Sustainable Handpump Projects in Africa

Report on Fieldwork in Ghana
May 22 - June 7 2002

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The people of Odumase, Somsei, Yordan’nu and Fesi
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<tr>
<td>AFD</td>
<td>Agence Française de Développement</td>
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<td>APDO</td>
<td>Afram Plains Development Organisation</td>
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<tr>
<td>APM</td>
<td>Area Pump Mechanic</td>
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<td>BHC</td>
<td>British High Commission</td>
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<tr>
<td>CBO</td>
<td>Community Based Organisation</td>
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<tr>
<td>CIDA</td>
<td>Canadian International Development Agency</td>
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<td>CIF</td>
<td>Cost, Insurance and Freight</td>
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<td>CWSA</td>
<td>Community Water and Sanitation Agency</td>
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<tr>
<td>CWSP-1</td>
<td>First Community Water and Sanitation Programme (World Bank, Ghana)</td>
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<td>DA</td>
<td>District Assembly</td>
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<tr>
<td>DANIDA</td>
<td>Danish Agency for Development Assistance</td>
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<tr>
<td>DFID</td>
<td>Department for International Development (UK Government)</td>
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<td>DWST</td>
<td>District Water and Sanitation Team</td>
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<tr>
<td>EHA</td>
<td>Environmental Health Assistant</td>
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<tr>
<td>ESA</td>
<td>External Support Agency</td>
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<td>FAM</td>
<td>Foundries and Agricultural Machinery (GH) Ltd.</td>
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<tr>
<td>GMIM-II</td>
<td>Ghana-Modified India Mark II</td>
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<td>GWCL</td>
<td>Ghana Water Company Ltd.</td>
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<td>GWSC</td>
<td>Ghana Water and Sewerage Corporation</td>
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<td>HDB</td>
<td>Handpump density breakpoint</td>
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<tr>
<td>KaR</td>
<td>Knowledge and Research</td>
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<tr>
<td>KfW</td>
<td>Kreditanstalt für Wiederaufbau</td>
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<tr>
<td>Acronym</td>
<td>Description</td>
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<tr>
<td>NCWSP</td>
<td>National Community Water Supply and Sanitation Programme</td>
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<td>NSRWS</td>
<td>National Strategy for Rural Water Supply and Sanitation</td>
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<td>NGO</td>
<td>Non-Governmental Organisation</td>
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<td>VRCWSP</td>
<td>Volta Region Community Water Supply and Sanitation Programme</td>
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<td>WEDC</td>
<td>Water, Engineering and Development Centre (Loughborough University)</td>
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1. Introduction

1.1 Research project

This report has been produced as part of the second phase of a KaR (Knowledge and Research) project (R7817) entitled *Guidelines for Sustainable Handpump projects in Africa*. This research is funded by the UK Department for International Development (DFID) and is being carried out by the Water, Engineering and Development Centre (WEDC) at Loughborough University, UK.

For many years, handpumps have been considered an appropriate water supply option for low-income communities, but in many cases, particularly in Africa, they have fallen into disuse shortly after installation. The project aims to collect data from successful handpump projects and synthesise it into a set of guidelines that can be used by planners, implementers and decision-makers to prepare future handpump projects that have an improved chance of long-term sustainability.

The stated purpose of the project is:

*Improved benefits from communal handpumps in Africa through an increased application of factors affecting sustainability in new projects*

Full details of the research project and the outputs produced so far can be accessed on the projects web site at http://www.lboro.ac.uk/departments/cv/wedc/projects/shp/index.htm

The outputs so far include:

- A literature review
- Draft guidelines for field evaluation of handpump projects
- A report on a half-day workshop on handpump sustainability
- A report on an electronic conference on handpump sustainability
- An inception report for the first phase of the project
- Report on fieldwork in Zambia

This is one of four reports on fieldwork carried out in different countries in Africa. Zambia was the first country to be visited for fieldwork during April and May 2002 where the ‘Draft guidelines for field evaluation of handpump projects’ were first trialed. Ghana is the second country visited as part of the project.

1.2 The field visit

The field visit to Ghana took place between 22 May and 7 June 2002. The primary purpose of this visit was to learn from successful handpump projects in the country by assessing which factors and structures contribute to project sustainability.
The visit was planned in collaboration with WaterAid Ghana and the Community Water and Sanitation Agency of the government of Ghana, and focused on two geographical areas of Ghana: Afram Plains District and Volta Region (Figure 1). These two areas were selected on the basis that they both had long-term handpump projects which were perceived to be successful and yet used significantly different handpump delivery and maintenance structures, both now and in the past.

![Figure 1: Regional map of Ghana](image)

### 1.3 Methodology

Following the first field visit to Zambia a slightly different approach was taken during this visit. The Zambia visit suggested that factors at institutional and governmental level may have a greater influence on long-term sustainability than those at community level. For this reason, fewer visits to communities were made in Ghana and more key informant interviews were conducted with government, donor agency and implementing agency staff. A visit diary is presented in Appendix 1 and a list of persons met provided in Appendix 2.
INTRODUCTION

A series of checklists were used to guide interviews with key informants (see Appendix 3), collected information was recorded in the field and later used to compile the various sections of this report. A number of villages were visited and Checklist C was used to guide discussions with community members, the information collected was used to complete a sustainability snapshot for each community visited (Appendix 4).

The opinions expressed within this report are solely those of the authors and are based on observations made and information collected during the visit only.
2. Handpump provision and maintenance in Ghana

2.1 Government policy

2.1.1 National Strategy for Water Supply and Sanitation

In February 1991, about 60 participants from sector institutions and external support agencies met at Kokrobite, Ghana for a workshop to deliberate on the development of a National Strategy for Rural Water Supply and Sanitation. The Kokrobite workshop recommended that the objectives of the National Community Water and Sanitation Programme (NCWSP) would only be achieved through the adoption of a National Policy and Strategy established in line with the Government’s decentralisation policy.

The National Strategy for Rural Water Supply and Sanitation (NSRWS) was launched by the government of Ghana in 1994. The following are the key elements of the strategy developed:

- Demand responsive approach to the delivery of facilities;
- Public sector facilitation;
- Private sector provision of goods and services;
- Community ownership and management;
- Integration of hygiene education with the provision of water and sanitation facilities; and
- Gender mainstreaming at all levels of sector activities.

The national policy for rural water supply projects is that a demand led approach should be adopted whereby implementation of improved water supplies responds to the needs and wishes of the recipient communities. In theory, communities should determine their own priorities and make their own decisions regarding technology choice.

In line with the Government’s decentralisation policy, the NSRWS involves capacity building for key sector players, especially the District Assemblies. Training and technical support to District Assemblies in the implementation of the NCWSP were identified as priority activities.

Also in line with central Government policy, there is currently a privatisation strategy through which it is intended that the supply and distribution of spare parts for handpumps is to become the sole responsibility of the private sector. Specialist services such as borehole siting and drilling, handpump installation and community mobilisation are contracted out by government to private organisations.

It is also Government policy that rural water supplies should be community owned and managed and that the community should contribute to the initial
cost of implementation. The rationale behind this is that communities will regard the facility as their own once they have contributed towards its construction.

In order to derive maximum health benefits it is intended that hygiene education should go hand in hand with the provision of water and sanitation facilities. The National Strategy also provides for the promotion of awareness of the roles of men and women in the delivery of facilities, and emphasises the role of women in particular, since they are considered to be more directly affected by the lack of adequate water and sanitation facilities.

2.1.2 Community Water and Sanitation Agency Act

As part of the National Strategy for Rural Water Supply and Sanitation the Community Water and Sanitation Agency (CWSA) was set up as an independent body alongside the Ghana Water Company Ltd. (GWCL), replacing what was previously known as the Ghana Water and Sewerage Corporation. CWSA is the key facilitator of the NCWSP and the primary objective of the agency is to facilitate the provision of safe water and related sanitation services to rural communities and small towns. GWCL is responsible for urban water and sanitation services.

The Community Water and Sanitation Agency Act, 1998 lists the functions expected of CWSA which include:

- Support to District Assemblies to promote the sustainability of water supply services and encourage the involvement of communities in design, implementation and management;
- Formulation of strategies for effective mobilisation of resources;
- Encouragement of private sector participation;
- Technical assistance to District Assemblies;
- Assistance and co-ordination with Non-Governmental Organisations (NGOs); and
- Collaboration with international agencies as considered necessary.

2.1.3 Handpump standardisation

In the early 1990’s the government introduced a handpump standardisation policy whereby four models of handpump were selected for use Nationwide, the Ghana Modified India Mark II (GMIM-II), the Afridev, the Nira and the Vernet. This policy was introduced to facilitate the availability of spare parts and avoid the proliferation of little known, hard to repair pumps.

