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**SUSTAINABILITY OF COMMUNITY WATER
MANAGEMENT IN SMALL TOWNS OF DEVELOPING
COUNTRIES: CASE STUDIES FROM GHANA**

By

STEVE R.K. DOE

A Doctoral Thesis

**Submitted in partial fulfilment of the requirements for the award
of Doctor of Philosophy of Loughborough University**

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ABSTRACT

This thesis investigated the sustainability of community water management in small towns of developing countries by using case studies from Ghana. Sustainability is investigated as a multi-faceted concept encompassing technical, managerial, institutional and organisational issues. The study is particularly relevant because over 1 billion of the world's population lacks access to safe drinking water with resultant poverty, morbidity and mortality among the World's most vulnerable, a significant proportion of who live in small towns of developing countries. Small town dwellers are likely to increase thus exacerbating the existing situation of poor sustainable water services. Efforts at providing solutions, largely through the public sector, were found to be ineffective and inefficient. Consequently, many governments have adopted community management a key paradigm for rural water supply and sanitation for small towns. The thesis however, hypothesises that community management is limited in achieving sustainable water supply solutions in small towns; hence modifications are needed in approach to the issues of small town water supply. The case study methodology relied on direct observation, focus group discussions, semi-structured interviews and household surveys to gather reliable and valid data. The thesis concludes that community water management is indeed limited in small towns. The implications of the research highlight the need for a paradigm shift in the selection of water supply management models for sustainability in small towns. Since the private sector is active in Ghana, the research explored public-private partnerships as a viable water management option. The study gives a special context to small towns for sustainable water service delivery different from the usual rural and urban contexts. The recommendations from the thesis include practitioner focussed policy changes that affect planning and support systems for water supply in small towns as well as areas of future research.

Key words: Water supply, sustainable development, sustainability, small towns, community management, public-private partnership, Ghana, participation.

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GLOSSARY OF TERMS USED

Appropriate

Suitable, right or fitting.

Artisan

Someone who works with his or her hands such as a mason, a blacksmith, a hair-dresser, a tailor etc. etc.

Asymptotic significance (P)

The significance level based on the asymptotic distribution of a test statistic. Typically, a value less than 0.05 is considered significant. The asymptotic significance is based on the assumption that the data set is large.

Basic needs approach

The basic needs approach is an approach to water supply with the objective to provide clean and convenient water to as many people as possible.

BOT

Build Operate and Transfer. BOTs require the private operators to obtain the money necessary to build an infrastructure; operate the infrastructure so as to meet specified performance standards for a set period; and then to transfer it to the government at the end of the contract period.

Breakdown maintenance

Breakdown maintenance is maintenance that only takes place when something breaks down. It is not anticipatory or preventive.

Chi-Square

Chi-square is used to test the hypothesis that proportions are equal. A proportion is what you get when you find out how many people of all possible people answer a certain way or have specific characteristics.

Community

A community is defined as any group of people inhabiting a specific geographical location (such as a town) and capable of taking collective decision and action for their common good.

Community management

Under the community water management model the communities have responsibility for their water supply systems by being involved in the decision making and planning, level of service determination, financing, as well as choice of water supply technology during water supply. The communities also assume managerial and/or operations and maintenance duties for the water systems through an elected committee.

Concession

Concessions combine the scope of management contracts with the private investment accompanying BOTs.

Demand responsive approach

An approach to water supply with the objective of providing improvements to water supply which the beneficiary community is willing and able to pay for.

District assembly (DA)

The country of Ghana is divided into 10 Regions. Each of the regions is divided into districts. The administrative body of the district forms the District Assembly for the District. Each elected representative is called an Assemblyman or woman.

Empowerment

Putting the power of decision making in the hands of the communities.

Equity

Fair distributions of resources such that even the disadvantaged in society are catered for.

Expected count

The frequency expected assuming there is no difference in the distribution of the observation.

Foot valves

A valve is an element of a water distribution system that can be opened and closed to different extents to vary its resistance to flow, thereby controlling the movement of water through a pipeline.

Frequency

Number of occurrences or observations.

Joint-venture

A joint-venture is a partnership between two parties sharing equally in the risks as well as the rewards.

Lease contract

A lease contract is a public-private partnership option where the private sector is contracted to manage the water supply system with minimal input of private capital.

Management contract

A contract to manage the water systems without any infusion of private capital.

Mean

A measure of central tendency. The sum of all observations divided by the number of observations.

Mechanised borehole

A borehole fitted with a pump to lift water to a tank for distribution.

Median

A measure of central tendency. It is the value above which and below which half of the cases fall, the 50th percentile.

Ownership

The responsibility and control of technical cooperation programmes and projects at all stages rest with the intended beneficiaries. Whereas legal ownership lies with the District Assemblies, the communities are educated to have a psychological sense of ownership because it is believed that they will take care of what they feel they own.

Participation

Participation is a process through which stakeholders influence and share control over project initiatives and the decisions and resources, which affect them.

Piped system

Refers to water systems consisting of a network of pipes, valves and other appurtenances.

Private sector participation (PSP)

PSP is defined broadly as relying more on the private institutions of society and less on government to satisfy people's needs.

Profit margin

Profit before interest and taxes divided by revenue.

Range

The difference between the lowest and the highest score.

Reservoir

A storage tank within a water distribution system for holding water prior to distribution to consumers via a network of pipes.

Routine maintenance

Maintenance carried out from time to time following a recurrent schedule. This type of maintenance is supposed to avoid break downs in the system.

Rural village

Administratively defined as a settlement with less than 5000 people. Defined in this thesis as a community smaller than small towns.

Service contract

A contract made out to the private sector to provide services such repair of electrical or mechanical equipment. This may also cover consulting services.

Service intermediary

Governmental agencies, non-governmental and donor agencies responsible for services such as water supply provision.

Small town

Small towns are settlements that are sufficiently large and dense to benefit from the economies of scale offered by piped systems, but too small and dispersed to be efficiently managed by a conventional urban water utility. They require formal

management arrangements, a legal basis for ownership and management, and the ability to expand to meet the growing demand for water. Small towns usually have populations between 5,000 and 50,000.

Source works

The point from which untreated water comes from and this may include the civil works made for the abstraction of water from groundwater sources, lakes, rivers and reservoirs.

Standard deviation

This measures variation from the mean and is the average distance the average score is from the mean.

Sustainability

A water supply project is sustainable when it is able to deliver an acceptable (to the communities) level of benefits for an extended period of time after major financial, managerial, and technical assistance from an external donor is terminated.

Sustainable development

Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

Trader

A businessman or woman who buys and sells. Usually acts as a middle person between the farmer and buyers in the cities.

Turbidity

The degree to which light is scattered by particles in the water. It indicates the clearness of the water.

Urban community

Any community larger than small towns.

Water Board / Water and Sanitation Development Board (WSDB)

Elected/selected representatives of communities entrusted with oversight and management of the water supply systems.

Water management

Management of water supply for domestic and/or industrial consumption. It involves the basic decision-making regarding the overall operation and maintenance as well as possible expansion of the water supply scheme.

Water quality monitoring

Includes all the activities such as testing undertaken to make sure that at all time the water supplied to consumers meets acceptable national and / or international standards.

Water supply system

A water supply system encompasses the source works, the distribution system and all appurtenances used to bring water from the source to the consumer.

White collar job

This is a skilled or professional job that usually involves working from an office. This requires a minimal degree of education such a university diploma.

ABBREVIATIONS

BOT	Build Operate and Transfer
CIDA	Canadian International Development Agency
CWSD/A	Community Water Sanitation Division / Agency
CWSP	Community Water and Sanitation Programme
DA	District Assembly
Danida	Danish International Development Agency
DRA	Demand Responsive Approach / demand-driven approach
GTZ	German Technical Cooperation
GWSC	Ghana Water and Sewerage Corporation
JICA	Japan International Development Agency
MOWH	Ministry of Works and Housing of Ghana
O&M	Operation and Maintenance
OECD	Overseas Economic Cooperation for Development
P	Significance level (statistics)
PPP	Public Private Partnership
PSP	Private Sector Participation
SIDA	Swedish International Development Agency
UN	United Nations
UNDP	United Nations Development Programme
UNICEF	United Nations Children's Educational Fund
USAID	United States International Development Agency
WATSAN	Water and Sanitation
WSDB	Water and Sanitation Development Board (Water Boards)
X ²	Theoretical Chi-square value

1. INTRODUCTION

1.1 GENERAL

The provision of basic services to developing countries has become an important area of concern and research since the development agenda has focused on sustainable development. Consequently, there is significant international interest in the provision and management of affordable water supply. However, sustainable management of the water supply systems in communities throughout the developing world remains a major challenge (Brandling-Bennett, 1999).

The international interest in potable water supply is captured in the Millennium Development Goals of the United Nations member states which list water supply as one of the eight development goals (UN, 2002). Specifically, the aim is to reduce by half the proportion of people without sustainable access to safe drinking water by 2015. Furthermore, the major donor organisations such as the World Bank, UNDP, DFID, USAID, CIDA, SIDA, GTZ, DANIDA, NDF to name just a few, pay particular attention to water provision. This is due to the fact that, perhaps more than any other sector, *water supply* hits on all the main themes of their development agenda, namely, *poverty alleviation*, *environmental sustainability*, *private sector-led growth*, *participatory development* and *good governance* (World Bank, 2003).

Despite all the efforts by governments and donor organisations, the global water challenge is still enormous since over 1 billion people of the world's population still lack access to safe water supply (WHO, 2000). It is estimated that 3.4 million people in developing countries die every year from diseases due to lack of access to safe drinking water, inadequate sanitation and poor hygiene (Saywell, 2000). Furthermore, in a typical developing country town, the proportion of the poor

without access to basic services such as water supply is extremely high ranging from 30-60 per cent (Black, 1996). Rapid urbanisation coupled with rapid urban growth and low economic growth has exacerbated the situation by placing extreme strain on governments in their efforts to provide basic services such as water supply and sanitation (Cotruvo, 1999). This in turn has led to widespread environmental problems and raised the incidence of morbidity and mortality amongst the poor, vulnerable communities. Adequate management of water supplies is therefore important to health, community development and the sustainability of communities.

1.2 GLOBAL FOCUS ON WATER AND SANITATION

The global interest in water supply is evidenced by a series of international fora spanning more than two decades. These fora were targeted at finding solutions to the water supply problems especially in underserved areas of the world but progress in the sector has been too slow to provide the needed relief (Saywell, 2000).

Safe water supply received unprecedented global attention when the period 1981 to 1990 was declared the International Drinking Water Supply and Sanitation Decade. A new thinking and approach to water supply was expressed in various international fora through a special chapter of Agenda 21 in which governments committed themselves to help their people have access to safe water supply and sanitation. With the slogan "water for all by year 2000", the need for appropriate and low cost technological options to increase coverage of water and sanitation facilities in the 1990s was stressed (Black, 1996). The global attention on water supply received renewed attention in subsequent fora and conferences including the United Nations Millennium Development Goals which aim to reduce by half the proportion of people without access to safe drinking water by 2015 (UN, 2002), the World Summit on Sustainable Development which took place in Johannesburg

in 2002 as well as the Third World Water Forum in Kyoto in 2003. These international fora are discussed in more detail in Section 2.4.1.

Despite all these high profile efforts, progress in the sector has been too slow and inconsistent to bring much relief to the poor in developing countries, especially those in rapidly growing communities (Saywell, 2000). A survey conducted by the World Health Organisation (2000) covering the period of 1990 to 2000, showed that 816 million additional people were provided access to safe water but this was negated by world population growth of 15% and break down of the existing water systems. The highest population growth rates are taking place in towns of population less than 100,000 people which are estimated to be about 40-45% of global population (Saywell, 2000). Therefore the amount of people without access to clean drinking water is likely to increase and at a faster rate unless measures are taken to ensure the sustainability of existing water systems in those towns. Yet small towns have generally been overlooked in development programmes because they have fallen outside the main classifications of Urban and Rural Areas (Coing et. al., 1998; Stoveland and Bassey, 2000). Furthermore, where small towns are included in development programmes they are not disaggregated from rural nor urban settlements, making it difficult to increase knowledge on basic service delivery in these communities.

1.3 SUSTAINABLE WATER MANAGEMENT MODEL SELECTION

Attempts to provide guidance to policy makers and implementers on the appropriate choice of water supply and sanitation technology and management options in both rural and urban contexts enjoy a long line of precedents unlike small towns (Reid and Coffey, 1978; Shahalam, 1984; Francey's et. al, 1992; Saywell, 2000).

Generally, early efforts at the selection of water supply options were attempted by the World Bank and the UNDP in the 1980s and tended to focus on physical factors and cost considerations (Black, 2000). Much focus was put on the need for appropriate and low cost technological options to increase coverage of water and sanitation facilities. However, due to many project failures, the international attention started shifting from appropriate technologies to a greater concern with institutional and service management issues (Laryea, 1994; Knudsen and Tidemand, 1989; Bossuyt and Laporte, 1995). The institutional and management issues are aimed at increasing the participation of beneficiaries through community management.

1.4 COMMUNITY WATER MANAGEMENT IN SMALL TOWNS

Community management, a rural water supply and sanitation model, is the preferred choice for most governments and donor organisations in small towns of developing countries. It has evolved in response to the ineffectiveness and inefficiencies of public utility management. Despite the widespread adoption of community management, it has essentially remained a rural water supply and sanitation model (Cotton and Tayler, 1994; Knudsen and Tidemand, 1989; Bossuyt and Laporte, 1995).

Under community management, the donor assisted programmes call for the communities to participate in planning, paying, managing and maintaining their water facilities (International Water and Sanitation Centre, 2003). Much success has been achieved in rural villages (McCommon et al., 1990). However, since small towns are not rural villages, do small town dwellers want to participate in planning, paying, managing and maintaining their water facilities? Can longer term

commitment necessary for the sustainability of community water management be elicited from small towns?

An International Water and Sanitation Centre (IRC) workshop held in the Netherlands to discuss community management concluded that there was a need for a better understanding of community management (Evans and Appleton, 1993). Other commentators recognise that there is a need to identify situations in which community management is not appropriate and should not be promoted (Lammerink, 1998; O'Rourke, 1992). McCommon et al. (1990) also whilst advocating community management in rural communities observed that although community management seems to hold great potential for promoting development in rural areas, further steps should not be taken in this direction until an effort has been made to formally test the hypothesis that strong community management does in fact lead to sustainable water supply and sanitation systems. Yet little knowledge exists today on the potential for sustainable community water service delivery specifically in small towns.

1.5 PURPOSE OF THE RESEARCH

This research is designed to enhance knowledge about the sustainability of small town water service delivery. It is aimed at facilitating decision-making processes regarding the choice of sustainable water management models by service providers in small towns. The primary research question centres on how sustainable water service delivery is using community management in small towns. The research also explores opportunities for employing other water management models besides community management.

The study encompasses a wide variety of issues including institutional, managerial, technical, financial as well as organisational considerations pertinent to sustainability. The most important theme is that it focuses on the perceptions and

attitudes of the stakeholders involved in water service delivery in small towns. Those perceptions and attitudes are likely to govern their actions in the sustainable management of their water supplies. Sections 3.2 and 3.3 in Chapter 3 detail further the objectives, hypothesis and research questions governing this thesis.

1.6 STRUCTURE TO THE THESIS

This thesis is structured in such a way as to present a logical order to the investigation, findings and conclusions. Chapter 1 introduces the subject, the scope and goals of the thesis. Chapter 2 details a review of the existing literature on the topic with the aim of providing insight on the current debate and areas of empirical weakness regarding the suitability of water management in small towns. The chapter concludes with a summary of the knowledge gap the research seeks to address. Chapter 3 presents the methodology for data collection, linking the research questions to the research design whilst the primary data analysis of household surveys, key-informant interviews, focus group discussions and direct observation are analysed in Chapter 4. Chapter 5 discusses the implications of the research findings and considers the broader practical and theoretical implications of the research. Chapter 6 concludes the thesis with a summary of major insights in understanding the sustainability of small town water supply. This is followed by a synthesis of recommendations for future research. Each chapter begins with an outline of the contents and concludes with a short summary of key points.

1.7 CHAPTER SUMMARY

It is evident to most governments that adequate water supply is important to health, community development and the sustainability of communities. However, despite considerable global efforts, progress in the sector has been too slow to make any significant impact to the poor and disadvantaged in small towns of developing countries. The provision of water supply in these areas is negated by the high

population growth rates and poor management of existing systems thereby increasing the number of people without adequate water supply. The prevalent model for the management of water supply in small towns of developing countries is community management. Even though this is a successful model in rural villages, its application in small towns for sustainable water service delivery is less known. The focus of this research therefore is to investigate the extent to which community management can provide sustainable solutions in small towns.

The research aims to advance knowledge about the extent to which community management can be advocated as an exclusive *soulient* in development strategies in the water sector. The thesis contributes to an improved understanding of the context of small town water supply management in developing countries and the choice of water management models. It thus strengthens the arguments for community management by indicating its likely limits.

2. SUSTAINABLE WATER SERVICE DELIVERY IN SMALL TOWNS

2.1 CHAPTER OUTLINE

This chapter considers the literature that focuses on the sustainability of water supply management in small towns of developing countries. The literature review presents the general context of water service delivery and identifies the specific knowledge gap associated with sustainable management of water supplies in small towns. Since water service delivery is multi-disciplinary requiring skills from finance, planning, social sciences and engineering, sustainability is reviewed and analysed within a multi-dimensional framework. The literature review is therefore organised around the dimensions of sustainability which consist of:

- Organisational issues
- Social issues
- Technical issues
- Financial issues.

Organisational issues cover those domains that impact on the selection and sustainability of water management models. Special attention is given to community management and public-private partnerships since these models are evolving as a result of the inefficiency of public utility management in developing countries. The remaining topics analyse the literature on the key issues dealing with social, technical and financial domains which impact the sustainability of water service delivery in small towns. The chapter concludes with an appreciation of areas of theoretical and empirical weakness identified from the review.

2.2 PUBLICATIONS REVIEWED

The literature review covered a wide scope including published and grey literature on the subject of sustainability of community water management in small towns. Over 300 documents and materials have been examined including refereed journals, development reports as well as governmental agency project documents.

Given that much of the relevant literature on the subject of sustainable community water management in small towns are likely to have been written within the past ten years because of the relative newness of the subject, the review focused on the literature written from 1990 to 2003. Based on this review 1100 citation titles and corresponding abstracts were identified and reviewed from research databases such as the Cambridge Scientific Abstracts using different combinations of key words identified at the onset of the study. The initial focus was on refereed journal articles. The purpose was to present and analyse the current debate and controversies on the subject from the perspective of reliable professionals in the sector.

With the initial list generated, each of the citations was categorized as highly pertinent, moderately pertinent, or marginally relevant. Next the citation listing in each category was cross-checked to ensure that the citation was categorized appropriately for this investigation. The original list of 1100 citations contained approximately 300 highly pertinent citations, 200 moderately relevant citations, and 600 citations that are marginally relevant to this investigation. All citations that were categorized as highly pertinent to the investigation were reviewed and briefly summarized. During this review process, additional articles of interest (typically articles cited in the articles being reviewed) were identified, added to the highly pertinent list and reviewed as appropriate.

Since all the relevant materials pertaining to the subject could not be found in refereed journals and articles from research databases, other sources of data such as governmental and donor agency documentation which accumulate data from projects undertaken were sought for further background information. The relevant material pertaining to the subject of this thesis has been abstracted and presented in the following sections.

2.3 BACKGROUND TO THE THESIS

This section introduces the framework for the literature review and explains the terms that appear most often in the thesis. Since *sustainability*, *community*, and *community management* have been used extensively in the thesis, an explanation has been provided upfront. Small towns were also defined in the context of this study.

2.3.1 Conceptual framework for assessing progress toward sustainability

Through the past half-century, much effort in a variety of disciplines has been put to developing an approach to assessing change that pushes beyond an emphasis on economic signals to include a more complete treatment of human and ecosystem well-being (Hodge, 1997). The challenge lies in adequately reporting on progress towards sustainability.

Earlier efforts at assessing human well-being heavily focused on economic indicators (Michalos, 1997; Hodge, 1997). However, economic analyses that do not take into account the full environmental and human costs have led to detrimental, even life-threatening policies, decisions and actions (Hodge, 1997). With the publication of the report of the World Commission on Environment and Development, *Our Common Future* (WCED, 1987), international attention was

brought to bear on how to monitor and assess progress within the context of sustainable development. Section 2.4.1.3 elaborates on the report by the World Commission on Environment and Development and its relevance for this thesis.

Several models aimed at measuring sustainability have been developed over the years (since 1987). However, the ones that have the most appeal are based on a three-part model that integrates environment, economy and society (social/cultural/community/health) (Saddler, 1988; Hancock, 1990; Evans and Stoddard, 1991; Dorsey, 1991). Since the three-part model was originally developed in the field of resource use, it can be applied to the context of water supply sustainability in communities.

Among those that have implicitly expanded and applied the three-part model in the context of water supply to communities in developing countries are the World Health Organisation (2000) and Mukherjee (1999).

