination in chapter two explored the concepts of sustainability, participation, and the role of women in the development process; from this, criteria were devised to evaluate the URWSP. For the purposes of this thesis, sustainability has been measured by: the degree of participation of villagers who use the hand-pumps; the degree to which women, as water managers, are able to ensure that their particular interests help mould the organization of the URWSP; the concern for substantial financial constraints of the national government and rural people which influence their ability to support the water supply system economically both at present and in the future; and the extent to which environmental impacts of the URWSP are considered in terms of current and expanded levels of service. Information gathered from a questionnaire given to a small number of women in the Upper Region, as well as data from a 1985 evaluation of the URWSP and a number of interviews with key informants provided the basis for the conclusions reached.

Chapters three and four examined current economic problems facing Ghana, and specific implications of these for supporting the hand-pump system. Ghana has accumulated a tremendous debt burden which continues to increase, and the austerity programme in place since 1983 has not improved this situation. Social welfare has suffered, with the retrenchment

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of thousands of government workers, and curtailment of social, education, and health programmes. Green (1988) has documented the declining well-being over this period, especially of the rural poor; life expectancy has declined, infant mortality rates have soared, and the proportion of Ghana's population below the poverty line has risen. The need to pay national debts (or at least debt interest) has led the national government to try to extract wealth from peasants, who then may have to degrade their environment in order to attempt short-term survival.

It is within this context that the water supply system must be financed, which explains why a programme such as the URWSP cannot be carried out in isolation of national and local limitations. The technology chosen must be priced at a level affordable to Ghanaians, and supportive infrastructure has to be in place. Research has shown both of these areas to be problematic. In the URWSP, the hand-pumps have been selected without local input concerning cost, complexity, or durability, and as a result they are an impediment to Ghana's capability to maintain the URWSP in post-CIDA years. While the original hand-pump choice was completely inappropriate for conditions in the Upper Region, more recent selections still tend to be biased in favour of Canadian-made equipment as well as technological complexity. The former militates against purchasing pumps which present the best value, and whose spare parts consume the least foreign exchange. The latter often

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has led to breakdowns which necessitate time-consuming, costly repairs.

In terms of infrastructure, GWSC has been experiencing financial difficulties which will be compounded in all likelihood by those of the national government. GWSC cannot be counted on to provide adequate maintenance, replacement, and levels of service to rural areas in the years to come. The implementation of a hand-pump tariff in 1985 represents an attempt to transfer costs to users. However, there are several difficulties with this. First, villagers have to be able to afford the levy. Evidence indicates that many of those interviewed were having trouble paying the tariff, and it is unrealistic for GWSC to attempt to place more of the financial burden on rural areas. A second issue is that without allowing villagers an effective voice in the decision-making structure, the water supply system will not be organized in such a way that villagers feel responsible for its operation, and will not be financed in accordance with Ghanaian economic realities.

Chapter five investigated this issue of participation in detail. Both the amount and kind of participation have been limited; there has been neither a substantial involvement of villagers, nor has any involvement been of an empowering nature. Programme design and implementation were very technocratic, with people's participation confined to unpaid labour in construction. In subsequent phases, attempts have

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been made to involve villagers somewhat, and to investigate their local knowledge systems about health and sanitation. Unfortunately, URWSP management has not attempted to give rural people any real power to determine the project's structure. Decision-making control has been kept out of the hands of those who depend on the water supply system, and who now have to pay for it. In addition, when villagers are consulted, it tends to be with village men that discussions take place. Despite women's responsibility for water management, and their regular contact with the hand-pumps, they have been excluded from managing the new technology which has been introduced. This is evident particularly in terms of pump maintenance and repair, which are fundamental elements of a well-functioning water supply system. While women have the greatest interest and involvement in hand-pumps, they have little understanding of how pumps operate, and especially of how to fix them in the event of a breakdown. This has created a dependence which did not previously exist on village men and on GWSC, the latter placing the system in a vulnerable position given GWSC's financial woes.

