UNIVERSITY OF CAPE COAST

PRIVATE SECTOR PARTICIPATION IN THE MANAGEMENT OF WATER SUPPLY SYSTEMS IN SMALL SETTLEMENTS IN THE ASHANTI AND BRONG AHAFO REGIONS

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2009

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BY

KWAKU ADU-BOATENG

DISSERTATION SUBMITTED TO THE INSTITUTE FOR DEVELOPMENT STUDIES OF THE FACULTY OF SOCIAL SCIENCES, UNIVERSITY OF CAPE COAST IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR AWARD OF MASTER OF ARTS DEGREE IN ENVIRONMENTAL MANAGEMENT AND POLICY

DECEMBER, 2009

DECLARATION

Candidate's Declaration

I hereby declare that this dissertation is the result of my own original work and that no part of it has been presented for another degree in this university or elsewhere.

Candidate's Signature:…… Date:……..……

Name: Kwaku Adu-Boateng

Supervisor's Declaration

I hereby declare that the preparation and presentation of the dissertation were supervised in accordance with the guidelines on supervision of dissertation laid down by the University of Cape Coast.

Supervisor's Signature…… Date……..……

Name: Professor A.M. Abane

ABSTRACT

This study examined private sector participation in the management of water supply systems in seven small settlements in the Ashanti and Brong Ahafo regions. The seven water supply systems selected were located in the following towns, Bekwai, Ejura and Kuntenase all in the Ashanti region and Nkoranza, Atebubu, Duayaw Nkwanta, and Nante in the Brong Ahafo region. The objective of the study is to examine the participation of private sector in the management of small town water supply systems; determine the various types of management models in the management of small town water supply systems; examine the arguments for and against the involvement of private sector involvement in the management of the systems; and undertake SWOT analyses of stakeholders in the management of small town water supply systems.

The selection of water supply systems was done using purposive sampling, considering the number of systems that are operational in these regions

The main findings of the study include, the identification of four major management models in small town water supply systems; strengths, weaknesses, opportunities and threats of various stakeholders in the management of small town water supply systems; various types of private sector and their levels of involvement in small town water supply systems and the merits and demerits of the private sector in the management of small towns water supply systems.

It is recommended that, effective supervisory role is played by public sector agency over the activities of private sector in the management of small town water systems to ensure good performance of the systems.

ACKNOWLEDGEMENTS

This study could not have been possible without the help of others. I sincerely wish to express my profound appreciation to my supervisor, Professor Albert M. Abane, Head of Department, Department of Geography and Tourism, University of Cape Coast. His support and guidance have been tremendous in arriving at these findings. I am also very grateful to Dr. Kwabena Nyarko Biritwum of the College of Engineering, Kwame Nkrumah University of Science and Technology (KNUST) for the various suggestions he made towards the completion of this work.

I am most indebted to my wife for the support she provided towards the completion of this study. My appreciation also goes to the management and staff of the seven small town water supply systems in Bekwai, Atebubu, Nkoranza, Ejura, Kuntenase, Duayaw Nkwanta and Nante for the patience and time they had during the administration of the instruments. My further appreciation goes to citizens of the towns where the water systems are located Finally, my gratitude also goes to Mr. Francis Odei Gyebi for administering the instruments and Mr. Wisdom Yao Dargbui for his support in bringing this study to completion.

DEDICATION

To my wife, Afua Ofouwaah Adu-Boateng, and the kids, Owusua and Kusiwaa.

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LIST OF ABBREVIATIONS

BOO:	Build, Own and Operate
BOOT:	Build, Own, Operate and Transfer
COM:	Community Ownership and Management
CWSA:	Community Water and Sanitation Agency
CWSD:	Community Water and Sanitation Division
DA:	District Assembly
DBFO:	Design, Build, Finance and Operate
DFID	Department for International Development
GDP:	Gross Domestic Product
GoG:	Government of Ghana
GWCL:	Ghana Water Company Limited
GWSC:	Ghana Water and Sewerage Corporation
KfW:	Kreditanstalt fur Wiederaufbau
MWH:	Ministry of Works and Housing
NCWSP:	National Community Water and Sanitation Programme
NGOs:	Non Governmental Organizations
OU:	Operating Unit
PPP:	Public Private Partnership
PRODICP:	Promotion of District Capitals
PSP:	Private Sector Participation
PURC:	Public Utility and Regulation Commission
PWD:	Public Works Department

ROT:	Rehabilitate, Operate and Transfer
WATSAN:	Water and Sanitation
WSDB:	Water and Sanitation Development Board

CHAPTER ONE

INTRODUCTION

Background to the study

Water is a fundamental requirement of life, which should be accessible to all, but it is not so in the World and Ghana for that matter. Access to safe drinking water and adequate sanitation services significantly contribute to improved health, economic development and enhanced community development (Khan 1997). Constraints facing the provision of water supply for both urban and small town settlements have been enormous. In spite of decades of government and donor-supported investments in water supply and sanitation, public utilities in many African countries have been unable to fully meet the demand for water and sanitation services (Larbi, E et al., 2004). One of the resulting effects of the poor delivery in water and sanitation services in Africa is that, the continent has become the poorest in terms of water supply and sanitation services in the World.

According to Small towns, large rural villages, peri-urban or auxiliary centres are among the terms used to describe settlements in Ghana and Africa that have between 5,000 and 50,000 inhabitants. The proportion of the African population living in centers of more than 5,000 inhabitants rose from 13% in 1960 to 40% in 1990 and is expected to reach 60% by 2020 (DFID, 1998). Supplying these centers with drinking water is an enormous challenge.

There is consequently an inescapable responsibility on governments to see to it that all their citizens obtain satisfactory water supply services that can be affordably delivered. The delivery of these services has two main components, that of provision and maintenance of the systems. The provision of water supply systems infrastructure has mainly been the sole responsibility of governments with the support of donor agencies in most developing countries (Larbi, E et al., 2004). Lammerink (2003), further explains that, management of the systems however, has been a combination of the governments, beneficiaries and the private sector. Decades of promises from governments throughout the developing world to provide free services have not worked. The policy itself has provided a barrier to the provision of services. Free services in fact disempower beneficiaries and destroy their leverage. It is fundamentally a "top down", centralised approach and is inherently dependent on remote bureaucracy.

Generally, there is a high demand for better water services in small towns and therefore makes its production a profitable activity even where users have access to free alternative sources (for example private or public wells or hand-pumps). In Ghana, the price of drinking water from such services varies from 14Gp to 67Gp per cubic meter (CWSA, 2004). Demand varies widely, depending on the type of service; the daily consumption per person varies from approximately 5 to 35 litres. This variation is explained by the fact that, for certain uses such as laundry or bathing, many households continue to use their traditional sources, which are free. The quantity used can also vary by a factor of three between the different agricultural seasons (PRODICAP, 1998).

As a result of macroeconomic pressures during recent years, most African governments no longer commit themselves either to manage or to expand water supply systems. Community management by volunteer users cannot also cope adequately in small town water supply systems with growing populations, as they do not generally have the knowledge to renew or extend the networks (Larbi E. et al, 2004). Water supply systems for small towns are large enough to apply economies of scale, but too small and scattered for a conventional commercial water company to balance its operating costs.

Community management is an extremely effective concept, especially for small-scale water supply systems. Being inexperienced, community-based water committees tend to manage their water supplies at the least cost. They do not try to optimise their functioning, for example by extending systems to sell more water and attain economies of scale. On the contrary, their approach is generally to minimise expenditure, sometimes even at the expense of preventive maintenance. The accumulated savings remain in a bank account. Community management in principle makes it possible to reduce the salaries of the operation and maintenance workers (CWSA, 2004). However, the actual management is often in the hands of a small group that may not be representative of all the users. This small group often monopolises control of the finances. The community management approach easily translates into a compromise between the interests of different social groups in an area. In the event of misappropriation, close social relations make sanctions difficult, and non-payment for water by some is

perceived as normal. When a major breakdown occurs, the community may not be able to deal with it, because the savings have been spent on another project.

Private sector involvement in water services is a debate, which has been going on for some time. There are strong proponents for and against it. In Ghana the debate has become something of a struggle, which illustrates starkly, the primary issues around which the debate revolves. The proponents of private sector involvement are, obviously, the private sector, some elements of government and agencies such as the World Bank, while those against are the labour movement, some academics, non-governmental organisations (NGOs) and politicians (Jonah, 2003). These issues are manifested in the numerous international and national conferences that have been going on of late in the country. There is at present very limited involvement of the private sector in water supply in Ghana.

Governments generally involve operators from outside the public sector, whether non-profit associations or commercial companies, in order to improve efficiency of operations and transparency of accounting. The simplest form of delegation is a management contract, in which the operator simply runs the water services and can be paid on merit, according to the results (Engmann, 2003). Alternatively, the operator can raise the finance for the household connections and the extension of the distribution system. This financial commitment constitutes a form of lease contract.

The challenge of providing improved water services in Ghana is therefore huge. Private sector participation is increasingly seen as a key component of sector reform strategies aimed at improved service provision for all consumer

groups. In recent years, there has been a trend on increased use of the private sector in the delivery of water service.

Statement of the problem

There are over 150 constructed and rehabilitated small towns water supply systems in Ghana and all the ten regional capitals are also served with various water supply systems (CWSA, 2004). The availability and sourcing of capital investments in the construction or rehabilitation of these water supply systems have not been as difficult as the maintenance of the systems after construction. This phenomenon has resulted in poor delivery from the systems and in some cases their breakdowns. The management of most of these water supply systems is incidentally in the hands of the public sector (Larbi, E et al., 2004). Larbi, E et al., 2004, further indicate that, this situation in no doubt has fueled the call by some sections of the society and especially the donor community for the participation of the private sector in the management of water supply systems in Ghana. This situation has birthed a debate on the merits and demerits of private sector participation in the management of water supply systems in the country with civil society organisations being against it and government and donor community being for it. This study therefore aims at the "cradle to grave" analyses of private sector participation in the management of small towns water supply systems in Ghana with examples from selected systems in Ashanti and Brong Ahafo Regions.

Objectives of the study

The main objective of the study is to assess private sector participation in the management of small town water supply systems in Ghana. The specific objectives are to:

- Examine the participation of the private sector in the management of small town water supply system.
- Determine the various types of management systems in small town water supply delivery.
- Examine the arguments for both for and against private sector participation in the management of water delivery; and
- Undertake SWOT analyses of stakeholders in the management of small town water supply systems.

Research question

In order to arrive at the expected outcome, the study seeks to answer the following researched questions:

- What are the various levels of private sector participation in small town water systems management?
- What are the various management models in the management of small town water systems?
- What are the merits and demerits of each level of private sector participation in the management of small town water supply systems?

- What are the strengths and weaknesses of stakeholders in the management of small town water systems?

Scope of the study

There are about 150 constructed or rehabilitated small towns water supply systems in Ghana (Eugene, et al., 2004), but the focus of the study was narrowed to the small towns water supply systems in the Ashanti and Brong Ahafo Regions. About thirty small town water systems in the Ashanti and Brong Ahafo regions were considered under the study but some are newly constructed. Only those which have operated for over five years were targeted for the study. This is because available data for 5-year duration was adjudged as a feasible period for the study and since most of the small town water systems have not been in operation for than five years.

Relevance of the study

The study provides information on the delivery and management of small towns water supply systems in Ghana and specifically, selected towns in the Ashanti and Brong Ahafo regions. The study also serves as a reference to Ghana Water Company Limited (GWCL), Community Water and Sanitation Agency (CWSA), Ministry of Works and Housing (MWH), Non Governmental Organisations (NGOs) and all relevant stakeholders concerned with the delivery of water supply systems in the country. It offers suggested solutions to the problems of managing small town water supply systems, while at the same time

providing information on the on-going debate about private sector participation in the water supply sector in the country. Finally, the study provides baseline data for further research on private sector participation in the management of water supply systems in the country.