The GMIM-II was developed by Kumasi Univerisity of Science and Technology in conjunction with CWSA. The primary modification is the use of stainless steel riser pipes to counter the corrosion of galvanised iron pipes as a result of aggressive groundwater.
Three further models of handpump are currently under review: the Modified Vernet handpump, the Rope and Washer pump and the DIT Wonder pump. The last two of these are both manufactured in-country although current production levels are fairly low.

2.2 Institutions

2.2.1 Government

The single institution with the greatest responsibility and influence over handpump projects in Ghana at present is undoubtedly CWSA. In general, handpump-based water supplies should be implemented in collaboration with CWSA and currently the majority of partners adhere to this. The main exception to this is where handpumps are situated in urban areas where they are viewed as supplementary water sources and responsibility for these remains unclear. CWSA has its national headquarters in Accra and regional headquarters in each of the regional Capitals, there are also CWSA district offices in some areas.

CWSA has a strong staff base and has made considerable progress in raising staff salaries and retaining quality individuals. Highly motivated staff members, however, have to compensate for the lower performance of some colleagues, which may hinder the pace of progress at times. The main constraint facing CWSA is that of limited financial resources for both implementation and on-going support and hence a heavy reliance on the donor community.

As part of the Government’s decentralisation process District Assemblies have become the focus points for water supply activities in the rural districts. Each District Assembly should have a District Water and Sanitation Subcommittee which is responsible for assessing and approving community applications for improved water supplies, and for awarding contracts for implementation.

The process of establishing District Water and Sanitation Teams (DWSTs) has been conducted in some regions and is currently underway in the others. These teams comprise of government employees from different sectors such as district engineers and environmental health officers, and report to the Ministry of Local Government. The DWST is responsible for monitoring community water supplies and passing monitoring data onto the CWSA regional office. CWSA has an advisory and facilitative role by providing strategic and technical support.

2.2.2 The World Bank

The World Bank has provided substantial funding for the Ghana water sector restructuring process and many government policies mirror World Bank policies and conditionalities that have been promoted as part of the
restructuring process.

The First Community Water and Sanitation Project (CWSP-1) 1994-2000 was the World Bank’s first stand-alone water and sanitation project in Ghana. It was designed to help achieve the objectives of the NCWSP: (a) provide basic water and sanitation services to communities that will contribute toward the capital costs and pay the normal operations, maintenance, and repair costs of their facilities; (b) ensure sustainability of these facilities through community management, including involvement of women, private sector provision of goods and services, and public sector promotion and support; and (c) maximize health benefits by integrating water, sanitation and hygiene education interventions.

The Implementation Completion Report on the project emphasises that district strengthening and support are critical for sustainability, and that community and district level contracting are important in the long-term since they establish commercial links and make for greater accountability between the community and the provider of goods and services. The importance of training for community management, adequate information campaigns to facilitate the demand-driven approach, and stakeholder consultation and co-ordination are also highlighted.

### 2.2.3 Other external support agencies

Several bi-lateral donor agencies are involved in the rural water supply sector in Ghana, these include the Danish Agency for Development Assistance (DANIDA), the Canadian International Development Agency (CIDA), Kreditanstalt für Wiederaufbau (KfW) and Agence Française de Développement (AFD). These agencies have a key role to play in the provision of improved rural water supplies, however their approaches to implementation vary. In recent years DANIDA has placed much emphasis on building the capacity of CWSA by providing advisors and funding, but giving overall responsibility for programme management to CWSA. Other agencies such as CIDA and AFD tend to adopt a more traditional project approach in which project management remains with the donor. However, co-ordination between different External Support Agencies (ESAs) and Government has improved recently, resulting in greater consistency nationwide.

International NGOs such as WaterAid and World Vision International have been involved in rural water supply provision in Ghana for many years. Traditionally, such organisations have supported implementation of water supply projects by local partner NGOs by offering financial support, training and technical advice as well as assistance with planning, budgeting and institutional development. All activities are planned through consultation with CWSA and should conform to national policy.

Such international NGOs also work to influence other organisations in Ghana including Government and donor agencies at both district and national levels,
and aim to strengthen links and form networks with these organisations to widen the impact of their work.

Some smaller NGOs also support handpump projects in Ghana, although such projects are often linked to institutions such as schools or clinics. These projects do not always adopt the Government approach to implementation and maintenance, sometimes causing problems with long-term sustainability.

2.2.4 Local NGOs

Local NGOs such as the Afram Plains Development Organisation (APDO) provide an alternative to direct government implementation, and have been supported by ESAs such as WaterAid, World Vision International and UNICEF. APDO receives 80% of its funding from WaterAid, 15% from UNICEF and generates 5% itself by contracting out specialist services. Local NGOs are involved in the provision of handpump-based water supplies, training for operation and maintenance, spare parts supply and rehabilitation programmes. Such NGOs may have a significant presence and impact at district level, and are often able to forge solid and productive relationships with individual communities.

2.2.5 Community based organisations

Many communities form WATSAN committees which are responsible for managing operation and maintenance of community-owned handpumps. Such committees are normally elected by community members and are responsible for collection and storage of maintenance funds, monitoring of pump performance, routine preventive maintenance and organisation of repairs and replacements. These community-based organisations (CBOs) are often given training in management and maintenance procedures by the implementing agency.

2.2.6 The private sector

As a result of central government policy the private sector have a key role to play in rural water supply projects. There are several private companies in Ghana which are involved in borehole drilling and handpump installation, and as a result there is significant competition to win contracts.

In addition, there are a small number of companies involved in importing handpumps and spare parts into the country. These include Ghanira Ltd. which assembles the Nira pump in-country, and PPSI International and Foundries and Agricultural Machinery (GH) Ltd. (FAM) which import pumps from India.

CWSA is keen to handover responsibility for the provision and distribution of handpump spare parts wholly to the private sector. As a result, the agency recently invited tenders for a spare parts supply contract, which was awarded to FAM. This involves seed funding from DANIDA and KfW via CWSA.
with the intention of fully private operation within three years.

Community mobilisation and sensitisation prior to handpump installation are conducted by private partner organisations. Many of these organisations are made up of individuals whom are experienced health and education professionals and were specifically trained by CWSA for this role.

Private individuals work as Area Pump Mechanics (APMs) in some areas. Each APM is trained by CWSA in pump maintenance and repair, and is responsible for a zone in which several pumps are located. Pump mechanics often have a related profession such as a motorbike or bicycle mechanic, and charge communities for each pump repair carried out.

A Stakeholders table is presented in Appendix 5.

2.3 Funding

2.3.1 Costs

The average cost of drilling a borehole to be equipped with a handpump in Ghana is about $6,000, making this by far the most costly part of any project and way beyond the means of most rural communities. The cost of the pump itself ranges between $200 and $900, whilst the price of spare parts range between a few cents and about $100. Pump mechanics charge for their services and these fees often vary enormously despite attempts by CWSA to standardise. Additional costs include the cost of a feasibility study, community mobilisation and training.

Many communities are unaware of the true cost of maintenance of a handpump installation although CWSA has made attempts to inform communities of likely annual maintenance costs by providing this information in feasibility reports. The estimated average annual maintenance cost for a Ghana-Modified India Mark II is 150,000 Cedi (approximately $20).

2.3.2 Donor support

The Ghana water supply sector is heavily dependent on donor support from the International community and between 95% and 100% of implementation costs for handpump projects are generally met by donors. This situation is unlikely to change in the near future although all CWSA and DWST running costs should be met by Government.

2.3.3 Government funding

Following World Bank policy the Government has adopted the principle of counterpart funding whereby District Assemblies are required to make a 5% contribution to implementation costs for rural water supplies.
Currently, 5% of national funds are allocated to District Assemblies and in turn each Assembly is expected to allocate 20% of their allocation to water supply and sanitation. In addition, any allocation from internally generated funds is decided at district level. Currently, limited financial capacity at district level means that District Assemblies are unable to provide adequate counterpart funding for the number of projects that external support agencies would like to implement. As a result of this, some donors such as DANIDA have lobbied for the abolishment of counterpart funding for the water sector.

CWSA core funding provides staff salaries and administration costs for regional offices. District Water and Sanitation Teams are at present part-funded by District Assemblies and part-funded by donors although the long-term goal is to give overall responsibility to the Ministry of Local Government working through the District Assemblies.

### 2.3.4 Community financing

The current government policy requires a 5% community contribution to the capital cost of implementation (drilling and installation) which is known as a ‘commitment fee’. Some District Assemblies expect communities to raise this money to demonstrate an expression of interest, whilst others only request payment after a feasibility study has been conducted and the community has selected a water supply option.

Communities are also expected to meet all on-going maintenance and repair costs. Some communities raise maintenance funds by charging a levy at the point of delivery (e.g. 50 Cedi per bucket) which is referred to as the ‘pay as you fetch’ system. In other cases, communities charge a monthly household contribution or raise money only when repair is necessary.