The final factor in this evaluation of the URWSP was an examination of the environmental impact of the water supply system, which was explored in chapter six. To this end, a conceptual environmental impact assessment (EIA) model was discussed, involving variables such as groundwater resource potential; landscape quality around pump-sites; health of

Upper Region residents; and purity of pump water. A significant limitation on the performance of an EIA is the limited amount of available information. Scattered evidence points to a lowering of water table levels to date, and the possibility that areas surrounding hand-pumps might be subject to degradation or desertification. Villagers' health appears to have improved somewhat (based on the small sample interviewed), but concerns raised by the 1985 evaluation team that in some cases non-pump water sources are more pure than pump sources have not been dealt with by the URWSP.

All of this re-affirms the point raised in chapter two, that support for a healthy environment too often is all talk and little action. Redclift's (1984;1987) suggestion that the developmental crisis is an environmental crisis is well-taken, and should lead to decisive action on the part of aid agencies and governments. In order for this water supply system to operate well into the future, it must be able to do so without negatively affecting the environment on which it relies. These physical resources also must be able to support expansions to accommodate increased populations. The URWSP must consider issues such as these, and enact policies which find a way to integrate environmental concerns into programme design.

7.1.2 Sustainable Development: How does the URWSP Fare?

In view of the findings discussed above, evidence points to the URWSP as an example of unsustainable development. Despite various modifications in approach and policy from one component of the programme to another, there has been no fundamental reworking of the organization and decision-making hierarchy of the water supply system. Although there are some positive changes which already have been, or will be, made, such as the introduction of VLOM-style pumps, on the whole the URWSP is still very much a top-down initiative. CIDA, the government of Ghana, and GWSC have control over decision-making, deciding for rural people how the hand-pump system is to function. Villagers were not brought into discussion about solutions to inadequate access to potable water before the hand-pumps were installed, and have had little power to make their concerns an integral part of the programme.

The ramifications of this approach are many. Villagers do not have a water supply system which works for them to meet their self-determined needs. Rural women hold a peripheral role in the programme, and the particular impact of URWSP policies on them is not considered sufficiently. The economic cost of the hand-pump system likely is greater than the national and local ability to pay (a gap which will increase rather than decrease). Finally, the effect of the water supply system on the physical environment has not been recognized as a key issue, in spite of the large number of

boreholes and CIDA's desire to increase service to accommodate population growth.

If a water supply system is to be developed in such a way that it has a beneficial impact on rural people over the long-term, it needs to be based on needs, resources, and opportunities existing at local and national levels. As figure 7.1 suggests, external knowledge and decision-making should play only a small role in determining the structure of the system.

7.2 Future Research Concerns

The topics discussed below are areas which would benefit from further research. The URWSP as it currently stands lacks adequate in-depth knowledge of a number of critical issues.

(1) How can the water supply system be structured - organizationally and financially - in such a way as to overcome ties to fluctuating political and economic conditions at national and international levels? That is, the present dependency on non-local sources (the government and foreign donors) for funding and economic decision-making places the URWSP in a very vulnerable position. While constraints resulting from the ERP, the debt burden, and Ghana's export orientation cannot be eliminated, their influence on the sustainability of this hand-pump system can be reduced.

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(2) What alternative technologies and associated programme organization would be most conducive to meeting the needs and accommodating the limitations of rural people? Research conducted through discussions with villagers as to the hand-pump technology selection , decision-making structures, and maintenance responsibilities will help to determine what kind of water supply system villagers want, and for which they will be able and willing to pay.

(3) What existing social organizations can be utilized to integrate such things as maintenance and health education better? For instance, local women's groups might be in a suitable position to voice autochthonous concerns, as well as acting as a support mechanism through which the URWSP can consult with women and men about water and sanitation habits.

(4) Much research is needed on the environmental impact of this water supply system:

- How have water table levels been affected by current pumpage rates?
- How well will groundwater resources be able to support extension of the hand-pump system?
- What is the risk of land degradation around pump-sites due to increased human and animal activity and the withdrawal of groundwater reserves?