The model is appropriate for analysing the sustainability of community water management in small towns because it uses a holistic approach to sustainability. It has the following dimensions:

- *Organisational sustainability*- refers to whether the organisational models employed can carry on long after water system inauguration or whether the water system will collapse into disuse because essential organisational skills cannot be found. Section 2.5 discusses this issue in more detail.
- *Social sustainability* – refers to whether system operation will damage the environment, health and prosperity. The issues involved are discussed in more detail in Section 2.6.

- *Technical sustainability* – refers to whether the water supply technologies selected can be maintained long term by those responsible for the water systems based on their technological skills. Section 2.7 describes the issues involved with technical sustainability in greater detail.
- *Financial sustainability* – refers to whether the water system is managed efficiently such that essential funds for the management of the water supplies and system expansion are always available. Section 2.8 discusses this dimension in more detail as they relate to cost recovery and financing.

Within this framework the definition of sustainability for this thesis is given as:

A water supply project is sustainable when it is able to deliver an acceptable (to the communities) level of benefits for an extended period of time after major financial, managerial, and technical assistance from an external donor is terminated.

Sustainable projects lead to improvements that persist and spread beyond the project boundary (Danced, 1998). The literature survey follows this framework of assessing sustainability of community water management.

2.3.2 Defining community & community management

Community is a word with many meanings and uses (Cox, 1987). It can therefore be used in different contexts. Checkoway (1995) stated that it is customary to view community as a place in which people live (such as a village or city) or as a population group with similar characteristics (such as rural villagers or older people) or as a concern people share in common (such as religious freedom, status or women). It is also viewed in reference to social relations characterised by personal intimacy, emotional depth, social cohesion, and continuity in time (Nisbet,

1969). A community as used in this thesis refers to any group of people inhabiting a specific geographic location (such as a town) and capable of taking collective decision and action for their common good. In terms of achieving sustainability of their water supplies, a community can be viewed as a unit of solution in society and provides a forum for initiative and collective action.

Community management has many interpretations hence the need to define it appropriately in the context of this thesis as it applies to small town water supply. In the development field, community management has broad applicability across many disciplines including governance, housing, water and sanitation, rural finance, agriculture as well as health (Roberts and Pietsch, 1996; Lammerink, 1998; Darcy, 2002; Jennings, 2002). The standpoint of authors is pragmatic; conventional modes of infrastructure provision such as public finance and public execution have failed countless millions of urban and rural dwellers hence community management offers the potential alternative solution (Cotton and Tayler, 1994). Community management is therefore seen as a means to provide solutions to the problems of inefficiency, inadequate maintenance, ineffective management, poor cost recovery, under funding and lack of investment in the provision of basic services by using the communities themselves instead of government (ibid). Therefore, under community management, state institutions in the provision of basic services are being replaced by a host of community-level and support agencies (Jennings, 2002).

Robert and Pietsch (1996) defined community management as a form of management which has come to be identified with community development goals and practices, with little certainty as to whether this form of management advances or retards the community development goal of community empowerment. Community management considers the conditions for effective social action and the role of community-managed organisations in this form of political participation.

In the water sector, Wood (1994) defined community management as 'when democratically elected representatives of the community make the decisions which affect the day-to-day running of the scheme and accept all responsibility for the facility. Wegelin-Schuringa (1998) considered community management as a form of community participation in which the community takes the final decision on all important aspects in the planning and implementation of the water supply system and in which the responsibility for operation and maintenance lies with the community. Furthermore, McCommon et al. (1993) distinguished community management from community participation by stating that community management is taken to mean that the beneficiaries of rural water supply have responsibility, authority and control over the development of such services, sustainability being the point of emphasis. Community management as used mostly in the water sector literature therefore refers to the beneficiary communities (through their representatives):

- Having responsibility for their water supply systems by being involved in the decision making and planning towards system establishment and:
- Performing managerial and/or operations and maintenance duties on the water systems.

Decision making and planning includes activities such as technology choice, location of water supply systems and the selection of the water management team. These activities are believed to engender participation which would lead to community empowerment and ultimately result in the replication of other community projects. Participation is therefore a very important component of community management. Hamdi (2000) listed five (5) levels of participation in order of increasing community involvement:

- None
- Indirect
- Consultative
- Shared control
- Full control

These levels of participation can be applied to the different stages of a development project which include:

- Initiation
- Planning
- Design
- Implementation
- Maintenance

Community management in water supply generally advocates the community having full control over all the stages of the water supply project (McCommon et al. 1993; Wood, 1994; Wegelin-Schuringa, 1998). However, the community may not have the necessary technical, financial and organizational capacity to adequately manage (maintenance stage of the project) the water supply systems for sustainability thereby undermining the community empowerment process. Therefore, community management as challenged in this thesis refers to a management model whereby a community has full responsibility for its water supply system by being involved in the planning and decision-making regarding technology choice, financing and level of service during the water system establishment. The community also performs managerial and/or operations and maintenance duties of the water supply systems irrespective of its capacity to assume those responsibilities.

Management of the community water supply is usually done through a committee elected from among the community members. This committee is called a Water and Sanitation committee (WATSAN) in the rural context and Water Board in small towns. The Water Board is comprised of members elected from two or more WATSAN committees. However, for uniformity of terminology used in the thesis, each water management committee in this thesis shall be referred to as a Water Board since the function of WATSANs and Water Boards are essentially the same (to manage the community water systems). The Water Board usually assigns roles such as chairperson, treasurer and operator of the water supply systems to its members. The operator need not always be a Water Board member. Many Water Boards aim for equal numbers of men and women in order to ensure gender balance. The Water Board is usually given training for a few days to help it perform its duties by non-governmental organisations (NGOs). Some Water Boards also receive on going technical support from the local government.

Section 2.5.2 discusses into more detail the features of sustainable community water management as well as the current debate on the model from the perspective of the existing literature.

2.3.3 Small towns of developing countries

This Section provides a definition of small towns based on service delivery. This definition will be used later in Chapter 3 of this thesis in the selection of the case study towns. The section also advances reasons for the need to investigate small town water service delivery.

2.3.3.1 What are small towns?

Two approaches to the definition of small towns can be applied. The first focuses on administrative definitions by national governments and the second which this thesis uses is based on service delivery. The service delivery approach is superior

when discussing sustainability because apart from incorporating the first approach it puts water service delivery in context.

According to varying ecological setting and economy, different criteria are considered in identifying small towns globally but population size seems to be the dominant criterion. Singh and Singh (1979) state that in the USA, Belgium and India, settlements having inhabitants less than 10000, 30000 and 20000, respectively, are referred to as small towns. Hardoy and Satterthwaite (1986) defined rural and urban areas as those with population less than and more than 5000, respectively. They however admitted to the unsatisfactory nature of such an arbitrary cut off. Nevertheless, the administrative definition used by national governments is based mainly on population size. The limitation with this approach is that it is not possible to universally resolve the definition of small towns. As an example, Table 1 shows the various definitions of small towns being used in five different countries. In Ghana, small towns are settlements with populations of about 2000 to 10,000 and may extend to 30000 (Gariba, 1999; WSP, 2003). In Uganda, small towns have populations between 4000 and 30000 whilst small town population ranges from 2000 to 120000 in Colombia.

Table 1: Country-level definitions of small towns (WSP, 2003)

Country	Definition of small towns
Ghana	2000 – 30000
Nigeria	5000 – 50000
Uganda	4000 – 30000
Colombia	2000 – 120000
Philippines	5000 – 20000

The main weakness identified with the definitions of small towns as used by national governments is that they are purely based on population size since it is perhaps the simplest parameter. A better definition of small towns in relation to service delivery is therefore required.

The definition used in this thesis as a starting point, integrates population and other characteristics such as organisational arrangements for water service delivery since it has more versatility. In order not to reinvent the wheel, this research adopts the definition of some 350 top water and sanitation professionals the world over during an Internet-based conference on small towns held in March 2000 (WEDC, 2000) of which the author was a part:

Small towns are settlements that are sufficiently large and dense to benefit from the economies of scale offered by piped systems, but too small and dispersed to be efficiently managed by a conventional urban water utility. They require formal management arrangements, a legal basis for ownership and management, and the ability to expand to meet the growing demand for water. Small towns usually have populations between 5,000 and 50,000.

The small towns used for the case study in Ghana subscribe to the above definition.

2.3.3.2 Why small towns?

Small towns have generally been overlooked in development programmes because they have fallen outside the main classifications of Urban and Rural Areas (Coing et. al., 1998; Stoveland and Bassey, 2000). However, current data points to the fact that the population of small towns is significant (WSP; 2001a, 2003). They therefore deserve better.

The urban population of developing countries is growing relative to that of rural areas as shown in Table 2. For instance, whereas the annual population growth rate is 3.7 per cent in urban areas in Africa, that of rural areas is only 1.2.

Table 2: Annual population growth rates in the Third World (UN, 2001)

Region	Total population 2001 (thousands)	Annual growth rate 2000-2005 (percentage)		
		Total	Urban	Rural
Africa	812,603	2.3	3.7	1.2
Asia	3,720,705	1.3	2.5	0.4
Latin America and Caribbean	526,533	1.4	1.9	0.0

The United Nations (1999) observed that whereas in 1950, 30% of the world's population lived in urban areas, by 2000 the proportion of urban dwellers had risen to 47% and it is expected to reach 60% by 2030. The same source of the data above, states that the growth in urban areas is due to rural-urban migration and the transformation of rural areas [into small towns and] into cities. Since no rural town becomes a large city overnight, it can be deduced that as rural areas are transformed into larger settlements, they are more likely to be transformed into small towns rather than large cities making small towns an important part of the urbanisation process. If basic services can be provided adequately in the small towns, the load on the larger cities can be reduced as they develop into cities later.

In many countries, small towns are the most rapidly expanding centres of population growth and commercial activity (WSP, 2003). The following statistics support this statement:

- In Colombia, 66% of the municipalities are small towns (WSP, 2001a).
- Peru has 485 small towns (WSP, 2001b) which account for about 20% of the country's population. The definition of small towns in Peru is 2000 to 30000 people. Therefore, using the definition of this thesis in Section 2.3.3.1 will increase the percentage population of small towns in Peru to about 40% assuming a linear distribution.

- Twenty one (21) per cent of the national population of Vietnam lives in small towns (WSP, 2001c).
- About 40 million people are estimated to live in 3000 small towns (population 2000 to 20000) in Nigeria alone (Stoveland and Bassey, 2000). This accounts for 20% of the national population.
- Banerjee and Schenik (1984) estimated the population of small towns at about 28% of the population of India.

Based on the above data, the population of small towns globally can be estimated at 1.2 to 2 billion. It can therefore be concluded that the total population of small towns is sufficiently large to warrant better attention in basic service provision such as water supply.

Kammeier & Swan (1984) and Hardoy & Satterthwaite (1986) also identify some reasons why there is a need for policy change regarding small towns and why they need to be researched. These include:

- The issues of small towns have been given insufficient attention both in terms of their needs for services and facilities (such as water supply and sanitation).
- Sub-national and sub-regional levels of government administration are usually located in small towns: Thus they play a political role. It is through these towns that the needs and priorities of sub-national and sub-regional populations should be channelled to influence policies and resource allocation at higher levels of government. For instance in Ghana, all district assemblies are located in small towns.

- Long-term policies on small towns can lessen the tendency towards what can be judged to be undesirable concentrations of industries, services and government officials in a few (or just one or two) urban centres.
- The potential role of small towns in managing urban expansion within large city regions.

Even with such great evidence of the significance of small towns and with several authors writing on the administrative role of small towns (Hardoy and Satterthwaite, 1986; Rondinelli, 1984; Wong and Saigol, 1984; Adalemo, 1984), research into basic service provision such as water supply in small towns has received very little attention in comparison to rural and urban settlements. However, the ability of service providers to make progress in the water sector, thereby reducing the number of people globally without access to potable water depends on a change of attitude towards small towns. Small towns therefore deserve better attention from researchers and practitioners, especially in terms of water service provision.

2.4 EVOLUTION OF THE WATER SECTOR IN SMALL TOWNS

The water supply sector in developing countries gradually emerged in the two decades prior to the 1980s and developed in reaction to the struggles of post colonial states to extend the benefits of 'modern' infrastructure to their rapidly expanding populations. The states viewed water supply as a national responsibility. Therefore, public utility management was the *de facto* mode of service delivery. However, due to the ineffectiveness and inefficiencies of public utility management, more emphasis is being put on community involvement. In the 21st century, community management has become a model of choice for water supply

in rural communities throughout the developing world (International Water and Sanitation Centre, 2003). The same source observed that it has yielded significant achievements, but it has not always succeeded to supply water on a large scale and to secure unquestionable long term sustainability of water supply systems. Of particular relevance to this thesis is the sustainability of community water management in small towns since they have fallen outside the main classification of rural and urban settlements as stated in Section 2.3.3.2. This section describes the major events in the water sector in the developing world since this will shed light on the present status of small town water provision.

2.4.1 Milestones in the evolution of the water sector

The water sector in developing countries did not develop in a vacuum but is linked to and affected by developments in many other sectors; particularly those related to more general rural/urban development, the sustainability of natural resources and in particular water resources management. The major milestones which can be traced from the pre-1980s to the present are described below.

2.4.1.1 Pre-1980's: The needs based approach to water supply

Before the 1980's, water supply in developing countries was based on the premise that the provision of clean water would contribute to economic growth; government agencies should construct and maintain the water facilities; and public financing should subsidise water services (Kleemeier, 1995). This was referred to as the "need based approach". The need based approach was not sustainable due to lack of financial and technical capacity of governments. The focus in water supply therefore started shifting towards community managed systems.

The following are features of the need based approach (ibid).

- Objective - Provide clean and convenient water supply to as many as possible.

- Service level - Minimum service level (hand pumps, public taps).
- Role of Government - Appraisal, design, construction, operation and maintenance, training.
- Financing - Donor/government pays full costs, and subsidises operation and maintenance.
- Community participation - Extension service mobilises participation in water point location, user fee collection, etc.

Several problems were identified with this approach and include:

- In too many cases, the schemes under the need-based approach were not sustainable. In some countries it appeared that, the construction of new schemes could not keep pace with the failure of the existing ones, and that in most developing countries 25% of the existing water systems were not working (Briscoe and Ferranti, 1988).
- Given the high population growth rates, the strategy of the need based approach would not reduce the number of people without access to potable water supply within a reasonable time period (Kleemeier, 1995).
- The funds needed to achieve the universal coverage of water under the need based approach were astronomical. It was estimated that governments and donors were spending USD 1.5 billion a year on rural water supply as of 1988 but three to five times that amount would be needed to achieve universal coverage (World Bank, 1981).

Furthermore, the poor growth and huge balance of payment deficits experienced by developing countries starting in the latter part of the 1970's were attributed to domestic policies and institutional arrangements which ignored or distorted prices. According to the World Bank (1981, 1984), in order to restore growth, governments would have to initiate a process of structural adjustment, which includes measures such as restraining public expenditure, removing subsidies, and letting the private sector and market forces take over many functions from government agencies. Such policies from the World Bank and other donors such as USAID were clearly incompatible with the earlier ones recommending that governments should expand their role in providing publicly subsidised goods and services.

From the early 1980s, the strategies of the most influential donors aimed at alleviating poverty through economic growth, the preconditions being that there be economic stabilisation, and structural adjustment (Riddell 1987). The new change in donor strategy and the analysis which led to structural adjustment policies challenged assumptions about meeting basic needs which underlay the basic need strategy toward water supply. A series of international events from the 1980's till today have therefore been aimed at finding solutions to basic service delivery such as water supply and management by involving the beneficiary communities.

2.4.1.2 1981-1990: The International Water Supply and Sanitation Decade

Water supply in developing countries received unprecedented global attention when 1981 to 1990 was declared the International Drinking Water Supply and Sanitation Decade (IDWSSD) by governments during the 1977 World Water Conference in Mar del Plata, Argentina. The objective of the conference was expressed in the slogan "Water and sanitation for all". The emphasis of the decade was community participation in water supply. Despite the promotion of community management, the decade had limited success which was associated with lack of sustainability of the community water supply systems.

The IDWSSD conference recognised that to come close to accomplishing the goal of "Water and sanitation for all", a "radical overhaul of precepts and investment strategies governing the proliferation of taps, pumps and pipes in the developing world" was required (Black, 1998). The same source also observed that the vast majority of those without water and sanitation services were poor, and the countries in which they lived were frequently water short and had little to spend on public infrastructure.

The new approach was found in concepts of self-reliance and community action that had begun to be popularised under the catch-phrase 'small is beautiful' (Schumacher, 1973). Small is beautiful was to become one of the key-slogans of the water and sanitation sector and came along with a shift in focus to small NGO led projects, in which users were encouraged to play an active role in terms of providing inputs, labour or cash, to the development of simple, low cost systems. The models of the IDWSSD therefore remained small and scattered and did not start to approach the scale necessary to address the decade's ambitious goals.

In parallel to the water sector activities of the IDWSSD, awareness grew throughout the various fields of development co-operation of the need to involve communities or users at all stages of the project cycle. In publications by Chambers (1983) and Gran (1983), they stressed the importance of 'putting the last first', and highlighted the dangers of allowing outsiders with their characteristic 'biases' to drive the development process. They instead suggested a 'bottom up' development model in which the beneficiaries of development themselves defined their needs, priorities, and preferred developmental pathways. This development model has its own problems because as Hamdi (2000) put it, people (beneficiaries) do not always want to get involved.

Halfway through the IDWSSD, the donor community assembled in the External Support Agency Collaborative Council which officially identified community participation as one of the six basic prerequisites for improved performance of the water and sanitation sector. However, what is community participation?

Long before the IDWSSD, the United Nations (UN) in 1955, defined community development, which was then the widely accepted expression of community participation, as a 'process designed to create conditions of economic and social progress for the whole community with its active participation' (Moser, 1989). The problem identified with this definition by Abbot (1996) was that the extent to which participation can be implemented within development strategies depended on what is meant by the term and it was apparent that no clear consensus existed. This problem persists today because it is still not apparent the extent to which community participation (management) should be applied in small towns water supply. This has consequences for the sustainability of the water supply systems.

The term community participation is therefore nebulous in many respects. Even though, the first use of the term "community participation" dates from 1967, it concerned an introduction to evaluative research (Suchman, 1967). The International Water and Sanitation Centre (IRC) (2003) also document the first books on community involvement in water supply projects from Taiwan (1969) and Colombia (1975). Wijk (1979) documents the first literature review on participation and education in community water supply and sanitation. It was observed by some commentators, that the old water supply strategies of the need based approach failed because they never included participation (Knudsen and Tidemand, 1989; Bossuyt and Laporte, 1995). Furthermore, economic growth had made poor people poorer, and thus participation was the means to change this development (Lund, 1997). The term community participation can thus describe quite different forms and intensities of community involvement – from asking the community members to participate in certain activities with their labour, time and

money; to informing the beneficiaries of decisions made by outsiders on their situation; to extracting information from them without giving them a say in decision – making; to finally basically leaving everything to the beneficiaries with a minimum of external involvement apart from maybe the provision of funds. The definition can take on radically different forms, on a continuum from spontaneous to coerced, or from active to passive (Khan and Stewart, 1994; World Bank, 1992; Danced, 1998).

A problem therefore with community participation is that it is difficult to determine the extent to which the community members should be involved in for instance managing their own water supplies in rural villages, small towns and urban cities. Despite the confusion about the meaning of community participation, many projects during the IDWSSD started involving women and men in trench digging, system maintenance, and water committees. However, it soon turned out that sustainable water and sanitation could not be achieved with just involving people in the manual work, but also in the planning of programmes and the selection of technology. It was also around this time that the first references to 'community management' started to appear. Korten's (1986) monograph on community management in Asia and Parwoto's (1986) model for community based management in Indonesia were some of the early examples. Roark et al. (1989) also documented field studies in which community management played a major role in Cameroon, sub-Saharan Africa and Indonesia. The communities in all cases were rural.

By the end of the IDWSSD a total of USD 73,891 million had been spent on expanding water supply, and by 1990, no region had achieved less than 73% coverage of the population in urban areas (South East Asia) and less than 32% coverage of the population in rural areas (Africa) (IRC, 2003). Even though, this represented a significant increase in water supply service coverage it however, fell far short of attaining "water and sanitation for all" by 1990. It also became clear

during the decade that many of the constructed water systems broke down soon after implementation as a result of poor maintenance and management (Briscoe and Ferranti, 1988). Although coverage was increased, the sustainability was often questionable. The IDWSSD therefore missed its objective by a wide margin even though community management was employed. Furthermore, even though the activities of the IDWSSD specifically mentioned urban and rural areas, no emphasis was laid on small town water supply. Consequently, little is known about the progress made during the IDWSSD towards sustainable water service delivery in small towns in the prevailing literature.

2.4.1.3 The 1990s: After the IDWSSD

As the IDWSSD came to an end in 1990, regional and global meetings were held by governments which sought to draw together the lessons of the Decade and to map out new directions for the water and sanitation sector in the 1990s. They culminated in a series of events including:

- 1992- International Conference on Water and the Environment, Dublin.
- 1992- United Nations Conference on Environment and Sustainable Development, Rio de Janeiro.
- 1996- Formation of the World Water Council.
- 1997- First Water Forum, Marakech.
- 1997- Formation of World Commission for Water in the 21st century.

These events are described highlighting their particular significance to the thesis.

