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MAXIMIZING THE BENEFITS FROM WATER AND ENVIRONMENTAL SANITATION

Sustainable operation and maintenance of small towns water supply systems in Ghana

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The Operation and Maintenance (O&M) of small towns water supply systems have been neglected in the past in a great number of developing countries. It is estimated that 30 to 60 percent of existing water supply systems are not operational, which has a high impact on the well-being of concerned populations (WHO, 2000). There is the tendency in developing countries to redefine the roles and responsibilities of the various actors involved in operation and maintenance. Indeed governments, because of heavy financial burdens and efficiency problems, are gradually changing their role of “provider of services” to that of “facilitator of processes”. Communities, therefore, have increasing responsibilities, not only in the operation and maintenance of their water supply systems, but also in the financial management of these systems. Some experiences and best practices that have been learnt in this case study are shared and recommendations made to enhance sustainable operation and maintenance.

Introduction

This study is about the Operation and Maintenance (O&M) of the Oyibi Area and Abokobi Area Small Towns Water Supply Schemes located in some rural communities in the Greater Accra Region of Ghana. Both water systems take their sources from underground water abstracted via boreholes at varying depths.

In line with the strategy and principles of the Community Water and Sanitation Agency (CWSA), Ghana, the design and construction of the water systems were carried out in close collaboration with the beneficiary communities to enhance sustainability.

Oyibi area water supply system or scheme

This water scheme serves 7 communities with a population of 5000 people. It was designed as a “floating reservoir system”. Here, the pump input is equal to the maximum daily demand and the reservoir is sited at the highest elevation. The system is not connected to the National Grid of Electricity but to 2 generator sets of 27.0kVA each which are being used to generate power to run the water scheme – one at each borehole site.

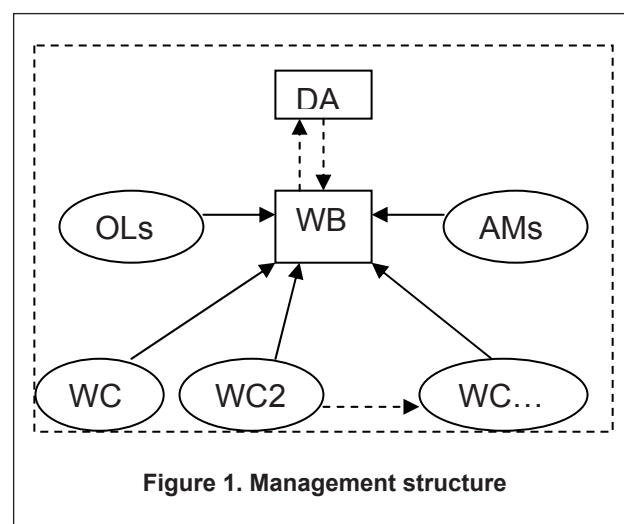
Abokobi area water supply system or scheme

This water scheme serves 3 communities with a population of 6000 people. It was designed as a “fill and draw system”. Here, the pump delivers water into the reservoir before any distribution takes place and water can only be received into

the system via the reservoir. The system is connected to the National Grid of Electricity.

Operation and maintenance management

To promote sustainability and complete the concept of Community Ownership and Management (COM), the Abokobi Area and Oyibi Area Mechanized Water Supply Schemes are each under the management of a Water and Sanitation Development Board (Water Board). This Water Board has oversight responsibility of the O&M of the water scheme whereas



Legend:

DA - District Assembly, OLs – Opinion Leaders
WB – Water Board, AMs – Assembly Members
WC1...n – Watsan Committees

the various Water and Sanitation (watsan) committees take responsibility for each community linked to the scheme. The Water Board has been trained in the operation, maintenance and management of the water supply scheme.