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- How can any of the above negative effects be overcome or mitigated substantially?

(5) Further information is necessary concerning the issue of pump water contamination.

- How do pump versus non-pump water sources rate in terms of faecal coliform contamination (based on an examination of a large number of pump areas)?
- How does pump water become contaminated?
- How can this contamination process be avoided or resolved?

7.3 Alternative Models for the Sustainable Development of Water Supply Programmes

The way in which the URWSP has been designed, implemented, and evaluated to date is not satisfactory; it has not resulted in the development of a water supply system which operates in accordance with villagers' requirements and constraints. Therefore, it is vital that alternative models of development programmes are formulated and debated, in a way which recognizes the lessons to be learned from non-sustainable approaches like that of the URWSP.

This section explores one possible alternative model which could be used to solve inadequate access to potable water. In many ways it runs counter to the way in which agencies such as CIDA carry out 'development' because it challenges a number of the biases inherent in conventional

programme structure: emphasis on the large-scale; the use of top-down structures; and a heavy reliance on foreign "experts" at the expense of local knowledge.

Figure 7.1 depicts the variables which would be considered in this alternative, and their interrelationships. There are three key components: (1) environmental support systems; (2) economic and financial constraints; and (3) the socio-cultural context. The first factor, the physical environment, encompasses local and regional biophysical systems, which in the case of a water supply system would involve such components as the hydrological regime. In this way, there would be adequate concern for, and monitoring of, environmental impacts, so that the biosphere is not degraded.

The second factor, economic and financial constraints, takes into account limitations at various levels (intra-household, local, and national) so that people can attempt to meet their needs affordably and effectively. In the case of Ghana, the Economic Recovery Programme, a rising debt burden, and growing rural poverty would be taken into account, hopefully thereby avoiding the establishment of a water supply system which cannot be maintained at adequate service levels over the long-term.

The third factor, the socio-cultural context, acknowledges the local influences on the development process,

FIGURE 7.1

Integrative Model for Development Programmes

- a - problem identification
- b - solution design
- c - solution implementation
- d - solution evaluation

* active involvement of both genders and all classes, especially the poor

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through which potential solutions must be mediated¹. Included are local power structures, social organizations, and gender- and age-defined productive and reproductive responsibilities. Local women's groups, for instance, might decide to play an active role in helping to develop a water supply system because women have responsibility for water management. As well, by clarifying duties which depend on gender (or age), there is less chance that technology which is introduced will erode the domain and status of a particular group in that society.

Two elements stem from the adequate recognition of socio-economic context. First, indigenous knowledge systems are utilized, and certain elements of this combine with certain elements of external knowledge to create the most appropriate combination for a given context. Second, empowerment or active participation of villagers becomes a fundamental part of development. Active participation of villagers is a prerequisite for sustainability, and it is imperative that participation is based on the involvement of people from all sectors of the society in terms of both gender and class. Obstacles to the inclusion of women and the poor have to be overcome so that everyone contributes to and makes decisions about the development process; in this way, people are

¹ The socio-cultural context within which the URWSP takes place has not been explored in much detail in this thesis primarily because this author felt that an adequate examination could not be made without field work in the Upper Region.

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empowered to undertake the improvement of their society or culture.

The above three factors all contribute to the development of a sustainable development initiative, in this case a water supply system. Basic to the structure of this system is the participation of villagers in problem identification and resolution. In this model, people have the opportunity to solve their problems first by identifying their own un-met needs, then through designing, implementing, and evaluating potential solutions. There is constant feedback between these phases. Here, the initiative for a development project such as a water supply system does not come from exogenous forces; it is local people and their particular concerns which guide each of the various steps of an initiative.

The above model is a suggestive, rather than a definitive, guide to the development process. It indicates how development programmes could undergo radical restructuring so that sustainable development can materialize. Alternatives such as this one need to be placed urgently on to the mainstream agenda, so that institutions such as CIDA, as well as researchers and policy makers, can explore avenues of real and sustainable change.