1992- International Conference on Water and the Environment, Dublin (ICWE)

Five hundred participants, including government-designated experts from a hundred countries and representatives of eighty international, intergovernmental

and non-governmental organizations attended the International Conference on Water and the Environment (ICWE) in Dublin, Ireland on 26 to 31 January, 1992. The experts saw the emerging global water resources picture as critical. At its closing session, the Conference adopted the Dublin Statement.

The Conference participants called for fundamental new approaches to the assessment, development and management of freshwater resources, which can only be brought about through political commitment and involvement from the highest levels of government to the smallest communities. Commitment will need to be backed by substantial and immediate investments, public awareness campaigns, legislative and institutional changes, technology development, and capacity building programmes. Underlying all these must be a greater recognition of the interdependence of all peoples, and of their place in the natural world.

In commending the Dublin Statement to the world leaders assembled at the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro in June 1992, the Conference participants urged all governments to study carefully the specific activities and means of implementation recommended in the Conference Report, and to translate those recommendations into urgent action programmes for water and sustainable development.

1992- United Nations Conference on the Environment and Sustainable Development, Rio de Janeiro

Various international reports have been prepared on the status of the environment over the last decades but none has had the tremendous effect of "Our Common Future" prepared by the Brundtland Commission which was established by the United Nations in 1983. The report describes scarcity of resources, population growth, environmental impacts and unequal distribution of economic welfare and growth as interacting threats to our common future on earth. "Sustainable development" which was defined as "...development that meets the needs of the present without compromising the ability of future generations to meet their own

needs" (World Commission on Environment and Development, 1987) was introduced as the only possible and acceptable development if human civilisation is to avoid collapse in the near future. In contrast to earlier environmental status reports, the Brundtland Commission's report gained major significance in the international political discussion on the environment and together with the ICWE led to the UN-sponsored World Conference on Environment and Development in Rio de Janeiro in June 1992. As stated in Section 2.3.1 international attention was brought to bear on how to monitor and assess progress within the context of sustainable development. The word *sustainability* has therefore since then been linked to sustainable development (Doe and Oduro, 1999).

The Rio Conference enjoyed the participation of heads of governments from 118 countries and resulted in a programme for cooperation on the integration of development processes and environmental considerations, which is to ensure a responsible development and sustainability for the earth in the 21st century. Agenda 21, the main output of the United Nations Conference on the Environment and Development echoed calls for indicators of sustainability to simulate a three-part model including economy, environment and society as stated in Section 2.3.1.

On the natural resources management front, world leaders once more committed themselves to a comprehensive programme to provide sustainable water supply and sanitation services to the hundreds of millions of the world's population who currently lack access. All states and support agencies were therefore urged to implement activities aiming for universal coverage outlined in Agenda 21 which emphasised community managed systems.

Community management had clearly been accepted as a model of choice in most developing countries. Consequently, more and more examples of community management could be found around the world and several countries including Uganda, Ghana, South Africa, India and Tanzania had all made community

management a key concept in their national water policies and laws (IRC, 2003). Community management was applied to small towns the same way it was applied to rural villages without any distinction. However, little is known specifically about the extent of sustainability of community water management in small towns and communities larger than rural villages (Lammerink, 1998; O'Rourke, 1992; McCommon et al, 1990). The Water Supply and Sanitation Collaborative Council (WSSCC) (1999), notes that questionable sustainability, inappropriate technologies, and failure to increase water and sanitation coverage all continued to be challenges to community management after the IDWSSD.

1995/6- Formation of the World Water Council

The authority over the management of the world's fresh water is fragmented among the nations of the world, hundreds of thousands of local governments, and countless non-governmental and private organizations, as well as a large number of international bodies. The management issues have been subjected to numerous studies and debates in the international arena (World Water Council, 2000). Consensus was established around the need for the creation of a common umbrella to unite the disparate, fragmented, and ineffectual efforts on global water management evidenced in the international fora on water and the environment discussed so far.

In 1995, the Founding Committee of the World Water Council was formed and convened its first meeting in Montreal, Canada, in March 1995, and again in Bari, Italy, in September 1995. These two meetings defined the mission and objectives of the World Water Council. In June 1996, the World Water Council was legally incorporated and its headquarters established in Marseille, France. Its membership consisted of more than 300 members including public and private sectors, NGO's, United Nation agencies; a unique network representing over 50 countries.

The World Water Council was therefore dedicated to strengthening the world water movement for an improved management of the world's water resources. The missions of the World Water Council are to promote awareness and build political commitment on critical water issues at all levels, including the highest decision-making level, to facilitate the efficient conservation, protection, development, planning, management and use of water in all its dimensions on an environmentally sustainable basis for the benefit of all life on earth. To fulfil its missions and objectives, the World Water Council has created the **World Water Fora** which, accompanied by a Ministerial Conference, is a major water event organized every three years in close collaboration with the authorities of the hosting country. The World Water Council's other activities include organizing and sponsoring major international and regional conferences and awareness-raising events, jointly publishing reviews and articles, participating in the establishment of dialogues on cross-sector issues, facilitating the creations of commissions and expert panels to bring forward constructive solutions on key issues and influencing water policy.

1997- First World Water Forum, Marakech

The First World Water Forum was organised by the World Water Council and called on governments, international organizations, NGO's and the peoples of the World to work together in a renewed partnership to put into practice the Mar del Plata and Dublin Principles and Chapter 18 of the Rio Summit to initiate a "Blue Revolution" to ensure sustainability of the earth's water resources. In particular the Forum recommended action to recognize the basic human needs to have access to clean water and sanitation, to establish an effective mechanism for management of shared waters, to support and preserve ecosystems, to encourage the efficient use of water, to address gender equity issues in water use and to encourage partnership between the members of Civil Society and Governments.

In response to demonstrated needs and recommended actions, the World Water Council launched a 3-year initiative of study, consultation and analysis that led to a

global vision (Vision 21) for water, life and the environment in the next century. Building on past international efforts and relying on the collective wisdom and resources of the international water community, the process leading to a vision included research, consultations, workshops, print and electronic publications and many other means for absorbing, synthesizing and disseminating knowledge. At the conclusion of this process, fully aware of the complexities and pitfalls along the way, the Vision offered policy-relevant conclusions and recommendations for action to be taken by the world's leaders to meet the needs of future generations.

1997- Formation of World Commission for Water in the 21st century

The success of the First World Water Forum in Marrakech, Morocco, and the issuing of the Marrakech Declaration firmly established the leadership of the World Water Council in water affairs. The World Water Council received the mandate to develop the World Water Vision for Life and Environment for the 21st Century.

2.4.1.4 The 2000s: The new millennium

The international efforts prior to year 2000 were reinforced in the new millennium by events such as:

- 2000- The Fifth Global Forum of the Water Supply and Sanitation Collaborative Council (WSSCC).
- 2000 - The Global Consultation for Safe Water 2000, New Delhi.
- 2000 - Second World Water Forum, The Hague.
- 2001- Inter-Country Dialogue Between West African States, Nouakchott
- 2001- United Nations Millennium Declaration
- 2001- New Partnership for African Development (NEPAD)
- 2002- UN World Summit on sustainable Development, Johannesburg
- 2003- Third World Water Forum, Kyoto.

Community management was further stressed at these fora. At the same time some service providers started considering public-private partnerships, especially for urban water supply. The effects of the international fora on the evolution of the small town water sector are presented below.

2000- The Fifth Global Forum of the Water Supply and Collaborative Council (WSSCC).

In November 2000, the Fifth Global Forum of the Water Supply and Collaborative Council (WSSCC) in Brazil reached consensus on the way forward for the water supply and sanitation sector: the Iguaçu Action Programme (WSSCC, 1999). The Iguaçu Action Programme (IAP)'s mainspring is Vision 21. It translates that Vision, which has caught the imagination of the world and is shared by all WSSCC members, into practical activities to improve hygiene, sanitation and water for poor people. Vision 21 covers many subjects, and it is important, for impact and consistency, to concentrate mainly on a small number of them. The Council therefore suggested four main advocacy subjects for the Council's work at all levels over the next few years. Some of those deal with community management issues:

- Institutional management options
- Public-private partnerships
- The adoption of a code of sector ethics and rights

The ongoing work suggested to be undertaken in the IAP is the promotion of institutional reform, the promotion of good governance, capacity building of public sector agencies, and the promotion of engagement of all sector stakeholders, including the establishment of partnerships with the private sector and the implementation of institutional arrangements supporting sanitation. An aspect not previously addressed is the institutional implications for adoption of a code of ethics and greater appreciation of the rights of consumers, concurrent with

responsibilities, in sustainable service development. However, it is not clear from the literature whether or not public-private partnership is an independent model and a viable option for improving the sustainability of water supply systems.

2000 - The Global Consultation for Safe Water 2000, New Delhi

The resulting Delhi Statement promoted the principle of "Some for all rather than more for some", which set out guiding principles as the basis of future sector work. Community management was further endorsed in the guiding principles and stressed that communities or beneficiaries should not just be involved in water system inception, but should accept ultimate responsibility for and ownership of the entire life-cycle of their water systems. Much of the focus was on rural communities and no specific mention or action plans were directed at small towns. Differentiating between small towns and rural villages in terms water service delivery is therefore not well documented in the prevailing literature.

2000 - Second World Water Forum, The Hague.

The Second World Water Forum was successful in uniting stakeholders' voices in discussing the Vision 21 further.

2001- Inter-Country Dialogue between West African States, Nouakchott

This was the first international conference on small towns. Even then it was regional rather than global. It took place in March under a broader program on the management of water and sanitation services in small towns and multi-villages. The conference was attended by 115 participants from 12 African countries and was developed by a partnership between Programme Solidarite Eau, the French Cooperation and the World Bank. Participants came from governments, civil society and the private sector.

The primary goal of the conference was to provide a forum for various participants from African countries to come together to discuss their policies and perspectives

on water supply and sanitation management for small towns. Four themes were identified including:

- Management responsibilities
- Maintenance
- Financial aspects
- Technical advise and support

As a next step, a follow-up workshop was anticipated to be held in Addis Ababa, Ethiopia.

2001- International Conference on Freshwater, Bonn

This conference took place in December 2001 and helped speed up the process for the Third World Water forum in 2003.

2001- United Nations Millennium Declaration

The goals of the Rio Conference and the other international fora were further carried on into the United Nations Millennium Development (MDG) Goals which gained much attention at the recent World Conference on the Environment and Development in South Africa in 2002. Number 7 of the MDG was devoted to water supply to developing countries (UN, 2002).

2001- New Partnership for African Development (NEPAD)

The new partnership for African development is a pledge by African leaders based on a shared vision to place their countries individually and collectively on a path to sustainable development. Among the sectoral priorities is water and sanitation. No particular mention is made of small towns. If there is any plan for small towns it is perhaps contained in the general plans for rural and urban settlements.

2002- United Nations World Summit on sustainable Development, Johannesburg

Efforts from Bonn and the other international fora culminated in the WSSD in Johannesburg that identified water as one of the five most important issues to address in the 21st century. Yet the water challenge in small towns continues to be great. Section 2.4.2 elaborates on this.

2003- Third World Water Forum, Kyoto.

The Third World Water Forum was the most recent forum and took place on 16-23 March 2003 and succeeded in creating 100 new commitments to mitigate today's water crisis. It was attended by governments, civil society and industry. Water management was placed high on the political agenda. It built on the 2nd World Water Forum by transforming the World Water Vision (Vision 21) into tangible and concrete action plans and commitments. Twenty four (24,000) participants discussed issues on water. Outputs of Kyoto adopted in "Water – A G8 Action Plan" state that the G-8 (group of 8 industrialised nations) will take concrete water action plans to follow up on the outcome of the 3rd World Water Forum.

Three principles guided the forum:

- "Open to all"
- "Created through participation by all"
- "Translating visions into concrete actions and commitments"

Furthermore, Action #3345 was "Community Water Initiative". The budget was estimated at USD 50 million over a five year period of 2003 to 2008. The purpose was to provide grants to support initiatives in water supply and sanitation at the community level. This is part of United Nation Millennium Development Goals. Public Private Partnership to benefit the poor was also promoted by the Netherlands at the forum. Even though, urban and rural areas were specifically

mentioned in action plans, no specific mention was made of small towns. Therefore, even though significant global and regional attention has been on water supply very little attention has been paid specifically to small towns over the past decades. This is reflected in the status of small town water supply as discussed in the following section.

2.4.2 Water service delivery in small towns: The present situation

The conclusions that can be drawn from the series of international fora on water are self-evident:

- Water supply to communities is high on the international agenda.
- Community involvement/participation will continue to play an important role in water supply in developing countries.
- Small towns have received very little specific international attention.

As stated in previous sections, small towns have been generally overlooked in development programmes since they have fallen outside the main classifications of Urban and Rural Areas (Stoveland and Bassey, 2000). This state of affairs reflects the water supply coverage in small towns today. The following observations can be made from the literature:

- In a study of 37 small towns in 36 states in Nigeria, less than 10% have access to safe drinking water. Furthermore, eighty (80) percent of the existing mechanised water schemes in the small towns were not functional. (Stoveland and Bassey, 2000).
- In Vietnam, it was estimated that only 45% of the small towns in the country had piped water systems (WSP, 2001c).

- The national water supply companies in Burkina Faso, Mauritania, Mali and Senegal do not supply small towns with water due to budget constraints even though they are supposed to (Collignon, 1998).

Many commentators (Livingstone and McPherson, 1993; Boadu, 1994; Briscoe and Ferranti, 1988) attribute the low coverage of water supply provision to developing countries (including small towns) to the following reasons:

- Poor policy at all levels
- Lack of political will
- Inappropriate management approaches
- Lack of gender balance
- Neglect of consumer preferences
- Poor institutional frameworks

All these reasons can be examined for small towns by investigating the facets of sustainability as stated in Section 2.3.1 including:

- Organisational sustainability
- Social sustainability
- Technical sustainability
- Financial sustainability

These dimensions of sustainability are explored in the following sections.

2.5 ORGANISATIONAL SUSTAINABILITY

Organisational issues in water service delivery focus on the appropriate management structure to be adopted for sustainability in the communities (Caporali and Vergara, 1999). Organisational sustainability according to Section 2.3.1 refers to whether the organisational models employed can carry on long after water system inauguration or whether the water system will collapse into disuse because essential organisational skills cannot be found. Even though three main management models can be identified in small towns, community management is promoted in most countries exclusively. This section explores the management models in small towns and focuses on the pertinent ones as identified by the international fora in Section 2.4.1.4.

2.5.1 Modes and models of water supply delivery in small towns

Before proceeding with a discussion of the organisational issues in small town water service delivery, an overview of the existing water supply management models is required. An internet forum on small towns made up of 350 water supply specialists globally identified three main management models for small town water supply (WEDC, 2000). They include:

- Cooperative Management Association (Community Management)
- Regional or National Management (Public Utility)
- Private Sector Participation (Public-Private Partnership)

Under community management, ownership of the water supply system may be with the local government or with the community which manages and operates the services. Co-operatives are normally made up of the members of the community who meet annually or at set times of the year, an executive board (Water Board) that meets periodically to make management decisions and an operating group. The co-operative is financially autonomous but not always formally recognised by the

national government. Under regional or national management option, a regional or national utility owns the water supply facilities and is charged with planning, construction and operations. Oversight is provided by a board usually appointed by the national government through the Water Ministry. Under the Public Private Partnership model, a private company may be employed under local, regional or national management. Operations are wholly or partially contracted out to the private company.

Before the 1980s, the water service delivery systems in small towns were provided by national or regional public utilities (WSP 2000; WSP, 2001a) as stated in Section 2.4.1.1. However, since the 1990s, the trend in water service delivery in small towns is toward increasing community management (WEDC, 2000). For example:

- In Colombia, 90% of the water supply systems are community managed (WSP, 2001a).
- In Benin all the water supply systems were owned and operated by the national utility. However, since 2 August 1996, a decree (96-317) mandates the establishment of community management and transfer of ownership of the water supplies in the small towns to the communities (WSP, 2000).

Furthermore, Table 3 reflects the trend in most communities with donor assistance towards their small town water supply. The literature shows a shift away from national and regional public utility management mainly as a result of ineffective and inefficient public utility management (Gentry and Fernandez, 1997). A large number of the water systems are therefore operating exclusively under community management. The literature is limited on alternative management approaches.

Table 3: Status of small town water supply (WSP, 2003)

Country/Project	Management
<i>Ghana</i> Community Water and Sanitation Project	Management through a community Water Board, with operation and maintenance carried out by local employees
<i>Nigeria</i> Small Towns Water Supply and Sanitation Program Pilot Project	Management through a community Water Consumer Association
<i>Uganda</i> Small Towns Water and Sanitation Project	Management through a community Water Board, with operation and maintenance carried out by local employees.
<i>Paraguay</i> Fourth Rural Water Supply and Sanitation Project	Community Water User Association is responsible for management, operation and maintenance. Technical support provided by regional association of Water User Associations.

Of the three management models, public-private partnership (PPP) is the least employed for water supply in small towns (WSP, 2001a; WSP 2000) even though in some developing countries such as Mauritania, Colombia, Vietnam and Peru there have been successful experimentation with the private sector providing management to small towns. The same sources report that there were service improvements in the water supply as a result of PPP. Furthermore, compared to community management, there is very little literature on the implementation of PPP, especially, in small towns.

The thesis will not treat public management into any more detail since community management developed as a result of the inefficiencies and ineffectiveness of public utility management as stated earlier in this section. The rest of the literature review will therefore concentrate on community management and public private partnerships.

2.5.2 Community Management

Community management has been discussed mostly at a general level so far. However, since it is an important management model in small town water supply

an in-depth description and analysis of the current debates on the model is required. The literature reviewed however portrays community management as a model for rural villages. This in itself questions the application of community management in settlements other than rural villages, unless it can be proved that those communities possess similar characteristics as rural villages. However, the existing literature does not distinguish between rural villages and small towns in terms of water service delivery under community management.

2.5.2.1 Understanding community water management

Some important features of sustainable community management can be identified from the literature. A community subscribing to these features has potential for sustainable community management. The features include:

- The communities are rural with population usually less than 3000 people (McCommon et al.'s, 1990; Evans and Appleton, 1993; PCWS-ITN, 2001; SER, 2001; Laryea, 1994).
- The occupation of the inhabitants are predominantly farming or agriculturally based (PCWS-ITN, 2001).
- Community management in the communities relies on participation and empowerment in the service establishment to be sustainable (McCommon et al, 1990; PCWS-ITN, 2001).
- Household heads attended water related meetings to take decisions toward their water supplies (SER, 2001; Lammerink, 1998).
- Social pressure was used to discipline deviant community members who did not want pay the water user fees (Lammerink, 1998; SER, 2001).

Boxes 1 to 3 illustrate the points above.

Box 1: A model community managed water project (PCWS-ITN, 2001)

Water supply and sanitation is a priority need of Barangay Doña Flavia in the Philippines which is mostly rural with an agriculture and forestry-based economy. A total of 2,687 people or 429 households were expected to benefit from increased access to safe water supply using community management. The water project included the development of knowledge, attitudes and skills of the chosen leaders so that they will have the confidence to take a lead role in ensuring the sustainable, efficient and effective operation of the water systems. This resulted in the formation of the Doña Flavia Water Supply and Sanitation Association. Participation in decision-making between the support groups (NGOs, municipal and provincial government) and primary stakeholders (user groups), and a continual process of shared decision-making at all stages of the project cycle helped develop the community's sense of responsibility for and control over the local operation, maintenance and management of the water or sanitation system.

Lessons from the case highlighted in Box 1 show that, community management applied in Dona Flavia was organisationally sustainable (PCWS-ITN, 2001). The introduction of the water supply project was demand driven and a consultation process was important in establishing levels of participation and willingness to support its continued operation, maintenance and repair. Since the communities showcased are rural and small in size it is not clear from the existing literature whether or not the same level of organisational sustainability can be replicated in larger communities such as small towns. Furthermore, it is not clear from the literature whether or not small towns actually differ in characteristics from rural villages. This is because until recently, small towns have been grouped together with rural or urban communities (Stoveland and Bassey, 2000).

Box 2 illustrates the first and third points and comes from a 1993 workshop organised in The Hague, Netherlands by the International Water and Sanitation Centre (IRC). The IRC collated experiences on community management from seven developing countries in Africa, Asia and Latin America, namely, Cameroon,

Guatemala, Honduras, Indonesia, Pakistan, Uganda and Yemen (Evans and Appleton, 1993). It was identified that:

- The community has legitimate authority and effective control over management of the water supply system and over the use of the water thereby ensuring organisational sustainability.
- The community commits people and raises money towards the upkeep of the water system ensuring financial sustainability.
- All key decisions are taken in the community.
- Community management can mean more widespread implementation of sustainable water supply systems.

Box 2: Community management prompts replication (Evans and Appleton, 1993)

From its small beginnings 20 years earlier, the national NGO *Agua del Pueblo* has become a thriving model of how application of community management principles can lead to, in turn, successful projects, increased community self-sufficiency, widespread replication and a growing self esteem and job satisfaction for agency staff. Since being officially ratified by the Guatemalan Government in 1981, *Agua del Pueblo* has supported development of 125 water systems, benefiting more than 90,000 people in 150 rural communities. Seventy of those communities act cooperatively in 5 community associations. With shared technical support and pooled resources, the associations themselves are able to initiate new projects and build the capacity of communities to manage them.