The management of the two water supply schemes has a two-tier structure comprising the various watsan committees and the Water Board consisting of representatives from the watsan committees. Each individual community has formed a 7-member watsan committee with at least 3 of the members being women. The watsan committees have selected 3 members each, at least one of them being a woman, to represent them on the Water Board. In addition the District Assemblies are represented on the Water Board through 2 elected Assembly Members. They are members of the Water Board but have observer status only. Figure 1 shows the management structure.

Roles and responsibilities

Roles of the water board

The Water Board is the major decision making body in matters of water supply and sanitation in the communities and is overall responsible for the management of the scheme, in particular the following activities:

- Participate in the planning and support implementation of water supply facilities
- Conduct regular board meetings
- Set water tariffs for standpipes and house connection and decide on tariff collection system
- Propose necessary bye-laws to regulate water use for approval by the District Assembly, enforce tariffs and other obligations and promote sanitation and hygiene practices within the communities
- Undertake financial planning and budgeting and the financial affairs of the water supply scheme
- Employ and monitor staff for the day to day operation and maintenance of the water scheme
- Contract private sector operators for selected O&M and repair tasks and monitor their work
- Report to the District Assembly (monthly O&M reports, water quality monitoring reports, annual reports including audited financial statements)

Roles of Watsan committees

The watsan committees assist the Water Board in carrying out its responsibilities and facilitate easy communication between the water users and the Water Board. The watsan committees also assist in the technical monitoring of the facilities and give feed back on disorders, defects etc. They are also responsible for hygiene education in their communities.

Roles of District Assembly (DA)

The District Assemblies are the highest political authority at the local level and they have considerable responsibility in ensuring that water service delivery is sustainable. The

Water Board is responsible to the DA in the management of the water scheme.

The roles and responsibilities of the DA are to:

- Provide a legal framework for community based water supply management
- Provide support to the Water Board in all matters of water supply management
- Ensure that the Water Board operates on a sound financial basis
- Audit the accounts of the Water Board
- Examine and approve water tariffs
- Approve rules and regulations in respect of the water supply system
- Monitor the quality of water supplied to the community
- Monitor operation and maintenance

Management system

The communities through their Water Boards and employees operate and maintain the water supply system on its own. A Technical Co-ordinator employed by the Water Board carries out daily operation and maintenance activities. He/She is supported by skilled artisans, e.g plumbers, electricians, mechanics etc. from within the communities whose services may be procured when necessary.

Management staff

The operating staff comprise:

Technical Coordinator (TC): The TC performs the following functions:

- Take an overall charge of the technical, financial and administrative staff
- Consolidate daily technical records
- Analyse and interpret records
- Prepare technical reports
- Present regular periodic reports at Water Board and community meeting
- Letters and memo writing and general correspondence
- Filing
- Office organisation

Operator/caretaker: He/she performs the following functions:

- Operation of pumps, i.e. starting and stopping, identification of faults and solution of minor problems according to manufacturer's instructions
- Regular inspection of installations
- Keep records and analyse technical data
- New service connections
- Monitor the reservoir
- Stock keeping
- Prepare technical reports

Accounts clerk: He/she performs the following functions:

- Payment of salaries and allowances
- Payment of contractor fees
- Keeping financial and administrative records
- Preparation of household and institutional bills
- Preparation of financial reports
- Investment of cash surplus
- Make payments, receiving cash and issuing receipts for monies collected
- Collect fees for house connection on a monthly basis
- Collect daily turnovers at each standpipe
- Keeping cash book
- Pay collected funds into the bank account

Vendors: A number of water vendors recruited from within the communities are in charge of water sales and receive payments for water at the standpipes. They charge the agreed tariff per 18-litre bucket or per cubic metre, as the standpipes have been provided with water meters. The money received is submitted every day to the Accounts Clerk against receipt. In addition to receiving water payments, the vendors are also responsible for keeping the standpipe environment tidy and report on technical defects.

Modality for payment of water tariffs

As far as the modalities of payment for water use is concerned the communities have opted for the Pay-As-You-Fetch (PAYF) method instead of monthly or quarterly rates per household or person. The charge per 18-litre bucket is Two Hundred cedis (¢200) which is approximately equivalent to Two cents (\$0.02) and the charge per cubic metre is ¢10,000 (\$1.10).