7.4 Prospects for Sustainability

This thesis has found the URWSP to be an example of unsustainable development for a variety of reasons. The

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empowering participation of women and men, an appreciation for the problems engendered by severe economic difficulties at the local and national levels, and respect for environmental support systems have not been much in evidence.

The lack of integration of these elements into URWSP planning and operations illustrates a critical paradox. On the one hand, potable water is an essential human need; in this light, CIDA's attempts to improve access to it through the URWSP are a positive initiative. On the other hand, however, by not facing the contradictions inherent in the world capitalist system and patriarchal biases as they presently exist, CIDA is helping to ensure that rural needs will not be met over the long-term. The nature of the global economy is such that Ghana in general - as part of the underdeveloped South - and rural villagers in particular - as the end-of-the-line periphery on to whom the detrimental impacts of the system are passed - scarcely can afford to pay for the necessities of life, especially when they are delivered inappropriately. The current context of enormous debt servicing ratios, greater impoverishment of rural people, and the erosion of health and education services are incompatible with the objectives of the URWSP. Ghanaians, particularly those outside of urban areas, do not have the money to fund a water supply system like the URWSP, despite the importance of its implications for better health and productivity and ultimately human resource development. By

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denying the reality of these circumstances because of its role in perpetuating the interests of the North, CIDA is not presently contributing positively to Ghana's future.

CIDA's practices in this regard are not an aberration; they are typical of the approach it employs in many initiatives. There are other options for the development process; the model presented in figure 7.1 is but one example. If environmental degradation is to be halted, if the rural poor are to gain control over their lives and their livelihoods, and if substantial improvements in human welfare ever are to occur, drastic changes in development programmes are imperative. Only in this way will sustainable development become a reality in practice, not just in the rhetoric of policy.

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APPENDIX A

QUESTIONNAIRE FOR WOMEN WITH ACCESS TO WATER PUMPS

I.D. Number:

Name of village:

Number of people in village:

Distance from centre of village to pump:

Distance from woman's home to pump:

SOCIO-ECONOMIC STATUS

Age: _____

Marital status: _____

Number of children and sex: _____

Number of co-wives: _____

Number of other women in yard: _____ In compound: _____

Total number of people in yard: _____ In compound: _____

How many years of formal education have you had: _____

Type of housing:

Number of rooms: _____

What is roof made of: _____

What is floor made of: _____

What is the total size of all the land which your yard farms: _____

What is the total size of all the land which your compound farms: _____

ACCESS TO AND USE OF PUMP AND NON-PUMP WATER

1. How many pumps does your village have? _____

How long has your village had the pump(s)? _____

2. Check all of the possible sources of water for this compound:

- hand-pump
- well
- dam
- pond or field dug-out
- river or stream
- dug-out in river or stream
- others (list them): _____

3. Put a check next to those sources which you use during the dry and rainy seasons:

DRY

RAINY

- hand-pump
- well
- dam
- pond or field dug-out
- river or stream
- river or stream dug-out
- others (list them): _____

4. Do you get any of your water from the pump(s): YES NO

A. i. If NO:

a. Why not? Explain. _____

b. Are any of the following reasons why you do not get any of your water from the pump? Check as many as applicable.

- too far away
- too long a wait in line
- don't like the water from the pump: describe why not.
- can't afford to use the pump

ii. Have you ever used the pump(s): YES NO

a. If YES, why did you stop? _____

b. If NO, do you think you ever will use the pump? Why would ~~me~~ you start? _____

B. If YES:

i. How much of your water do you get from the pump?