Box 3 highlights another success story of community management from Aguacatán in Guatemala. It demonstrates all the features of successful community management stated above.

Box 3: How seven rural communities manage their water supply (SER, 2001)

Aguacatán is located 305 kilometres from the capital of Guatemala. This municipality comprises 49 rural communities. Seven of them are home to 550 families, totalling 3,600 inhabitants. These communities joined forces to construct a water supply system, and subsequently, to reinforce their capacity to manage water. Few men can read and write; illiteracy is even higher among women. Men do agricultural work and count on the help of women, who also carry out household duties, tend to domestic animals and make their own clothing. In 1986, the seven communities constructed a water supply system which was managed by the community associations on a daily basis. The heads of family, men or women, in all seven communities participate in the meeting assemblies. The assembly is also a mechanism for social control for those who infringe the regulations and do not comply with the responsibilities assumed in the management of water supply. These persons are fined or morally penalised. The establishment and legitimacy of the customary norms have even more validity and in the majority of the cases, are supported by written documents. Social pressure constitutes an essential element of control and adequate management of community water supply.

To conclude the synthesis of the literature review of this section, successful features of sustainable community management were found in communities that are predominantly farmers (PCWS-ITN, 2001).

The literature also shows that sustainable community water management can be found in rural communities with population usually less than 3000 people (McCommon et al.'s, 1990; Evans and Appleton, 1993; PCWS-ITN, 2001; SER, 2001; Laryea, 1994).

Organisational sustainability of water supplies is linked to participation and empowerment in the service establishment (McCommon et al.'s, 1990; PCWS-ITN, 2001; Robert and Pietsch, 1996). Since small towns are being differentiated from rural villages in this thesis, it is not clear what the actual potential for participation and empowerment is in small towns. It should however, not be assumed that there will be automatic involvement by the communities in small towns just because service providers want them to be. This is because as Hamdi (2000) observes, community members do not always want to get involved. An examination of the potential for participation and the other characteristics that lead to sustainable community water management is therefore necessary in small towns.

The literature also highlights that household heads attend water related meetings to take decisions (SER, 2001; Lammerink, 1998). Furthermore, social pressures were used to discipline deviant community members (Lammerink, 1998; SER, 2001) in order to ensure that they pay the water user fees that are so vital to the sustainability of the water supply systems. In determining the organisational sustainability of small town water supply, a pertinent question then is whether the structure of small towns allows social pressure to be effective in sustainable water service delivery.

The literature so far shows the characteristics of organisationally sustainable community water management to be tied to the characteristics of rural villages. However, small towns are not rural from the synthesis of the literature in Section 2.3.3.1. Therefore what is the actual state of sustainability of community water management in small towns? The literature so far sheds very little light on this very important issue.

2.5.2.2 Current debate on community water management

Despite all the success and progress of community water management in rural villages, it has not always lived to its expectations and faces many constraints according to some commentators (Cotton and Tayler, 1994; Knudsen and Tidemand, 1989; Bossuyt and Laporte, 1995). This section presents a synthesis of the debate on community management and raises pertinent questions that arise from the analysis of the literature review.

Laryea (1994) whilst admitting that community management may hold the key to success in rural water supply acknowledges that community water management has inherent problems. Are the inherent problems observed in small towns (which are regarded as rural by some service providers) or in typical rural villages. The

literature does not differentiate small towns from rural villages so this important detail is lost.

At the conclusion of 1990, the target for the International Drinking Water and Sanitation Decade which advocated community water management as a means to providing all populations with access to potable water was far from reached as stated in Section 2.4.1.2. O'Rourke (1992) observed that community participation and management may be conducive to achieving the decade's target, but are not sustainable solutions in the water sector. Could this sustainability problem be attributed to small towns since in their analysis small towns were regarded as rural? Can the participation necessary for organisational sustainability also be found in small towns since they are larger communities than typical rural villages? The literature is silent on this issue.

Many commentators have also blamed the "failure" of community management to deliver on a lack of feeling of ownership on the part of the community (Cotton and Tayler, 1994; Knudsen and Tidemand, 1989; Bossuyt and Laporte, 1995). Niedrum (1994) questioned the viability of community management in some communities by corroborating this with experiences from Rwanda which showed that community management failed because:

- The beneficiaries were not involved in decision-making and as such felt no sense of ownership.
- Differences in community and project objectives.
- Lack of participation by women who are responsible traditionally for water.
- The large populations involved and a lack of community cohesion.

Niedrum's first three findings were already corroborated in Section 2.5.2.1. However, the last point is rather ambiguous. Was she referring to rural villages, small towns or urban cities? His research did not qualify this.

Wegelin-Schuringa (1998) also identifies some of the disadvantages of community management in Box 4 which, are usually rooted in the organisation of the community water committees.

Box 4: Disadvantages of community management (Wegelin-Schuringa, 1998)

- Water management committees fulfil their responsibilities during the construction phase of the water systems establishment but fail to continue their work after commissioning.
- Committees only become active when there is a break-down. During the time in-between breakdowns committees feel there is no need to meet or even collect maintenance fees.
- Committees tend to break up shortly after formation due to lack of regular activity.
- The handling of funds often becomes the focus for conflict.
- Over dependence on external agency staff.
- Overlapping roles especially, the direct involvement of the chairperson and secretary in the collection of revenue.
- Misappropriation of funds and lack of accountability in some cases.

The practices identified in Box 4 are not conducive to organisational sustainability. Can the long term commitment necessary for organisational sustainability be found in small towns? The literature does not provide adequate evidence to answer this question.

Feacham (1980) during an earlier research observed that the community management approach had rarely been a component of the water supply and sanitation sector of the 'West'. O'Rourke (1992) then asks, 'why western donor agencies are so enthusiastically imposing it on other cultures and societies without sound research and proof that it is a viable option?' To buttress this point, Niedrum (1994) pointed out that development agencies continue to think of community management as the solution to the sustainability of water supplies despite the fact that challenges exist. Community water management, she pointed out, usually has a life span of about 3 years after the projects that established them have ceased.

Despite the strong evidence that the population of small towns is sufficiently large globally to warrant distinction (Section 2.3.3.2), community management has had limited research specifically targeting larger communities. Among the few that investigated community management in urban service delivery were Cotton and Tayler (1994). They however, concluded that for community management to work, the households need to be less than 50. Since urban centres have number of households many times larger than what they found out, it can be concluded that community management may not be viable in urban cities. Furthermore, Abbot (1996) in his book "*Sharing the city*", gives a comprehensive account of urban community participation both in theory and practice. Both Cotton and Tayler (1994) and Abbot (1996) were however silent on the boundaries of community management for small towns.

Many commentators are also beginning to realise that community participation is a very vague and open concept and that there is a great discrepancy as to what participation or even community means (O'Rourke 1992; Livingston and McPherson, 1993). The same sources acknowledge that community management as a new concept has a number of grey areas with few clear guidelines for projects. As can be seen from this analysis so far, small town water supply is certainly a grey area which warrants more research. Even the commentators that have written in favour of community management (Evans and Appleton, 1993; McCommon et al., 1990) recognised that there was a need for a better understanding of the factors which motivate the organisational sustainability of community management. They also recommended in their studies that there was a need to identify situations in which community management is not appropriate and should not be promoted.

From the analysis of the literature so far, some degree of controversy can be said to exist between commentators of community management and current development practice. On the one hand, the commentators observed that community

management's boundaries for larger communities (e.g. small towns) are vague. On the other hand, current development practice is moving toward more and more community management of water supplies in small towns (Section 2.5.1). The logical resolution of this controversy is to investigate the boundaries of community management in small towns. Yet few studies have been conducted specifically targeting small town water supply. This is perhaps due to the fact that, as stated in Section 2.3.3.2, they have been left out in the major classifications of rural and urban (Coing et. al., 1998; Stoveland and Bassey, 2000). However, as the literature review has shown (Section 2.3.3.2), the population of small towns is estimated at 1.2 to 2 billion globally. Furthermore, since they are rapidly growing communities, the water supply situation is likely to get worse unless studies and interventions are specifically directed at them in terms of establishing the extent of organisational sustainability of community management. Furthermore, other models other than community management ought to be explored. Even though the literature sheds very little light on PPP (Section 2.5.1), where the private sector is active this option ought to be explored.

2.5.3 Public-Private Partnership

Section 2.5.2 has analysed community management at length. Section 2.4.1 stated that from the perspective of international organisations in the water sector such as the WSSCC, public-private partnership may be introduced as a water supply model or as an extension of the community water management model. However, little is known about PPP especially in the water sector in small towns of developing countries. This section considers private sector participation and public-private partnership in general and also how these are currently applied in the water sector and especially in small towns. An aim of this section is to shed light on PPP as a possible water management model in small towns.

2.5.3.1 Historical perspective and definition

Utilising the private sector to satisfy people's needs started a long time ago. What is new, however, according to Savas (2000) is the deliberate use of the private sector as a tool to improve the functioning of government and even entire societies such as in the management of water supplies.

The intellectual foundation for privatisation began with Milton Friedman (1962). Management Professor Peter Drucker was the first to suggest the word *privatisation* in the context of *reprivatize* (Drucker, 1969). Savas (1974), Poole (1976), Spann (1977), Rothbard (1978) among others, researched and wrote on privatisation in the 1970s. In the United Kingdom, policy advocates of the Adam Smith Institute began promoting privatisation in the mid-1970s. A series of denationalisations- privatisation by sale of state-owned companies started in 1979 in Britain with the British Petroleum. In the water sector, privatisation started with the water utilities in Britain in 1989. In the 1980s many developed countries following the British example embarked on privatisation programmes (Ramanadham, 1988). Privatisation or private sector participation in developing countries was mainly pushed by donor countries and international agencies that had grown impatient with the poor performance of state-owned enterprises they had previously financed in urban cities.

Privatisation/private sector participation is not a word that has come easily to developing countries. Until recently, the term was not used in countries with a legacy of socialism. They prefer to call it divestiture or state withdrawal (White and Bhatia, 1998). Privatisation has mainly been used in developing countries to refer to governments selling some or all of their equity interests in specified enterprises. Often it is not clear what the government role is in enterprises in which it continues to hold majority shares. Nevertheless, transactions which have resulted in government yielding ownership control are often reported as privatisation and cover anything from the sale of a 1% minority equity stake in a business or a

management contract for a state owned enterprise to the outright sale of a multi-million dollar, fully owned state enterprise. This definition however does not capture the full picture. A source of confusion stems from the use of divestiture interchangeably with privatisation. Divestiture according to White and Bhatia (1998) is any transaction by which government has transferred title in or sold some or all of its assets or shares in an enterprise regardless of any transfer of operational control.

Limiting the definition of privatisation to state enterprises alone does not do justice to the definition. Consequently, Savas (2000) defines privatisation broadly as relying more on the private institutions of society and less on government to satisfy people's needs. This definition aptly captures the general meaning of private sector participation in this thesis.

It is increasingly becoming clear that government alone cannot shoulder the burden of basic service delivery such as water supply and sanitation (refer to Section 2.4.2.2). Therefore, in rural communities, community management is being used in the management of water supplies as stated in Section 2.4. On the other hand, government is entering into all kinds of arrangements/partnerships with the private sector in the provision of basic services in urban cities. The water systems in small towns are smaller than those in urban cities hence the potential base for revenue is small. However, these small towns have the most acute need for improved water services along with the fewest of resources (Gentry and Fernandez, 1997; Savas, 2000). The same source observed that these small communities need the private sector. Yet the perceptions of all the stakeholders of the PPP are not always properly documented.

Public-private partnerships (PPP) a less contentious term than private sector participation/privatisation is used to refer to the arrangements between the public and private sectors. Mitchell-Weaver and Manning (1991) defined PPPs by what

they are not. They stated that PPPs are not privatisation, subsidies nor unfettered free market. They are a special form of third party government, corporatism, which brings organised representatives of the private sector, labour and civil society into the government decision-making process. Yet this definition is not always so obvious to the stakeholders in the water sector. Section 2.5.3.4 elaborates on this.

The Yale University/UNDP Program on Public-Private Partnerships offers the broadest definition of PPP as depicted in Figure 1.

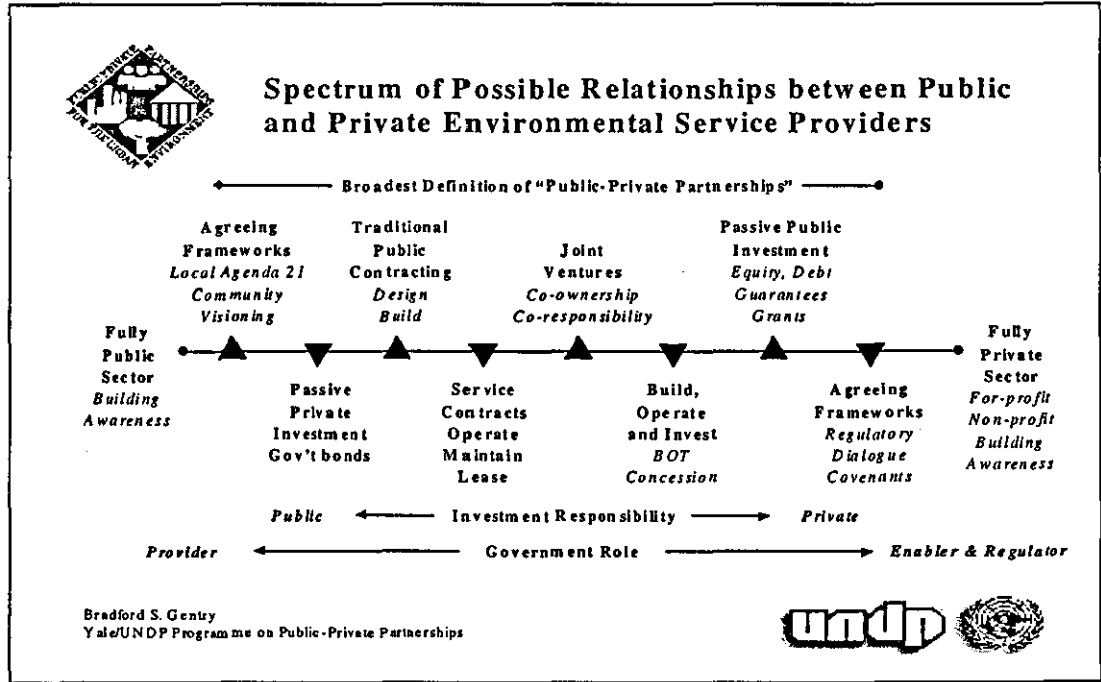


Figure 1: Spectrum of Public-Private Partnerships

According to the definition given by the Yale/UNDP Programme, PPPs are bounded on both extremes by the fully private sector and the fully public sector. As one moves from the left to the right, government's role changes from being a provider to enabler and regulator. The investment responsibility of the private sector also increases. The Yale/UNDP framework presents various options for public-private partnership ranging from agreeing frameworks through community visioning to agreeing frameworks for regulation. PPP are therefore a multi-sector

relationship and in some cases elements of partnership may be found. Little is however known about the perceptions of stakeholders of small town water sector regarding PPP.

2.5.3.2 Understanding PPP

PPP are becoming a common feature in the water sector since the privatisation of the British Utilities more than 10 years ago as stated in Section 2.5.3.1. Several forces have propelled the PPP push and Savas (2000) identified the major ones as:

- Pragmatic
- Economic
- Philosophical/ideological
- Commercial
- Populist

The characteristics of these five forces are summarised in Table 4.

Table 4: Influences promoting privatisation (Savas, 2000)

Influence	Effect	Reasoning
Pragmatic	Better government	Prudent PPP leads to more cost-effective public services.
Economic	Less dependence on government	Growing affluence allows more people to provide for their own needs, making them more receptive of PPP.
Philosophical /ideological	Less government	Government is too big, too powerful, and too intrusive in people's lives and therefore is a danger to democracy. Government's political decisions are inherently less trustworthy than free-market decisions. PPP reduces government's role.
Commercial	More business Opportunities	Government spending is a large part of the economy; more of it can and should be directed towards the private sector. State owned assets can be put to better use by the private sector.
Populist	Better society	People should have more choice in public services. They should be empowered to define and address common needs and to establish a sense of community.

The goal of pragmatists is better and more cost-effective government. Economic affluence reduces people's dependence on government and increases their acceptance of privatised approaches. The goal of the philosophical is less government and one that plays a smaller role *vis-à-vis* private institutions. The goal of commercial interests is to get more business by having more of government's spending directed toward them. The populist goal is to achieve better society by empowering people so that they can satisfy their common needs, while diminishing the power of large public and private bureaucracies.

Hamdi (2000) observes that partnerships can only be formed when there is a convergence of interests. An understanding of these influences in the context of small town water supply will provide a useful pointer to identifying stakeholder interests and hence making PPP an effective water management model.

2.5.3.3 Public-private partnership models for water supply

The most common PPP models applied to water supply from the definition of PPPs in Figure 1 are shown in Table 5.

If governments/communities are wary of giving up too much control over water services, they may enter into lease or management contracts with private providers. Generally for short terms (5 to 7 years) they allow governments to obtain some improvements in performance and efficiency, as well as a more complete understanding of their water problems. They do not however, generate significant investments of private capital or any capital investments (Brook Cowen, 1998; Gentry and Fernandez, 1997). A variation of the lease model is *affermage* where the private entity brings in working capital but not new capital for financing of capital works (Moss and Terme, 1994).

Table 5: Management options in PPP (Brook Cowen, 1998)

Option	Asset ownership	Operations and maintenance	Capital investment	Commercial risk	Normal duration (years)
Service Contract	Public	Shared	Public	Public	1-2
Management Contract	Public	Private	Public	Public	3-5
Lease	Public	Private	Public	Shared	8-15
BOT	Private	Private	Private	Shared	20-30
Concession	Public	Private	Private	Private	25-30
Joint-venture	Shared	Shared	Shared	Shared	depends

Build-operate-transfers (BOT) are an effective way to bring private money into the construction of new water treatment facilities or the substantial renovation of existing ones. Similar to the methods used to finance new power plants, BOTs require the private operators to (Gentry and Fernandez, 1997; Moss and Terme, 1994):

- Obtain the money necessary to build the plant.
- Operate the plant so as to meet specified performance standards for a set period.
- Transfer the plant to the government at the end of the contract period.

In return, the government agrees to buy all the output from the plant for a price calculated to repay the operator's cost and generate a reasonable profit. Since BOTs generally involve only one facility, they do not improve performance or efficiencies in other parts of the system (beyond the additional water supply or treatment capacity they provide).

The facility-specific nature of BOTs limits their ability to help optimise system resources and efficiencies. In order to capture these gains, concessions have been the preferred option. Concessions combine the scope of management contracts

with the private investment accompanying BOTs. In essence, the government cedes control over the delivery of services in a specified region to a private company. The operator is responsible for obtaining the money to upgrade and expand the system and for meeting specified performance standards. In return the operator collects fees directly from the system customers (Moss and Terme, 1994). The government acts in this instance as a regulator.

PPP has mainly been used in the developed world where large multinational corporations such as Vivendi, Saur and Thames/RWE to name but a few manage water utilities with efficiency gains in operation and maintenance (Kempe and Schreiber, 1997). Experiences in small towns water supply in developing countries is however limited. For instance, questions of which PPP sub models will be acceptable to a cross-section of stakeholders in the small town water sector arise.

2.5.3.4 PPP in small towns water supply

In the water sector in developing countries, public-private partnerships are more likely to be found in urban cities than any other community. The Water Utility Partnership of Africa (2000) provides an overview of public-private partnerships in the water sector in Africa shown in Box 5. All the examples are from the urban sector.

Box 5: Water supply PPP in Africa (Water Utility Partnership of Africa, 2000)
<ul style="list-style-type: none"> • In 26 out of 48 countries in Africa, PPP is widely in place (10), partially in place (3), or now being explored, set up or procured (13);
<ul style="list-style-type: none"> • In all cases of PPP ownership of fixed assets has remained with the public sector.
<ul style="list-style-type: none"> • Management lease arrangements (affermage) exist in 4 countries: i.e. Central Africa Republic, Cote D'Ivoire (hybrid between affermage and concession), Guinea and Senegal (enhanced lease); Enhanced leases are being procured or established in Madagascar (Maputo), Tanzania (Dar es Salaam), Niger, Ghana (Accra and Kumasi), Bissau;
<ul style="list-style-type: none"> • Concession contracts exist in 3 countries: Comoros (partial concession), Gabon and Morocco;
<ul style="list-style-type: none"> • Management contracts exist in 3 countries: Sao Tome & Principe, South Africa, Tunisia (Mali (interrupted in 1998)); Performance based management contracts are being procured or established in Mozambique (5 secondary towns), Angola (hybrid between Management Contract and affermage).
<ul style="list-style-type: none"> • BOT or similar arrangements exist in South Africa, Tunisia and in Senegal.
<ul style="list-style-type: none"> • Most partnerships were set up after 1992. In two countries the contracts were interrupted due to unclear contractual arrangements: Gambia (affermage) 1996 and Mali (management contract) 1998.