Limitations of the study

The limitations of the study were constraints of time and finances. Time constituted a constraint because I had to travel from the Tamale in the Northern Region to Ashanti and Brong Ahafo Regions to collect data, and the project had to be done and completed within a given time frame. Data for some of the small town water systems in the two regions were also not available to the researcher. However, the researcher made every effort to cover seven water supply systems to make the findings useful.

Organisation of the study

This work is divided into five chapters. Chapter One deals with the introduction, which covers background to the study, statement of the problem, objectives of the study, research questions, rationale of the study, scope of the study, limitations of the study and the organisation of the study.

Chapter Two focuses on literature review, which is sub divided into management models, roles and responsibilities of stakeholders in the management of small town water supply systems, performance indicators, concept of private sector participation and conceptual framework.

Chapter Three covers the research methodology. It covers study area, study design, population, sampling techniques, instruments for data collection and the administration of the instruments. Chapter Four presents the results and discussions. Chapter Five covers summary, conclusions and recommendations of the study.

CHAPTER TWO

LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

Introduction

In this chapter, a review of literature relevant to the study is outlined. This chapter begins with the concept of management models and small town water supply systems, performance indicators of various management practices, assessment of small town water supply systems and private sector participation. These are followed by an outline of the conceptual framework used for the study.

Management models

According to Still (1965), management is basically marketing and innovations. This makes management an art of just creating innovations and marketing. Wegelin-Schuringat (1998) further states that, management is the art of getting things done through people. This makes management people centered. Management is simply the act of getting people together to accomplish desired goals and objectives. Management comprises planning, organizing, staffing, leading or directing, and controlling an organisation (a group of one or more people or entities) or effort for the purpose of accomplishing a goal. Resourcing encompasses the deployment and manipulation of human resources, financial resources, technological resources, and natural resources.

There have been many attempts to define a management structure for the small town water supply systems through stakeholders meetings both in Ghana and other countries. A number of management models have evolved as a result of these initiatives. Below are some of the main management options being used by some small town water supply systems in Ghana:

- The community through its WSDB and employees, operates and maintains the water supply systems entirely by itself, (with a trained manager, operator, and financial/administrative staff), and calling upon the services of plumbers, electricians, mechanics for maintenance functions;
- The community through its WSDB hire staff (to see to some aspect of its daily operation, financial, administration, technical and maintenance) and signs a contract with a firm or firms or individuals to perform specific functions such as technical, financial, or administrative on a periodic basis, such functions could be the preparation of financial reports, internal auditing or some aspect of the planned maintenance functions (maintenance contract with private firm);
- The community through its WSDB contracts a firm to completely operate and maintain the water supply system including meter reading, billing and revenue collection, for an agreed fee based on the contractual agreement.

Each community through its WSDB must take their own decision on the management type they want. However the most appropriate decisions/option depends on four factors, namely:

- The complexity of the technology of water supply system;
- Quantity of water being produced/number of people served;
- The location of the community in relation to major road networks, and commercial centers; and
- The commitment of the community (Eugene, et al., 2004)

Roles and responsibilities of stakeholders

According Jonah (2003), each stakeholder has a specific role to play in ensuring the sustainability and proper functioning of the small town water supply systems. Performance indicators for assessment of various management models are outlined below. Indicators are those used to assess the overall performance of the water supply systems. These indicators are summarised as follows:

Technical and operational

- Maintenance programme details
- Water production (lpcd). Based on the total annual water supplied to the distribution system (including purchased water).
- Water consumption (lpcd). Based on the total annual water sold (includes standpipes, metered connections, and estimated consumption from unmetered connections).

- Unaccounted for water (%). (Total annual water supplied-total annual water sold/total annual supplied.
- Pipe bursts (burst/pop/yr or burst/community/yr or bursts/km/yr).
- Water quality (Regular testing? Variations from required standards?) (Pilgrim, 2002)

Financial management

- Average tariff. (US$/m³). Total annual revenues/annual amount of water sold.
- Total annual revenues per population served (US$/pop).
- Ratio of cost coverage (%). Total annual revenues/total annual cash requirements.
- Profitability of water service (%). Profit or loss/total annual revenue.
- Debt service ratio (% of operating revenues). Total annual debt service expressed as a percentage of total annual revenues.
- Unit operational cost (US$/m³ sold, US$/m³ produced). Total annual cash requirements/total annual volume sold or produced.
- Connection fee (US$).
- Connection rate. Number of connections/population; and number of new applications per month.
- Collection efficiency (months). (Total annual revenues-year end accounts receivable)/total annual revenues expressed in months of equivalent sales.

- Investments (% operating revenues, or US$/capita). Total annual investments expressed as a percentage of total annual revenues, and per capita served (IRC, 1996).

Customer service

- Continuity of service (hrs/day). Average hours of service per day for water supply.
- Complaints about service (% of population, or % of connections). Total number of complaints per year expressed as a percentage of the total number of population served, or total number of connections.
- Number of days to resolve complaints (days).
- Number of days a new customer is waiting to be connected (days).
- Number of illegal connections disconnected per month.
- Customer representation in management decision making, accountability and transparency

  (Keefer 1998).

Organisation and management

- Staff per 1000 population served.
- Cost of staff (salary and other expenses on staff) as a proportion of operational costs (%).

Total annual costs (including benefits) expressed as a percentage of total operational costs (operational costs exclude depreciation, interest and debt service).

- Staff qualifications.
- Water coverage (%). Population with easy access to water services/total town population.
- Proportion of connections that are metered (%). Total number of connections with operating meters/total number of connections.
- Contracted out service costs as a proportion of operational costs (%). Total cost of services contracted out to the private sector expressed as a percentage of total annual operational costs (operational costs exclude depreciation, interest and debt service).
- Staff attrition rate (no. of staff quitting per year).
- WSDBs members' attrition rate (ratio of active WSDB members and total no. of members on the board).
- The number of collaborating meetings with other stakeholders (www.cwsa-gh.org/water).

Definition of small town water systems

Small town water supply systems can be categorized as ones that need to be planned, designed, managed and operated by more than voluntary committees, and where more experienced professionals are needed but which do not require large utilities as those based in urban centers. This according to Jonah (2003) is

defined as those settlements with population thresholds of between 5,000 and 50,000. It could be half the lower or double the higher end and managed by local utilities. The towns are further categorized based on population as follows.

Categorize I	2,000 – 5000
Categorize II	5,000 – 15,000
Categorize III	15,000 – 30,000
Categorize IV	30,000 – 50,000

These categories form the basis for establishing the per capita consumption for the design of such systems. The border between rural and small towns and urban centres is fuzzy and depends on local circumstances. A settlement with a population 5,000 in one country may be considered as urban centre and in another country an urban centre may be of 20,000 people, as in countries like China and India (Haarmeyer, 1992).

Moreover there are synergies between small towns and rural water supply (i.e. companies that can also provide planning, maintenance and services to surrounding villages with point sources), and between small towns and urban centers. Operators in urban centers may provide services to satellite towns and operators in small towns may also expand their business to larger cities as they gain experience. Hence, small towns have been categorised in terms of management and technological assistance and are discrete towns with well-defined borders. The reality is that a group of communities in close proximity to one another may choose to collaborate in a rural piped water scheme serving all of them or that a town may have a more dense centre served by a piped network and

the disbursed households/settlements at the periphery served by a point source such as hand pumps (Engmann, 2003).

Definitions of Public Private Partnership (PPP)

A wide variety of definitions are being used within the 'spectrum' of public private partnerships, with little or no correlation among these definitions. Each country have to go through a process of determining which combination of PPP approaches best suits a country's political, socio-economic and water resources environment. The range of private sector options available varies in pattern. The main changes across the spectrum are the degree of private sector involvement and capital investment introduced and therefore the length of the contract required to obtain the necessary pay back and the necessary return on capital investment.

Selection of an appropriate type of contract for the provision of water and sanitation service needs to be carefully thought through, based on good information. Public Private Partnership (PPP) contracts for water sector service provision have been conveniently categorized into a number of different types of contract or PPP options that are briefly described subsequently in order of increasing scope and complexity. It is necessary to understand the range of options to see where contracting out can be used to best advantage. Specific contracts can also be developed with features from two or more of the options discussed. Examples of Contracts are:

Service contracts, are the simplest form of PSP whereby the public authority (though not necessarily the public) retains overall responsibility for operation and maintenance of the system, except for the specific system components that are contracted out. The contractor's responsibility is limited to managing its own personnel and services efficiently. Typically, service contracts are used for maintenance of components such as pumping stations and meter reading. Payment is usually on a lump sum basis, dependent on achieving certain agreed targets. A typical contract duration is anywhere between six months to three years. Almost all countries have experience with these types of contracts in other contexts but they may not always have been recognized to be valuable as a separate policy option for the water sector.

Sansom et al., (2003), further argues that, one variation of the Service Contract type is the "labour only' where the contractor essentially provides a specified number of staff for a specific purpose to a public authority who maintains overall responsibility for providing the service. The precise number and skill profile of the contract staff is usually specified by the public authority. The contractor is in effect acting as a contract staff agency. Under such a contract it is difficult to set performance standards, because the public authority makes the management decisions. It is generally only possible to replace unsatisfactory staff. This type of arrangement has been widely used, for example, in the Indian water sector.

According to Roger (1993), management contracts are generally a more comprehensive arrangement, where the public authority transfers responsibility to

a private contractor for the management of a range of activities such as the Operations and Maintenance (O&M) of a water supply distribution system or major sub-system. Remuneration is usually based on a tendered fee. Those contracts that also have an incentive based component, using parameters such as volume of water produced or improvements in bill collection rates are generally believed to be more successful. Roger (1993), further states that, public authority usually finances working and investment capital and determines cost recovery policies. Management contracts are often seen as a useful first step towards more complex PPP arrangements such as Leases or Concessions. A typical contract duration is from three to five years and occasionally up to 15 years. Countries with these types of contracts include: Uganda, South Africa, Mexico, Kenya and India. Two common forms of organisational arrangements for Management contracts are as follows:

A joint public/private company is established for the purposes of the operation of the contract with staff and resources being provided both from the government/utility and the private operator. This encourages shared ownership and hopefully shred benefits. This type of contract is generally used for a large scale management contract, e.g. Trinidad and Tobago.

(Sansom, et al., 2003).

Community/co-operative management contracts occur where a community or user group manages some aspect of water or sanitation service provision. For example, in an urban environment the community group may manage part of the tertiary water distribution water network and cost recovery from consumers in a

defined area, while they pay the utility for the bulk supply of water. There may or may not be a written contract and in some cases the community group may take over the management of assets. Countries with these types of contracts include; Haiti, Kenya and India.

According to Sansom, et al., (2003), lease contracts, also known as affermage, are used where a private operator or lessor rents the facilities from a public authority and is responsible for operating and maintaining a complete system and collecting the tariffs. The lessor effectively buys the rights to the income stream from the utility's operations and thus assumes a significant share of the commercial risk associated with those operations. The lessor generally provides the working capital and the public authority deals with the capital investment. The duration of a Lease contract can be from 5 to 15 years. Countries with these types of contracts include: France, Guinea, Poland and Senegal.

BOT contracts, (Build, operate and transfer – with variations such as BOOT: build, own, operate, transfer; BOO: build, own and operate; DBFO: design, build, finance and operate; and ROT: rehabilitate, operate and transfer) are a form of concession whereby a private firm or consortium agrees to finance, construct, operate and maintain a facility for a specific period, before transferring the facility to a Government or other public body. BOT arrangements are attractive for new plants that require large amounts of finance. The contract period is normally greater than 20 years, sufficient for the private contractor to pay off loans and achieve a return on investment. These contracts often require high tariffs and/or subsidies to meet the BOT operator's costs, with the

government utility remaining responsible for paying the private contractor. Countries with these types of contracts include Brazil, Malaysia, Mexico and China (Sansom et al., 2003).