(all; most; some; none)

In the dry season: _____

In the rainy season: _____

ii. For how long have you been using the pump: _____

iii. Do you use only pump water: YES NO

a. If YES:

i) why do you not use other sources? _____

ii) Are any of the following reasons why you only use pump water? Check as many as applicable:

- cleaner
- tastes better
- healthier
- not as far to walk to
- water always available from it
- everyone else goes there
- takes less time to get water from it

b. If NO (i.e. you use pump water as well as other sources of water), why do you not use only the pump: _____

IF RESPONDENT DOES NOT USE THE PUMP, QUESTIONNAIRE IS NOW ENDED

IF RESPONDENT DOES USE THE PUMP, PLEASE GO ON TO QUESTION 5

CHANGES AS A RESULT OF YOUR USE OF THE PUMP AND PUMP WATER

5. How has your use of a pump changed the amount of water:
- a. that your yard collects and uses? Explain why the amount has increased or decreased; how have its uses changed? _____

- b. that your compound uses? Explain why the amount has increased or decreased; how have its uses changed? _____

6. Has access to the pump saved you time: YES NO
- a. If YES, what do you do with this 'extra' time? (eg. social activities, child care, agriculture, marketing, husband) Be specific

- b. If NO, why not? _____

PRESENT WATER HABITS

7. How long does water collection round-trip take, including waiting time:

in rainy season: _____
 in the dry season: _____

8.a. Who is responsible for water collection?

(1=always; 2=most of the time; 3=occasionally; 4=never)

Rainy Season Dry Season

- you
- your co-wives
- your daughters
- your sons
- your mother
- your husband
- others (list them):

b. Do you generally collect water alone or with others? With whom?

Rainy season: _____
 Dry season: _____

9. Please check what you use the water you collect for:

- drinking
- cooking
- bathing
- washing clothes
- animals
- to water crops
- building
- plastering
- others (please list): _____

10. Please describe any aspects of water collection that you like.

11. Please describe any aspects of water collection that you dislike.

12. Do you usually go with other women to collect water or meet other women at water sources? What is important to you about this time for socializing? Has the pump changed this? Please describe. _____

TARIFFS (USER FEES) FOR PUMP

13. Does a tariff/user fee have to be paid for the pump:

___ YES ___ NO

a. If YES:

i. Who pays this tariff? Please check.

- you
- someone else in your yard (list) _____
- someone else in your compound (list) _____
- the village as a whole; from whom does the money come? _____
- other (please list) _____

ii. Why was this person chosen? _____

iii. How much is the tariff? _____

What portion do you, your yard, or your compound pay? _____

13. CONTINUED...

iv. Please check whether you feel this is:

- too much
- too little
- a reasonable amount

v. Where does the money come from to pay for this: by not purchasing something else (what?); by taking on extra work (describe); by some other means (describe)? _____

vi. Do you consider it a worthwhile expense? _____

vii. Does the tariff depend on how much or whether you use the pump? _____

viii. Have you changed your water collection habits as a result of the tariff/user fee? i.e. amount you use the pump, amount of water you collect from it? _____

B. If NO tariff/user fee has to be paid for the pump:

i. Would you be willing to pay for the pump? Why? _____

ii. What changes would you make so that you could afford to pay a tariff/user fee for pump water? _____

iii. Who would pay for this? You; someone else in your yard/compound (who)? Why this person? _____

iv. Why would you not be willing to pay for the pump? _____

v. Do you think others in your yard/compound feel differently about this issue than you do? In what way? _____

PROBLEMS WITH THE PUMP

14.a. How often has the pump(s) broken down in the last year?_____

b. When it does break down:

i. Who is responsible for fixing it? Why was this person/people chosen?_____

ii. How long does the pump usually take to be fixed?_____

iii. From where do you get your water when the pump is broken?_____

iv. Has the same person/people been responsible for maintenance since the pump was installed? If not, explain._____

v. Would you prefer someone else to be responsible for pump maintenance? Who? Why?_____

vi. Do you know how to make minor repairs to the pump?_____

vii. If not, would you like to know how? Why?_____

HEALTH ISSUES

15. a. Do you think that drinking water plays a part in determining health?_____

b. Please rank all of water sources which your village can use in order of how healthy you think they are in the rainy and dry seasons: (1=most healthy; 6=least healthy)

Rainy Dry

- hand-pump
- well
- dam
- pond or field dug-out
- river or stream
- dug-out in river or stream
- others (please list):