This system is organised as follows:

Each standpipe is provided with a water meter. Water vendors are responsible for the water sale at the standpipes whose taps are locked when the vendors are not around. The vendors follow agreed-upon opening hours. The vendors receive payments for the water fetched at the standpipe in accordance with the agreed tariff and submit the collected money to the Accounts Clerk who balances against the meter readings.

The vendors are paid their commission of 20 percent of the revenue. This means that the vendor makes more money if more water is sold. Seventy-five percent of the revenue is paid into the Water Board's account while 5 percent is paid into the local watsan committee's account. Some of the funds are invested and used for operation and maintenance, major replacements and future expansion.

The Water Board is responsible for the payment of staff salaries and allowances.

Financial sustainability

The two water supply schemes began operation in February 2004 following practical completion of construction and commissioning. Figures 2 and 3 show the financial performance trends from their operational inception in February 2004 to February 2005.

At the end of February 2005, the net profits of Oyibi Area and Abokobi Area schemes were approximately 80 million cedis (8,900 dollars) and 170 million cedis (18,900 dollars) respectively. Both water supply schemes yielded quite substantial amount of money of over 300 million cedis (33,300 dollars) each during the period; but the expenditure of the Oyibi Area water supply scheme was too high. This was mainly due to the high cost of operation and servicing of the two 27.0kVA generator sets. The Abokobi Area water supply scheme is hooked to the National Electricity Grid because the location is supplied with electricity.

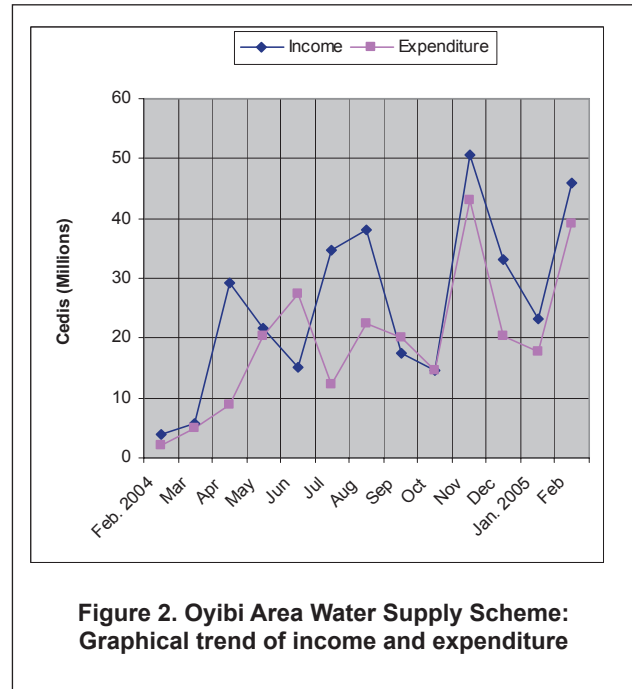


Figure 2. Oyibi Area Water Supply Scheme: Graphical trend of income and expenditure