Concession contracts

Concession contracts tend to be more comprehensive in scope, where the private sector company takes on full responsibility not only for operating and maintaining the utility's assets, but also for investments to enhance and extend these assets. Formal asset ownership remains with the Government but, the private sector assumes complete control for the contract period. Frequently the concessions are bid according to price – the bidder who proposes to operate the utility and meet the specific investment and performance targets, for the lowest tariff, wins the concession. Alternatively, the contract may be let according to the promised degree of service coverage within a specified time. The contract, which is usually over a period of 25 – 30 years, sets out the main performance targets, particularly for quality of supply and service coverage as well as arrangements for arbitration of disputes between the project partners. Concessions generally require tariffs to be at a level that meet the full costs of service provision. The inevitable changes in circumstances require some mechanism for economic regulation to adjust tariffs during the concession. The private operator generally had the responsibility to collect tariffs directly from customers in order to generate its own revenue. Countries with these types of contracts include: Argentina, Philippines, France and Malaysia (Lammerink & Bolt, 2003).

Table 1 highlights the typical allocation of responsibilities between the public and private sector for the different contract options. The 'Basic modes of water sector organisation' indicates the continuum of increasing private sector management and increasing ownership of the utility for the different types of Contracts (The World Bank, 1997).

Table 1: Responsibilities for the public and private sector for each contract type

Contracting type	Asset ownership	Operation and maintenance	Capital investment	Commercial risk	Typical duration
Service contract	Public	Public	Public	Public	1 to 3 years
Management contract	Public	Private	Public	Public	3 to 5 years
Lease	Public	Private	Public	Shared	8 to 10 year
Contract concession	Public	Private	Private	Private	25 to 30 years
BOT	Public	Private	Private	Private	15 to 25 years

Source: Sansom, K. et al, (2003)

Merits of privatisation

Advocates of privatisation argue that governments run businesses poorly for the following reasons:

The government may only be interested in improving a company in cases when the performance of the company becomes politically sensitive. Conversely, the government may put off improvements due to political sensitivity, even in cases of companies that are run well. The company may become prone to corruption and further more, employees may be selected for political reasons rather than business ones.

The government may seek to run a company for social goals rather than business ones (this is conversely seen as a positive effect by critics of privatization).

It is claimed by supporters of privatization, that privately-held companies can more easily raise capital in the financial markets than publicly-owned ones.

Parts of a business which persistently lose money are more likely to be shut down in a private business.

Nationalised industries can be prone to interference from politicians for political or populist reasons. Examples include making an industry buy supplies from local producers (when that may be more expensive than buying from abroad), forcing an industry to freeze its prices/fares to satisfy the electorate or control inflation, increasing its staffing to reduce unemployment, or moving its operations to marginal constituencies. It is argued that such measures can cause nationalized industries to become uneconomic and uncompetitive.

Private companies make a profit by persuading consumers to buy their products and not the products of their competitors. Proponents of privatization argue that private corporations thus need to serve exactly the needs of their clients; and the more their clients are willing to pay, the better they serve the needs. Proponents also suggest that this means the corporations need to focus on even more marginal groups (who might not get their voice heard through the democratic system, yet still can pay for services).

The basic argument given for privatisation is that governments have few incentives to ensure that the enterprises they own are well run. On the other hand, private owners, it is said, do have such an incentive: they will lose money if businesses are poorly run. The theory of privatisation holds that, not only will the enterprise's clients see benefits, but as the privatised enterprise becomes more efficient, the whole economy will benefit. Ideally, privatisation propels the establishment of social, organisational and legal infrastructures and institutions that are essential for an effective market economy.

Another argument for privatization is that to privatise a company which was non-profitable (or even generated severe losses) when state-owned means taking the burden of financing it off the shoulders and pockets of taxpayers, as well as freeing some national budget resources which may be subsequently used for something else. Proponents of laissez-faire capitalism will argue that it is both unethical and inefficient for the state to force taxpayers to fund the business that can not work for itself. They also hold that even if the privatized company happens to be worse off, it is due to the normal market process of penalizing

businesses that fail to cope with the market reality or that simply are not preferred by the customers.

Many privatization plans are organized as auctions where bidders compete to offer the state the highest price, creating monetary income that can be used by the state.

Demerits of privatisation

Opponents of privatization dispute the claims made by proponents of privatization, especially the ones concerning the alleged lack of incentive for governments to ensure that the enterprises they own are well run, on the basis of the idea that governments must answer to the people. It is argued that a government which runs nationalized enterprises poorly will lose public support and votes, while a government which runs those enterprises well will gain public support and votes. Thus, democratic governments, under this argument, do have an incentive to maximize efficiency in nationalized companies, due to the pressure of future elections.

In practical terms, there are many pitfalls to privatization. Privatization has rarely worked out ideally because it is so intertwined with political concerns, especially in post-communist economies or in developing nations where corruption is endemic. Even in nations with advanced market economies like Britain, where privatization has been popular with governments (if not all of the public). Since the Thatcher era, problems center on the fact that privatization programmes are very politically sensitive, raising many legitimate political

debates. Who decides how to set values on state enterprises? Does the state accept cash or government-provided coupons? Should the state allow the workers or managers of the enterprise to gain control over their own workplace? Should the state allow foreigners to buy privatized enterprises? Which levels of government can privatize which assets and in what quantities?

In the short-term, privatization can potentially cause tremendous social upheaval, as privatizations are often accompanied by large layoffs. If a small firm is privatized in a large economy, the effect may be negligible. If a single large firm or many small firms are privatized at once and upheaval results, particularly if the state mishandles the privatization process, a whole nation's economy may plunge into despair. For example, in the Soviet Union, many state industries were not profitable under the new system, with the cost of inputs exceeding the cost of outputs. After privatization, sixteen percent of the workforce became unemployed in both East Germany and Poland. The social consequences of this process have been staggering, impoverishing millions, but to little social benefit in many post-Communist countries. On the other hand, proponents claim that Poland's and East Germany's economies will fare better in the long term, with positive social consequences that one can already see in those countries. In the process, Russia has gone from having one of the world's most equal distributions of wealth in the Soviet era to one of the least today. There has been a dearth of large-scale investment to modernize Soviet industries and businesses still trade with each other by means of barter.

Privatisation in the absence of a transparent market system may lead to assets being held by a few very wealthy people, a so-called oligarchy, at the expense of the general population. This may discredit the process of economic reform in the opinion of the public and outside observers. This has occurred notably in Russia, Mexico, and Brazil.

Privatisation can also have a ripple effect on local economies. State-owned enterprises are often required by law to patronize national or local suppliers. Privatised companies, in general, do not have that restriction, and hence will shift purchasing elsewhere. Bolivia underwent a rigorous privatisation programme in the mid 1990s, with disastrous impact on the local economy in the short term.

Outcomes of privatisation

Westerhoff (1998) observed that in competitive industries with well-informed consumers, privatization consistently improves efficiency. Such efficiency gains mean a one-off increase in Gross Domestic Product (GDP), but through improved incentives to innovate and reduce costs also tend to raise the rate of economic growth. The type of industries to which this generally applies includes manufacturing and retailing. Although typically there are social costs associated with these efficiency gains, these can be dealt with by appropriate government support through redistribution and perhaps retraining.

Miller (2000) further argues that, in sectors that are natural monopolies or public services, the results of privatization are much more mixed. In general, if the performance of the existing public sector operation is sufficiently bad,

privatization will tend to improve matters. However, much of this may be due to the imposition of related reforms such as improved accounting systems, regulatory systems, and increased financing, rather than privatization itself. Indeed, some studies show that the greatest gains from privatization are achieved in the pre-privatization period as reforms are made to prepare for the transfer to private hands. In economic theory, a private monopoly behaves much the same as a public one.

Conceptual framework

Anderson (1993) in a theory of privatisation postulates that motivation for privatisation is to reduce cost and ensure better value for money, improve quality of service expertise, reduce management structure and increase flexibility. This gives an indication of the positive side of private sector involvement in small settlement water supply systems. It is therefore expected that private sector involvement in the management of small settlements water supply systems will help by way of improving efficiency, reducing cost, reducing management structure and reducing cost of operations. Oates (1998) adds to the list of reasons for contracting-out by suggesting that outsourcing objectives are normally rather simplistic single goals such as cost saving but increasingly, the decision to outsource is based on desire to bypass internal politics. Oates further states that private participation will introduce competition among market operators. It is therefore expected that participation of the private sector will introduce some

level of competition in the management of small settlement water supply systems, which will in turn improve efficiency.

CHAPTER THREE

METHODOLOGY

Introduction

The methodology covers the description of the study area, the study design, sampling method of the study population and various data collection techniques and instruments used. Also considered is the procedure for data gathering processing and analysis.

Study area

Purposive sampling was used in selecting the towns for the study so that a mix of the management models could be obtained for the analysis. Seven small town water supply systems were selected for the study (Table 2).

Table 2: Study area

Town	Management Model	Region	Financial Agency
Bekwai	Private operator performs all O&M tasks on behalf of WSDB through contractual Agreement	Ashanti	EU/GoG
Atebubu	Private operator performs all O&M tasks on behalf of WSDB through contractual agreement	Brong Ahafo	EU/GoG
Ejura	Direct WSDB management with hired pipe attendants including WATSAN members	Ashanti	KfW/GoG
Nkoranza	Direct WSDB management with hired pipe attendants including WATSAN members	Brong Ahafo	KfW/GoG
Duayaw Nkwanta	Direct WSDB management but with a maintenance contract with a private firm	Brong Ahafo	EU/GoG
Nante	Wholly operated, maintained and managed by community members.	Brong Ahafo	IDA/KfW/GoG

Source: Field work, 2006

Study design

The study was descriptive and non-interventional case study design focusing on seven selected towns in the Ashanti and Brong Ahafo regions. As descriptive study it was designed to obtain pertinent and precise information concerning the topic under consideration that is Private Sector Participation in the Management of Water Supply Systems in Small Settlements. Gordon and Gordon (1994) state that descriptive study indicates how data are collected, organised and displayed in tables. On the other hand, Koul (2001) is of the view that a descriptive study is more than just a collection of data. It involves measurement, classification, analysis, comparison and interpretation. Koul contends that as in any study, descriptive studies researchers identify and define the problem, select or construct tools for collecting data, describe, analyse and interpret the data in clear and precise terms and draw definite and meaningful conclusions.

It was non-interventional in that it described and analysed private sector participation in water supply management without manipulating or introducing any stimuli in an attempt to change anything.

Study population

The population size of the study area focused on seven small town water supply systems. The study population includes community members and opinion leaders in organised groups such as women groups and youth groups within the selected towns. Much emphasis was placed on women since they are much

involved in the fetching and usage of water. They also monitor water quality and devise strategies to conserve supplies in times of scarcity (Singh, 1992).

Sampling and sample size

Seven small town water supply systems were selected. There are 18 small town water supply systems in the Ashanti and Brong Ahafo regions (Eugene et al., 2004). The number selected represents 39% of the total number of water supply systems in the two regions.

The selection of the water supply systems was done using purposive sampling to ensure the reliability of the data collected. This method was employed having in mind a purpose of water supply systems that are operational in the Ashanti and Brong Ahafo regions. The various types of operational management systems being implemented by small town water systems in the two regions were considered in the selection of the study area. This is to ensure that a range of management systems are covered under the study. Geographic location of the various systems was employed in the selection of the water systems. This is to ensure that the population and the different various economic strengths of the towns are covered. Years of operations of the water systems were taken into account, which ensures that a consistence data of the systems are available for the study. A purpose of ensuring that at least two of the water supply systems that will be considered under the study will be operating in the same management system to ensure comparison of management systems was also considered. The populations of the towns that various water systems serve and the complexity of

the systems were also considered. Using simple random sampling, some members of the seven towns were selected and interviewed.

Data collection

The data collection was grouped into two: Primary data and secondary data. Secondary data referred to data that was collected from the record books of the WSDB, the private operators and operating and management staff of the various water systems. The secondary data collected included:

- Annual profit or loss of the water systems over the period under study. This was derived from the accounts books of the various water systems
- The records books of the various systems were assessed.
- Various studies undertaken on the water systems by the managers of the system or by other stakeholders were examined.
- The demographic data on the various towns that the water systems serve were collected.
- The revision of management and technical reports that were relevant to the study was done.