16. How has health in your village changed since the pump was installed? Please check the appropriate response.

- a. number of children affected with diarrhoea has:
 - gone up; - gone down; - not changed
- b. number of cases of bilharzia has:
 - gone up; - gone down; - not changed
- c. number of cases of guinea worm has:
 - gone up; - gone down; - not changed
- d. number of times you have been sick is:
 - more; - less; - the same as before the pump was installed

THE EFFECT OF THE PUMP(S) ON YOUR VILLAGE

17. a. Do you feel pressured to use the pump? ☐ YES ☐ NO
From whom? Why? _____

b. Do you feel pressured not to use the pump? ☐ YES ☐ NO
From whom? Why? _____

18. Have you ever had any concerns or suggestions about the pump?
☐ YES ☐ NO

a. If yes, please describe them. _____

b. Who did you talk to about these concerns/suggestions? Did that person/people do anything; if so, what and how long did it take? _____

19. Has GWSC (Ghana Water and Sewage Corp.) ever talked to you, your husband, you co-wife, or another member of your yard about any of the following? Check appropriate columns, checking as many as applicable.

	<u>YOU</u>	<u>YOUR HUSBAND</u>	<u>YOUR CO-WIFE</u>	<u>OTHER YARD MEMBER (who?)</u>
pump location				
number of pumps to be installed				
training to use the pump				
training for pump maintenance				
training on ways to use pump				
water to improve health				
who would be responsible for maintaining the pump				
whether there would be a tariff				
how much the tariff would be				
others: _____				

20. Are water supply and water quality the most important problems that you have? What other problems do you face? _____

21.a. What are the greatest benefits to you from the pump installation?

b. What are the greatest drawbacks/problems? _____

APPENDIX B

FRA-FRA TRANSLATION OF QUESTIONNAIRE

QUESTIONNAIRE FOR WOMEN WITH ACCESS TO WATER PUMPS

Bana inge la wane bange fom?
Fo tenga yuure?
Nerba ba le ubo fom tenga pua?
Ya tenga la tengasuka la pompi zaa taaba la wane?
Fom yire la pompi la zaa taaba la wane?

SOCIO-ECONOMIC STATUS

Fo dogum yuuma dela a le?
Fo tare sira?
Fo koma dela ba le? Bodibto: Pugto:
Fo yentaasi dela ba le?
Pogsi si le nlagum bona ya deo pua?
Pogsi si le nlagum bona ya uire la pua?
Nerba ba le nbo ya deo pua? Yire Pua?
Fo tabe kenge sukuul yo? Yuuma a le pua?
Ya yia me la wane wane?
Deto to le?
Ya pilime bii ya lase me?
Zinzaka la booro pua la pam mi bii ba salke la sameto?
Ya deo la samane zun la wane?
Ya yire la samane zun la wane?

ACCESS TO AND USE OF PUMP AND NON-PUMP WATER

1. Pompi doma bale n boe ya tenga pua?
Ban tu ba la, yuuma a le nwana?
2. Pa-ale ya yire doma n ete seem nyeta koom.
- Nuusi pompi; - Lua; - Mogre; Soko bii bulka; - Kulaa;
- bulka te ba tu kula pua; - sela le pa-ase?
3. Le man pa-ale ya ete seem yeta koom uune la seeo.
- Pompi; - Lua; - Mogre; - soko bii bulka; - Kulaa;
- Bulka te ba tu kulaa pua; bii bem?

4. Ya lagum po akra ya koom pompi pua?

___Le ___Aai

a. i. La san dena Aai

(a) Bem soi?

(b) Yela boe ana wa pua paale sere usoi ti ya ka nyeta koom pompi pua? A zun seem la pa-ale a zaa.

- La zaa me; - ya na ta zeele yuu me ge hya ake; - ya kabote pompi. koom; pa-ale sesem nsoi; -ya ka tan vilingra pompi la me.

ii. Ya tab ake koom pompi pua? ___Ee ___Aai

(a) La san dena ee, beem inge te ya base?