### 2.4 Implementation

#### 2.4.1 Past approaches

In the past, rural water supply projects have been very much donor-driven and supply-led. Communities have had little or no involvement in prioritising their own needs, selecting appropriate solutions or planning and managing their own facilities. Various NGOs and government institutions have often installed handpumps with minimal consultation with the beneficiary communities or with other donors and institutions. Consequently, implementation approaches have varied greatly and a wide variety of different handpumps have been installed nationwide.

In general, there were no clear design criteria concerning selection of communities or number of users per handpump. Formerly, scant attention was paid to sustainable maintenance to the extent that spare parts and technical competency were sometimes not even available in-country.
2.4.2 Current approach

The current approach promoted by CWSA places much emphasis on the role of the community and is typified by the following key elements:

- Demand responsive approach in which a project is initiated at the request of the community;
- Technology choice made by community;
- Community contribution to capital cost of installation;
- Community collection and management of maintenance funds;
- Community level maintenance and local technical backup; and
- Private sector provision of spare parts and specialist services.

It should be noted, however, that not all implementing partners adhere strictly to this.

The standard design criterion determining distribution is 300 users per handpump, although there is some disagreement among stakeholders regarding how flexible this figure should be.

From the ‘one hit’ project approach of the past, where the implementing organisation plans the project, installs the pumps and quickly leaves, there has been a gradual shift to a more systematic programme approach to both handpump delivery and maintenance (see Box 1).

Box 1. Projects or programme?

'I wouldn’t talk about projects, what we are running now is a programme.'

P. Amanor, Eastern Region Director, CWSA

The three-tier maintenance system currently promoted by CWSA is that of community-based pump caretaker, area pump mechanic (responsible for between 5 and 30 pumps on average) and regional maintenance unit.

The pump caretaker is trained in preventive maintenance only and any major faults are reported to the area mechanic who diagnoses the fault and carries out repairs. A cash or in-kind charge is made for this service. Spare parts are either obtained by the mechanic or by the community themselves. Some systems (e.g. that used in Afram Plains district) differ slightly to this in that community-based volunteers receive higher levels of training and are able to carry out most repairs themselves, removing the need for area mechanics. Major repairs such as borehole rehabilitation are carried out by private sector maintenance units, which charge for this service.
2.4.3 Afram Plains and Volta Region

The two study areas selected for this project were Afram Plains district and the Volta Region. These two areas represent two successful but significantly different approaches to handpump delivery and maintenance, although both are broadly in line with government policy. Afram Plains is an example of where donor-supported NGOs have led the process with minimum government involvement, whilst Volta Region is an example of where donor support has enabled government institutions to develop and manage their own rural water supply programme. The maintenance structures also differ between the two areas.

2.5 Spare parts provision

Until recently, handpump spare parts have only been available from CWSA or from relevant NGOs, where spares have been subsidised to some degree, at least with respect to transportation and storage costs. CWSA has now introduced a new distribution system with funding from DANIDA and KfW, in which responsibility has been handed over to the private sector. The contract for spare parts provision was put out to tender and was awarded to Foundries and Agricultural Machinery (GH) Ltd. (FAM).

This initiative involved a $125,000 donation from DANIDA to hire the private contractor, rent appropriate warehouses and provide necessary marketing and promotion. In addition to this, DM 400,000 (apx. $200,000) was provided by KfW to purchase and import the initial batch of spare parts for all four standardised handpumps and establish quality control procedures. The intention behind this is that the initial batch of spares acts as a seed fund which will generate profits for the private contractor, some of which will be used in a revolving fund to purchase more spares, leading to a fully privatised sustainable system of spare parts provision. The contract with FAM will run for three years, after which it is hoped that sales will have increased, meaning that the contractor generates increased income which he keeps.

CWSA is currently negotiating with Ghana Internal Revenue Services to try and establish duty free status for imported handpump spare parts.

2.5.1 Supply network

As part of the CWSA contract, FAM have established five distribution outlets for spares: one in Tema, two in Accra, one in Kumasi and one in Tamale. They are reluctant to open any additional outlets due to limited profitability, arguing that the more levels in the supply chain the more exposure for profits and the greater the cost to the end user.

The location of these existing outlets means that travel from some communities to the nearest distribution point takes one or two days and involves considerable cost. CWSA is still keen to identify private spare parts
outlets at regional and district level and yet progress in this area remains slow. Some private companies have expressed an interest but are unable to invest 10 million Cedi (approximately $1,200) in spare parts as required by FAM.

2.5.2 Cost of spares

Prices of spare parts are decided by CWSA and different parts have different profit margins ranging between 0% and 70%. The price of each particular part is fixed nationwide meaning that the contractor must absorb regional variations as a result of transportation costs. In effect, this means there is some degree of subsidisation, otherwise parts in the Upper regions of Ghana would be selling at several times the price of identical parts in Tema or Accra.

There is a commitment by CWSA and it’s donors to remove subsidisation from the provision of spare parts and yet this appears to contradict the current 60% Government subsidy for operation and maintenance of urban water supplies in Ghana. If Government placed comparative emphasis on rural water supply this may produce a more sustainable supply system.

2.5.3 Commercial viability

The commercial viability of spare parts provision in the country remains doubtful since the use of imported pumps and parts is promoted and yet the demand for and turnover of spares remains very low. Private sector stakeholders themselves question the viability of private sector participation and are often reluctant to get involved (see Box 2).

<table>
<thead>
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<th>Box 2. Private sector involvement</th>
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<tr>
<td>'The supply of handpump spares in Ghana is not commercially viable since the demand is too low.'</td>
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<tr>
<td>Mr. K. Venkatesh, Country Manager, PPSI International Ltd., Accra</td>
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<tr>
<td>'Minimal involvement of the private sector means more benefit to the consumer.'</td>
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<tr>
<td>Mr. S. Ram Mirpuri, Meera and FAM Water Division Ghana Ltd., Tema</td>
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Unless the number of handpumps nationwide increases dramatically and the density of pumps in any given area increases significantly to an adequate minimum threshold (currently undetermined) it is unlikely that the proposed private sector model will be successful.
3. Field visit report: Afram Plains

3.1 Introduction

3.1.1 The Afram Plains area

Afram Plains district is located in the northern part of Ghana's Eastern Region. Lake Volta forms the northern, eastern and southern boundaries of the district. The population is 143,000 and the district covers an area of approximately 5,040 km$^2$. Access to the district from Accra and the regional capital, Koforidua, is comparatively difficult due to poor road conditions, and involves a ferry crossing.

The population is made up of a wide variety of ethnic groups since the district was a resettlement area following the damming of the River Volta. Communities are heavily dependent on agriculture and fishing, some practice nomadic farming using slash and burn techniques.

The geology of the Afram Plains is typified by low depth sandstone and conglomerate constituting a fractured aquifer, and the topography is generally flat. There are sources of surface water, primarily Lake Volta itself, but no springs. The wet-to-dry success rate of borehole drilling is approximately 50% and static water levels in drilled boreholes range between 5 and 30m.

3.1.2 Framework for water supply provision

The provision of water supply facilities and ongoing support to communities is the responsibility of the District Assembly through its District Water and Sanitation Team (DWST). However, its limited financial and human resource capacity mean that it is only able to fulfil this role to a very limited extent. The Afram Plains Development Organisation (APDO), a local NGO, working in partnership mainly with WaterAid, but also with various international funding bodies and Ghana government agencies, now plays a major role in supporting the District Assembly and communities.

3.1.3 Current status of water supply

Groundwater is the principal source of improved water supply to the rural population. The handpump-equipped borehole is the predominant technology option employed. Some 230 Ghana Modified India Mark II and 66 Afridev handpumps are installed in the district. Roughly two thirds of these are operating satisfactorily.
3.2 Handpump delivery

3.2.1 Previous handpump delivery

Handpumps were introduced into the Afram Plains district on a large scale in the 1980s through water supply project interventions funded by the Catholic Church and World Vision International. Handpumps were also provided through more limited interventions by other small NGOs and individuals. Implementation decisions, including siting were generally based on the assessments made by the providers, with limited community mobilisation. Water supply systems were provided to communities on a charitable basis, generally with no requirement for a contribution to capital costs by communities.

3.2.2 Present handpump delivery

Funding

The provision of handpumps within Afram Plains is based on partnerships between central and local government, external support agencies and APDO within the national Community Water and Sanitation Policy framework. The majority of governments contribution to water supply funding is provided by external donors.

Community selection

A number of selection criteria are employed by APDO and the District Assembly including population, incidence of waterborne disease, ease of access for drilling rigs, and whether the community is settled (i.e. non-nomadic). Priority communities for intervention are agreed with the District Assembly and its zonal committees. APDO in conjunction with the zonal committee then determine the programme for the year depending on the availability of funds. Communities that have already paid their contribution are given priority.