Public-private partnership in the small town water sector is not altogether absent. A study by the Water Supply and Sanitation Programme of small towns in Mauritania showed that 4% of the water supply systems had public-private partnership in the form of lease contracts (WSP, 2001d). The same source stated that the water supplies by the private enterprises were efficient. Another study of small towns in Vietnam found 2 out of 17 water supply systems employed PPP using management contracts (WSP, 2001c). Similar studies in Benin and Peru found low percentages of small towns engaging the private sector (WSP, 2003) even though in all the cases these produced better results compared to the alternative management options of community management and public utility management. Even though some successes have been made, they are too few to generalise about the acceptability of PPP and hence their viability in the small town water sector. More research is therefore required into PPP in small towns, especially as relates to the perceptions and interests of stakeholders.

PPP faces a number of challenges due to the number of stakeholders that have to be satisfied. Documentation exists on the challenges and opportunities faced by PPP particularly in the effort to improve the quality and quantity of services (Sohail and Cavil, 2001; Plummer, 2001; Sohail et. al., 2001; Sohail and Cotton, 2001; ADB, 2001). These challenges include:

- Financial and technical issues.
- Poor information in the contractual phases.
- Tariffs and billing.
- User dissatisfaction.
- Lack of effective water policies and poor institutional arrangements.

A study of PPP or any management model in the water sector in small towns ought to investigate the above factors adequately.

Furthermore, opposition to PPP from pressure groups is on the ascendancy globally. For instance, on July 5-8, 2001 the "Blue Planet" conference in Vancouver opened with a call by Barlow (2001) to promote "a global water revolution". This is the first of many international civil society meetings in favour of renationalising privatised water supplies. Several campaigns against PPP are underway in a variety of Third World countries such as Ghana (FFM, 2002). Groups against private sector participation are springing up in India, Bolivia, Mexico, South Africa, Guatemala, Colombia, Tanzania, Slovakia, Honduras, Philippines, Mozambique, Indonesia, as well as First Nations within North America. The concerns against PPP in the water sector include (Bond and Bakker, 2001):

- Water must not be an economic good but a right.
- PPP makes the poor worse off.
- Users are dissatisfied with PPP.

Clearly, these assertions are at variance with the economic and populist drivers of PPP stated in Section 2.5.3.2.

Hall (2001) argued in favour of returning PPP managed water systems to public utility management. However, his case studies focussed on experiences from developed countries whose public sector is more efficient than those of developing countries. Many of the arguments against PPP therefore only show just one side of the story. Consequently, in analysing the existing literature against PPP the following questions come to mind:

- Are the advocates against public-private partnerships speaking for the users?
- Are the issues raised pertinent?
- What are the true perceptions of the water users?

A major weakness found in the literature on PPP is that most are silent on the questions raised.

2.6 SOCIAL SUSTAINABILITY

Social sustainability includes water quality and equity concerns according to Mukherjee (1997). This section provides a synthesis of the literature review as it impacts water supply management in small towns.

2.6.1 Water quality issues: health implications

Adequate management of water quality issues lead to safe water supply. Cairncross and Feacham (1993) provided a discourse on the broad health implications arising from safe water supply. Even though the authors caution against specific attribution between intervention and health outcome, they argued that generally the combination of measures to improve personal and domestic hygiene and adequate water supply lead to health benefits. The World Health Organisation (WHO, 2002) estimated that water, sanitation and hygiene interventions reduce mortality by 65% in developing countries. Consequently, an issue of immense significance to policy makers in the provision of water supply is water quality (Glynn et al., 1992; Cotruvo et. al., 1999). According to the WHO (2000) any sustainable water supply system must treat this issue adequately.

The World Health Organisation (WHO, 2002) provided guidelines for water quality that national governments use to develop their own specific guidelines. The guidelines cover bacteriological quality standards for drinking water and delineated them into the various stages of the treatment process. National governments require that routine monitoring of water quality be a requirement to protect public health. Water quality monitoring is one of the most important water management tasks since it has serious health implications (Cotruvo et. al., 1999). Yet the same source observed that the task is so complex that it lies beyond the capability of many communities. Little is however known about how water quality issues are treated specifically in small towns.

Significant risks are associated with water quality. For example, arsenic is a poisonous substance that affects health and therefore requires adequate water quality testing and treatment on site. It is estimated that up to 77 million people in Bangladesh alone are at risk of drinking arsenic contaminated water (WHO, 2002). The same source declares arsenic contamination of ground water a global problem. Addressing such water quality issues are therefore a must for overall social sustainability of the water supply systems.

Whilst parameters of drinking-water such as colour, taste, odour and turbidity may not pose significant health risks similar to arsenic, they may give rise to complaints from consumers. They also therefore affect the sustainability of the water supplies since the consumers may not be willing to maintain a water supply whose quality they find unacceptable (Cotruvo, et. al., 1999). Yet few studies investigate this issue as an indicator of sustainability of the water supply systems.

2.6.2 Equity in water supply

Social sustainability is used to bring focus to equity issues (Saddler, 1988; Glynn et al., 1992). Equity aims to address the failings of the market system (Lumsden, 1999) by allowing collective action within governments and communities to take deliberate steps to correct deficiencies so that the needs of the poor in society are catered for. For example, in the discussion of PPP in Section 2.5.3.4, Bond and Bakker (2001) argue against public-private partnerships because they do not believe that they address the needs of the poor equitably.

The key issues for equity are given in Table 6.

Table 6: Key issues for equity (CINARA, 2000)

Key issue	Indicator
Water user charges	<ul style="list-style-type: none"> • Are tariffs determined based on ability to pay, direct consumption or rising block consumption? • Do different social groups pay different charges for water obtained from the water system?
Access to water supply	<ul style="list-style-type: none"> • What is the type of access to water supply? E.g. tap stands or house connections. • Gender sensitivity. Do female headed households have equitable access to water supply
Vulnerability of poorer community members	<ul style="list-style-type: none"> • What is the distribution of intermittency and hours of service to each segment of the community? • Will the abstraction of water damage the environment and therefore prevent the vulnerable future generations of the opportunity to use the resource?

Mukherjee (1999) observed that when relatively few people benefit from community water supply services, the community cannot muster the collective willingness and responsibility to maintain them. Even though equity issues and water quality issues are discussed at length in rural villages *vis a vis* the poor and the rich (Cotruvo, et. al., 1999; Mukherjee (1999), since it is only now that small towns are being distinguished from the main classifications of rural and urban, knowledge on social sustainability in small town water supply is limited.

2.7 TECHNICAL SUSTAINABILITY

Technical sustainability as defined in Section 2.3.3 is related to the technologies employed in water service delivery. The sustainability of service delivery of community water systems is constrained by the technical complexity of the water supply systems (Cotruvo, 1999). Yet few commentators consider the technical issues involved when prescribing institutional reforms to water supply models (IRC, 2003). This section presents the objective of water supply systems, the technologies of delivery in use in small towns and relates them to the management needs and hence the sustainability of the systems.

2.7.1 Technical objective of water supplies

The practice of transporting water for human consumption has been around for several millennia. From the first pipes by the Crete in 1500 B.C to the complex water distribution and treatment systems in developed countries, the history of water supply is quite a story. Although the size and complexity of water systems vary dramatically from cities to rural villages, they all have the same purpose – to deliver potable water from the source to the user (Walski et. al., 2001).

Engmann (2001) outlines the objectives that small town water supply systems must meet in developing countries:

- The supply of an adequate amount of water that includes the ability to plan for future expansion.
- The supply of water that meets international or at least national water quality standards.
- A reliable supply of water virtually without interruption.
- The above must be achieved in a cost effective manner (otherwise the financial sustainability of the system will be put in jeopardy).

A water management model meeting the objectives above can be said to be technically sustainable. However, technical sustainability is constrained by the type of technology in use in the communities.

2.7.2 Types of water supply systems in small towns

Water supply systems in small towns fall into three major classifications (Alorsorof, 1987):

- Borehole and hand pump based systems.
- Pipe gravity systems.
- Conventional water supply systems.

2.7.2.1 Borehole and hand pump based systems

Borehole and hand pump based systems are classified into two groups, deep boreholes and shallow protected dug wells. Deep boreholes and hand pump schemes rely on a well drilled usually with a rotary drill and has a small diameter of about 13 cm (Arlosorof et al., 1987). The well is lined but the water bearing aquifer part of the well is screened sometimes using perforated PVC pipes. The well is then fitted with a hand pump on a designed platform equipped with a drainage system. Pumps consist typically of pump rods, rising mains, cylinders and seals.

Borehole and hand pump based systems usually serve very few populations, usually a household and populations typical of rural villages (Doe and Oduro, 1999). These are therefore not common in small towns as defined in Section 2.3.3 of the thesis.

2.7.2.2 Piped gravity systems

Piped gravity systems serve larger populations than those served by borehole and hand pump based systems since they have distribution systems that can cover larger geographical areas. The flow of the water from the source through the distribution system is by gravity. A gravity piped scheme consists of intake works, pipeline, various tanks and tap stands and/or house connections. Much of the description of piped gravity systems are taken from Hofkes (1983).

The first point of flow in a water system is the source, where the water is collected at an intake and funnelled into the pipeline. Intake works include springs, stream intakes or dams. The fundamental purpose of the intake works is to collect water from diffuse sources and focus the water to a single point which is the entrance of the pipe system. The intake works incorporate standard design features which allow for adequate control of the water, opportunity for sedimentation and prevention of further contamination of the source.

Tanks in piped gravity systems are either break pressure tanks or reservoirs. The function of a break-pressure tank is to allow the flow to discharge into the atmosphere and thereby reduce its hydrostatic pressure to zero and establishing a new static level (Jordan, 1980).

Pipelines are the conduits by which the water is conveyed to the user. They thus form an important aspect of the design of a piped gravity system. These are usually buried some few centimetres below the ground surface. They can be looped, branched or both.

Tap stands are the most frequently used component of the entire system and as such face more abuse than other parts of the water system and no other structure fits in so closely with social and cultural needs. A tap stand is more than just a physical structure since it becomes a new and important gathering point of the town where women wash clothes and men bath themselves. The sustainability of a gravity piped system depends largely on the tap stands.

2.7.2.3 Conventional water supply systems

Conventional water supply systems consist of sources of potable water, treatment facilities, transport facilities, pump stations and customer configurations. Conventional water systems are mainly typical of cities and larger towns. The main

difference between conventional water supply systems and other systems is that they have at least a sedimentation basin whilst the others do not.

Untreated water (raw water) may come from groundwater source or surface water such as lakes, reservoirs and rivers. The raw water is usually transported to a water treatment plant where it is treated. The degree to which the raw water is treated to achieve potability depends on the characteristics of the raw water, relevant drinking water standards, treatment processes used, and the characteristics of the distribution system (Walski et. al., 2001).

Conventional water treatment consists of primary, secondary and tertiary treatment. Primary treatment usually consists of removal of large particulate matter. Initially, coagulant dosing with aluminium or iron salts is carried out using a dosing system. Passing the raw water through specially designed structures such as V-notches, or using mechanised flocculators creates turbulent flow, stimulating coagulant dispersion and floc formation.

The flocculated water flows into sedimentation tanks. The sedimentation tanks usually have a series of hoppers at the base of the tank to enable concentrated accumulation of deposits to allow them to be periodically discharged to a nearby sump. Sediment consists of fine agglomerated particles and floc. Water usually leaves the sedimentation tank via a spillway after skimming has taken place. Once leaving the sedimentation tank, the partially treated water enters a filtration system. The filter removes fine particles which failed to agglomerate and settle in the secondary treatment phase. Due to their light nature, these fine particulates remain in solution. The back flushing operation governs the arrangement of the filter beds. The filters cause the heavier and hence larger particles to settle first with the finer particles finally settling.

Tertiary treatment consists of disinfection and pH stabilisation. PH stabilisation is usually carried out by using lime. Before leaving the plant to enter the water distribution system, the water usually enters a unit called *clear water well* where disinfection usually takes place. Disinfection is carried out using chlorine/and or ammonia, ultra violet light or ozone.

Moving water from source to the customer requires a network of pipes, pumps, valves and other appurtenances. Potable water is usually pumped from the clear water well using pumps to storage tanks/reservoirs. The tanks are connected to the supply pipeline with inlet and outlet pipes and are usually raised above existing ground level. The stored potable water gets to the user through a network of pipes of different sizes, consisting of main lines and laterals. The length of the entire network can be indicative of the size of the water supply system. Tap stands and house connections represent the consumer end of the water distribution system. An examination of the physical status of a water supply system must comprise all the components described above because they have implications for the operation and maintenance of the system.

2.7.3 Operation and maintenance issues

Operation and maintenance is an inevitable requirement of any water supply system whose goal is sustainability, however simple the water system may be (Cotruvo et al, 1999). In the consideration of a water supply system, it is imperative that the project planners recognise the elements of the system design that make the facility suitable for a particular community (whether rural, small town or urban). According to Arlosorof et al (1987), many water supply systems are not sustainable because the communities take on maintenance and management commitments that are beyond their capabilities. It is therefore important to consider the appropriate organisation for maintenance of the systems right from the onset of the water project.

2.7.3.1 Maintenance needs of borehole and hand pump based systems

Most of the maintenance issues of borehole and hand pump based systems consist of the maintenance of the pumps. A common problem is the lack of spare parts (ibid). Common spare parts must be readily available in or near the community which could mean that it is manufactured locally. The public sector usually helps by ensuring availability of spare parts and by facilitating manufacture through the appropriate incentives and enforcing quality control. Under this system the community may contract a mechanic from nearby to fix the water facility paying for the services through a maintenance fund. A typical example is the employment of a repair man who lives locally and services facilities in other surrounding communities. The repairman is expected to carry a toolbox and have some specialised knowledge. The maintenance needs of this type of technology are not great and therefore easily handled under community water management.

2.7.3.2 Maintenance needs of gravity piped schemes

A piped gravity scheme demands a more organised approach compared to borehole systems since the maintenance is more complex than that of hand pumps which are typical of rural villages. The maintenance of piped gravity systems call for the replacement of burst pipelines, faulty valves, broken masonry work, broken taps to name just a few, the spare parts of which must be abundant in that region. Organisation for maintenance can take three forms, namely (Hofkes, 1983):

- Some community members trained to replace burst pipes and repair minor masonry damage.
- A centralised system used by the District in particular with emphasis on the role of a District Water Supply Engineer.
- A private contractor retained to take care of mechanical maintenance.

Under the first system, some community members who already possess some skills in masonry work and or plumbing are given some refresher courses to tailor their skills towards the maintenance of the piped schemes. This would include the replacement of sections of burst pipes and repair of cracked masonry. In normal operation and maintenance, as soon as anyone detects a leakage (usually detected by the wetness of the soil around the pipelines) that person must report it to one of the Water Boards (community's water managers). The next approach is to call in the repairman trained for that purpose. If the damage is within his ability he does the repair work. However, if it is more complex such as problematic valves and special problems with the electro-mechanical system, more specialised skills are required. The DANIDA Project in Ghana (Pem Consult, 1997) which promotes community management, makes mention of a District Water Supply Engineer or Technician. His duties include maintenance. He/she can carry out preventive maintenance activities such as touring the communities on a yearly basis to inspect the piped systems. He/she must however be available when any problem with the water systems is reported to his office. To carry out his duties he would need a maintenance crew. These are recruited from the bigger communities nearby or people can be centralised under a unit of a governmental agency such as the Community Water and Sanitation Agency of Ghana. This also calls for the ready availability of spare parts. This system is rather theoretical and has limited practicality. The problem with the maintenance of piped gravity schemes is that many of the spare parts may not be produced locally or even nationally. In such a case maintenance may be expensive and thus mobilisation of money for repairs requires effective billing and tariff systems by competent management systems. Questions of how to make these water supplies which are typical of small towns sustainable arise.

2.7.3.3 Conventional water supply systems

Operation and maintenance of conventional water supply systems is the most complex of all the three categories of water supply systems discussed so far due to

the large size and complexity of the systems. They consist of repair of tanks, treatment units, pump stations and lengths of pipe networks some with very large diameters of several meters.

Among the management expertise required for the management of conventional water supply systems are:

- Pump operation
- Trouble shooting
- Routine maintenance
- Breakdown maintenance
- Rehabilitation and expansion of system to meet demand
- Water quality monitoring
- Data collection, interpretation and reporting
- Monitoring
- Supervision of operatives
- Operation of production plant and source protection

Daily operations include activation of pumps, dosing chemicals, flushing of pipelines and inspection of generators, valves, pumps, hydrants, meters and pipe networks. Inspection includes overall civil structures such as pump stations, chemical storage rooms for cracks, general equipment storage rooms for cracks and other signs of distress including, deterioration of finishes as well as service installations, electrical, plumbing etc. However, studies into the technical sustainability of the water supply systems in small towns have received very little attention.

According to Jordan (1980) less obvious problems, however may arise from the “human factor” which include the management issues. Some of the human

problems result in neglect, inadequate or no maintenance. An assessment of the sustainability of the water supply systems must therefore consider not only the technical issues but management issues as well.

2.8 FINANCIAL SUSTAINABILITY

Financial sustainability is an important facet of the long term sustainability of the water supply systems in small towns as stated in Section 2.3.1. Aspects of management which were neglected in community management and therefore resulted in the inability of community systems to remain sustainable can be traced to (IRC, 2003):

- Managerial efficiency
- Quality of service
- Cost recovery and willingness to pay

These issues are reviewed in the following sections.

2.8.1 Managerial Efficiency

Managerial efficiency is an important aspect of sustainability because it determines whether the water supply system will be functional in the long term or fall into disrepair. Managerial efficiency therefore plays a strong role in this study as contained in the methodology to the field work in Chapter 3.

The practical efficiency questions that arise in water supply are (WHO, 2000):

- How efficient are the services?
- What proportion of the time is the water supply out of service?
- How predictable is downtime?

- Can consumers plan around it?
- In piped systems, what are the amounts of physical and non-physical (apparent) losses?

For the issue of efficiency to be meaningful and useful it must be measurable or identifiable. CINARA (2000) identifies some key variables in Table 7 which can be applied in determining the efficient performance of a water supply system some of which have been applied in the design of the methodology in Chapter 3. This is also reflected in the field data collection of the thesis in Appendix 2.

Table 7: Key indicators of efficiency in water supply (CINARA, 2000)

Key questions	Indicators
How efficient are the services?	<ul style="list-style-type: none"> • Total number of bills paid/total number of bills distributed (effectiveness of billing) • Profitability (annual) • What are the investments • Reserves for damages and future investments
What proportion of the time is the water supply out of service?	<ul style="list-style-type: none"> • Proportion of time the water system is out of service
How predictable is downtime?	<ul style="list-style-type: none"> • Ability of consumers to plan around it.
What are the amounts of physical and non-physical (apparent) losses?	<ul style="list-style-type: none"> • Unaccounted for water per month.

An efficiently managed water supply system will promote sustainability because financial resources will be available to keep the system running (Cotruvo et. al, 1999). These key indicators were employed in the design of the field data collection in Chapter 3.

2.8.2 Quality of Service

Quality of service is an indirect way of gauging the performance of water management from the perspective of the users. A service may be defined generally

as 'any activity or benefit that one party can offer another that is essentially intangible and that does not result in the ownership of anything. Its production may or may not be tied to a physical product' (Kotlar and Armstrong, 1989). In an age marked by consumers of varying tastes and different degrees of sophistication, competition in business has intensified and one of the ways by which some businesses have sought to be ahead of competitors is by service differentiation (Boyd and Walker, 2000). Zeithaml et al. (1990) identify four dimensions of service quality. These are:

- Tangibles: Appearance of physical facilities, equipment, personnel and communication materials.
- Reliability: Ability to perform the promised service dependably and accurately.
- Responsiveness: Willingness to help customers and provide prompt service.
- Assurance: Knowledge and courtesy of employees and their ability to convey trust and confidence
- Empathy: Caring, individualised attention the firm provides its customers.

These service quality dimensions are most crucial to the survival of most businesses. However, how do they fit into the scope of the management of a naturally monopolistic business such as a water supply? In water supply, quality of service refers to (WHO, 2000):

- The type of access to water supply services there is.
- The type of technology used.
- Effectiveness of the services provided.
- The cleanliness and safety of the water at the point of distribution.
- The safety of the water at the point of consumption.
- The water quality parameters of greatest concern to the consumer.

Saywell (2000) observed that in most developing countries, water and sanitation users [especially those in small towns] are not viewed as customers and therefore do not enjoy the quality of service attributes discussed so far. This invariably has a negative impact on sustainability because some water utilities do not try to satisfy the customer needs of quality. However, the perception of quality of service by the consumer is perhaps the most important attribute of a service. This is because, if the users (customers) can not link the amount of money that they have to pay for the water supply service, they will be unwilling to pay for it and user fee collection would be more difficult (Mukherjee, 1999). The knowledge base on these indicators is rather limited. This research therefore employs quality of service as an important indicator of sustainability which the research methodology applies in the design of the household surveys in Appendix 1.

2.8.3 Costs and willingness to pay

The costs associated with water supply in small towns can be classified into two broad categories:

- Capital investment costs.
- Operation and maintenance costs.

Capital costs cover the service establishment costs. Operation and maintenance costs are associated with the day to day running of the water supply systems. For sustainability, the water consumers in the communities must not only pay operations and maintenance costs but contribute as well to capital costs (Cotruvo et. al, 1999). According to the Water Supply and Sanitation Programme of the World Bank (WSP) (2001c) the actual sharing of capital costs between the various stakeholders is very diverse.