(b) Bem wan inge te ya nyaa bota?

b. La san denaa Ee:

i. Ko sebo te ya akra pomppi pua la zune (a wane)?

(Ya koom zaa; bo zoezoe; ya koom bosebo; ya pun ka makra pompi koom). Loe ya man yele seem wa bo uune la seeo.

ii. Ya akre pompi koom, la dela yuuma a le?

iii. Ya okre la pompi koom maa yo? ___Ee ___Aai

(a)i. La san den Ee; Bem nsoi te ya akra pompi koom maa.

ii. Bene nle sona te ya akra pompi koom maa? - Bo ani la songa; - bo ani la songa ya noorin; - bo ka tare bausi; -bo zia ka zaa la ya; - bo ka mam keeara; - nera woo akre la bilam; ba akre ka toi.

(b) La san dena Aai (ya lagum akra bulsi la luusi koom une), bem nsoi te ya ka akra pompi koom maa?

CHANGES AS A RESULT OF YOUR USE OF THE PUMP AND PUMP WATER

5. Ya san akra la pompi kom maa:

a. Ya deo pua n tare bo itaseem la, bo skre bii bo ka skre?

Bo san skra, pa--ale sela nsoi te bo sekra, bo san ka el sekra, le pa-ale sela nsoi ti bo ka sekra. Ya tare ob ita la bem te bo sekra bii ka sekra?

b. Ya yire me pua, bo sekre ya bii bo ka sekre ya? Bo san sekra, bem nsoi, bo san ka le sekra bem le soua?

6. Ya akre pompi koom la, la base te ya nyeta nenga tuna tuyma a se-a yo? ___Ee ___Aai

a. Ya san nyeta nenga tuna tuuma a se-a, bem tuuma nde a?

(De-ingo p'a bii, kuma tareka bii, kua tuuma bii, da-a kene bii, fom la fo sira tuuma bii bem?)

b. La san dena la Aai, bem nsoi?

PRESENT WATER HABITS

7. Ya na zeele yue la wane gee ake koom kule yire ge lebna?
Ya na yue la wane seeo pua? Gee uune me?
8. a. Bana n alkre koom ya yire pua?
(1=daare woo; 2=magla-magla; 3=dabsa a sea; 4=ka makre)
- Fo mea; - fo yentaase; - fo poyausi; - fo dayuusi; -
fo ma; - fo sira; bana nle pa-ase?
b. Fo maa na akra fo koom bii fom la baseba nlagum akra?
Bana ude ba?
- seeo pua? Uune?
9. Fo tare koom la ita la bem?
- ko nyuurimo; - duka; - sowa; ppera logro; - nyuusa
dunsi; - basa bun-buula; mela yia; - takra yia; bem le
pa-ase?
10. Pa-ale koom akre in ane nyelom fom zie seem.
11. Le pa-ale koom akre in ka ame nyelom fom zie seem me.
12. Fom la fo pog taaba ne kena akra koom la bii fo na keng
paaba me binin? Ya na sa ta paae taaba la, la ane ya la wane
ya daare woo taaba nyelom pua? Pompei pua koom akre tee wana
yo? Pa-ale fo mi sseem.

TARIFFS (USER FEES) FOR THE PUMP

13. La nare te ya yaara gee akra pompi koom yo.
____Ee ____Aai
- a. La san den aEe:
- i. Ane wan ya? Soke bise.
- fom yo? - ya deo la pua nera yo; - ya yire la pua
nera yo; - ya tenga pua yo; - la san dena bala, ane wan
ya. Bem le pa-ase?
 - ii. Bene enge te ba loe ina daana?
 - iii. Ya yaari la wane?
Fom yaari la wane? Ya deo la pua yaari la wane? Ya
yire la pua yaari la wane?
 - iv. Ya yaari seem la, la zoe me bii, la poe me bii la
kam seke la maa?
 - v. Ya nyeti ligri la be yaara? Ya na koose la ya
bunbuuka bii ya ite la bem pa-asa? Pa-ale.
 - vi. Ya te-ese ti ya yaari wa, la ane songa bo ya?
 - vii. Ya ake koom woo, ya ka ake koom woo, la perige ti
ya ya mi go?

viii. Yawa la base te fo tee fom na akra fo pompi koom la seem mi yo? Fom kene pompi la seem la fom akre koom la seem.