Implementation process

The process starts with the expression of a need for improved water supply by the community in consultation with the district zonal development committees and the District Assembly. Communities are invited to make written applications to the district assembly. APDO then confirm that the applications are serious and genuine and have the backing of the community through an initial meeting with the community.

The process of community mobilisation starts at this first meeting during which APDO explains the process and often assists the community to formalise its application. The community will also be informed at this stage that it is required to make a 5% contribution to construction costs.
The mobilisation process is continued over several months and includes hygiene promotion activities undertaken in conjunction with the District Health Authority, training community in accounting and formation of the community water and sanitation committee.

Borehole drilling and pump installation is supervised by APDO staff.

The community contribution

The 5% contribution to construction costs normally comprises a cash contribution of 1 million Cedi (2% - 3% of cost) which is paid to CWSA. The communities also make other in-kind contributions including labour, cement for apron construction, access road repairs and facilitating access of the drilling rig to the site where necessary.

Choice

Siting decisions are generally taken jointly by the community based on their preferences and APDO staff who use hydrogeological considerations. However the borehole equipped with handpump is the only technological option offered to communities.

3.3 Handpump maintenance

3.3.1 Previous maintenance

Handpump maintenance in the eighties relied on a central mechanic provided by the donor organisation. Communities had received little or no training in maintenance and repair and found it difficult to report faults and breakdowns promptly due to poor access conditions. Once faults were reported it often took up to three months before the mechanic was available to inspect the pump. This was often followed by further delays to inspection of the pump by the mechanic, procurement of spares from Accra or Kumasi, and eventual repair of the pump. Repair costs were generally met by the donor organisation.

The late eighties and early nineties saw the introduction of the area mechanic concept, which has now become CWSA's preferred model. One mechanic, usually someone already providing mechanical repair services, was given responsibility for approximately 10 handpumps in a given area and was expected to make a charge for services. Communities were often reluctant or unable to make cash payments to the mechanic and over a period of time some area mechanics lost interest in the handpump repair business.

3.3.2 Present maintenance

APDO and communities have developed an approach based on volunteers
from the community. These volunteers are given a higher level of training than pump caretakers elsewhere in Ghana and are able to undertake preventative maintenance and low-level repairs. They do not receive cash for their services but are given special privileges within the community. For example, they will generally not be required to make contributions in relation to the water supply facility. One set of tools is provided by APDO for a group of volunteers on a zonal basis.

In view of the very limited spare parts distribution network within the country, APDO maintains a spare parts store at its head office in Tese from which communities can buy spares. These are obtained by APDO from Accra at market prices and sold by APDO at prices that cover the purchase and transportation costs but not storage costs. APDO believes that charging the full cost would make them unaffordable to communities. APDO also reviews its prices from time to time to cover currency depreciation losses.

Information obtained from CWSA shows that spare parts prices at its designated outlets (see Section 2.5) need to be marked up by 40% - 100% of the CIF (cost, insurance and freight) cost to take account of harbour charges, warehouse costs, insurance and profit.

### 3.4 Sustainability issues

#### 3.4.1 Role of government

The long term presence of APDO, a strong, well resourced local NGO with a commitment to the Afram Plains district has been a key factor contributing to sustainable operation of handpumps in the area. A possible consequence of APDO's success is that local government's level of funding to water supply and its capacity to support communities have remained relatively low.

The District Assembly's allocation to water supply and sanitation comprises a mandatory 20% of the subvention it receives from central government and a discretionary proportion of internally generated revenue. The allocation is small and in the present financial year are 120 million Cedi ($15,000) and 50 - 60 million Cedi (approximately $7,500) respectively.

APDO receives the majority of its funding directly from WaterAid and other international funding partners, and not through CWSA’s national or regional structures. CWSA’s general influence and project monitoring in Afram Plains is therefore relatively weak (see Box 3).
Box 3. NGO’s crucial for sustainability

‘NGOs are the livewire in providing water and sanitation services to the rural people. Without them the process would not work because we are not technically equipped. Their technical expertise is crucial.’

Mr. K. Ba-Innimayah, District Co-ordinating Director, Afram Plains District

The District Assembly freely admits that the DWST lacks technical capacity and that the expertise of NGOs like APDO is crucial to sustainability. It was also apparent that the institutional responsibility for handpumps in urban areas was unclear, even to the District Assembly, with urban communities expecting the local water board of the Ghana Water Company to take responsibility and vice versa. This resulted in high incidence of non-functioning handpumps within the district capital Donkorkrom.

3.4.2 Adapting policy to local requirements

While working broadly within the framework of the NCWSP, APDO has been able to promote a number of approaches that are considered more appropriate to a remote population with a predominantly agricultural economy. For example, although CWSA policy requires communities to set aside specified amounts of money in dedicated bank accounts to pay for maintenance. Communities in Afram Plains district appear unwilling to tie up their limited funds in bank accounts particularly since they understand that its value will be eroded through currency depreciation. When there is a need to raise funds for maintenance, APDO is often able to assist the community with the marketing of its agricultural produce by facilitating contact with prospective buyers.

3.4.3 Spare parts distribution by the private sector

APDO's records show that the total value of spare parts sold in the first quarter of 2002 was approximately 1.3 million Cedis ($160). This level of sales indicates that the private sector is unlikely to show general interest in handpump spares distribution from a business point of view.

3.4.4 Technology choice

The handpump-equipped borehole is the only technology option offered to communities by the District Assembly and APDO and is generally provided without a complete assessment of financial viability. Although hydrogeological conditions in Afram Plains often dictate the need for drilled boreholes, appropriately designed and constructed hand-dug wells are a feasible option in some areas. Rainwater harvesting is also a feasible option for some communities due to the high annual rainfall and relatively long rainy season in the district.
The adoption of lower cost options, where appropriate, will lead to more efficient utilisation of donor, government and community resources and result in greater sustainability of community water supply systems. It may also enable public institutions to become more self-sufficient in providing rural water services (see Box 4).

**Box 4. Appropriate technology?**

‘Because of the nature of the equipment required we can never wholly fund and support handpump projects’

Mr. K. Ba-Innimayah, District Co-ordinating Director, Afram Plains District

### 3.4.5 Over reliance on donor funding

District Assembly officials and APDO have identified the over reliance on donor funding and the very low level of local government resource allocation to the water supply as long-term threats to sustainability.

*Figure 2. Ghana-Modified India Mark II handpump and apron*
4. Field visit report: Volta region

4.1 Introduction

4.1.1 The Volta Region

Volta region is situated in south-eastern Ghana between the eastern shores of Lake Volta and the Ghana - Togo border. The region has an estimated population of 1.7 million of which some 80% live in rural communities of less than 5,000 inhabitants.

4.1.2 Framework for water supply provision

Water supply to Volta region's rural population is delivered through the Volta Region Community Water and Sanitation Programme (VRCWSP) co-funded by the Governments of Ghana and Denmark and implemented through the CWSA and the District Assemblies in Volta Region. Key elements of the programme are:

- Technical assistance and financial support to the CWSA regional directorate and the District Water and Sanitation Teams in Volta region; and
- Capital funding for water supply and sanitation facilities.

4.1.3 Current status of water supply

Approximately 45% of Volta region's population have a satisfactory water supply. The approximate number of and type of schemes implemented by VRCWSP are:

- Piped schemes 80
- Borehole /handpump 1,200
- Gravity schemes 30

CWSA’s pump test monitoring report for Volta Region in 2001 indicates that 80.3% of the Ghana Modified India Mark II pumps in the region were functioning and 89.3% of the Nira pumps in the region were functioning.

4.2 Handpump delivery

4.2.1 Previous handpump delivery

Prior to the VRCWSP, handpumps had been provided through a variety of donor-funded programmes as well as through interventions by NGOs, notably World Vision International. Donor-funded programmes were implemented through a centralised framework by the Ghana Water and Sewerage Corporation (GWSC), which had responsibility for both urban and rural water supply. CWSA officials describe the previous delivery process as being
supply-driven and ‘top-down’ with little or no community involvement in decision-making.

### 4.2.2 Present handpump delivery

The delivery of handpumps in Volta region is now implemented almost exclusively through the VRCWSP within a decentralised framework. The CWSA regional office located in Ho has primary responsibility for managing the programme and has benefited from extensive capacity building undertaken by DANIDA funded advisers. This has enabled CWSA to progressively adopt a facilitating role aimed at building implementation capacity within the district assemblies and communities.

#### Funding

Table 1 summarises the well-defined framework for cost sharing between government, the external funding agency (DANIDA) and communities. In addition, a key feature of the arrangements is the high level of donor funding for investment and the recurrent costs at district level.