Primary data was collected through interviews and discussions with stakeholders within the selected small towns. The data collection had three parts, namely:

- Qualitative questions directed at WSDB members, private operator (or employed staff as is the case with WSDB managed systems), DWST and community members
- A set of quantitative questions derived from basic financial, technical, management and operation and maintenance procedure.
- Interview schedule with stakeholders on management options and institutional structures in the operation.

Three weeks was used in administering the instruments. The gathering commenced in January 16th and ended on February 6th 2006. However, secondary data was not readily available for the set of quantitative questionnaires administered in some of the towns. In towns where data were available, it was either not up to date or simply too difficult to extract data.

Data analysis

Data gathered from the field study was edited and coded to ensure that all interview schedules were complete and contained accurate information. All interview schedules were given serial numbers to facilitate easy identification for scoring. The raw scores were fed into the computer and analysed using the computer software: Statistical Product for Service Solutions (SPSS 10.0). Analysis of the field data was done using descriptive statistics such as frequencies.

The performance indicator taken from the World Bank's Benchmarking "start Up" kit with modification to suit Ghana's small towns' peculiar situation

was then used to assess the performance of the systems categorized under the various management models.

The indicators were classified as:

- General;
- Technical (including operation and maintenance);
- Management and organisation;
- Financial; and
- Customer.

Based on the data collected from the four identified management models, performance evaluation of the systems was conducted through a relative scoring system.

Excellent case - 10 score; Worst case - 0 score' was applied to each indicator adopted for the analysis to measure each of the management models. The sum of the scores for each model gave a reflection of the performance of the management model. This was complemented by the discussions with various stakeholders on the advantages and the disadvantages of the various management types to confirm the relatively best management option.

Description of data

The data collection focused, among other issues, on the following:

- Brief description of the water supply facility in each of the seven selected towns (including capacity of storage tanks and length of distribution and distribution pipes etc);

- Population (served and un-served) and management model adopted;
- Number of standpipes/number of household connections per specified period;
- Major economic activity and tariff (price of water per m^3 or per bucket);
- Number of pipe burst and other repair works per specified period;
- Detailed expenditure (salary, electricity bills overhead cost etc) and percentage profit and
- Number of meetings among stakeholders.

Performance assessment of water supply systems

Performance assessment was carried on the various water supply systems using tools as SWOT analysis and performance indicators. The indicators considered are technical, financial, customer service and organisation and management. A SWOT analysis on the roles and responsibilities of various stakeholders was performed. With a knowledge of the roles and responsibilities of the main stakeholders in the institutional structure and overlaps in roles and responsibilities, capacity of stakeholders in the performance of their roles as well as accountability relationships were determined with the use of questionnaire. The effect of the institutional structure on the performance of the small town water supply system was then analysed.

Indicators, which have been approved and adopted by CWSA in the assessment of the small towns' water supply systems, were used for this study. The following performance indicators were used.

Technical and operational indicators comprise the following:

- Maintenance programme details (routine and periodic maintenance)
- This ensures longer life span for the water facility if the schedule is strictly adhered to. The sustainability of the system largely depends on effective maintenance policy.
- Water production (lpcd). This is based on total annual water supplied to the distribution system (including the consumption/purchased water). It gives an indication as to whether water could meet the demand of the consumers (based on the basic water needs of the beneficiaries)
- Water consumption (lpcd). This is based on total annual water sold (includes standpipes, metered household, commercial, industrial and institutional connections, and estimated consumption from unmetered connections).
- It provides a basis for measuring level of patronage, possible use of alternate sources and living standard.
- Unaccounted for water (%). (Total annual water supplied – total annual water sold / total annual water supplied). This is an indicator for leakages, pilfering and possibly faulty meters
- Pipe bursts (burst/pop/yr or burst/comm./yr or bursts/km/yr). This is also an indicator for design defects; use of old pipelines and guide to replace sections of pipelines.
- Number of hours of water supply/day.

- This gives an indication of the availability and access to water by consumers.
- Water quality (regular testing and variations from required standards).

An indicator that water quality standards are constantly monitored and that safe water is being supplied to consumers. Regular testing at various points of the system helps identify possible source of pollution to the water.

Financial indicators considered were:

- Average tariff. (¢/m^3). Total annual revenues / annual volume of water sold;
- Total annual revenue per population served (¢/pop);
- Profitability of water service (%). Profit or loss/total annual revenue;
- Unit operational cost (¢/m^3 produced). Total annual cash requirements/total annual volume produced;
- Connection fee (¢);

When the above financial indicators are compared to per capita income of the inhabitants, it gives an indication of affordability.

- Collection efficiency (months). (Total annual revenues-year end accounts receivable) /total annual revenues expressed in months of equivalent sales.

Customer service indicators considered are continuity of services, complaints about service delivery and number of days to resolve conflict.

- Continuity of service (hrs/day). Average hours of service per day for water supply. This gives an indication of the availability of service.
- Complaints about service (% of population, or % of connections). Total number of complaints per year expressed as a percentage of the total number of population served, or total number of connections.
- Number of days to resolve complaints (days).

Organisation and management indicators used to assess the performance of the water supply systems are:

- Staff per 1000 population served.
- Cost of staff as a proportion of operational costs (%). Total annual costs (including staff benefits) expressed as a percentage of total operational costs (operational costs exclude depreciation, interest and debt service).
- Staff qualifications.
- The number of collaborative meetings with other stakeholders.

Table 3: Scoring system for indicators

Indicators	Components/Parameter	Scoring
Maintenance Programme	Availability of routine maintenance schedule (20%)	2
	Implementation of schedule (40%)	4
	Availability of employed qualified Personnel (20%)	2
	Availability of major maintenance schedule (20%)	2
	Total (100%)	10
Unaccounted for water	P%	10-P/10
Pipe Burst/Month	Nil (10 score), Every Month (0 score)	10-0
Water quality/quarter	Quarterly (10 score): Nil within the year	10-0
Average Tariff	5556/m3 (5 score-average); the approved rates from CWSA (¢5556/m3) is given an average score of 5. The other tariffs are scored as relative percentage to the score of the approved rates. (The average tariff of ¢11,100.00 is given the highest score of 10, and free consumption is given a score of 0)	10-0
Unit Operational cost	Highest 10 score; lowest 1 score.	
Profitability (%)	P%	2P/10
Collection efficiency	1 month-10 score; 12 months – 1 score; over 12 Months – 0 score	1-10
Continuity of service (hrs)	24hrs (10 score); 12hrs (5score); 0hrs (0 score)	P/10

Table 3 (Continued)

Indicators	Components/Parameter	Scoring
Indicators	Components/Parameter	Scoring
Customer satisfaction (%)	P% (Random sampling of 1% of Total served Population)	P/10
Number of days to resolve Complaint	1 day – 10score; 1 week-1score; after 1 week-0score	10-0
Staff per 1000 pop served	Relative terms (highest 10 score)	10-0
Cost of staff as proportion of Operational cost	Relative terms (highest 10 score)	10-0
Staff qualification	System manager Bsc-4 score HND – 3 score SSS/on the job trainee – 2 score Operator HND/on the job trainee – 2 score Plumber/technician-1 score Accounts RSA III – 2 score SSS/RSA II-1 score Assistant Operator Plumber -1 score Security - 1 score	10-0
Reporting and meetings (no.)	Monthly – 10 score, yearly-1 score, 0 score for no report	10.0

Source : (CWSA, 2004; 0' Connell, 1997; GTZ, 2000; Pilgrim, 2002)

CHAPTER FOUR

RESULTS AND DISCUSSION

Introduction

This chapter deals with the various characteristics of types of private sector and their level of participation in the management of small town water systems and types of management systems. The section also deals with the merits and demerits of various types of management systems. The chapter further discusses the strengths, weaknesses, opportunities and threats of the various stakeholders in the management small town water systems. The performance assessment of the identified management systems are also discussed in this chapter.

Private sector

The study identified the private sector in the management of small town water supply systems in three different categories. The composition, legal status and the mode of operations of the private sector is determined. These are classified as an individual, group of people and corporate body.

Individual

A key partner of the management of small town water systems is the individual, who operates as the private sector. An individual was identified as a private sector within the management structure of small town water supply systems. It was identified that an individual plays the role of the private sector but has no formal registration as a corporate entity. Their operations were found to be non formal and they normally operate at the less skill areas of operations such as standpipe attendants, meter reading or revenue collections. Contracting individual as a private sector in the management of small town water supply systems tends be cheaper in terms of cost (Larbi, E. et al, 2004).

Group of people

Group of people was also identified as a private sector within the management structure of small town water supply systems. They are not corporate entities. They are just a group of people who have come together with a common purpose of doing business within the management structure of small town water supply systems. They are not organised and do not normally pay tax. They also normally operate in the areas of less technical skills such as standpipe attendants, meter reading or revenue collection. The involvement of informal groups as private sector in the management of water supply system improves coordination and also introduces competition in their areas of activities (Larbi, E. et al, 2004).

Corporate bodies

According to Lorentzen (1998), the involvement of corporate bodies in the management of small town water supply systems introduces competition and prudent procurement procedures. It is also cost effective and qualified staff are usually employed. Another element of the private sector within the management of small town water supply systems is the corporate entity. Such an entity is usually a registered body with legal backing. They are usually an organized body with a well defined management structure. They operate at all the sectors. It was identified that corporate bodies normally take full operations of the systems. The staff is made up of both skilled and unskilled labour. Payment of tax is a core function of corporate bodies.

Types of management systems identified

This section deals with the objective of analyzing the various types of management systems in small town water supply systems. Four main management systems were identified in the seven selected water systems. The management systems were classified and compared. According to Jonah (2003), performance of small town water supply systems are influenced by the management type established for the operation, maintenance and management of the systems. The types of management systems identified are presented below.

Wholly privatised

With this management system, there is a complete delegation of all operation and management tasks to a private firm. The private firm in operation is a corporate body under this management system. They operate with skilled and unskilled staff. A formal contract agreement is usually signed between the District Assembly/WSDB and the private firm to manage operate and maintain the systems for a defined period, with detailed terms of reference (TOR). Specific achievement targets are also set for the private firm. The Bekwai and Atebubu systems fall under this category.

Partially privatised

There is partial delegation of functions in the management of small towns water supply systems. The task of operation and maintenance is delegated to a private firm in this type of management system. However, the management of the systems is undertaken by the WSDB/DA through trained staff. The trained staff are made of systems managers, operators and accounts Clerks. A contract is signed with the private firm for periodic maintenance of specific component of the systems. Major repairs and breakdowns are also carried out by private firms. The private firm is made of corporate bodies and individual service providers. The Nkoranza and Ejura water systems are in this category.

Limited privatisation

The water supply system is managed and maintained by the WSDB/DA in this type of management system. WSDB/DA manages and maintain the systems with support from trained staff. The trained staff are made of systems managers, operators, accounts Clerks. The private sector is involved with the operations of the public standpipes. The private sector involvement in this system of management is individual persons, with no formal organisation or registration. Formal contract is signed between the private individual and the WSDB/DA. The Duayaw Nkwanta and Kuntenase systems are in this category.

Community management

The system is fully managed, operated and maintained by the beneficiary community. Limited support of the private sector is sought in the maintenance of the water supply systems. Trained members of the community take charge of the systems in the management, operations and maintenance of the systems and routine repair works are also done by these trained community members. However, private firms are invited to repair works that are beyond the trained community members. The Nante water supply system falls under this category.

Assessment of identified management systems

The four identified management systems were assessed to determine the merits and demerits of each system. The issues considered are in Table 4. The

management systems are identified, defined and compared to ascertain their merits and demerits.