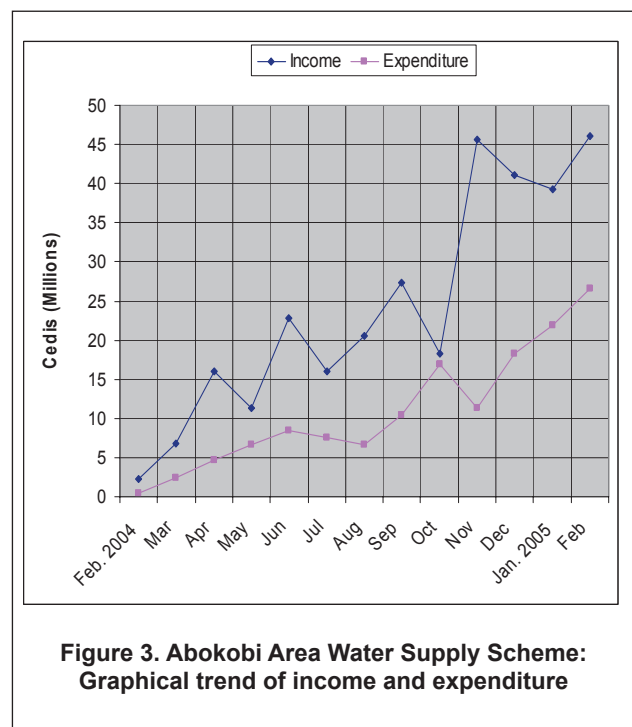


Figure 3. Abokobi Area Water Supply Scheme: Graphical trend of income and expenditure

Challenges and discussions

Funds are to be accumulated for O&M, and excess funds invested and used for major replacements and expansion of the water systems in future.

In linking financial sustainability to the technical sustainability of the two water schemes, the Abokobi Area scheme seems to be performing better.

Looking at the trend of cash inflow and outflow of the Oyibi Area scheme, the Water Board needs to adopt certain stringent measures to make more money to meet the high cost of operating the generator sets or find the alternative of getting hooked to the National Electricity Grid which is cheaper.

It is imperative that the financial administration of Water Boards be guided by the provisions in the new Financial Administration Act, 2003, (Act 654) in Ghana. The Act details out the procedures for financial administration in the public sector.

In spite of a number of training programmes organized, a few caretakers and vendors have problems with recording correct meter readings. This might require either sustained training or suitable replacements.

Some District Assembly members fail to attend Water Board meetings and this is disincentive to the decentralization policy for government and grass root participation in water and sanitation issues.

While attendance and participation of female Water Board members has improved, they require some time to assert themselves and make their presence felt. They require continuous encouragement and motivation.

There is the need for improvement of flow of information generally and integration of traditional authorities of member communities in water and sanitation issues for greater effectiveness of the Water Boards.

Hygiene education needs to be sustained through a variety of participatory tools in order to improve community appreciation for potable water and increased patronage of water from the stand pipes. Some residents still fetch water from streams, dug-outs and unwholesome traditional sources.

Conclusions and recommendations

The institutional arrangements put in place for the O&M of the water schemes should ensure sustainable management. However, the various stakeholders must be committed, transparent and properly resourced.

The two water schemes, especially the Abokobi Area scheme, appear to be having quite substantial cash inflow. This is due to the fact that the water systems are quite new and therefore expenditure on maintenance is not high. Attempt must therefore be made to invest the excess income in the purchase of major parts e.g. the submersible pumps. Attempt must also be made to find reliable measures of investing the excess income against lean periods.

In the case of Oyibi Area, it is clear that using the generator sets for such community managed systems poses a real threat to the sustainability of the water scheme. It

appears that after a period of 5 years this system cannot be maintained by the community if stringent measures are not taken (refer figure 2).

It is clear that the Pay-As-You-Fetch method as against monthly or quarterly flat rates is a sure way of ensuring sustainability of community managed water systems.

Provision of standpipes with water meters is one of the sure ways of ensuring effective collection of money for actual water consumed.

Vendors, because they receive commission on water sales, are motivated to carry out their duties of keeping the environment tidy.

It has also been observed that the establishment of the water systems and involving the community in management has given jobs to the Technical Coordinator, Vendors and Caretakers.

Some progress has been made to a large extent in equipping the two Water Boards and their various watsan committees to enable them operate with a reasonable degree of success and on sound management principles.

Operating the Community Ownership and Management (COM) concept under the two small towns water supply schemes, with the kind of complex developmental history of the beneficiary communities, is a difficult and arduous task. It requires adequate time, patience, tact, deployment of a wide variety of participatory mobilization tools, facilitative skills, pooling resources from within and without, particularly when sustainability is the primary objective.

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