<table>
<thead>
<tr>
<th>Table 1. Funding framework</th>
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<tbody>
<tr>
<td></td>
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<tr>
<td>Investment Costs</td>
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<tr>
<td>CWSA set-up costs</td>
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<tr>
<td>DWST set-up costs</td>
</tr>
<tr>
<td>Water and sanitation hardware</td>
</tr>
<tr>
<td>Community mobilisation</td>
</tr>
<tr>
<td>Recurrent costs</td>
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<tr>
<td>CWSA Regional office</td>
</tr>
<tr>
<td>District engineer</td>
</tr>
<tr>
<td>Other DWST running costs</td>
</tr>
<tr>
<td>EHA salaries</td>
</tr>
<tr>
<td>EHA enhanced field allowance</td>
</tr>
<tr>
<td>Maintenance of systems</td>
</tr>
</tbody>
</table>

#### Community selection

The water supply and sanitation sub-committees of District Assemblies make decisions regarding selection of communities. Communities requiring an improved water source apply to the district assembly which prioritises the applications using criteria generally related to the incidence of waterborne disease and distances to water sources.
Implementation process

CWSA collates the applications received by the District Assembly and makes the final decision on which projects to implement based on the district assembly's prioritisation and the CWSA / DANIDA budget. Community mobilisation activities are undertaken by consultants and NGOs through contracts supervised by the CWSA's extension unit with the involvement of the district assembly's environmental health assistants and water and sanitation teams.

Technical aspects, which include the preparation of a comprehensive feasibility report and the supervision of construction is undertaken by CWSA and district technical staff. Tendering and award contract processes are presently undertaken by the CWSA regional office. However in future it is intended that the district water and sanitation teams will become more involved.

Choice

The feasibility stage offers the opportunity for communities to select technology options of their choice based on their preferences and ability to pay. However the CWSA budgets may sometimes dictate the type of system implemented in a particular community (see Box 5).

<table>
<thead>
<tr>
<th>Box 5. Communities may not always get what they ask for</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fesi is a large village in Kpando district with a population of over 2000, with dwellings on both sides of the main road through the village. Although the community had opted for a piped system, handpump equipped boreholes were implemented due to CWSA budget constraints. The WATSAN committee though satisfied with the operation of the handpumps is unhappy because the system does not respond to their needs. Hydrogeological conditions on one side of the road were not suitable for boreholes, villagers living on that side of the road therefore have to walk long distances to fetch water. The number of hand pumps is also considered to be insufficient and results in long queues at certain times of the day. The committee also complained that some of the older villagers find it difficult to operate the handpumps. The possibility of a solar powered system was discussed with the community but they rejected this option because they feared the panels might be stolen.</td>
</tr>
</tbody>
</table>

4.3 Handpump maintenance

4.3.1 Previous maintenance

Prior to the development of the National policy and strategy on decentralisation which saw the creation of CWSA, maintenance of handpumps implemented by government was the responsibility of centralised GWSC maintenance units. Many systems implemented by NGOs lacked
viable maintenance infrastructure and eventually fell into disrepair. Maintenance costs were usually borne by the provider of the handpump (government or the NGO).

**4.3.2 Present maintenance**

**Funding**

Community water and sanitation committees set up under the VRCWSP are encouraged to charge for water at the point of collection to finance the maintenance and repair of handpumps. In the communities visited the charge was found to be in the region of 50 Cedi/18 litres ($0.35/m$³). The funds collected are kept in dedicated bank accounts controlled by the committee chairmen and treasurers. The practice appears to be widely applied within the region and is reported to be acceptable to community members. Alternative charging systems are also employed including daily, weekly or monthly tariffs.

**Spare parts**

The VRCWSP maintains a store at the CWSA headquarters in Ho where a full range of handpump spares are on sale. Outlets for fast moving items have also been established at five district headquarters (HoHoe, Akachi, Krachi, Banta and Nkwanta) using existing businesses. The initial stocks were financed by DANIDA on a revolving loan basis but it has been difficult to maintain the interest of the business community. The research team tried to find the outlet in HoHoe but was unable to find anyone who knew of its location. There is also concern that the spares distribution system recently established by CWSA [see Section 2.5] will fail to attract the interest of businesses at the district level, particularly if they are expected to pay in advance for stock.

**Maintenance arrangements**

Each community appoints a caretaker who is trained by VRCWSP to carry out low-level preventive maintenance tasks. Routine maintenance and repair is carried out by area pump mechanics trained by the programme. Although their distribution within the region is uneven, they are normally located at a distance of not more than 20km from any community. Area mechanics expect to be paid in cash for their services. CWSA has prescribed the maximum amounts to be charged by area mechanics for different types of work (20,000 Cedis ($2.50) for above ground work, and 50,000 Cedis ($6) below ground.

For major repairs beyond the capacity of the area mechanic, communities will need to procure the services of a mechanic with specialist equipment. One such business exists in Ho (DIT Services Ltd). The owner is a former World Vision International mechanic who in addition to having flushing and fishing capability is able to manufacture various pump components and also
developed the DIT Wonder Pump (a handpump made entirely from locally available materials). DIT has provided specialised services (which can cost up to 1 million Cedis ($130)) to a number of communities. Some communities have been able to meet such costs from their maintenance funds generated from water sales.

Monitoring and reporting

Environmental health assistants play a crucial role within the VRCWSP. They are responsible for preparing quarterly monitoring reports which include the following:

- Standard pump test results;
- Report on cleanliness of the facility;
- Inspection of the soakaway pit; and

The environmental health assistants receive a formal qualification gained through a two-year course at one of two regional schools of public health. They have each been supplied with a motorbike on a co-ownership basis and are given a fuel allowance through the programme. There are six assistants in each district providing support to 20-30 communities.

4.4 Sustainability issues

4.4.1 Role of government

VRCWSP has worked through government's regional and district water supply and sanitation institutions. This has resulted in a significant strengthening of capacity at these levels. The programme has also encouraged the allocation of funds at district level for 30% of recurrent costs. The funding agency justifies this subsidy on the grounds that if it were to tailor the programme to fit the district level financial capacity, the programme output would be much lower than that desired by both government and the funding agency.

CWSA has recently introduced a new salary scale for its staff, which is reported to be attractive within the Ghanaian context. This will result in maintaining a high degree of motivation among its staff and enable the rural water and sanitation sector to retain highly trained personnel.

The community role

The vending of water by water and sanitation committees at the handpump is a positive sustainability factor since communities are generally able to finance maintenance and repair and are even able to invest their surplus funds in government treasury bonds or buy spares in advance of their being required.
4.4.2 Spare parts distribution

The limited availability of spares at district level is a threat to sustainability as handpump spare parts retailing appears to be unattractive as a business activity. It is doubtful whether the new CWSA initiative will improve the situation.

4.4.3 Donor funding

A new phase of DANIDA assistance to the Volta region will commence in 2003 and some thought is being given to what approach to adopt. The new approach will test how well district level institutions will cope with a reduced level of DANIDA support. For example, responsibility for funding the district engineers will be passed on to government. DANIDA will shift its focus to providing more general support to the national ministry of local government in order to strengthen its capacity to play a co-ordinating role within the sector.

Figure 3. GMIM-II handpump, Fesi village
5. Conclusions

The authors of this report wish to emphasise that handpump projects in urban settings have not been addressed in detail by this study and that the focus of the report is on rural water supplies in Ghana.

The handpump projects in the two study areas can be deemed to be broadly sustainable providing that the following conditions are met:

- Donor support continues at a comparable level;
- CWSA or APDO remain active at district level; and
- There remains some level of subsidisation of spare parts provision or the density of handpumps increases greatly.

The primary conclusion arising from this research visit is that there is no single way of implementing a sustainable system of handpump delivery and maintenance. Some more detailed common conclusions, however, are provided below.

5.1 Institutional

*Government and NGOs*

Communities cannot simply be left alone and be expected to manage their own water supply in a sustainable way. Institutional support from Government or NGOs is an important component of a sustainable system in terms of monitoring, community liaison and spare parts provision.

*Private sector*

The contracting out of community-based (software) activities and technical services to private organisations is generally effective. Private sector participation in both implementation and maintenance, however, requires effective monitoring by Government and NGOs to ensure efficiency.

5.2 Financial and economic

*Government and donors*

The level of funding required for the implementation of new handpump projects in Ghana is high and significant donor support is currently required. Without such support it is highly unlikely that government institutions will be able to provide adequate financial resources unless the profile of rural water supply is significantly enhanced and greater budgetary priority given to the sector.
Private sector

The provision of handpump spare parts is not a natural business activity due to low turnover and profitability. It is necessary to establish a handpump density breakpoint (HDB) at which spares provision becomes commercially viable. The HDB should stipulate the number of handpumps of a particular model required in a given area, to guarantee sufficient demand for spare parts to produce sufficient turnover for the private supplier. If this HDB is not met then provision of spare parts on a purely commercial basis will not be sustainable.