Table 4: Assessment of various management systems

Indicator	Management Type			
	Type 1	Type 2	Type 3	Type 4
Management	System is fully managed by the private sector, which pays between 10% and 15% of the gross profit to the DA	System is partly managed by the DA through the WSDB and partly by private sector managed	System is fully managed by the DA through the WSDB	System is fully managed by Community members.
Maintenance	Maintenance is done by the private firm as stated in the contract	Maintenance is done by the private firm as stated in the contract	Maintenance is done by the WSDB	Maintenance is done by technical people within the community
Water Sale	Sale of water is by "pay as you fetch".	Sale of water is by "pay as you fetch".	Sale of water is by "pay as you fetch"	Sale of water is by "pay as you fetch".
Tariff Collection	Private firm collects water sales everyday based on water meter reading	WSDB collects water sales everyday based on water meter reading	WSDB collects water sales everyday based on water meter reading	Community members are responsible for collection of water sales

Table 4: Assessment of various management systems (Continues)

Reporting	Monthly report through the WSDB to the DA who also accounts to the community on the operations and that of the private sector	WSDB prepares progress reports twice in a year	WSDB prepares progress reports twice in a year	No report is prepared
Water Quality Analysis	Water quality is carried out monthly	Water quality is carried out once in year	Water quality is carried out once in year	Water quality is to be done once in year, but this rarely followed
Staff salary and remuneration	Operative staffs have relatively better salary and subsequently better output. Operative is wholly private.	Lower wages and lower output. Salaries of WSDB could come under scrutiny by community members	Lower wages and lower output. Salaries of WSDB could come under scrutiny by community members	Only allowances are paid to volunteers
Revenue	Revenue is highest due to high efficiency in collection. The private operator pays a percentage of expected revenue to DA and not percentage of actual revenue collected.	Revenue is relatively high.	Revenue is relatively low.	Revenue is lowest.

Table 4: Assessment of various management systems (Continues)

Control water wastage	There is greater control of wastage of water since the private operator is allowed in the contract, a limited percentage for unaccounted for water. Wastage is the lowest	Control of water wastage is low but better than type 3	Control of water wastage is low.	Control of water wastage is lowest.
Auditing of activities	Auditing services are provided by the DA to ensure that proper accounts are kept so as to reduce financial irregularities.	Auditing services provided is not as regular as in type 1	Auditing services provided is also not as regular as in type 1	No auditing is done on the operations of the system.
Frequency of breakdowns	Frequency of breakdown is low.	Frequency of breakdown is not as low as type 1.	Frequency of breakdown is not as low as type 1.	Frequency of breakdown is low.

Attendance to breakdown	Attempt to breakdown is prompt since delays affect profit margin of private and they could also pay penalties for not providing water within specified period as agreed in the contract.	There are component personnel to handle more technical component. Attendance to breakdown is swift but depends on how fast WSDB's inform services providers.	It takes a relatively long time to attend to break downs (in comparison with model type 1 and type 2	It takes a relatively longer period to attend to break downs (in comparison with other models.
Tariff setting/ approval and review	Carried out by DAs/WSDB/ Private Operator	Fixed by WSDB with influence from traditional authorities and opinion leaders.	Fixed by WSDB with influence from traditional authorities and opinion leaders.	Fixed by community members at community fora with influence from traditional authorities
Overhead charges	There is perceived high overhead charges which result in high water tariffs.	Low overhead charges, low tariffs but payment for maintenance firms is high	Relatively lower overhead charges resulting in lower tariffs	Lowest overhead charges resulting in lower tariffs.

Table 4: Assessment of various management systems (Continues)

Social Accountability	Social accountability to community members is missing. Since private firm is accountable to the DA as stated	Social accountability to community members is prominent.	Social accountability to community members is prominent	Social accountability to community members is prominent
Data Availability	Systematic and detailed records on O&M and Management functions are available since it forms part of the contractual agreement.	Record keeping is relatively effective. It is not difficult getting organised data from the system	Record keeping is not effective. It is difficult getting organised data from the system	Record keeping is not effective. It is difficult getting organised data from the system is virtually non existence
Contractual Obligation	There is contractual obligation, failure of which could lead to sanctions, a fine (fee) or contract being abrogated as the situation may be, on all aspect in the running of the system at his own risk.	There is contractual obligation on only specific component of the system. Contract, is also only for major maintenance only.	Management is voluntary in nature and there is no contractual obligation. WSDB would not be surcharged for non performance, at worst they will be dismissed	Management is voluntary in nature and there is no contractual obligation.

Table 4: Assessment of various management systems (Continues)

Monitoring	Monitoring role by WSDB/DA is available and it does compel the private operator to perform better.	Monitoring role by the community members is not strong	Monitoring role by the community members is not strong	Monitoring role by the community members is not strong

Source: Field work, 2006

SWOT analysis of key stakeholders

SWOT analysis was carried out to determine the internal and external factors that affect the management of small town water supply systems.

The results are presented in three (3) Tables. The strengths, weaknesses, opportunities and threats of communities are discussed in Table 5.

Communities' commitment is high in the management of small town water supply systems since there is no substitute for water. It is also easy to mobilize communities' manpower. Members of communities who live in compound houses tend to pay more for water. Profit made from sale of water can be used to support other developmental projects within the community. Donor support is also available to communities. Tariffs for water are relatively high for small town water supply systems.

Table 5: SWOT analysis of communities

Strength	Weaknesses	Opportunities	Threats
There is no alternative to water. This demonstrates the fact that issues concerning water affect all; Resourcefulness Easy mobilization of manpower; Committed leadership; Unity within communities help in mobilizing communities.	Block charges are disincentive to consumers in compound houses; High connections fee for households discourages patronage of this level of service; Apathy among community members.	Usage of profit from water sale to support other developmental project within the community; Improvement in the general standard of living in the community; Usually benefit from donor assistance.	Leakages in the system are borne by consumers; Relatively high tariffs compared to urban water supply systems; Lack of proper management systems to ensure sustainability of the facilities.

Source: Fieldwork, 2006

Table 6: SWOT analysis of private sector

Strength	Weaknesses	Opportunity	Threats
Profit mindedness; High managerial skills; Collaboration with DAs in setting up tariffs; Technical and management expertise; Vast experience in water supply industry.	Weakness in management structure; Sustainability of private company depends on level of patronage; Lack of system expansion.	Policy on PSP favours private sector participation; Government policy of private sector as the engine of growth of the national economies encourages private sector participation in small towns; Donor bias or policy favours privatization; No substitute for water.	Presence of alternative sources of water within the community; High electricity bills as a result of government policy on full recovery; Unpaid bills by Government Agencies; Illegal connections by costumers; Unreliable power source; Relatively high levels of tariffs compared to low tariffs enjoyed by urban dwellers; Vandalisation of installations of the system.

Source: Fieldwork, 2006

Table 7: SWOT Analysis of District Assemblies

Strength	Weaknesses	Opportunities	Threats
Job security; Availability of qualified personnel; Capacity building of technical staff;	Low salary levels and poor working conditions, which contributes to low attrition rate and output; Lack of monitoring structures to monitor the operations; Weak marketing attributes; Lack of business orientation and management.	Donor support for the establishment and sustainability of the management structures; Easy management of water systems; Availability of materials for repairs.	Possibility of seeking high paid jobs due to low salary; Illegal connections; Non payment of bills by state agencies; Governmental interference.

Source: Field work, 2006

Performance assessment of the identified model

This section addresses the objective of assessing the various management models in the management of small town water supply system. An assessment of the performance of the four models identified was carried out. The performance indictors for assessing the performance of various management systems were determined by using scoring indicators in table 3. Table 8 gives the summary of the findings, while tables 9 to 15 give the details findings of the various system types. The outcomes of the assessment are presented in Table 8 to 15. The assessment of the four types of management systems was also based on the indicators from the data collected. The results are presented below.

Overall performance assessment of the water supply systems

Table 8 gives the overall performance assessment of all the water supply systems. The Ejura water supply system had the highest population (48,000) among all the systems, while Nante water system had the least population (3,800). This shows that the Ejura water system had the highest service population and benefits more people than all the systems.

The Bekwai water supply system had the highest number of standpipes (62), while the Nante water supply system had the least of 10 standpipes. The Bekwai water system also had the longest length of pipes for both transmission and distribution lines (25,830m). The Nante water supply system had the least length of pipes (5,100m). The Bekwai and Ejura Water supply systems had the largest storage reservoir of 60m^3; the Nante water supply system had the smallest

storage reservoir of 20m³. The number of standpipes, the length of pipes and size of the storage reservoir determine the complexity and size of the systems.

In general the Bekwai water supply system is the most complex and largest of all the systems, followed by the Atebubu water supply system, Ejura water supply systems, Nkoranza water supply systems, Duayaw Nkwanta water supply systems, Kuntenase water supply systems and Nante water supply system in that order. The best overall performing water supply system was however the Nkoranza water supply system (with percentage performance of 79.8) as indicated in table 1, whereas the Nante water supply was the least with performance indicator (with percentage performance of 55.4).

Table 8: Summary performance assessment of the water supply systems

Town	Type of System	Maximum Design Population	Total No. of Standpipes/No.	Total pipe length of System/m	Size of overhead tank/m^3	Average Total Scoring	Percentage Performance /%
Bekwai	1	29,124	62	25,830	600	104.8	74.3
Atebubu	1	30,555	58	21,205	450	100.1	71.5
Nkoranza	2	33,847	51	18,235	490	111.7	79.8
Ejura	2	48,120	52	17,175	600	97.8	69.9
Duayaw Nkwanta	3	25,840	27	10,050	180	86.6	61.8
Kuntenase	3	5,341	18	12,220	25	84.6	60.4
Nante	4	3,800	10	5,100	20	77.5	55.4

Source: Field work, 2006

Performance assessment of the Bekwai water supply system

Table 9 presents the general performance of the Bekwai water supply systems. The overall performance of this system was satisfactory. The technical and operation performance of the Bekwai water supply system were good and maintenance programme for this system was high. Pipe burst per year within the system was low and unaccounted for water was initially high (24%) but got improved by the fifth year (17%). Water quality analysis provisions were also followed very well by the systems operations and maintenance activities.

The financial performance of the Bekwai water supply system was also good. Average tariff were within CWSA standards as indicated in table 3. Water profitability was negative in the first year but got improved over the years and became satisfactory over the remaining four years. Collection efficiency were however low for the Bekwai water supply system. It is also clear that customer service was impressive over the period under study. This resulted from the good customer service hours per day, customer satisfaction and less number of days to resolve complaints.

In terms of organisation, the Bekwai water supply system was rated as good. Reporting and meeting towards effective management of the systems were also satisfactory. There were also qualified personnel managing the system.

Table 9: Performance assessment of Bekwai water supply system

	Years					Relative score (scale of 1-10)				
Response	Year 1	Year 2	Year 3	Year 4	Year 5	Year 1	Year 2	Year 3	Year 4	Year 5
Technical and Operational										
Maintenance programme details (%)	80	90	90	90	90	8	9	9	9	9
Pipe burst (burst/comm../yr)	3	4	2	3	1	7.5	6.7	8.3	7.5	9.9
Unaccounted for water (%)	24	27	15	18	17	8	7.9	8.5	8.2	8.3
Water quality (No./Year)	4	4	4	4	4	10	10	10	10	10
Financial										
Average tariff (¢/m³)	,556.00	5,556.00	5,556.00	5,556.00	8,333.00	5	5	5	5	7.5
Profitability of water (%)	3.00	18.00	10.00	16.00	26.00	-0.6	3.6	2	3.2	5.2
Unit Operational cost (¢/m³ sold)	3,500.00	3,500.00	7,000.00	7,000.00	7,000.00	2.5	2.5	5	5	5
Collection efficiency (months)	4	3	3	2	3	2.5	3.3	3.3	5	3.3

Table 9: Performance assessment of Bekwai water supply system (Continues)

Costumer										
Continuity of service (hrs/day)	12	14	14	14	14	5	6	6	6	6
Customer satisfaction (%)	90	85	90	85	90	9	8.5	9	8.5	9
No. of days to resolve complaints (days)	3	1	2	3	1	8	10	9	8	10
Organisation										
Staff per '000 pop. Served	0.39	0.35	0.35	0.32	0.30	2.5	2.3	2.3	2.2	2.1
Cost on staff as a proportion of operational cost (%)	13.35	14.5	12.5	13.2	12.4	8.5	8.8	8.7	8.9	8.8
Staff qualifications	10	10	10	10	10	10	10	10	10	10
Reporting and meeting (no.)	10	12	12	12	12	8	10	10	10	10
						93.9	103.6	106.1	106.5	114.1

Source: Field work, 2006

Performance assessment system of the Atebubu water supply system

Table 10 presents the general performance of Atebubu water supply systems. The overall performance of this system was not satisfactory. The technical and operational performance of the water supply system was however good. Maintenance programme performance for this system was high for all the years under study. Pipe burst within the system was low while unaccounted water for was generally high. Water quality analysis provisions were followed very well by the systems operations and maintenance activities.