In small towns in Vietnam, on average users pay 16% and the rest comes from public sources including donor funds. According to Linares (2000), in small towns in El Salvador, the capital costs are covered from a government grant. The user is expected to pay for the capital costs through “connection fees”. In some countries, official development assistance projects require the beneficiaries to pay from 5 to 20% of the capital cost of system establishment and to pay for all the operations and maintenance costs (CWSA, 1990).

Even though financing of the capital costs varies across countries, the users are expected to bear the full operational and maintenance costs. According to the WSP (2000), the selling price of water in small towns should cover:

- Compensation of workers
- Operations (power, upkeep, maintenance, management)
- Renewal of equipment
- Future extensions

But can the users in small towns pay the water user fees? In a study of 37 small towns in Nigeria, Stoveland and Bassey (2000) observed that 95% of all households surveyed were willing to change their water supply to an improved system. The same source also stated that more than 90% of the small town households were willing to pay tariffs similar to those in the cities and even more. Furthermore in Colombia, the private management of water supplies was able to recover operation and maintenance over sale of 80 to 93 per cent compared to other management models which had only 66% (WSP, 2001a). Linares (2000) in a study of small towns in El Salvador also observed that the small towns were able to pay in excess of operating costs.

Willingness to pay depends on other factors than the value householders place on the clean water supply. However, the amount people are willing to pay for water supply is affected by:

- Current water supply- those without potable water were willing to pay more for water
- Type of connection- those with household connections were willing to pay more

The WSP (2001a) also observed that the type of fees paid by the users depends on the type of management system. The financial sustainability of the water supply systems therefore depends on the ability of the water managers (Water Boards) to collect user fees by employing appropriate management models. The prevailing literature does not give much account of the ability of Water Boards in small towns to collect water user fees under community management.

2.9 CHAPTER SUMMARY

The literature review provided insight into the technical, social, organisational and financial issues associated with the sustainability of community water management in small towns from the existing literature. The following points are highlighted from the review:

- **Sustainability** – which refers to the long term operation of the water supply systems depends on technical, social, financial and organisational issues. A framework for the investigation of the sustainability of the water systems in any community must therefore include all these facets.
- **Management models in small towns** – Even though public utility management of water supplies used to be the de facto water management

model in small towns, the current trend is towards community management as an exclusive option due to the inefficiency and ineffectiveness of public utilities. However, the literature points to the need to investigate the boundaries of community management. The literature also shows that another management model which requires investigation is public-private partnerships in water supply management. The rest of the study was therefore devoted to an investigation of these two management models.

- **Neglect of small towns in international fora on water and sanitation –** Even though the literature review shows many international fora focusing on water supply in developing countries, very few make specific action programs for small towns. Small towns are therefore left out in development programs. However, the important role of small towns in the urbanisation process shows that they deserve better.
- **Limited studies on water service delivery in small towns -** Valuable studies of small town water management have been undertaken in some developing countries including Nigeria, Colombia, Mauritania and Uganda by the Water and Sanitation Programme of the World Bank (WSP, 2001a; WSP, 2001b; WSP, 2001c; WSP, 2001d). However, the literature review indicated that few publications have covered the issue of the sustainability of community management in small town water supply.

In particular, no substantive information was found which relates to the following important issues regarding the sustainability of small town water supply systems:

- The characteristics of small towns that differentiate them from rural villages from the perspective of water service delivery.

- The status of technical sustainability of the water supply systems in small towns under community management.
- The status of social and financial sustainability of the water supply systems in small towns.
- Alternative management options to community management in small towns.
- User perception of alternative/improved management models in small towns.

These gaps in knowledge and practice were used in the definition of the key research questions stated in Section 3.2 of this thesis.

3. RESEARCH DESIGN AND METHODOLOGY

3.1 CHAPTER OUTLINE

After identifying the gap in knowledge on the sustainability of community water management in small towns, the next step is the appropriate design of a methodology that investigates the research questions that arise. This chapter presents the methodology adopted for the research and covers a presentation of the:

- Objectives of the research and research questions
- Guiding hypothesis
- Research design
- Data sources and justification
- Indicators for data collection on sustainability
- Data collection methods
- Method for data analysis

The overall research design, process of field work and analytical framework for data analysis are described and explained. Emphasis is given to the sources of data, justification for data selection and the techniques adopted for data collection and analysis.

3.2 OBJECTIVES AND RESEARCH QUESTIONS

The purpose of the preceding literature review was to provide the necessary background, to demonstrate the significance of the study and to identify the specific knowledge gap associated with the provision of water supply to communities in small towns of developing countries. Having examined the existing literature on the sustainability of small town water service delivery, the

next most important stage is the clear articulation of the research question/s that arise. This has clear implications for the type of research design to be adopted for the investigation (Yin, 1989).

From the literature review the primary research question can be stated as:

How sustainable is small town water service delivery under community management?

The primary research question leads the researcher to an investigation of the status of community water management in small towns. A series of secondary research questions are associated with the primary research question. Table 8 presents the gaps identified in the literature (Section 2.9) and the associated secondary research questions.

Table 8: Research questions and objectives

Gap in Literature	Research Question	Objective
The characteristics of small towns that differentiate them from rural villages from the perspective of water service delivery.	How different are small towns and rural villages from the perspective of water service delivery?	To investigate whether or not differences exist between water service delivery characteristics of small towns and rural villages. The criteria for comparison include demographic factors, community support and ownership of water supply initiatives which are important criteria for the organisational sustainability of community management.
The status of technical sustainability of the water supply systems in small towns.	What is the status of technical sustainability of small town water service delivery compared to rural villages?	To carry out a technical assessment of the water supply systems in selected small towns to determine how well they have been managed under community management since establishment compared to rural villages employing community management under similar intervention.

Gap in Literature	Research Question	Objective
The status of social and financial sustainability of the water supply systems in small towns.	What is the status of social and financial sustainability of small town water service delivery compared to rural villages?	To investigate the social and financial sustainability of small town water service delivery compared to rural villages employing community management under similar intervention.
Alternative management options to community management in small towns.	What are the challenges that arise in the consideration of alternative water management models in small towns?	The objective was to investigate problems and barriers of entry to alternative management models in the water sector in small towns.
User perception of alternative/improved management models in small towns	What are stakeholder perceptions of alternative water management models in small towns?	The objective was to investigate the level of awareness and readiness of users and other stakeholders to accept public-private partnership as a water management model.

This research aims to advance knowledge on the sustainability of small town water management and to help facilitate decision-making processes regarding water service delivery by service providers. The work encompasses a wide variety of issues including organisational, institutional, financial and technical considerations. The focus is to critically examine the sustainability of community water management in small towns and alternative management models. Much attention is however focused on the perceptions and preferences of the users as this is pivotal to the sustainability of any water management solution. This is important because most often assessments and judgements regarding the choice of water supply and sanitation are heavily decided based on external perspective (Saywell, 2000). However, the long term sustainability of a chosen water management model cannot be achieved without the cooperation of the stakeholders.

3.3 HYPOTHESIS

The working hypothesis of the research to be examined in order to answer the research questions is stated as follows:

Community management is limited in achieving sustainable water supply solutions in small towns of developing countries; hence modifications are needed in approach to the issues of small town water supply.

3.4 RESEARCH DESIGN

Research design is essentially a logical sequence of steps linking the initial research questions to the data collected and ultimately to a series of conclusions arising from the study (Yin, 1989). The overall research design for this study is outlined in this section. The purpose is to ensure that the logic of the study's approach is maintained thereby avoiding situations whereby the evidence fails to address the initial research questions.

3.4.1 Research strategy

Yin (1989) offers a framework which is useful in deciding the choice of research strategy appropriate to the research questions identified. These comprise three main conditions:

- The type of research question posed.
- The degree of control over behavioural events the investigator can exercise.
- The extent to which the investigation focuses on contemporary rather than historical events.

Table 9 illustrates the three conditions as applied to each potential research methodology.

Table 9: Research design selection criteria

Strategy	Case study	Survey	Archival analysis	History	Experiment
Form of research question	how, why	who, what, where, how many, how much	who, what, where, how many, how much	how, why	how, why
Control over behavioural events	no	no	No	no	yes
Focus on contemporary events	yes	yes	yes/no	no	yes

Source: Yin (1989)

Cross-referencing the key elements of the study against the framework in Table 9 defines the appropriate research strategy. Small town water supply is a contemporary issue and not historical thus history and archival analysis are not appropriate strategies. Furthermore, because, the researcher could exercise no control over the phenomenon in question, experimental analysis is ruled out. This leaves case study and survey as the most appropriate research strategies to investigate the sustainability of community water management in small towns.

Fink and Kosecoff (1998) defined survey as a method of collecting information directly from people about their ideas, feelings, plans, health, beliefs, social, educational and financial background. The survey method is especially important in this thesis because the perceptions of the various stakeholders in the small town water sector are sought regarding community management and alternative management models.

A case study is technically defined as an empirical study that (Yin, 1989):

- Investigates a contemporary phenomenon within its real-life context; when

- The boundaries between phenomenon and context are not clearly evident; and in which,
- Multiple sources of evidence are used.

Case study as a method for investigating the research questions raised in Section 3.2 is suitable because of its flexibility and when used in an intellectually rigorous manner to achieve experimental isolation of selected social factors offers the strengths of experimental research within natural settings (Hakim, 1987). Furthermore, case studies enable the use of a variety of data collection techniques and methods including survey which gives a more rounded, holistic, study than with any other design (Yin, 1989; Hakim, 1987).

3.4.2. Components of the case study research

Yin (1989) argues that a good research design should comprise five components:

- A study's questions.
- Its propositions.
- Its unit(s) of analysis.
- The logic linking the data to the propositions.
- The criteria for interpreting the findings.

These are described according to this study's focus in Table 10.

Table 10: Case study research components

Case Study Component	Application to this Study
Study question/s	How sustainable is small town water service delivery under community management?
Study's propositions	Community management is limited in achieving sustainable water supply solutions in small towns of developing countries; hence modifications are needed in approach to the issues of small town water supply.
Its unit(s) of analysis	The water management structure in small towns of developing countries.
The logic linking the data to the propositions	The method by which the data is linked to the hypothesis. It provides guidance on data to be collected and methods for analysing the data.

The criteria for interpreting the findings	This refers to the analytical framework used to manage the data collected. This is based on the facets of sustainability defined in Section 2.3.1.
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3.4.3 Validity and reliability

Because a research design is supposed to represent a logical set of statements, the quality of any given design can also be judged based on certain logical tests. Yin (1989) as well as Cook and Campbell (1979) mention four tests of validity and reliability which are relevant for this study. These are:

- *Construct validity*: the extent to which the constructs in the conceptual framework can be successfully measured in the research;
- *Internal validity*: the extent to which a causal relationship can be established, whereby certain conditions are shown to lead to other conditions, as distinguished from spurious relationships;
- *External validity*: the extent to which the study's findings can be generalized;
- *Reliability*: the extent to which the operations of a study such as data collection procedures can be repeated with the same results.

Since the sustainability of community water management in small towns has more descriptive research questions requiring the development of a comprehensive picture of a phenomenon, greater emphasis is placed on construct validity, external validity and reliability.

The selected measures relied upon to improve validity and reliability of the study are shown in Table 11.

Table 11: Validity and reliability measures

Test	Case Study Tactic	Phase of Study in which Tactic Occurs
Construct validity	Multiple sources of evidence used from government/policy makers, water users, water management boards and direct observation of the water systems. Establish chain of evidence Have sector peers review the draft case study report	Data collection Data collection Composition
External validity	The use of multiple case studies	Research design
Reliability	Employment of quantitative and qualitative techniques Develop case study database	Data collection Data collection

An elaboration of the validity and reliability measures in this research can be found in Section 3.7 of this thesis.

3.5 DATA SOURCES AND JUSTIFICATION

Since the research investigates the sustainability of water management in small towns, relevant primary and secondary data were sought. For secondary data, the researcher relied on analysis of institutional and administrative reports and academic journals pertaining to the subject as stated in Section 2.2 of the literature review. For primary data, the researcher relied on household surveys, key informant interviews, direct observation and focus group discussions which are described in Section 3.7. This section presents the data sources and the justification.

3.5.1 Data sources

The approach for the selection of primary data sources can be analysed at the macro, meso and micro levels.

At the macro level, Ghana was chosen on the basis that:

- It's socio-economic and multi-cultural characteristics are similar to many developing countries in Africa. Results can therefore be generalized to other developing countries to some extent.
- It affords the practice of community management which is similar to many developing countries.
- It has in the past served as a pacesetter to other African countries. Therefore a successful model developed from Ghana will offer a good chance of acceptability and replication in other developing countries.
- It has an active private sector and some structured government institutions for PPP in water service delivery.

From the author's 8 years of work experience in the water sector in several developing countries, the choice of the country Ghana alone was deemed sufficient for all the data collection since the practice of community management upon which this study focuses is similar to that of other developing countries. Furthermore, the case study methodology aims for replication (see Section 3.5.2). Therefore, choosing more than one country for this study would be superfluous.

At the meso-level, small towns were selected because they are important settlements in the development of developing countries as stated in Section 2.3.3 of the literature review.

At the micro-level, two small towns and two rural villages were selected with the help of the personnel of the Community Water and Sanitation Agency (CWSA) which is the governmental agency responsible for small towns and rural water supply in Ghana.

The following criteria developed from the definition of small towns in Section 2.3.3 of the literature review were applied in the selection of the small towns:

- Are sufficiently large and dense to benefit from the economies of scale offered by piped systems, but too small and dispersed to be efficiently managed by a conventional urban water utility.
- Require formal management arrangements.
- Require a legal basis for ownership and management.
- Have the ability to expand to meet the growing demand for water.
- Have populations between 5,000 and 50,000.

In addition, the following criteria were used in the selection of all the four case studies including the two rural villages for comparison.

- Community management in operation for at least 2 years.
- Water supplies established by service providers (governments and/or NGOs).
- Availability of management records.
- Geographical coverage (as many regions as possible in Ghana).
- Communities with a prior water scarcity problem because they value water best.

Two years of operation has been chosen as an adequate length of time to show whether a water supply system has the potential of being sustainable or not because according to Niedrum (1994) community water management usually has a life span of 3 years (Section 2.5.2.2). The choice of 2 years therefore was to accord the researcher the opportunity to study functional water systems and not broken down systems.

Water supplies established by service providers accords a common platform for comparison since all case studies under technical cooperation were established using participatory development similar to those described in Section 2.4.1 of this thesis.

Management records, especially financial records serve as indicators of financial sustainability of water supply management as discussed in Section 2.8. However, not all towns in developing countries have management records for their water supply. Therefore, in order to be able to perform this study, the case study towns must have management records.

As wide a geographical coverage as possible was sought in order not to bias the study in favour of certain geographical areas in Ghana. Furthermore, communities with prior water scarcity problems are the best to use for the study because they all value water equally.

3.5.2 Justification for multiple case studies: replication

Section 3.5.1 stated that two rural villages and two small towns were used for the case studies. The purpose of using multiple case studies was for literal and theoretical replication.

A key analytic method used in the analysis of multiple case studies is replication. The primary focus of the analysis is on the overall pattern of results and the extent to which the observed pattern of variables matches a predicted one. The researcher examines a single case for the pattern and if it is found, then looks to see if it is found in subsequent cases. If identical results are predictably obtained over multiple cases, literal replication has been achieved (Yin, 1994). To this end two rural villages are being examined in Ghana based upon the findings of the literature review that community management is a rural water supply model. If the results

from the two rural villages are identical and confirm the theory in the literature review, then literal replication has been achieved.

On the other hand, if different results are obtained over multiple cases but for predictable reasons, theoretical replication has been achieved (Yin, 1994). Two small towns are being used for the expectation of theoretical replication in this study, since the study hypothesises that community management is limited in providing sustainable water services in small towns.

In the case study method, because the researcher does not use statistical generalization, but rather, generalises theory, the goal is to obtain replication, not enumeration (Yin, 1994; Kohn, 1997; Tellis, 1997).

3.6 INDICATORS FOR DATA COLLECTION ON SUSTAINABILITY

An important step in the design of the case study methodology is the determination of what needs to be measured and/or observed in the case study communities in order to investigate the literal and/or theoretical replication. As has been established in Section 2.3.1, the thesis examines the extent to which small town water supply can be sustained through community management. This section therefore presents a set of indicators arising from the sustainability framework for the thesis identified in the literature review in Chapter 2. The indicators were pilot tested using two communities similar to those used in the actual fieldwork. The indicators and the results of the pilot testing are presented herein.

3.6.1 Facets of sustainability

Mukherjee (1999) identified the dimensions of sustainability applied to water supply evaluation as consisting of the following as stated in Section 2.3.1:

- Social sustainability
- Organisational sustainability
- Technical sustainability
- Financial sustainability

These dimensions have been tested and refined by the World Bank in developing countries since 1997 (ibid). All these factors of sustainability interact with each other and could change over time. This makes the measurement of sustainability a complex challenge. These dimensions were therefore pilot-tested before being applied to the case studies in Ghana.

3.6.2 Indicators

The indicators associated with the dimensions of sustainability are shown in Figure 2. These indicators have been stated and explained where necessary in Sections 2.5 to 2.8 of the literature review. The purpose of presenting them here is to collate them for the pilot testing in the field. The indicators have been used in community managed water supply studies by the World Bank (Mukherjee, 1999) in some developing countries and also by CINARA in Latin America (CINARA, 2000).





Facets of Sustainability	Indicators of Sustainability	
Technical Sustainability		<ul style="list-style-type: none"> • What functioning systems exist? • What physical condition are they in? • What is the physical quality of system design? • What is the quality of workmanship? • What are the differences between original and current designs as a result of user modification?
Financial Sustainability		<ul style="list-style-type: none"> • What is the technical capacity of the management committee? • What is the perceived quality of service by users? • What is the willingness to pay? • Do tariffs cover all costs? • Is there transparency of the financial management? • Is there a designated treasurer?
Organisational Sustainability		<ul style="list-style-type: none"> • What is the participation in planning and decision-making? • What is the organisational structure? • What is the participation of women? • Are there clear rules for water usage and fees? • Is there ownership and rights?
Social Sustainability		<ul style="list-style-type: none"> • What is the water supply coverage? • Is there effective use? • Is there consumer satisfaction? • What is the nearness and location of the source to users?

Figure 2: Empirical evaluation of sustainability

3.6.3 Pilot testing

Fink and Kosecoff (1985) and Mikkelsen (1995) observed that, it is prudent to pilot test methodologies prior to the actual field work. The methodology including the indicators of sustainability was therefore pilot tested on two communities (one rural, one small town) similar to those used for the actual fieldwork in Ghana. The observations from the pilot study are noted herein.

- Contacts with resource personnel were made during the pilot testing of the methodology which proved invaluable in terms of logistics during the main field work.

- Much time was spent during the pilot testing to locate sources of relevant data. At one time the researcher moved across the whole country only to be told that the information sought was in the capital city of Ghana. The thoroughness of the pilot testing therefore made the main fieldwork run smoothly. It also helped in deciding which data sources were worth concentrating on.
- The pilot testing made it possible for the researcher to gauge how much time was needed to do effective data collection during the actual field work.
- The pilot testing also helped the researcher to refine the methodology checklists used.
- In terms of the dimensions of sustainability, the author found that they could be expanded to cover more indicators (e.g. time of response as a measure of financial sustainability).

The indicators were reframed so that they could be scored and ranked, where necessary. An improved version of the sustainability indicators was incorporated into the main field work. These indicators are in the survey and evaluation proforma (Appendices 1 to 3). The final indicators are presented in Section 5.3.2.

3.7 DATA COLLECTION TECHNIQUES

Deciding what to measure for the investigation of sustainability does not guarantee that one knows how to measure the indicators. Mukherjee (1999) observed that the best evaluation approach is based on the belief that community-based programs are best evaluated by the communities themselves. Consequently, multiple sources of evidence were applied by seeking data from the households (beneficiaries) in the communities, water sector personnel and the private sector in order to improve

construct validity as stated in Table 11. The specific data collection techniques employed to improve validity and reliability include:

- Direct field observation.
- Semi-structured interviews.
- Household surveys.
- Focus group discussion.

The following section gives an account of how these techniques were applied in the field.

3.7.1 Direct field observation

Direct field observation enables the researcher to see for him/herself the conditions of the community setting under observation. According to Hamdi (2000), it enables a researcher to form a preliminary opinion about how things work based on a variety of indicators. For example, long lines at stand pipes might tell about inadequate water pressure, poor maintenance etc. etc.

The direct observation consisted of a technical assessment by the author of the water supply systems in the case communities in the months of February to April 2002. It was based on the technical component of sustainability discussed in Sections 2.7 and 3.6. It provided data on how technically sustainable community management was in the small towns. The main objective was to ascertain whether the Water Boards in rural communities were more effective at carrying out their water management duties than those in the small towns. This was reflected in the status of the physical water supply systems. Furthermore, prior to the direct observation, relevant plans of the distribution system and as-built drawings were studied which provided another point for comparison of the present state.

The salient data derived from the technical sustainability indicators in Section 3.6.2 was summarised in Table 12. The detailed evaluation proforma used in the field is in Appendix 2 of this thesis.