Community

The demand for water from the handpump will determine what price can be charged for that water. Where alternative supplementary sources are available, demand is likely to be lower and hence the willingness to pay may be less. However, this may not be a problem since the pump is likely to be used less and hence annual maintenance costs will be lower.

It is important to find appropriate means to collect maintenance fees for each individual community. A ‘pay as you fetch’ approach may be successful where there is a strong cash economy but may not work where income patterns are more irregular. Storage of agricultural produce and effective marketing of this is an alternative approach.

Due to economic instability and currency devaluation, investment of maintenance funds in imported spare parts may be a more appropriate way of storing funds than depositing capital in the bank.

5.3 Social

Ownership

A capital contribution to installation costs by the community does not necessarily create a higher sense of ownership of the facility. Communities who made no initial cash contribution have proved just as efficient in operating and maintaining their pump, and demonstrate equally high levels of responsibility and ownership.

Community organisation

Where a number of handpumps are owned by a single community it is necessary to establish a high level of organisation and control by the WATSAN committee. The role of community-based organisations becomes more important as the number of handpumps in a given community increases.
CONCLUSIONS

Demand responsiveness

The number of users per handpump depends on the community’s perception of need, not an arbitrary number per pump. If project approaches are to be truly demand responsive, and handpumps are not to fall into long-term disrepair, the service level appropriate to any given community must be determined by that community.

5.4 Technical and environmental

Aggressive groundwater

Where there is a high incidence of aggressive groundwater a high level of investment may be required to modify existing handpump technologies and this cost should be considered from project inception. Policy makers must also remain open to alternative appropriate technologies including both handpumps and other options.

Handpump development

Standardisation is a useful measure to ensure the availability of spare parts in-country but should not stifle local innovation or low-cost alternatives. Locally manufactured pumps may offer real opportunities to decrease reliance on imported technology and promote long-term sustainability. Opportunities should be given to such ventures, even if these begin at low-levels of production and implementation.

Technology choice

The principal of offering communities a range of choices of technology should be planned carefully if it is to be successfully put into practice. The budgetary implications must be considered in detail prior to offering choices and the institutional capacity to respond to community demand should be ensured.

An alternative approach is to offer only a single technology choice (a standardised handpump) to communities, to increase handpump density in a given area and to promote demand for spare parts.

5.5 Research issues

One of the purposes of the visit to Ghana was to continue the field-testing of the project fieldwork methodologies (Parry-Jones et al., 2001b) and to begin to develop a framework for the final project output: Guidelines for Sustainable Handpump Projects in Africa.
**Institutional focus**

Following the findings of the fieldwork in Zambia (Harvey and Skinner, 2002) fewer visits to communities were undertaken in Ghana. Instead, there was greater focus on institutions such as central and regional Government agencies, external donors, international and local NGOs, and local Government (district assemblies). The importance of such institutions for project sustainability is high and the Guidelines developed must address institutional roles in project management, community mobilisation and capacity building.

**Checklists**

The fieldwork methodology checklists provide a useful framework to guide interviews and discussions with stakeholders. The information collected provides a comprehensive overview of project approaches and on-going maintenance systems and activities. However, some factors covered in the checklists do not directly influence sustainability and further revision may be necessary to make the tools more specific.

**Sustainability snapshot**

The ‘sustainability snapshot’ was used with the few communities visited (see Appendix 4) but was of little use for interviews with other stakeholders.

**Implications for development of Guidelines**

The project literature review (Parry-Jones et al, 2001a) identified eight factors critical to sustainability, these were refined during the visit to the following six:

- Institutional and policy arrangements
- Financing and cost recovery
- Community and social aspects
- Technology and the natural environment
- Spare parts supply
- Maintenance systems

The Guidelines developed must address each of these issues in detail and stipulate appropriate goals necessary for sustainability. They must, however, include different models or approaches that can fulfil these goals.

The Guidelines may be divided into sections to guide planners and implementers (Government or NGO) to work with:

- Policy-makers;
- Donors;
- Local government;
- Communities; and
- Private companies.
References


Other project outputs to date:


(All outputs are available at http://www.lboro.ac.uk/wed/projects/shp/index.htm)
# Appendix 1 Field visit diary

<table>
<thead>
<tr>
<th>Date</th>
<th>Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wednesday 22/05</td>
<td>P. Harvey arrived Ghana (pm)</td>
</tr>
<tr>
<td>Thursday 23/05</td>
<td>Met WaterAid, Accra</td>
</tr>
<tr>
<td></td>
<td>Purchased maps of study areas</td>
</tr>
<tr>
<td></td>
<td>Visited British Council</td>
</tr>
<tr>
<td>Friday 24/05</td>
<td>Met CWSA, Accra</td>
</tr>
<tr>
<td></td>
<td>Met DANIDA, Accra</td>
</tr>
<tr>
<td>Saturday 25/05</td>
<td>Planned itinerary</td>
</tr>
<tr>
<td>Sunday 26/05</td>
<td>R. Reed and D. Jawara arrived (pm)</td>
</tr>
<tr>
<td>Monday 27/05</td>
<td>Met WaterAid, Accra</td>
</tr>
<tr>
<td></td>
<td>Travelled to Donkorkrom</td>
</tr>
<tr>
<td>Tuesday 28/05</td>
<td>Met Afram Plains Development Organisation (APDO), Tease</td>
</tr>
<tr>
<td></td>
<td>Field evaluations</td>
</tr>
<tr>
<td>Wednesday 29/05</td>
<td>Visited Afram Plains District Assembly</td>
</tr>
<tr>
<td></td>
<td>Field evaluations</td>
</tr>
<tr>
<td></td>
<td>Travelled to Akropong, Eastern Region</td>
</tr>
<tr>
<td>Thursday 30/05</td>
<td>Met CWSA, Koforidua, Eastern Region</td>
</tr>
<tr>
<td></td>
<td>Travelled to Accra</td>
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<tr>
<td></td>
<td>Wrote up field reports</td>
</tr>
<tr>
<td>Friday 31/05</td>
<td>Met CWSA, Accra</td>
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<td></td>
<td>Private sector interviews</td>
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<tr>
<td></td>
<td>R. Reed departed Ghana (pm)</td>
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<tr>
<td>Saturday 01/06</td>
<td>Wrote up field reports</td>
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<tr>
<td>Sunday 02/06</td>
<td></td>
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<tr>
<td>Monday 03/06</td>
<td>Travelled to Ho, Volta Region</td>
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<tr>
<td></td>
<td>Met CWSA, Volta region</td>
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<tr>
<td>Tuesday 04/06</td>
<td>Kpando district: met DWST</td>
</tr>
<tr>
<td></td>
<td>Field evaluations</td>
</tr>
<tr>
<td>Wednesday 05/06</td>
<td>Visited F.A.M., Tema</td>
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<tr>
<td></td>
<td>Travelled to Accra</td>
</tr>
<tr>
<td>Thursday 06/06</td>
<td>Met WaterAid, Accra</td>
</tr>
<tr>
<td></td>
<td>Met CWSA, Accra</td>
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<tr>
<td>Friday 07/06</td>
<td>Met DANIDA, Accra</td>
</tr>
<tr>
<td></td>
<td>Met BHC/DFID, Accra</td>
</tr>
<tr>
<td></td>
<td>P. Harvey and D. Jawara departed Ghana (pm)</td>
</tr>
</tbody>
</table>
Appendix 2 Persons met