- b. i. Pompi koom akre la san dene yoo, fom wan boti ni te fo ya? Bem soi?
- ii. Fo san ka tarne wan ya pompi koom la, fo wan enge al wane ye ligri ya?
- iii. Ane wan ya? Fom bii, ya deo nera a yima bii, ya yire nera a yima. Bem soi te ina daana wan ya?
- iv. Bem soi ti fom minge ka bota te fo ya.
- v. Fo te-ese te nerba boe ya deo pua bii ya yire pua mi ka tara fom pute-ere wa pua yo? Enga daana te-esi la wane?

PROBLEMS WITH THE PUMP

- 14. a. Yuune ntole la, pompi doma bale nsa-am?
- b. A san na sa-am:
- i. Bana na maale? Bem soi te ba loe bama doma?
- ii. Dabea a le te ba na dike maale pompi la?
- iii. Pompi la na sa ta saa-am, fo na akra fo koom la be?
- iv. Ba binge pompi la daare la, a na san saa-am seba te ya loe la nmaale daare woo bii ya na tee la baseba?
- v. Ya bote ti ya tee nerba te bama kan sana ba maala pompi la? Bana? Bem zuo?
- vi. Sela fii san saa-am pompi la pua, fom wan nyange maale?
- vii. Fo san kan taam maale, fo bote ti fo zase? Bem zuo?

HEALTH ISSUES

- 15. a. Fo te-ese ti koom nyua, maale fo inga?
- b. Kobuna wa taaba, buna in ane songa la buna ka an songa seeo la uune? - pompi koom; - lua koom; - mogre koom; - sake koo bulka koom; - kulaa koom; - bulka ti ba tu kafa pua koom; - bem le pa-ase?
- Seeo Uune.
- 16. Ban binge pompi koom ya tenga daare la; ya vom pua tee la wane wane?
- a. kama nye-a bii saa mam paase me bii la sirige me, bii la pun ka tee?
- b. Dunduziim mama paase mi bii, la sirige me bii la puu ka tee?
- c. Nyiili mama paase me bii la sirige me bii la pum ka tee?
- d. Fom menga inga ba-ansi mam paase me bii la sirige me bii la an wu ban daa pun ka binge pompi la?

THE EFFECT OF THE PUMP(S) ON YOUR VILLAGE

17. a. Ba lakre ya bi perigire ya te ya nyuura pompi koom?

Ee_____ Aai_____ Ani perigire ya? Bem soi?

b. Ba perigiire ya te ya da nyaara pompi koom?

Ee_____ Aai_____ Ani perigire ya? Bem soi?

18. a. Fom tabi soke sokre bii, ka-am ka-ango ya pompi yele?

Ee_____ Aai_____

Fo sam tabi enge bala, paale to fom enge seem.

b. Fo tabi toge popmpi wa yele bo la ane?

Adoma enge la bem? A san enge la yue la wane gee te a nya enge?

19. Seba nbisis koom zuo Ghana wa pua la tabe toge bo fom, bii fo sira, bii fo yentaa bii yer deo pua nerbnina yel ana wa pna?

	Fom	Fo sira	Yen taa	Deodoma

Pompi la nze zune seem

Pompi duma la wan zuna seem

Zamse pompi koom akre

Zamse pompi maalko

Zamse pompi koom nyua te la

maale fo inga seem

Ani wan maala pompi la

Ba yaara bii ba da yaara

Ba yaara wane

Bem le paase

20. Koom nyea la bo som yela ma-a ndaane fom yo? Bem yela le paase bini?

21. a. Ba binge bii ba vigle pompi la claave la, bem la bem nba-a pee fo puure paa?

b. Bem la bem mi nba-a sa-am fo puure paa?

END

1 5 0 4 9 1

FIN