Table 12: Summary of the observation points

Water supply system	Points of observation
Source works	<ul style="list-style-type: none"> • Soundness of treatment works • Soundness of retaining walls • Status of drainage at the source • Cleanliness of immediate surroundings
Distribution system	<ul style="list-style-type: none"> • Soundness of reservoirs/tanks • Leakage in pipelines • Status of valves • Status of pumps
Consumer end	<ul style="list-style-type: none"> • Status of stand pipes/house connections • Status of drainage at the stand pipes • Cleanliness of immediate surroundings • Water quality (taste, colour and smell of water)

The evaluation proforma helped in the rating and evaluation of the performance and status of the water supply schemes. In all communities the Water Boards accompanied the author during the direct observation. They were very useful because they knew the systems very well and clarified any questions the author had. The direct observation therefore helped to verify the information obtained from the Water Boards/operators by establishing a reliable data set on the performance of the water systems over the years of operation (triangulation of data). The use of the multiple sources of data as well as the direct observation therefore improved the construct validity of the study as stated in Table 11.

3.7.2 Semi-structured interviews

Semi-structured interviews parallel closely direct observation and include listening to the needs, problems and aspirations of local inhabitants and other key informants (Hamdi, 2000).

Semi-structured interviews were conducted with key water sector personnel and the heads of private organisations interested in participation in the management of small town water supplies. This was done to examine their perceptions relating to community management in small towns and to elicit more detailed information on the research questions identified in Section 3.2.

Ten interviews were conducted with policy makers from the Ministry of Works and Housing, Community Water and Sanitation Agency (CWSA) and the District Assemblies (DA) during the course of field work. The similarities in responses did not warrant more interviews than ten. All the ranges of informants at the various levels of policy making in the water sector especially in relation to small towns were covered. Furthermore, since the sector personnel had oversight of all the small towns and rural water supply in Ghana, the views expressed were not limited to the four case communities investigated but included all the small towns in Ghana. They therefore provided an expert panel for the review of the findings as to the similarity of the case study communities to the rest of the communities in Ghana. This provided construct validity to the study as stated in Table 11.

Appointments were made with the key informants and prior to the commencement of the interviews, the interviewees were informed about:

- Purpose of interview and the research.
- Estimated length of interview.
- Anonymity (if required).

The interviews usually lasted between 30 minutes to 1 hour per person. Full-text transcripts of the interviews with the key sector personnel are presented in Appendix 7. They were based on the organisational dimension of sustainability presented in 3.6.2 and the following:

- Policy formation and implementation in the small town water sector
- Problems facing community management
- Barriers of entry to PPP
- Perceptions on PPP

Since the private sector is an important part of public-private partnerships, key personnel such as company executive officers of private companies which had expressed an interest in the management of small town water supplies were also interviewed by the researcher. The list of the companies was obtained from the Community Water and Sanitation Agency (CWSA) and is in Appendix 5 of this thesis. Table 13 shows the companies by categories of statements of expertise.

Table 13: Areas of private sector expertise

	Management, operations, maintenance, billing and collection	Technical support – design, civil, electro/mechanical installation and repairs	Water quality monitoring
No of firms	21	27	13

Total number of responding firms – 35

Some of the firms are quite sizable with over 100 employees and have been in the water sector as consultants, suppliers of machinery and equipment, and in commercial management for over 30 years. The list also included the most important civil engineering firms in Ghana. The interview questions can be found in Appendix 4 and included:

- Areas of company expertise
- Staff qualification
- Experience in the water sector

- Barriers to entry into the small towns water market

3.7.3 Household survey

Surveys can be used to make policy decisions, evaluate programmes and conduct research when the information needed should come directly from the people concerned (Fink and Kosecoff, 1985). House to house surveys therefore formed a central part of the data collection process since this ensured a 100% response rate. Ten (10) field assistants comprised of environmental health officers, social scientists and civil engineers with at least two years of experience in survey data collection helped in the household survey. Prior to the data collection, they were given an orientation on the purpose of the research and the type of data sought in order to improve reliability. A household survey on the average took an hour and a half to complete.

Stratified random sampling was employed whereby each town was divided into four parts with equal number of households randomly sampled within each group (strata). The study aimed to collect as sizeable a data set as possible within logistical constraints in each small town. The sample size was set at about 5% of all the households in a town. This technique was adopted to ensure that the responses gained are representative of the cross-section of household opinions and views. The research did not aim to prove that results from the survey are statistically significant but rather establish credible relationships between selected variables.

The household survey was designed to cover the characteristics and perceptions of small town dwellers and included:

- Sex, age and occupation of household heads/respondents
- Household size

- Involvement in planning & decision-making towards the water supply service establishment
- Meeting attendance and support of water supply activities
- Ownership of the water supply systems
- Level of awareness of the private sector in water supply in their towns
- Perceptions towards private sector involvement in water management
- Quality and usage of water
- Customer satisfaction with water supply
- Satisfaction with the job performance of the Water Boards

These issues were covered in an attempt to answer the research questions about the sustainability of community management as well as user satisfaction with other water management options. The full household survey proforma is in Appendix 1 of this thesis.

344 household surveys were completed as part of the research. The main reliability and validity issues with regard to data collection are included below. Efforts to mitigate errors arising in these forms are detailed below:

Sample selection bias: The districts of the towns to be sampled in this research were discussed in negotiation with the field assistants to ensure that the areas complied with the agreed criteria. The Field Assistants covered three sections whilst the author covered the fourth.

Item non-response error (failure of respondents to answer individual questions): Analysis of missing values from the questionnaire indicates a low level of item non-response for a majority of variables. In the majority of cases this ranged from 1.4 to 5%.

Response error (respondents misunderstanding the wording of the questions as presented): Attention was paid to providing field assistants with a detailed orientation towards the research and the questionnaire questions prior to the fieldwork. Furthermore, since the author took part in the household survey, the responses from the field assistants was cross checked to ensure reliability.

All the measures mentioned above during the survey therefore helped to ensure the validity and reliability of the study.

3.7.4 Focus group discussion

Focus group discussion as a method was chosen in order for the researcher to meet the various Water Board members as a group and not as individuals. Focus group discussions were therefore held with the Water Boards with a view to collect data on the performance of the water supply schemes and to solicit their opinion of community management and other management options. The Water Boards, being the managers of the water supply systems, are responsible for the day to day management of the water supply systems and hence their management activity is the unit of analysis of this research (see Table 10).

Members of the CWSA helped the researcher to arrange meetings with the four Water Boards in their respective communities. Discussions were held with 48 Water Board members in the four case study communities of Avenui, Tota, Savelugu and Bekwai in the months of February to April 2002.

Issues dealt with were based on the indicators of organisational sustainability identified in Section 3.6.2. In addition the following issues were dealt with:

- The process of selection of water boards and the length of a term of office.
- The rationale for their taking the job and if they were remunerated.

- How water tariffs were decided.
- Management of operation and maintenance.
- Complaint handling.
- Handling of defaulters.
- Financial information (revenues and costs) of the management of the water supplies.
- Level of awareness and perception of the private sector in water supply management.
- Perceived advantages and disadvantages of alternative management models.

The detailed proforma that guided the discussions with the Water Boards can be found in Appendix 3.

3.8 DATA BASE SUMMARY OF DATA RECORDS

The research generated a large quantity of qualitative and quantitative data relating to water supply in small towns of Ghana. Although the bulk of the raw data is not presented in the thesis, a synthesis is provided in the subsequent chapters. Table 14 summarises the database.

Table 14: Summary of information available in research database

Information Item	Quantity
Household survey questionnaires	344
Focus group discussions with Water Board members	48 members in 4 groups
Semi-structured interviews with key informants in the water sector	10
Survey questionnaires administered to local private companies in the water sector	35
Direct observation / evaluation of the water supply systems	4
Documents reviewed comprising, journal articles, administrative documents, published and grey literature	315

The household survey can be further broken down according to the case communities as presented in Table 15.

Table 15: Break-down of household surveys in case communities

Town ¹	Region	Population (2002)	Number of households	No. of household surveys administered ²
Bekwai (S)	Ashanti Region	28,000	1217	108 (9)
Savelugu (S)	Northern Region	25,000	1786	120 (7)
Tsrupke-Tota (R)	Volta Region	2,840	284	56 (20)
Awudome-Avenui (R)	Volta Region	1,700	189	60 (32)
Total			3476	344 (10)

¹ S and R refer to small towns and rural villages, respectively.

² Percentages of households surveyed are given in bracket.

The mean household sizes for Bekwai (S), Savelugu (S), Tota (R) and Avenui (R) are 23, 14, 10 and 9, respectively. Dividing the population by the mean household sizes calculated gave an estimate of the number of households in each community. The aim of the research whilst not employing a rigid scientific sampling methodology was to survey at least 5% of the households. However, due to the ease of administration of the questionnaire in rural villages more households were surveyed (20 and 32%, respectively). It was more difficult to cover the small towns because they are larger hence 7% to 9% of the households were surveyed.

3.9 DATA ANALYSIS

Sustainability as defined in Section 2.3.1 is multifaceted. Therefore an analysis of the sustainability of community water management in small towns must involve all the relevant facets in order to give a holistic picture. These facets include:

- **Technical sustainability** - refers to whether the water supply technologies selected can be maintained long term by those responsible for the water systems.
- **Financial sustainability** - refers to whether the water system is managed efficiently such that essential funds for the management of the water supplies and system expansion are always available.
- **Organisational sustainability**- refers to whether the institutions and organisational models employed can carry on long after water system inauguration or whether the water system will collapse into disuse because essential organisational skills cannot be found.
- **Social sustainability** – refers to whether system operation will damage the environment, health and prosperity.

The data was analysed using a statistical package for the social sciences (SPSS).

The data collected on the facets of sustainability during this research is quantitative as well as qualitative. The quantitative data has been generated from the technical evaluation of the performance of the water supply systems and the household surveys. This included financial and engineering data on the water supply systems. The qualitative data came mainly from sampling the views of the Water Boards, key sector informants and household heads.

The technical data regarding the status of the water supply systems were assigned numbers on a progressive scale reflecting the status of the water supply systems so that a comparison could be made of the technical performance indicators. Different aspects of the technical assessment (see Appendix 2) were assigned numbers. The

researchers experience as an engineer was helpful in providing an objective assessment.

The financial data collected from the Water Boards on the management of the water supply systems was processed into a series of profitability ratios for comparative analysis between the cases.

The organisational and social data was coded, computer entered and verified by the author. All statistical analyses were conducted with the Statistical Package for the Social Sciences (SPSS), SPSS for Windows, Release 11.0. The manual used was SPSS 11.0 Brief Guide (SPSS Inc, 2001).

The methods used to analyse the data can be summed up as:

- Descriptive statistics. These included counts, proportions, measures of central tendency, and measures of variation.
- Differences. The chi-square test was used mainly. A chi-square test is used with categorical data. It tests the hypothesis that proportions are equal. The level of significance was set at 0.05 (5%) for all tests.

Appendix 6 has the description of the software used and the chi-square test. The detailed data analysis is presented in Chapter 4.

3.10 CHAPTER SUMMARY

This chapter reviewed the hypothesis, objectives and key research questions that guided this research. An appropriate research design was then developed to investigate the research questions while at the same time ensuring reliability and validity. Quantitative and qualitative methods were used to enrich the overall data.

The analysis of the data followed a framework adopted to examine and extract relevant data in relation to the guiding hypothesis and research questions.

The primary research question was *how sustainable small town water service delivery is under community management*. Five secondary research questions stem from the primary question:

- How different are small towns and rural villages from the perspective of water service delivery?
- What is the status of technical sustainability of small town water service delivery compared to rural villages?
- What is the status of social and financial sustainability of small town water service delivery compared to rural villages?
- What are the challenges that arise in the consideration of alternative water management models in small towns?
- What are stakeholder perceptions of alternative water management models in small towns?

The research hypothesises that *community management is limited in achieving sustainable water supply solutions in small towns of developing countries; hence modifications are needed in approach to the issues of small town water supply*.

Case study and survey were the most appropriate research methods for the primary data collection. Two rural villages were selected for literal replication and two small towns were selected for theoretical replication making a total of four case studies. All case studies were chosen from Ghana. The unit of analysis for the

research is the water management structures in small towns of developing countries.

Multiple data collection techniques including direct observation, semi-structured interviews, household surveys and focus group discussions were used to improve validity and reliability of the study.

The research database includes 344 household surveys, 4 focus group discussions with 48 Water Board members, 10 semi-structured interviews, 35 surveys of private sector companies, 4 evaluations of the water supply systems in the 4 case study communities and over 300 reviewed documents for the literature survey.

The data analysis was based on the facets of sustainability including technical, financial, social and organisational issues. The technical data was ranked, the financial data was processed into profitability ratios and the social and organisational data was analysed using the Statistical Package for the Social Sciences (SPSS). The data analysis included descriptive statistics and differences such as Chi-square test for hypothesis testing.

4. ANALYSIS OF FIELD RESULTS

4.1 CHAPTER OUTLINE

The field results were analysed based on the dimensions of sustainability (refer Sections 2.3.1 and 3.8) in this study. The dimensions of sustainability include:

- Technical sustainability
- Financial sustainability
- Organisational sustainability
- Social sustainability

Before the data analysis, pertinent background information is presented about the economic status of the case country Ghana, the relevant water sector institutions, the status of the small towns water sector in Ghana and the case study communities of Avenui (R), Tota (R), Savelugu (S) and Bekwai (S). The letters R and S are used to denote rural villages and small towns, respectively.

The technical issues analysed consist of the type of water system technology used in the case communities, planning for system expansion to meet future demands and the physical status of the water supply facilities. The managerial issues analysed consist of the operations and maintenance of the water supply systems, financial sustainability and quality of service of the management provided by the Water Boards. The institutional issues analysed consist of the demographic characteristics of the case communities in relation to the criteria for successful community management identified in Section 2.5.2 of the literature review. Furthermore, the challenges to community management in the case communities are analysed. It was found during the study that, the private sector is active in

Ghana. Opportunities for public private partnership in small towns water service delivery was therefore analysed in more detail.

The purpose of the analysis is to provide evidence drawn from the direct observation, key informant interviews, focus group discussions and household surveys to address the research questions raised by the literature review. The relationship between these research questions and the presentation of sections in this chapter is reflected in Table 16.

Table 16: Comparison of key research questions and organisation of Chapter 4

Key research question	Section/s
How different are small towns and rural villages from the perspective of water service delivery?	4.5.1
What is the status of technical sustainability of small town water service delivery compared to rural villages?	4.3.1, 4.3.2, 4.3.3
What is the status of social and financial sustainability of small town water service delivery compared to rural villages?	4.4.1, 4.4.2, 4.4.3
What are the challenges that arise in the consideration of alternative water management models in small towns?	4.5.3.5
What are stakeholder perceptions of alternative water management models in small towns?	4.5.3.1, 4.5.3.2, 4.5.3.3, 4.5.3.4

4.2 BACKGROUND TO CASE STUDIES

The following sections provide a background to the case studies. The status of the general water sector including small towns, the water sector institutions in Ghana and a description of the case communities are presented herein.

4.2.1 Status of the water sector in Ghana

Ghana occupies an area of 238,500 sq. km on the West Coast of Africa and has a population of about 20 million. It has a per capita Gross Domestic Product (GDP) (which is a measure of productivity) of 400 USD (FFM, 2002). The average Ghanaian therefore subsists on about 1 USD per day. Compared to the United

States which had a per capita GDP of about 37,600 USD in the same year (CIA, 2002), Ghana is a very poor country. As in other developing countries, poverty in Ghana has many dimensions and is characterized by low income, ineffective and inefficient public sector and inadequate access to safe water (IMF, 2001). It is within this setting that the water sector can be found.

The development of public water supplies in Ghana started in 1928 (Ghana Water Company, 2000). Water supplies were provided by two organizations prior to the formation of the Ghana Water and Sewerage Corporation (GWSC). These included:

- The Water Supplies Division of the Public Works Department which, was responsible for urban and municipal centres, and
- The Rural Water Supplies Unit responsible for rural communities.

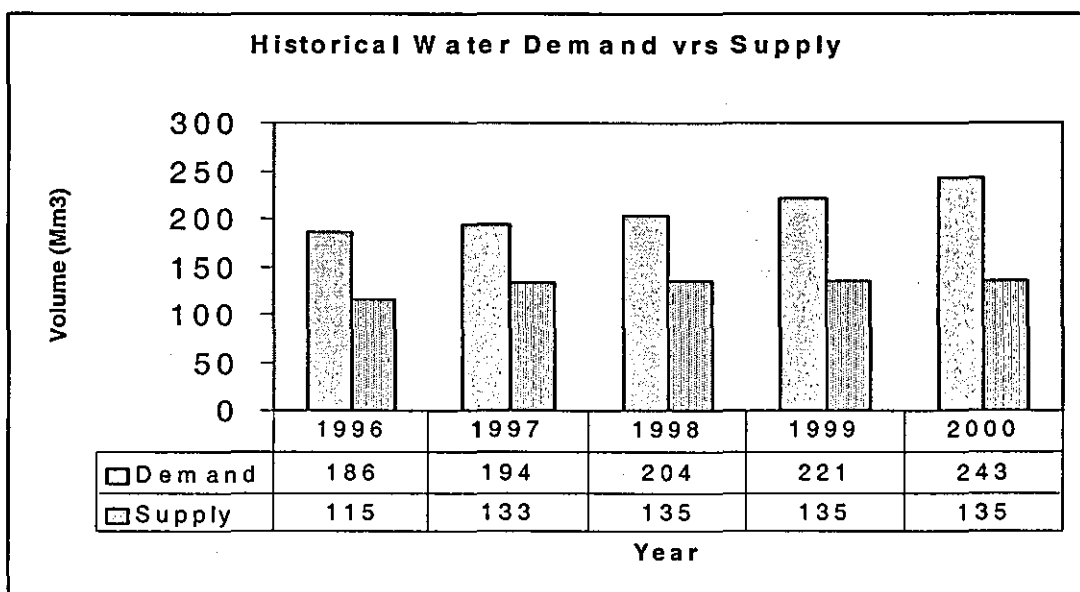
Small town water supply was therefore unknown at the time confirming the literature review that small towns have generally been left out of the main settlement classifications (see Section 2.3.3.2).

In 1965, the Ghana Water and Sewerage Corporation (GWSC) was created by an Act of Parliament (Act 310) as a legal entity and charged with the responsibility of providing and managing water supply and sewerage services for domestic and industrial purposes (GWCL, 2000). Since 1st July 1999, the GWSC has been converted into a limited liability company with the name Ghana Water Company Limited (GWCL). Before that, the Community Water and Sanitation Agency (an autonomous agency) was created to take care of water supply to rural areas and small towns so that the GWCL could concentrate on urban water supply.

The Ghana Government through its Ministry of Works and Housing (MOWH) is committed to ensuring that all Ghanaians have access to potable water. In line with

this commitment, the MOWH has over the years taken various measures to restructure the water sector and improve efficiency of water delivery. However, the operation of the water sector has been constrained by lack of financial, operational and institutional resources. The economic crisis in the country between 1970 and 1990 affected water supply operations severely (Ghana Water Company Limited, 2001) and the level of service declined as a result of deteriorating infrastructure and high unaccounted for water (over 50%). Furthermore, several of the water systems broke down completely. The operational difficulties were exacerbated by the removal of Ghana Government (GOG) subsidy in 1986 as tariffs approved by the GOG could not meet the financial requirements of the sector. As of December 2000, GWCL had a total debt of 367 million USD (GWCL, 2001). Furthermore, the supply of water has not kept pace with the demand as shown in Figure 3 and the situation has been worst of all in small towns.

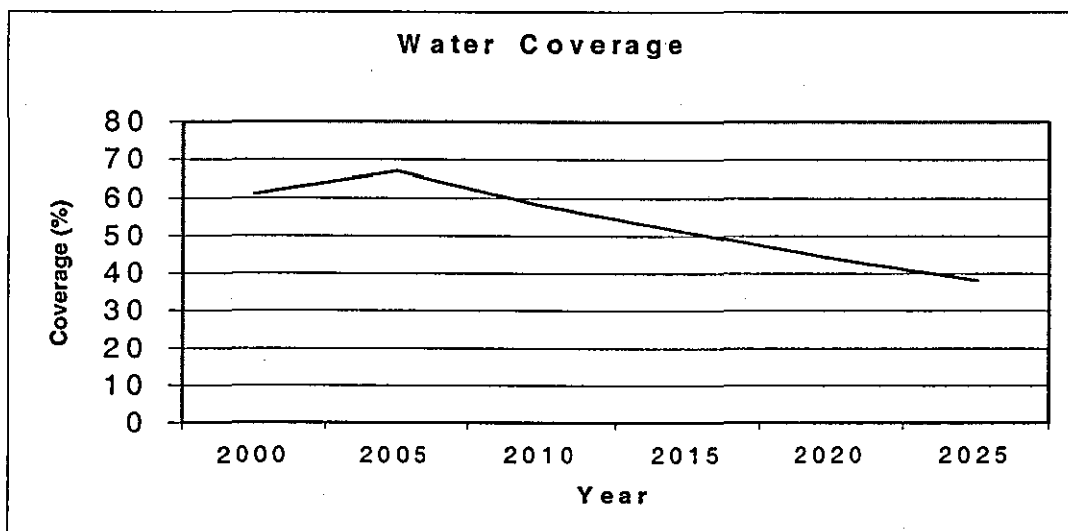
Figure 3: Historical water demand and supply



Source: Ghana Water Company (2001)

It was also forecast that the demand/supply situation of water would worsen in the future as shown in Figure 4.