Ms. T. Aborbor, WATSAN Committee Member, Fesi, Kpando District
Ms. A. Adigbli, Environmental Health Assistant, Vakpo Zone, Kpando District
Mr. V. Akiti, Environmental Health Officer, Kpando District
Ms. S. Alima, Deputy Director, Afram Plains Development Organisation (APDO), Tease
Mr. G. Alorwu, Area Pump Mechanic, Vakpo Zone, Kpando District
Mr. K. Asamoah, Chief Executive, Community Water and Sanitation Agency (CWSA), Accra
Mr. P. Attah, Managing Director, DIT Services, Ho
Mr. P. Amanor, Regional Director, CWSA, Koforidua, Eastern region
Mr. K. Ba-Innimayah, District Co-ordinating Director, Afram Plains District
Mr. E. Boateng, Regional Director, CWSA, Ho, Volta Region
Ms. C. Deh, Environmental Health Assistant, Fesi Zone, Kpando District
Ms. G. Dzagblani, WATSAN Committee Member, Fesi, Kpando District
Mr. K. Klitten, Co-ordinator, DANIDA Water Sector Development Programme, Accra
Mr. G. Kungo, WATSAN Committee Treasurer, Fesi, Kpando District
Mr. L. Mawusi, Manager, PSI International Ltd., Accra
Mr. S. Mensah, Vice-Chairman, WATSAN Committee, Fesi, Kpando District
Ms. V. Mensah, WATSAN Committee Member, Fesi, Kpando District
Mr. A. Modock, Executive Director, APDO, Tease
Mr. G. Mumbo, Country Representative, WaterAid Ghana, Accra
Mr. J. Nedjoh, Extension Services Specialist, CWSA, Ho
Ms. D. Okrah, WATSAN Committee Member, Fesi, Kpando District
Mr. S. Palance, WATSAN Committee Secretary, Fesi, Kpando District
Mr. K. Ram, Foundries and Agricultural Machinery (Ghana) Ltd., Tema
Mr. S. Ram Mirpuri, Meera and FAM Water Division Ghana Ltd., Tema
Mr. Y. Sarkodie, Planning and Investment Unit, CWSA, Accra
Mr. F. Soley, MOM Engineer, CWSA, Ho
Mr. A. Swatson, Water and Waste Management Specialist, The World Bank, Ghana Office, Accra
Mr. R. Van Ess, Director, Technical Services, CWSA, Accra
Mr. K. Venkatesh, Country Manager, PSI International Ltd., Accra
Mr. D. Woode, Second Secretary (Development), BHC/DFID, Accra
Appendix 3 Field checklists

Checklist A: National and/or Regional Stakeholders

Key informants (names, positions): Date of visit:
Location: Evaluator:

Demographic or baseline data
- Data available for project area at Regional/National level?
- Plans to improve data on rural water supply?

Policy
- National Water Policy in place? What stage is it at?
- Does it cover standardisation, local manufacture, gender, cost recovery?
- Is the policy being implemented? What are the main constraints?
- Does it cover monitoring and evaluation?
- Are there assigned institutions for follow-up and back-up support?
- Is the ownership of the boreholes and handpumps clear?

Institutional arrangements
- Organogram of key stakeholders at national/regional level?
- Roles and responsibilities of stakeholders clearly defined?
- Communication and coordination between levels?
- Relationship with local level structures?
- Role of private sector with respect to handpumps?
- Role of NGOs in rural water supply projects?
- Are there phasing-out strategies for support agencies, what are they?
- Are there procedures to be followed if an institution does not perform as it should?

Funding and flow of funds
- How is funding arranged for rural water supply sector?
- How do funds flow to local level?
- How are recurrent costs paid for?
- What are the cost sharing arrangements for handpump projects?

Resources
- Are there adequate resources at national/regional level to fulfil roles?
- What areas are most lacking?

Capacity building
- Have staff at national/regional level received capacity building?
- Do they provide capacity building to local government or other partners?
Checklist B: Local Government and project partner stakeholders

Name of department/organisation: Date of visit:

Location: Evaluator:

Key informants (names, positions)

Policy
- Are staff aware of national policies? Are these relevant to handpump projects?
- Is there a national or regional policy on standardisation?
- Are staff trying to implement these policies? What are the constraints?
- Is someone monitoring performance?

Project process
- Are water supply activities based on data about coverage or scarcity?
- Is there a mechanism for communities to apply for a handpump?
- Are technologies other than handpumps offered to communities?
- Is a Memorandum of Understanding signed?
- What is the planning and implementation process for handpump installation?
- Who is responsible for siting and drilling boreholes?
- Who is responsible for quality control during construction?
- What do communities contribute towards cost of handpump and installation?
- Who owns the pump? And the borehole or well?
- Is there a formal handover of the handpump?
- What is done to monitor performance of handpumps once installed?

Institutional arrangements
- Organogram for rural water supply?
- Responsibility for mobilisation, installation and maintenance of handpumps?
- Where are handpumps and spares obtained? Where are they manufactured?
- What is the content and purpose of training and what has it achieved?
- How is training phased or linked with implementation?
- How are participants for training selected?
- Are there refresher courses at district or sub-district level?
- Responsibility for training and follow-up?
- Are roles and responsibilities clearly defined?
- What constraints are there to fulfilling roles?
- What is relationship like with national/regional level and communities?
- What is the role of the community in handpump maintenance?

Water supply issues
- What is the design criterion for number of users per pump?
- Is there a standard design for a handpump installation?
- What is the most significant aquifer in the region?
- What type of sources do people use if they do not have access to handpumps?
- What choices were people given regarding water supply technology choice?
- Typical depth of borehole or well?
APPENDICES

- Who does the exploration and siting for boreholes? With what equipment?
- What is the success rate of drilling?
- Is there a problem with boreholes (e.g. drying up, siltation etc.)?
- Have any boreholes been rehabilitated?
- Is chemical composition of groundwater tested during drilling? Subsequently?
- Is bacteriological quality of water tested or monitored?

**Maintenance**

- What are the commonest causes of handpump failure?
- Is there a system in place for carrying out major pump repairs?
- Have communities been given toolkits for maintenance?
- Are they generally carrying out preventive maintenance?
- Do communities know how much it costs to maintain a handpump?
- Are they encouraged to regularly collect money for routine maintenance?
- Can communities afford the full cost of maintenance?
- Who pays for the cost of major repairs (e.g. dropped pipes, new rising main)?
- Are funds available for emergency breakdown (e.g. borehole collapse)?
- Where are spares available? Who buys them? Is there adequate supply?
- Is there a supply chain for spare parts? Could it be improved?

**Community and social issues**

- What mobilisation work is done with communities for handpump projects?
- Have staff been trained in participatory approaches?
- How is the community organized to operate and maintain the pump?
- Is implementation of water supply linked to hygiene education?
- How do communities communicate with local government and vice versa?
GHANA REPORT

Checklist C: Community/Users

Name of village/location: Date of visit:

Distance to district capital: Evaluator:

Key informants (names, positions, number of adult males/females)

C1. Project process
- When and how did the community first get involved in the provision of a handpump?
- Were they offered, or did they consider, any alternative technologies (e.g. bucket and windlass)?
- Were they clear about what their responsibilities were throughout the project?
- Did they sign a Memorandum of Understanding? What does this say?
- To what extent did they participate during installation?
- Where they involved in the siting of the handpump and if so how?
- Did they contribute towards the cost of the handpump and installation?
- Are they happy with the quality of the work done?
- Who owns the pump? And the borehole or well?
- Was there a formal handover of the handpump? If so how was this done?
- Does the community report back to local government on pump performance?

C2. Institutional arrangements
- Is there a formal organization responsible for managing the pump?
- Who is on this committee or organization (gender)?
- Are roles and responsibilities of organization members clearly defined? What are they?
- What constraints are there to fulfilling roles?
- What training did they receive in relation to the pump?
- When was this training received (before or after installation)?
- Are they confident with the skills they gained from training?
- What is the procedure when the pump breaks down?
- Does everyone trust the organization?
- How much contact does the community have with the local water supply department?

C3. Water supply issues
- How many households/people use the handpump?
- How much water per day does a typical household use?
- What is the maximum distance users walk to the handpump?
- What is the typical distance?
- What is the handpump water used for?
- Is the taste of the water acceptable?
- Is the handpump the preferred source of drinking water?
- Is it acceptable for washing clothes (no discoloration)?
- What other sources are there nearby? Are these used and if so what for?
- What is the relative distance to alternative sources of water?
- Does the water quality vary at different times of the year?
- Is the quantity of water adequate for everyone or is it rationed?
APPENDICES

- Does the quantity available vary at different times of the year?
- Is the pump used all year round? If not, why not?

C4. Maintenance
- How many handpumps are used by the community? How many are functioning at present?
- Are breakdowns frequent? When were the last three breakdowns?
- What is the typical downtime?
- What are the common breakdowns with the pump?
- Have there been any problems of vandalism?
- Who is responsible for repairing the pump? How far away do they live?
- Has the community got a toolkit for maintenance?
- Are they doing preventive maintenance? (Specify what and when)
- Do they have access to spare parts locally? How far do they have to travel?
- Who supplies spare parts?

Financing
- Can the community afford to buy spare parts?
- Do communities know how much it costs to maintain a handpump?
- Do they consider they can afford to maintain the pump?
- Are they regularly collecting money for routine maintenance? How?
- How much money do they have collected at present? How is this stored (bank account, treasurer, livestock, spares etc.)?
- Are there any problems with collection and storage of funds?
- If they are not regularly collecting money do they consider that they can quickly collect enough money whenever the pump breaks down?
- How much have they spent on maintenance in the past twelve months?
- Who would pay for a major repair (e.g. dropped pipes, new rising main)?