Average tariff were realistic over the years under study. Water profitability was overall in the negative over the period under study. Collection efficiency was however good with customer service rated in a similar manner.

In terms of organisation, Atebubu water supply system was given a good rating. Reporting and meeting towards effective management of the systems were also good. The personnel managing the system were also qualified.

Table 10: Performance assessment of Atebubu water supply system

	Years					Relative score (scale of 1-10)				
Response	Year 1	Year 2	Year 3	Year 4	Year 5	Year 1	Year 2	Year 3	Year 4	Year 5
Technical and Operational										
Maintenance programme details (%)	80	70	80	90	80	8	7	8	9	8
Pipe burst (burst/comm/yr)	3	4	2	3	2	8.5	8	9	8.5	9
Unaccounted for water (%)	29	27	26	28.3	25.4	7.8	6.9	7.4	7.2	7.5
Water quality (No./Year)	4	4	4	4	4	10	10	10	10	10
Financial										
Average tariff (¢/m³)	5,556.00 -	5,556.00	5,556.00	5,556.00 -	8,333.00	5	5	5	5	7.5
Profitability of water (%)	9.00	8.00	10.00	7.00	-17.00	-1.8	1.6	2.0	-1.4	-3.4
Unit Operational cost (¢/m³ sold)	3,500.00	3,500.00	7,000.00	7,000.00	7,000.00	2.5	2.5	5	5	5
Collection efficiency (months)	8	7	8	8	8	7.2	6	6	7.2	6

Table 10: Performance assessment of Atebubu water supply system (Continues)

Costumer										
Continuity of service (hrs/day)	7.2	7.2	7.5	7.9	8.5	5	6	6	6	6
Customer satisfaction (%)	80	80	75	80	80	8	8	7.5	8	8
No. of days to resolve complaints (days)	4	3	3	3	2	6	5	5	5	8
Organisation										
Staff per '000 pop. Served	0.29	0.26	0.23	0.20	0.18	4.5	4.3	4.0	3.1	2.6
Cost on staff as a proportion of operational cost (%)	21.4	19.5	16.4	21.4	22.3	8.5	8.8	8.7	8.9	8.8
Staff qualifications	10	10	10	10	10	10	10	10	10	10
Reporting and meeting (no.)	12	12	10	10	10	10	10	8	8	8
						99.2	99.1	101.6	99.5	01.0

Source: Fieldwork, 2006

Performance assessment system of the Nkoranza water supply system

Table 11 presents the overall performance of Nkoranza water supply system. The general performance of this system was satisfactory. The technical and operational issues of the Nkoranza water supply system had an overall good performance. Maintenance programme for this system was high for all the years under study. Pipe burst within the system was very low while unaccounted for water for the years under study was unsatisfactory. Unaccounted for water loss was low in the first year of operation but increased over the remaining four years. It started with a low figure of 7% for the first year but increased to 17% in the fifth year. Water quality analysis provisions were also followed very well by the systems operations and maintenance activities.

The financial performance of the Nkoranza water supply system was good. Average tariffs were realistic over the period under study. Water profitability was satisfactory, starting with 4% in the first year and steadily increasing to 30% in the fifth year. Collection efficiency was also satisfactory for the period.

Customer service was impressive over the period under study, resulting in good customer service hours per day, customer satisfaction and less number of days to resolve complaints. In terms of organisation, the rating was also good and qualified personnel are available in the management of the system.

Table 11: Performance assessment of Nkoranza water supply system

	Years					Relative score (scale of 1-10)				
Response	Year 1	Year 2	Year 3	Year 4	Year 5	Year 1	Year 2	Year 3	Year 4	Year 5
Technical and Operational										
Maintenance programme details (%)	80	70	80	90	80	8	7	8	9	8
Pipe burst (burst/comm/yr)	2	3	2	3	2	9	8.5	9	8.5	9
Unaccounted for water (%)	7	12	10	18	17	9.3	8.8	9.0	8.2	8.3
Water quality (No./Year)	4	4	4	4	4	10	10	10	10	10
Financial										
Average tariff (¢/m³)	3,125.00	3,125.00	6,250.00	6,250.00	6,250.00	2.8	2.8	5.6	5.6	5.6
Profitability of water (%)	4.00	18.00	23.00	25.00	30.00	0.8	3.6	4.6	5.0	6.0
Unit Operational cost (¢/m³ sold)	1,548.00	1,482.00	1,423.00	1,321.00	1,120.00	5.8	6.2	6.2	7.8	8.4

Table 11: Performance assessment of Nkoranza water supply system (Continues)

Collection efficiency (months)	70	70	90	95	95	7	7	9
Costumer								
Continuity of service (hrs/day)	16	16	16	16	16	8	8	8
Customer satisfaction (%)	90	85	90	85	90	9	8.5	9
No. of days to resolve complaints (days)	4	2	1	1	1	6	8	10
Organisation								
Staff per '000 pop. Served	1.11	1.14	1.21	1.17	1.20	1.2	2.4	2.3
Cost on staff as a proportion of operational cost (%)	11.2	11.2	12.5	13.2	12.4	8.5	8.8	8.7
Staff qualifications	8	8	8	8	8	8	8	8
Reporting and meeting (no.)	10	10	10	10	10	8	8	8
						101.42	105.6	115.4

Source: Field work, 2006

Performance assessment system of the Ejura water supply system

Table 12 presents the general performance of Ejura water supply system. The overall performance of this system was satisfactory. Both technical and operational performance were good. Maintenance programme for the system was also good for all the years under study. Pipe burst within the system was low. Unaccounted for water for all years were high. It averaged at a high figure of about 23% over the years under study. Water quality analysis provisions were also followed well by the system's operations and maintenance activities.

The financial performance of the water supply system was unsatisfactory, although average tariff were realistic over the years under study. Water profitability was negative. Collection efficiency was however good, so was customer service impressive over the period. This resulted from the good customer service hours per day, customer satisfaction and less number of days to resolve complaints. Organisation of the system was also found to be good. The personnel managing system were also qualified.

Table 12: Performance assessment of Ejura water supply system

Response	Years					Relative score (scale of 1-10)				
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 1	Year 2	Year 3	Year 4	Year 5
Technical and Operational										
Maintenance programme details (%)	80	75	75	75	75	7	7	8	8	8
Pipe burst (burst/comm/yr)	2	1	2	2	0	8.5	8	9	8.5	9
Unaccounted for water (%)	30	21	22	21	22	7.0	7.9	7.8	7.9	7.8
Water quality (No./Year)	4	4	4	4	4	10	10	10	10	10
Financial										
Average tarrif (¢/m³)	3,542.43	3,542.43	3,124.24	452.33	4,265.24	2.5	2.5	5	5	5
Profitability of water (%)	-10.00	-13.00	-6.00	-3.00	-6.00	-2.0	-2.6	-1.2	-0.6	-1.2
Unit Operational cost (¢/m³ sold)	1,548.00	1,482.00	1,423.00	1,321.00	1,120.00	4.1	3.1	3.1	4.1	4.1
Collection efficiency (months)	7	6	6	7	6	7.2	6	6	7.2	6

Table 12 Performance assessment of Ejura water supply system (Continues)

Costumer										
Continuity of service (hrs/day)	12	14	14	16	16	5	6	6	6	6
Customer satisfaction (%)	90	85	90	85	90	9	8.5	9	8.5	9
No. of days to resolve complaints (days)	3	1	2	3	2	8	10	9	8	9
Organisation										
Staff per '000 pop. Served	0.31	0.29	0.25	0.21	0.18	2.5	2.3	2.3	2.2	2.1
Cost on staff as a proportion of operational cost (%)	13.35	14.5	12.5	13.2	12.4	8.5	8.8	8.7	8.9	8.8
Staff qualifications	10	10	10	10	10	10	10	10	10	10
Reporting and meeting (no.)	10	10	8	8	8	8	8	6	6	6
						95.3	95.5	98.7	99.7	99.6

Source: Field work, 2006

Performance assessment system of the Duayaw Nkwanta water supply systems

Table 13 presents the general performance of Duayaw Nkwanta water supply system. The water supply system had average performance. The technical and operational performances were good. Maintenance programme for this system was high for all the years under study. Pipe burst within the system was low while unaccounted for water for all years were high, averaging 15% over the years under study. Water quality analysis provisions were not followed very well by the systems operations and maintenance activities.

The financial performance of the Duayaw Nkwanta water supply system was also good. Average tariffs were realistic over the years under study. Water profitability was negative in the first year but improved over the years and became satisfactory over the period. Collection efficiency was however low for the Duayaw Nkwanta water supply system.

Averagely, customer service was impressive over the period under study. In terms of organisation, the Duayaw Nkwanta water supply system was good. Reporting and meeting towards effective management of the systems were also averagely satisfactory. There were qualified personnel managing the system at the time of the study.

Table 13: Performance assessment of Duayaw Nkwanta water supply system

	Years					Relative score (scale of 1-10)				
Response	Year 1	Year 2	Year 3	Year 4	Year 5	Year 1	Year 2	Year 3	Year 4	Year 5
Technical and Operational										
Maintenance programme details (%)	80	70	80	80	80	8	7	8	8	8
Pipe burst (burst/comm/yr)	2	2	2	1	2	2	2	10	10	9
Unaccounted for water (%)	17	15	15	14	16	8.3	8.5	8.5	8.6	8.4
Water quality (No./Year)	2	2	2	2	2	5	5	5	5	5
Financial										
Average tarrif (¢/m³)	3,250.00	3,250.00	3,250.00	6,500.00	6,500.00	2.9	2.9	2.9	5.6	5.6
Profitability of water (%)	-3.00	3.00	6.00	-3.00	2.00	-0.6	0.6	1.2	-0.6	0.4
Unit Operational cost (¢/m³ sold)	2,250.00	2,150.00	2,050.00	2,000.00	1,955.00	5.6	6.8	7.2	6.5	7.4
Collection efficiency (months)	6	6	6	6	6	5	5	5	5	5

Table 13: Performance assessment of Duayaw Nkwanta water supply system (Continues)

Costumer										
Continuity of service (hrs/day)	14	14	14	13	14	5	6	6	5.5	6
Customer satisfaction (%)	90	85	90	85	90	9	8.5	9	8.5	9
No. of days to resolve complaints (days)	4	2	2	1	2	6	8	8	9	8
Organisation										
Staff per '000 pop. Served	0.19	0.16	0.15	0.12	0.10	2.1	1.8	1.6	1.3	0.9
Cost on staff as a proportion of operational cost (%)	7.5	8.2	7.4	8.0	7.1	6.9	7.2	7.1	7.0	6.2
Staff qualifications	6	7	8	8	8	6	7	7	7	7
Reporting and meeting (no.)	6	6	6	6	6	5	5	5	5	5
						76.2	81.3	91.5	91.4	90.9

Source: Field work, 2006

Performance assessment system of the Kuntenase water supply system

Table 14 presents the general performance of Kuntenase water supply system. The general performance of this system was averagely satisfactory. The technical and operational performance was average. Maintenance programme for the system was also good. Pipe burst within the system was low, but unaccounted for water for all years was high averaging 18% over the years under study. Water quality analysis provisions were not followed well by the systems operations and maintenance activities.

The financial performance of the water supply system was also average. Average tariffs were not realistic over the years under study. Water profitability was unsatisfactory over the years under study. Collection efficiency was also unsatisfactory for the water supply system. Customer service was impressive over the period under study. This resulted from the good customer service hours per day, customer satisfaction and less number of days to resolve complaints. Organisation of the system was also found to good.

Reporting and meeting towards effective management of the systems were also averagely satisfactory. There were also qualified personnel managing the system at the time of the study.

Table 14: Performance assessment of Kuntenase water supply system

	Years					Relative score (scale of 1-10)				
Response	Year 1	Year 2	Year 3	Year 4	Year 5	Year 1	Year 2	Year 3	Year 4	Year 5
Technical and operational										
Maintenance programme details										
(%)	70	65	70	75	65	7	6.5	7	7.5	6.5
Pipe burst (burst/comm/yr)	3	4	2	1	2	7.5	6	8	9	8
Unaccounted for water (%)	18	17	15	20	17	8.2	8.3	8.5	8	8.3
Water quality (No./Year)	2	2	2	2	2	5	5	5	5	5
Financial										
Average tariff (¢/m³)	3,000.00	3,000.00	3,000.00	6,000.00	6,000.00	2.7	2.7	2.7	5.4	5.4
				-	-					
Profitability of water (%)	-7.00	6.00	5.00	7.00	4.00	-1.4	1.2	1.0	-1.4	-0.8
Unit Operational cost (¢/m³										
sold)	4,562.04	3,542.43	3,124.24	3,002.25	2,850.25	5.6	5.8	6.3	6.9	7.8
Collection efficiency (months)	7	6	6	7	6	4.5	5	5	4.5	5

Table 14: Performance assessment of Kuntenase water supply system (Continues)

Costumer										
Continuity of service (hrs/day)	12	14	14	14	14	5	6	6	6	6
Customer satisfaction (%)	75	85	80	85	75	7.5	8.5	8	8.5	7.5
No. of days to resolve complaints (days)	3	3	2	3	2	7	7	8	7	8
Organisation										
Staff per '000 pop. Served	0.27	0.23	0.20	0.18	0.16	1.8	1.6	1.3	0.9	0.7
Cost on staff as a proportion of operational cost (%)	8.6	8.4	7.9	8.5	8.1	6.2	6	5.6	6.4	6.4
Staff qualifications	7	7	8	8	8	7	7	8	8	8
Reporting and meeting (no.)	7	8	8	8	10	5	6	6	6	6
						78.6	82.6	86.4	87.7	87.8

Source: Field work, 2006

Performance assessment system of the Nante water supply system

Table 15 presents the general performance of Nante water supply system. The overall performance of this system was generally unsatisfactory. The technical and operational performances were also not good. Maintenance programme for this system was low. Pipe burst within the system was however low for all the years under study having one burst within a year. Unaccounted for water for all years were also low with a range of between 4% and 12% under years of the study. Water quality analysis provisions were also poorly followed by the systems operations and maintenance activities.

The financial performance of the Nante water supply system was not satisfactory. Average tariffs were realistic over the years under study. It started with a tariff of ¢3,500 but increased to ¢8,750 by the fifth year. Water profitability was also unsatisfactory over the period under study, however collection efficiency was good.

Averagely, customer service was impressive over the period. There was however no data on number of days to resolve complaints. In terms of organisation, the Nante water supply system performed unsatisfactorily. Reporting and meeting towards effective management of the systems were also unsatisfactory. The personnel managing the Nante water supply system were not qualified.

Table 15: Performance assessment of Nante water supply system

	Years					Relative score (scale of 1-10)				
Response	Year 1	Year 2	Year 3	Year 4	Year 5	Year 1	Year 2	Year 3	Year 4	Year 5
Technical and Operational										
Maintenance programme details										
(%)	n/a	n/a	n/a	n/a	n/a	8	7	8	9	8
Pipe burst (burst/comm/yr)	1	0	1	0	1	8.5	8	9	8.5	9
Unaccounted for water (%)	12	5	4	6	4	7.8	9.5	9.6	9.4	9.6
Water quality (No./Year)	1	1	1	1	1	2.5	2.5	2.5	2.5	2.5
Financial										
Average tarrif (¢/m³)	3,500.00	3,500.00	8,750.00	8,750.00	8,750.00	3.1	3.1	7.8	7.8	7.8
Profitability of water (%)	0.50	1.20	0.23	0.12	0.10	0.1	2.4	0.46	0.24	0.2
Unit Operational cost (¢/m³ sold)	1,622.01	3,542.43	3,124.24	452.33	4,265.24	8	6	7	6	7

Table 15: Performance assessment of Nante water supply system (Continues)

Collection efficiency (months)	16	18	18	18	18	7.2	6	6	7.2	6
Costumer										
Continuity of service (hrs/day)	10	10	10	10	10	5	6	6	6	6
Customer satisfaction (%)	70	80	80	80	80	7	8	8	8	8
No. of days to resolve complaints										
(days)	n/a	n/a	n/a	n/a	n/a	0	0	0	0	0
Organisation										
Staff per '000 pop. Served	0.57	0.85	0.71	0.71	0.71	3.6	8.0	6.7	5.1	4.6
Cost on staff as a proportion of										
operational cost (%)	2.4	3.6	2.1	2.1	2.1	8.5	8.8	8.7	8.9	8.8
Staff qualifications	2	2	1	1	1	2	2	1	1	1
Reporting and meeting (no.)	Nil	nil	Nil	nil	Nil	0	0	0	0	0
						71.3	77.3	80.76	79.64	78.5

Source: Field work, 2006

Discussion of results

The overall assessment of the various systems did not indicate any clear trend in relation to the participation of the private sector and performance of the systems. The Bekwai and Atebubu systems, which are Type 1 model are fully managed, operated and maintained by the private sector. The performance of these systems however, varied over the period under study. The performance of the Bekwai system improved over the period, while that of Atebubu was sturdy. The Bekwai system had an initial performance relative score of 93.9 but steadily increased to 114.1 by the fifth year, while that of Atebubu system had average relative score of about 99.0. This was mainly due to low water profitability of the Atebubu system. The Nkoranza and Ejura systems, which are type 2, have the management of the systems undertaken by the District Assembly (Water Board). However, the operation and maintenance of the systems are carried out by the private sector. The Nkoranza system by all indication performed well over the period under study. It had an average relative score of 111.7 while the Ejura system had an average relative score of 97.8. This indicates a mixed performance for the two systems of the same model. While the Nkoranza system performed well, comparatively between the two systems. This was mainly due to non-profitability of the Ejura system and high unaccounted for water.

The performance of the Type 3 (Duayaw Nkwanta and Kuntenase systems) had moderate performance. They each had an average relative score of about 85.0. These two systems had moderate ratings because of low

profitability of water. The Nante system, which is a type 4 and fully managed, operated and maintained by the community, did not perform well generally.

The type 1 systems (Bekwai and Atebubu Systems) were relatively good performing systems among the identified systems in terms of operations, maintenance and management. These systems are also relatively large in terms of capacity and complexity due to the large nature of the towns. These two systems are wholly managed, operated and maintained by the private sector. This is followed by type 2 (Nkoranza and Ejura Systems), which have the operations and maintenance of the systems undertaken by the private sector. Next is the type 3 model (Duayaw Nkwanta and Kuntenase systems), with only the maintenance being undertaken by the private sector. The Type 4 model (Nante system) was generally the least performing system.

This trend is attributed to the fact that, with type 1, management, operation and maintenance of the systems undertaken by qualified personnel. Effective management is getting things done through people (Wegelin-Schuringat, 1998). This further indicates that, privately managed small water supply systems are effective in terms water delivery, customer satisfaction and tariffs as well the overall sustainable of the systems. There are also qualified personnel on site to perform routine and immediate repair works. It takes a relatively shorter time to carry out repair works on these systems. The systems have easy accessibility to better communication network to reach qualified maintenance organisation should the need arise. With profit as the motivation

of the private firm, competency and availability of personnel is usually not compromised.

In general the systems of type 1 had good performing indicators, but the performance of the Atebubu system however, had some setbacks. Unaccounted for water was high. The Type 2 had a relatively good operation and maintenance programme. There are relatively competent personnel within Operating Unit (OU) to carry out routine maintenance and also to do major repair works. However, external support is usually sought to repair breakdowns that are beyond the capabilities of the Operating Unit. It also takes a relatively shorter time to repair breakdowns as compared to type 3.

The Model Type 3 had signed a maintenance contract with a private firm to carry out routine maintenance and repair major break downs. However, the minor repair works which had to be done by the Water and Sanitation Development Board (WSDB) takes a longer time and is not well programmed. Moreover it takes quite a time to contact the maintenance organisation in case of emergency as compared to type 1 and type 2. Type 4, which is wholly community managed, operated and maintained had the Water and Sanitation committee (WATSAN) as managers of the system. Minor repair works are carried out solely by WATSAN committee but major repair works are done by the private sector from outside the community. There is however, no formal contract with firms that do repair of the systems. Model type 2 has middle level technical staff in the operations and management of the systems. Model type 3, had a maintenance schedule, which is handled by

low capacity technical staff of the WSDB (who are not well motivated due to low remunerations). Type 4, has no maintenance programme and this threatens the technical sustainability of the system.

Model type 1 has the highest frequency of water quality analysis and this is because there are contractual obligations, which ensure strict compliance. This is followed by type 2 and type 3 in that order. The frequency decreases as the involvement of private sector reduces. Type 4 has the most relaxed compliance. The enforcement was however relaxed as far as water quality analysis is concerned for all systems.

Unaccounted for water loss in both Bekwai and Atebubu systems under type 1 were high (between 24% and 29%) within the first two years of operations. This improved for the Bekwai system to about 15% and that of Atebubu system reduced to about 25.4% from 29.0%. This is considered high for a small town water supply system, which should be below 10% for it to be considered efficient (scoring 9 or below). This indicates that water leakages and pilfering are high within the systems. Although the system is fully managed and operated by the private sector, unaccounted for water is unsatisfactory. For type 2, the Nkoranza water supply system had a relatively good output with respect to unaccounted for water, with an average unaccounted for water of about 12.6%. This figure is nonetheless above the acceptable minimum figure of 10%. Although the Ejura water supply system is a type 2 as the Nkoranza system, unaccounted for water was initially worst. The system had an initial loss of 30% but reduced to about 21% over the

period of study, which is still considered high. The unaccounted for water for the two systems of type 3 were also high, it varies from 14% to 17% for the Duayaw Nkwanta water system and from 15% to 20% for the Kuntenase system. Although unaccounted for water for the two systems in type 3 are all lower than the systems in the type 2, the losses are considered high. This is because the systems in type 2 model are smaller in size in terms of number of standpipes and length of transmission and distribution pipes. Type 4 (Nante system) was the best system in terms of unaccounted for water, although the system was wholly community managed. With the exception of the first year where unaccounted for water was above 10% (i.e. 12%), unaccounted for water values were all below 10% for the remaining four years of the study. This is attributed mainly to the small size of the system in terms number of standpipes and length of pipes.

Profitability of water for type 1 was relatively positive for the Bekwai system but negative for the Atebubu system, although both systems are wholly private sector managed. The profitability of water for type 2 was also positive for the Nkoranza system but negative for the Ejura system. For type 3, profitability of water was positive for both systems and that of type 4, was also positive, although lower than type 3. Type 1 also had the highest operational cost (particularly cost of personnel because of the greater number and qualification of personnel and relatively best staff salary among the systems. Type 4 had the lowest operational cost, but this could however be deceptive because of long-term operational cost. Management cost of type 4

can be high in the long term because of poor maintenance programme. Unit operational costs were satisfactory for all models. Types 2 and 3 had better unit operational cost and this was followed by type 4. Average tariff for type 1 systems were close the recommended tariff set by CWSA for effective management of small towns water supply systems. Nonetheless this did not translate into the systems making profit. This is an indication that setting appropriate tariffs without efficient management of the systems will not automatically make them profitable. According to Jonah (2003), the involvement of the private sector or the management adopted is not the only factors that affect the performance of small town water supply system. Factors such as improper institutional structures, weak monitoring indicators of the management system, size of town, and economic activities of the inhabitants of the town affect performance of the systems.