C5. Community and social issues
- Is the handpump used by a single community or more than one? Are there any specific groups within each community?
- Have they established any rules with regard to the pump? Is the pump lockable?
- Does everyone in the community have access to use the pump?
- Are there any local taboos or beliefs associated with water or the handpump?
- What has been the impact of the handpump on the community?
- Is the community satisfied with the handpump? Why?
- Have they had any training on hygiene education? Do they understand the link between poor quality water and disease?
- How do communities communicate with local government and vice versa?

Technical data
- Type of handpump (model, make, country of origin)
- Type of source (borehole, hand-dug well)
- Date of installation
- Depth to cylinder
- Riser pipe material
- Approximate yield (strokes/litre; litres/second)
- Number of strokes to arrival of water
- Observed pump faults
- General quality of construction/installation
- Condition of apron/drainage
Checklist D: Private sector stakeholders

Private pump mechanics
- Where and when did they receive training?
- How were they selected to be trained?
- What did the training comprise?
- How long have they been working as a pump mechanic?
- How many pumps do they work on now?
- Who pays them for work? How much?
- Where do they get spare parts from?
- Can they carry out all repairs? What do they do if it is beyond their capacity?
- Do they have other employment?

Pump or spare part suppliers
- What profit levels do suppliers make? Why do they sell pumps/spare parts?
- Which models of pump do they stock (or hold parts for)?
- How long have they been stocking pumps/parts?
- How long are they ever out of stock?
- How did they initially go into business (e.g. with support from project)?
- Is the business now making a profit without external support or subsidy?
- Do they supply the full range of parts? What parts do they supply and why?
- Where do they purchase these items? Do they purchase them on credit?
- Who are normally their customers for pumps/parts?
- Do they provide technical assistance?
- Do they provide warranties?
- What degree or marketing is used or is needed?
- How does regulation effect them?
- How could business be improved?

Water vendors
- How long have they been vending water?
- How much do they charge for water? What profit do they make?
- What type of people are their typical customers (trade, private, farmers)?
- Do they pay towards pump maintenance?
- What would they do, or do they do, when the pump breaks down?
## Appendix 4 Sustainability snapshot questions and results

### Sustainability snapshot questions

<table>
<thead>
<tr>
<th>Factor</th>
<th>Issue</th>
<th>Statement</th>
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</table>
| Project process         | a) Participation            | 1. The pump was “given”, community not offered choice if they wanted to participate  
2. Community was asked if they wanted to participate  
3. The community initiated the project themselves |
|                         | b) Capital contribution      | 1. Community did not make any financial or in-kind contribution towards pump  
2. Community made significant in-kind contribution (set by the Project)  
3. Community made financial contribution (set by the Project) |
| Institutional Arrangements | a) Management system       | 1. No community organisation has responsibility for the water source  
2. Community has organisation but is not managing the source satisfactorily  
3. Community organisation is actively managing the source to everyone’s satisfaction |
|                         | b) Training                 | 1. No-one in community received any training from the Project or government staff  
2. Some people trained but cannot remember or apply what was learned  
3. Useful training was provided which still benefits trainees now |
|                         | c) Major breakdowns         | 1. Community would not know what to do in event of major breakdown  
2. No clear procedure, responsibilities unclear in case of major breakdown  
3. Clear procedure - confident that pump would be quickly repaired in case of major breakdown |
| Water supply issues     | a) Water use                | 1. Water never used for drinking  
2. Water sometimes used for drinking water, sometimes not  
3. Water always used for drinking water |
|                         | a) Water quality            | 1. All the people who use the pump perceive the water is not good for drinking  
2. Some of the people who use the pump perceive the water is not good for drinking  
3. Every one who use the pump perceives the water is good for drinking |
|                         | b) Source reliability       | 1. The water source yield is poor, people have to use other sources all the time  
2. Some time (dry season) the yield is inadequate to meet needs  
3. The water source always meets everyone’s needs |
<table>
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<tr>
<th>GHANA REPORT</th>
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| **Maintenance** | 1. Technical skills not available to community for maintenance when needed  
2. Some technical skills available for maintenance and repairs, but not all  
3. Technical skills for all maintenance processes and repairs readily available |
| a) Technical skills | 1. Maintenance equipment and spare parts not available  
2. Some availability but not for all repairs  
3. Equipment and spares available for all repairs |
| b) Equipments and spares | 1. No preventive maintenance being carried out on pump  
2. Some preventive maintenance being carried out, but not regularly  
3. Regular programme of preventive maintenance carried out |
| b) Preventive maintenance | 1. No funds readily available for maintenance when needed  
2. Some funds readily available but not sufficient for most expensive repairs  
3. Funds readily available and sufficient to cover most expensive repairs |
| c) Maintenance funds | 1. Some people never get access to the pump even when they want to use it  
2. Some people sometimes do not get access to the pump  
3. All the people who want to use the pump gain access all the time |
| a) Access / Exclusion | 1. There is no improvement in the community life-style after the handpump installation  
2. There is some improvement but not sufficient to solve all water problems  
3. Life-style of the community has substantially improved |
| b) Impact | 1. Community don't like the handpump and would prefer other water sources  
2. Like the handpump but are worried about sustainability  
3. Happy with the handpump and believe they will be able to sustain it |
| c) User satisfaction | 1. No-one in the community is aware of the link between dirty water and diseases  
2. People are generally aware of the need to use water in a hygienic way but often ignore it  
3. All the people are aware and use water in a hygienic way |
| e) Hygiene awareness | 1. Some people never get access to the pump even when they want to use it  
2. Some people sometimes do not get access to the pump  
3. All the people who want to use the pump gain access all the time |
<table>
<thead>
<tr>
<th>Question</th>
<th>Issue</th>
<th>Afram Plains</th>
<th>Volta Region</th>
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<tbody>
<tr>
<td>Project process</td>
<td>Participation</td>
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<td></td>
<td>Capital contribution</td>
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<td>Institutional arrangements</td>
<td>Management system</td>
<td>3</td>
<td>3</td>
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<tr>
<td></td>
<td>Training</td>
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<td>2</td>
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<td></td>
<td>Major breakdowns</td>
<td>3</td>
<td>3</td>
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<tr>
<td>Water supply issues</td>
<td>Water use</td>
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<td>Water quality</td>
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<td>Source reliability</td>
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<tr>
<td>Maintenance</td>
<td>Technical skills</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Equipment and spares</td>
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<td>3</td>
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<tr>
<td></td>
<td>Preventive maintenance</td>
<td>2</td>
<td>2</td>
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<tr>
<td></td>
<td>Maintenance funds</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Community and social aspects</td>
<td>Access/exclusion</td>
<td>3</td>
<td>3</td>
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<tr>
<td></td>
<td>Impact</td>
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<tr>
<td></td>
<td>User satisfaction</td>
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<td>3</td>
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<tr>
<td></td>
<td>Hygiene awareness</td>
<td>3</td>
<td>3</td>
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<tr>
<td><strong>Average score:</strong></td>
<td></td>
<td>2.56</td>
<td>2.68</td>
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## Appendix 5 Stakeholders Table

<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Responsibilities</th>
<th>Comments</th>
</tr>
</thead>
</table>
| Community and WATSAN committee / CBO | 5% capital contribution and in-kind contribution to installation  
Collection of maintenance fees  
Preventive maintenance of handpump  
Purchase of spare parts and payment of pump mechanic |  |
| Area pump mechanic (APM) | Diagnosis of faults  
Repairs to pumps within zone | APDO uses community pump volunteers in place of APMs |
| Environmental Health Assistant (EHA) | Quarterly monitoring of pump performance  
Reporting to DWST |  |
| District Water and Sanitation Team (DWST) | Compilation of district monitoring reports to CWSA  
Feasibility studies  
Technical advice to DA |  |
| District Assembly (DA) Water Supply and Sanitation Subcommittee | Selection of project beneficiary communities  
5% contribution to implementation costs  
Contracting out of specialist services such as drilling, installation and community sensitisation | Currently few DAs manage to fulfil 5% contribution and most contracts are still given by CWSA at regional level |
| CWSA / Government | Development of policy and programme strategy  
Compilation of monitoring data  
Contracting out specialist services  
Technical advice to DWSTs and DAs |  |
| APDO / NGO | Contracting out specialist services  
Community mobilisation  
Technical advice to DWSTs and DAs  
Supplying spare parts |  |
| Private sector organisations | Community mobilisation / hygiene education  
Drilling boreholes / installation of handpumps  
Borehole rehabilitation/flushing etc.  
Purchase, storage and distribution of spare parts  
Development of new handpump technologies |  |
| **External support agencies / donors:** DANIDA, WaterAid etc. | Provision of funds to CWSA and NGOs  
Programme development  
Technical advice and logistical support to CWSA  
Contribution to policy and strategy development |  |
|---|---|---|
| **The World Bank** | Provision of funds to central Government  
Development of Government policy and strategy in collaboration with CWSA |  |