Continuity of service hours in a day to customers was satisfactory for the Bekwai system (averaged 14 hours) but unsatisfactory for the Atebubu system (averaged 7.5 hours). The Nkoranza and Ejura systems had average service time of 16 hours in a day. The service time for the type 3 systems also averaged about 13hours, while Nante system, type 4 had the service time of 10hours.

Customer service satisfaction has been satisfactory for all the systems. Although the complexity and capacity of the systems in terms of operations vary, customer satisfaction was generally satisfactory. Number of days to resolve complaints were minimal for the type 1 model. Nkoranza system

under type 2 had the best time lapse in resolving customers' complaints. The performance of the Nkoranza system improved from an average of four days in the first year to just about one day in the fifth year. The Ejura, system (type 2) was relatively better but not as good as the Nkoranza system. Type 3 Models also have relatively efficient time of responding to customers complaints. There was no data available for the Nante water supply system under type 4 for customer service satisfaction. The relatively shorter time of responding to customers complaints among the systems of types 1 to 3 could be attributed to the involvement of the private sector. Data on customer satisfaction was not even available for the type 4 Nante (system with virtually no private sector involvement).

CHAPTER FIVE

SUMMARY CONCLUSIONS AND RECOMMENDATIONS

Introduction

The study focused on the various types of private sector and the levels of private sector involvement in the management of small town water supply systems. The merits and demerits of private sector involvement in small town water supply systems were also assessed in the study. The study further focused on various management models and the effects of private participation on the management systems. The objective addressed were, analyse the composition and structure of the private sector, examine the participation of private sector in the management of small town water supply system, analyse the various types of management models in small town water supply systems, examine the merits and demerits of private sector participation, undertake SWOT analyses of stakeholders in the water supply water supply sector and also assess the various management models in the management of small town water supply system.

A total of seven small town water supply systems were assessed and purposive sampling was used in the collection of data. Data collection was grouped into primary data and secondary data. Secondary data was obtained

from the various relevant documentations and primary date was obtained through the use of questionnaires.

Summary

The first objective addressed was to examine the private sector involvement in the management of small town water supply systems and the key findings are:

- Three types of private sectors are available in the management of small town water supply systems, namely, individuals, group of people and corporate bodies.
- Individuals and group of people operate in the unskilled areas of operations in the management of water systems.
- Greater involvement of private sector in the management, operations and maintenance of small town water supply systems tend to be the most effective option in terms of water delivery, customer satisfaction and tariff collection efficiency as well as the general sustainability of the systems; and
- Private sector involvement was found to be very effective in the management operations and maintenance of small town water systems.
- Small town water supply systems, which are small in complexity and capacity, can be managed by a community with minimal external support form the private sector.

- As the complexity and capacity of small town water systems increase, the ability of governmental agencies and bodies to effectively manage the systems reduces.
- Private Sector participation in the management of small town water supply system is not the panacea for good performance of the systems if the weaknesses in the systems are not addressed by managers of the systems.

Key findings of the second objective, which is assessing the various management models systems in small town water supply systems, are:

- Four management models were identified, each having its strong and weak points. That is each model had various levels of private sector participation, which could effectively facilitate the management of small town water supply systems when studied and modified.
- The identified models are:

Type 1: Systems are fully managed, operated and maintained by the private sector on behalf of the WSDB/DA

Type 2: Systems are operated and maintained by the private sector but the management is carried out by WSDB/DA

Type 3: Systems are maintained and managed by the WSDB/DA but operated by the private sector

Type 4: System is fully operated, maintained and managed by the

Community

The main findings of the third objective which dealt with examining the arguments for and against private sector participation in the management of small town water supply systems are:

- Water supply systems that have much District Assemblies influence are operated and managed more with social goals rather than as a business entity.
- Water supply systems that have less private sector involvement tend to make less profit.
- Water supply to communities is comprised at expense of profit making by managers of the systems.
- Private sector participation is usually effective with monitoring by the public sector.

  The main key findings of the fourth objective which is to undertake SWOT analyses of stakeholders in the management of small town water supply systems are:

- The main stakeholders are, communities/consumers, private sector and Government Agencies (District Assemblies). SWOT analyses of stakeholders are:

SWOT of Community

- The key strengths are that, communities have committed leadership, water issues are major priority to them since there is no alternative to water and are also resourceful.
- The main weakness is apathy among managers
- A major opportunity is that, communities tend to benefit from donors towards their operations.
- Major threats facing communities are lack of competent management systems and high tariffs compared to urban settlements.

SWOT of Private Sector

- The main strengths of private sector are that, they are profit oriented, have much experience and managerial skills in the water sector.
- The main weakness of the private sector is that, the sustainability of private sector depends on how the systems are patronage.
- The main opportunity of the private sector is that many governments consider the private sector as the engine of growth for economic growth.
- The main threats of the private sector are the presence of other alternative water sources which affects patronage.

SWOT of District Assemblies

- The key strengths of the District Assembly are job security and benefit derived from periodic capacity of building programme available.
- The weaknesses are of District Assemblies are low salary and poor working conditions of personnel and lack of business orientation and management.
- One major opportunity of District Assemblies is donor support for their activities.
- The main threats of District Assemblies is high attrition of personnel

Conclusions

Private Sector Participation is very important for effective management of small town water supply systems, with strong supervisory role played by the public sector. Private sector participation is however not the panacea for good performance of the systems if the weaknesses in the management and operations are not addressed by stakeholders.

Four management models were identified based on the level of private sector participation in the management of the systems. The level of participation affects the performance of the systems.

All stakeholders in the management of small town water supply systems have strengths and opportunities which can be harnessed for effective

management of the systems as well as weaknesses and threats that needs to be worked on.

Recommendations

Given the conclusions arrived at; the following recommendations are made for possible action:

- Private Sector Participation is important in the management of small town water supply systems, with strong supervisory role played by the public sector. In establishment of institutional structures in the management of small towns water supply systems, a public sector body should be included and given a supervisory role of the operations and management of activities of the private sector.
- The weaknesses in the supervisory role being played by the Public Sector (DA) should be reviewed and capacity building provided. Periodic and systematic training programmes should be put in place for managers of the systems.
- Private sector participation in the management of small town water supply is not the panacea for good performance of the systems if the weaknesses in the systems are not addressed. Weaknesses as uncounted for water losses, defaulting in payment of bills by customers among others should be addressed by managers of the systems.

- Governmental agencies and bodies should be made to play effective supervisory roles in assisting in the effective management of small towns water supply systems. Established legal institutions in the water sector such as Community Water and Sanitation Agency (CWSA), Public Utilities Regulatory Commission (PURC) and Ghana Water Company Limited (GWCL) should be adequately resourced to play this supervisory role.

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APPENDIX A

QUANTITATIVE QUESTIONNAIRE FOR PRIVATE SECTOR PARTICIPATION IN THE MANAGEMENT OF WATER SUPPLY SYSTEMS IN SMALL SETTLEMENTS IN THE ASHANTI AND BRONG AHAFO REGIONS

	Name of Town:						
	District:						
	Region:						
	Source of Water:						
	Tank Capacity:						
			Operational Year				
			2002	**2003**	**2004**	**2005**	**2006**
Item	**Description**	**Unit**					
1.0	**General**						
	Total population of town	No.					
	Population served	No.					
2.0	**Management**						
	Type of management						
	No. of board members	No.					
	No. of staff employed	No.					
3.0	**Technical**						

	Volume of water produced (from bulk meter)	m^3					
	Water consumed from public standpipes	m^3					
	Water consumed from house connections	m^3					
	Water consumed from institutions	m^3					
	Av. No. of pumping hours/day	hr					
	No. of standpipes	No.					
	No. of house connections	No.					
	No. of Institutions connected	No.					
	No. of disconnections due non payment of bills	No.					
	Major faults recorded	No.					
	Major expansion works done	No.					
4.0	**Financial**						
	Water tariff (commercial)	GH¢					
	Water tariff (public standpipe)	GH¢					
	Water tariff (house connections)	GH¢					
	Water tariff (Institutions)	GH¢					

	Amount billed (commercial)	GH¢					
	Amount billed (public standpipe)	GH¢					
			2001	**2002**	**2004**	**2005**	**2006**
	Description	**Unit**					
	Amount billed (house connections)	GH¢					
	Amount billed (Institutions)	GH¢					
	Amount collected (commercial)	GH¢					
	Amount collected (public standpipes)	GH¢					
	Amount collected (house connections)	GH¢					
	Amount collected (Institutions)	GH¢					
5.0	**Operation & Maintenance (O&M)**						
	Staff Salary	GH¢					
	Vendors Commissions	GH¢					
	Allowance for (Water	GH¢					

	Board)						
	Maintenance cost (pipe work)	GH¢					
	Maintenance cost (pump)	GH¢					
	Maintenance cost (electrical)	GH¢					
	Maintenance cost (taps)	GH¢					
	Maintenance cost (meters)	GH¢					
6.0	**Administrative**						
	Administrative cost	GH¢					
	Transportation cost	GH¢					
7.0	**Customer**						
	No. of customer complaints	No.					
	Customer Satisfaction (Random Sampling)	%					

APPENDIX B

QUALITATIVE QUESTIONNAIRE FOR PRIVATE SECTOR PARTICIPATION IN THE MANAGEMENT OF WATER SUPPLY SYSTEMS IN SMALL SETTLEMENTS IN THE ASHANTI AND BRONG AHAFO REGIONS

NAME OF PROJECT: ……

TOWN: ……

REGION: ……

I. TECHNICAL AND OPERATION

a. Who manages the system?.....

b. What constitute the private sector in your operations of the system?

c. Is the private sector involved in the management of the system?

d. If yes what is the level of participation?

e. Is the level of participation ok, be improved or be reduced?

f. Are you satisfied with the performance of the private sector? ……

g. If no, which area or how should the private sector improved?.....

.....

h. Is there a programme for maintenance for the system?.....

i. How often do you carry out routine maintenance within a year?.....

.....

j. Do you have the capacity to carry out routine maintenance?.....

.....

k. If no, where do you get assistance from? ……..

.....

l. How would you grade the performance of the water supply systems? a. Very good……., b. good……, c. satisfactory……, d. poor ……..,

m. Is the public satisfied with your services?.

.....

……

n. If no, which areas does the public wants to be improved?.....

o. Do you deposit any amount as contribution towards capital replacement of the system…….?; If yes how much?.....

p. Are customers satisfied with the quality of service you provide?.....

q. How many complaints do you receive each month?.....

r. What kinds of complain are most common?.....

s. How many days averagely, does it take for you to respond to a complain?.....

t. What is the duration of water supply in hours of service per day?.....; Is the restriction due to limited supply of water , or the number of hours that standpipe vendors are expected to work?

u. How many days in a month or year is service disrupted due to the system being shut down? What are the reasons?

v. How many staff do you employ?.....

w. What are your individual staff salaries?, maximum ¢……..; Minimum ¢…… (does this include SSNIT and Tax?.....); if not why……

x. What are the qualifications of the staff employed

y. Are there any other training needs, or problems that you would like to discuss?.....

z. How much money do you have in the bank account?. ¢.....; any debts

(¢…….); how much in arrears?, ¢.....

aa. How often are the account records audited? ……..;Who does audit?.....

bb. Total annual revenue from water sold, connection fees and other sources? ¢.....

cc. Total annual cash requirements (expenses)? ¢.....What are the main items included in this total?.....

.....

dd. Maximum production capacity of the system?.....; Is this enough to serve the community?.....

ee. What is the percentage losses in the system?.....; what is done to reduce the losses?.....

.....

ff. Any other comment you want to share……