Figure 4: Projected water coverage



Source: Ghana Water Company Ltd (2001)

Finding sustainable solutions to the management of water supply, especially to small towns should therefore be a high priority for the institutions involved in the water sector.

4.2.2 Water sector institutions in Ghana

The Ministry of Works and Housing (MOWH) is responsible for setting Government's policy objectives in the water sector in Ghana. These objectives are achieved through a number of agencies which are presented in the following sections.

4.2.2.1 Ghana Water Company Ltd (GWCL)

This is a parastatal body responsible for the production and distribution of water in urban areas in Ghana. Under the ongoing water sector reform programme, with private sector participation (PSP) as a main feature, the GWCL will be transformed into an asset leasing company, and 86 of the systems that they currently operate in the urban water sector, will be handed over to two private operators for

management, operation and maintenance. The companies bidding for the PSP are all multi-national corporations.

4.2.2.2 Advisory Committee, Water Sector Restructuring Project

This is a transitional body charged with overseeing the introduction of private sector participation into urban water supply. The Committee advises the sector minister and is served by a secretariat. The responsibility of this body does not extend to small towns nor rural areas at the moment.

4.2.2.3 Community Water and Sanitation Agency (CWSA)

CWSA, a semi-autonomous agency, is responsible for facilitating the development and management of community water supply and operates through a head office and regional offices. Community water supply includes rural villages and small towns.

4.2.2.4 Water Resources Commission (WRC)

WRC is responsible for the effective and efficient management of the country's water resources and grants licences to users for the abstraction of water. It is required to keep comprehensive data on the country's water resources. The WRC's functions and requirements impact on small town water supply in three ways:

- The granting of water licences
- Payment of abstraction fees by water users (yet to be determined by the Commission)
- The requirement to protect water bodies

4.2.2.5 Public Utilities Regulatory Commission (PURC)

The PURC is an independent body with oversight responsibility for the economic regulation of public utilities, which for the moment covers water and electricity

only. The key functions include (a) the provision of guidelines on, and the examination and approval of rates chargeable for provision of utility services, and (b) the protection of the interest of consumers and providers of utility services. Act 538 which set up the PURC however, specifically excludes the supply of water provided in a community, “where the supply of the water is operated and managed by the community itself”. The PURC indicates that the participation of the private sector in the small town would not re-define their role, and District Assemblies (DA) will continue to provide oversight in small towns. The DA and CWSA will however be encouraged to consult the PURC in developing capacity to carry out their regulating and monitoring duties.

4.2.2.6 District Assemblies (DA)

DA are the highest political authority at the local level. The concept of community management of water supply in rural and small towns places considerable responsibility on the DA in ensuring that water service delivery is sustainable. Following the breaking off of community water supply from urban water and with the on-going private sector participation (PSP) in Ghana’s urban water sector, 120 small town water supply systems have been transferred to District Assemblies (DA) for community management. This has imposed greater challenges on both CWSA and DA, which are required to ensure long-term sustainability of these systems, through effective management by Water and Sanitation Boards (WSDB) simply called Water Boards. This has created a link between MOWH and the Ministry of Local Government and Rural Development (MLGRD), which is yet to (strongly) manifest itself in terms of co-ordination of policies, activities and capacity building.

4.2.2.7 Other Active Institutions in the Water Supply Sector

In addition to the above institutions, there are other active players through whom the sector’s objectives are achieved. These include the international multi-lateral and bilateral financial institutions, as well as non-governmental organisations

(NGOs). The principal actors in community water supply include CIDA, DANIDA, European Union, JICA, KfW/GTZ, the World Bank (IDA), Water Aid and World Vision International (WVI). The support that is received from these bodies comes in the form of both hardware –facilities development, and software – management, training and institutional support. Table 17 sums the responsibilities of the main institutions in small town water sector.

Table 17: Institutional roles for small town water supply

Actor	Responsibility
CWSA regional office	<ul style="list-style-type: none"> • Provide professional back up service to the district • Monitor progress of small town projects • Arrange for capacity building • Monitor the effectiveness of the CWSA policy and guidelines
District assembly	<ul style="list-style-type: none"> • Monitor O&M – technical, financial and administrative • Audit WSDB account periodically • Review and approve community tariff • Contract consultant and contractors and supervise them • Assist WSDB in setting tariff • Provide technical approval for WSDB plans –extension, new standpipes • Monitor technical and financial status of community managed water system
Water Boards	<ul style="list-style-type: none"> • Set tariff • Set application procedures, connection and re-connection fees • Maintain financial records for O& M • Present every six months the summary of financial records to the community – income, expenditure and bank account. • Internal auditing to check the correctness of financial records • Provide financial records for inspection by CWSA and DAs/DWST • Approve expenditure • Manage the small towns facility

4.2.3 Status of small towns water supply coverage

There are about 287 small towns in Ghana and they account for about 30% of the national population. All of them have community management as mode of water service delivery. Small town water coverage is rather difficult to assess at this stage

because prior to 1994, water supply coverage was determined on the basis of *rural* and *urban* as they were both covered by the GWCL.

Since 1994, the CWSA has assumed responsibility for some small town water supply. The figures for 1998 indicate that coverage differs widely from region to region among the 10 regions of Ghana, with Central Region having the highest (51%) and Northern Region with the lowest coverage (15%), and a national average of 30%. In its strategic forecast for 1999-2008, CWSA envisages that the national average will rise to 60% in 2003, and 83% in 2008. This will involve a total capital cost of about \$424 million which was based on an estimated population of 14.9 million in 1998.

The source of necessary funds for investment in small town water supply in Ghana is unclear as the government's budget is greatly constrained as shown in Section 4.2.1. The small town water sector is not attractive enough for foreign direct investment from multinational corporations. One way forward is therefore to attract local private investments, hence improving the overall chances of physical (technical) and managerial (financial) sustainability. This study therefore investigated opportunities for private sector water management in the case study communities.

4.2.4 Description of case communities

The water supply management structures in two classes of communities were investigated in order to test the hypothesis of the study. For a control group, two rural villages, Awudome-Avenui (Avenui (R)) and Trukpe-Tota (Tota (R)) were used for literal replication. Table 18 summarises the information on the communities.

Table 18: Communities used for study

Town	Region	Population * (1984)	Population* (2000)	Population growth rate (%)**	Date of start of community management
Bekwai (S)	Ashanti Region	12,169	28,000	4.7	February 1999
Savelugu (S)	Northern Region	16,965	25,000	2.2	January 1999
Avenui (R)	Volta Region	1,452	1,700	1.0	December 1998
Tota (R)	Volta Region	-	2,840	-	March 1999

*Source: Ghana Statistical Service, 1984 and 2000 Census.

**Calculated by author.

All the communities selected fulfilled the following criteria established in Section 3.5.1 of the methodology:

- Community management in operation for at least 2 years.
- Water supplies established by service providers (governments and NGOs).
- Availability of management records.
- Geographical coverage (as many regions as possible in Ghana).
- Communities with a prior water scarcity problem because they value water best.

The individual communities are described below.

4.2.4.1 Awudome-Avenui

Awudome is located 20 km North-East of Anyinawase along the Anyinawase-Bame road in the Volta Region (one of the ten regions of Ghana). The community is in the Ho District.

The inhabitants are predominantly farmers with some light industrial and commercial activities. The current population is 1700 (GSS, 2001) making it a

rural village. Avenui (R) has an annual population growth rate of 1% which is typical of a rural village (1.2%) (UN, 2001).

Awudome-Avenui like most communities in Ghana has a traditional authority represented by a Chief and a council of elders running concurrently with a modern political authority represented by an Assembly man/woman and unit committees for development. It is through these political and traditional leaders that development projects such as water supply services are introduced and implemented in the community.

A feasibility study report prior to the installation of safe water systems found the major health and sanitation issues to be related to lack of clean water supply (Ho District Office, 1995). These included:

- Malaria
- Diarrhoea
- Skin diseases
- Worms
- Dysentery

The community depended on the Wuto stream, a borehole and a seasonal spring for its water supply. The borehole was drilled in 1987 under a governmental project. The water was sold to the community which paid the set tariffs to the then national public utility (GWSC). Because the borehole was situated far away from most households, they preferred to use the unsafe Wuto stream which was close by and free. The water was not safe for drinking as wastewater from the community flowed into it. Other households to the north of the town used the Basave spring which dried up during the dry season.

A socio-economic assessment by the Danish International Development Agency (Danida) therefore found the need for water supply improvements to be high (Ho District Office, 1995). This situation pointed to the need for a reliable source of water supply. Therefore, in 1998, the town was provided water under a bilateral agreement between Danida and the government of Ghana. The water supply management model adopted was community management.

4.2.4.2 Tsrupke-Tota

The community of Tsrupke-Tota is located in the Tsrupke zone and situated 7.8 km south of Vakpo, a town on the Kpando-Have road. The current population is 2840 (GSS, 2001).

Tsrupke-Tota like most communities in Ghana has a traditional authority represented by the Chief and the council of elders running concurrently with the modern political authority represented by an Assembly man/woman and unit committees for development. It is through these political and traditional leaders that projects such water supply schemes are introduced and implemented in the community.

The community depended on the Bisime stream, which is at a walking distance of 1.2 km from the community. Furthermore, there were 4 boreholes fitted with hand pumps but the yield of two (2) of them was found to be very low all year round. This situation pointed to the fact that a reliable source of water was needed. The current water supply systems were established by a Danida project and community management was the chosen management model.

4.2.4.3 Savelugu

The community of Savelugu is located in the Northern Region of Ghana and is situated 10 km from the regional capital Tamale on the Tamale-Bolgatanga road. Savelugu is the district capital of Savelugu-Nanton District.

The current population is 25000 (GSS, 2001). Savelugu has an annual population growth rate of 2.2% which is much less than that of a small town. This can be attributed to the migration of people from the northern regions of Ghana as a result of poverty towards the southern regions of Ghana. The northern communities therefore do not grow at the same rate as those in the southern parts of Ghana.

Savelugu like most communities in Ghana has a traditional authority represented by the Chief and the council of elders running concurrently with the modern political authority represented by an Assembly man/woman and unit committees for development. It is through these political and traditional leaders that projects such as water supply schemes are introduced and implemented in the community.

The Northern Region of Ghana is dryer than the other parts of Ghana giving rise to long droughts in Savelugu (S). The inhabitants depended on wells and rain water prior to potable water supply. The water systems in Savelugu were established with Ghana government assistance in cooperation with the Canadian International Development Agency (CIDA). Community management was the management model adopted.

4.2.4.4 Bekwai

Bekwai is the District Capital of Amansie East District in the Ashanti Region. It is located about 15 km from the regional capital Kumasi.

The inhabitants are predominantly traders with some light industrial and farming activities. The current population is 28000 (Ghana Statistical Service, 2000). Bekwai has an annual population growth rate of 4.7 which is higher than the average urban rate for West Africa of 4.2% (UN, 2001). This confirms the fact that small towns are the most rapidly growing centres of population growth.

Bekwai has a conventional water system. Community management is the adopted water management model.

4.3 TECHNICAL SUSTAINABILITY OF WATER SERVICE DELIVERY IN CASE STUDIES

A performance assessment of the water supply systems in the case study communities was undertaken to find information on their technical sustainability. Since the literature review in Chapter 2 of this thesis showed that current development practice promotes community water management, a rural water and sanitation model for small towns, the objective of this section was to ascertain whether or not the performance of community management in small towns is indeed comparable to that of rural villages in order to warrant the application of community management as an exclusive *soulient*. The data from the field study shows that based on (1) the type of water supply systems in the communities (2) the ability to meet demand increase and (3) the physical status of the water supply systems, the small towns have a less chance of technical sustainability under community management. There is therefore a need to improve community management and/or find other models to address technical sustainability in small towns.

4.3.1 Type of water supply technology in the case study communities

The small towns of Bekwai (S) and Savelugu (S) have conventional water supply systems. The two rural villages of Tota (R) and Avenui (R) have piped gravity system and mechanised borehole, respectively. Table 19 summarises information on the water supply technologies. An explanation of the different water supply technologies in small towns has been provided in Section 2.7.2 of the literature review.

Table 19: Types of water supply technology in the communities

	Bekwai (S)	Savelugu (S)	Tota (R)	Avenui (R)
Type of water supply system technology	Conventional water supply system	Conventional water supply system	Piped gravity system	Mechanised borehole
Physical description of system components	Conventional piped system which is dam fed by River Dankran	Conventional piped system distributed through 19 stand pipes	Piped gravity system fed from a spring catchment	Water pumped from borehole and distributed to the community through stand pipes
Year of establishment	1999	1999	1999	1998
Reservoir capacity (m³)	105	100	40	50

The raw water for the water treatment plant in Bekwai comes from a dam across the river Dankran. The water is pumped to a flocculation/coagulation tank where alum is added to aid the coagulation and settling of the suspended particles in the water. The flocculated water then flows to a sedimentation tank where the heavier particles settle. The settled water flows to a filter. The filtered water is stored in a clear well. The treated water in the clear well is disinfected using chlorine and then pumped to an overhead tank of 105 m³ capacity. From the overhead tank the water is distributed to stand pipes and household taps in the Bekwai (S) town.

Savelugu (S) also has a conventional water supply system similar to that of Bekwai. The storage tank capacity is 100 m³ and the water is distributed to the community through 19 stand pipes and some household connections.

Tota (R) uses a spring catchment as raw water source for its treatment plant. The intake works consist of a concrete tank built and filled with filter material (gravels). The concrete tank has a pipe outlet through which the spring water flows into another small holding tank. The water from this tank flows under gravity to a

storage reservoir from where it is distributed to the community members through public standpipes. There are no household connections.

The water supply system of Avenui (R) consists of a borehole from which water is pumped to an overhead tank of 50 m³ capacity. The water from the overhead tank flows under gravity to public stand pipes.

As stated in Sections 2.7.2 and 2.7.3, conventional water supply systems similar to those in the two small towns of Savelugu (S) and Bekwai (S) employ complex technologies. On the other hand, the rural villages have simpler water technologies. The complexity of the water supply systems in the two small towns predispose them to the need for better management expertise than those likely to be found under community management. The implications of the complex water supply systems under community water management are manifested in issues with system expansion to meet increasing demand and aging facilities in the small towns which are analysed in Sections 4.3.2 and 4.3.3.

4.3.2 System expansion to meet demand

Section 2.7.1 of the literature review listed the following as the objective of small town water supplies:

- The supply of an adequate amount of water that includes the ability to plan for future expansion.
- The supply of water that meets international or at least national water quality standards.
- A reliable supply of water virtually without interruption.
- The above must be achieved in a cost effective manner (otherwise the financial sustainability of the system will be put in jeopardy).

The technical assessment of the water supplies in the case study communities therefore investigated the adequacy of the water supplies to meet current and future demands. This is because unless each water supply system is augmented to meet the increasing demands of the community members, it will not be technically sustainable in the long run (Cotruvo et al, 1999). The analysed data shows that the small town water supply systems were not augmented to meet the increasing system demand of the communities.

Table 20 shows that the water supply systems in the rural villages of Tota (R) and Avenui (R) are able to meet all the current demand. On the other hand, the small towns of Bekwai (S) and Savelugu (S) are able to meet only 36% and 72% of current demand, respectively.

Table 20: Adequacy of water system to meet current demands

	Bekwai (S)	Savelugu (S)	Tota (R)	Avenui (R)
Total population	28000	25000	2840	1700
Population currently served by water system	10000	18000	2840	1700
Percentage population served by water system (%)	36	72	100	100

Two reasons can be advanced for the low water supply coverage in the small towns:

- The water supply systems were not designed for the large populations in the small towns today meaning the water supply systems were undersized.
- The water supply systems could not be maintained under community water management.

An examination of the as built drawings of the water supply systems showed that the systems were not undersized in both small towns. Rather the problem lied in the fact that some of the facilities were not working at the water treatment plants. Section 4.3.3 analyses the data on the physical status of the water supply systems to support this argument.

The low water supply coverage is exacerbated by the high annual population growth of the small towns as shown in Table 18. Hence there is a significant need to plan for system expansion to meet demand presently and also in the future. To highlight the seriousness of the situation, the population of Bekwai (S) is estimated to be about 44,000 at an annual growth rate of 4.7% in ten years. All things being equal, if the water system remains in its current status, it can only meet about 22% of the demand. There is therefore a need for a radical improvement in the water supply infrastructure to meet demand if the water supply systems in the small towns are to be technically sustainable. The radical improvements require substantial financial outlays which are discussed in Section 4.4.2.

4.3.3 Physical status of water supply facilities

An examination of the water supply/demand situation and the technologies in use alone is not enough to cover adequately the issues of technical sustainability. The physical status of the water supply systems in the four communities was therefore evaluated in order to determine how they reflect the two issues of poor demand management and complex technology. It was found that the two small town water supply systems were in worse physical condition than the two rural villages thus confirming the issues of poor demand management and complex water systems analysed in Sections 4.3.1 and 4.3.2. The small town water supply systems therefore have a less chance of being technically sustainable than the rural villages under community management.

In order to compare the physical status of the water supply systems, ranking was performed of the various components based on the sustainability indicators in Sections 3.6.2. Table 21 shows the rankings of the four water supply systems. One (1) meant that the attribute was in a poor state and 5 meant it was in an excellent state. As stated in the design of the methodology in Section 3.7.1 of the research methodology, the water supply system experience of the researcher was particularly helpful in ranking the systems appropriately.

Table 21: Comparison of the status of the water supply systems

System component	Avenui (R)	Bekwai (S)	Savelugu (S)	Tota (R)
Cleanliness of immediate surroundings at source	4	1	3	4
Status of drainage at the source	3	2	2	3
Soundness of retaining walls at source	4	2	3	4
Soundness of reservoirs/tanks	4	2	4	4
Overall water quality	4	3	3	4
Status of valves	4	2	3	4
Status of reservoir meter	3	2	2	2
Status of pumps	4	2	3	4
Pipe leakage	2	2	2	2
Status of stand pipes	4	2	2	4
Drainage and cleanliness of immediate surroundings at taps	4	2	3	4

1= Poor.....5 = Excellent.

Avenui (R) and Tota (R), the rural villages scored higher than the two small towns on all the attributes. This shows that the physical status of the water infrastructure in the two small towns was worse than in the rural villages implying that the water systems in the rural villages have been better managed.

Section 4.3.1 showed that the technologies for water supply in the small towns are more complex than those in the rural villages, requiring better management for technical sustainability. Section 4.3.2 also showed that the small town water supply systems are currently not able to meet the water supply demand of their

communities. The analysis of the physical status of the water supply systems therefore confirms that in deed the water supply systems are less technically sustainable than those in the rural villages. Explanations for the poor technical sustainability can be found by an examination of the financial sustainability in Section 4.4.

4.4 FINANCIAL SUSTAINABILITY OF WATER SERVICE DELIVERY IN CASE STUDIES

Mukherjee (1999) used the term financial sustainability but financial sustainability is a more holistic term, hence the researcher uses the latter. The data for the financial sustainability analysis comes from the financial records kept by the Water Boards, focus group discussions with the Water Boards and the household surveys. The analysis shows that the small towns are less managerially sustainable under community management compared to the rural villages

4.4.1 Management of water supplies by the Water Boards

Table 22 shows a summary of the financial/management basis of the water supply infrastructure in the four case study communities.

Table 22: Management information on the water supply systems

	Bekwai (S)	Savelugu (S)	Tota (R)	Avenui (R)
How system was established?	Through community-government collaboration	Through community-government collaboration	Through community-government collaboration /Danida project	Through community-government collaboration/ Danida project
Financing from government / donors (%)	95	95	95	95
Financing from community	5	5	5	5

	Bekwai (S)	Savelugu (S)	Tota (R)	Avenui (R)
(%)				
Who is responsible for management?	Community Water Board	Community Water Board	Community Water Board	Community Water Board

The table highlights the similarities between the water supply systems in the four communities used for the study and therefore served as a basis for their comparison. For instance, all four communities had their systems established through community and government collaboration. The bulk (95%) of the financing for the establishment of the water supply systems came from the government which came from grants from donor organisations such as the Danish International development Agency (Danida) and the Canadian International Development Agency (Cida). The communities contributed 5% of the capital costs. However, management by the Water Boards is different in the rural villages and the small towns.

The Water and Sanitation Development Boards (Water Boards), the communities' representatives are responsible for the management of the communities' water supply systems. In the communities, the Water Boards had employed operating staff for day-to-day operations while they do the management. In some cases the operating staff were on the Water Boards.

According to the CWSA's Operation and & Maintenance guideline for the communities, the critical parameters to enhance sustainability are:

- High reliability of the services (at least 95% of the time).
- Planned/preventive maintenance.
- Water quality monitoring.
- Systematic and continuous recording and utilisation of data.

It was discovered during the field work that the water supply services were not reliable in the small towns unlike the rural villages. This is explored in greater detail from the perception of the community members in Section 4.4.3. Maintenance in the small towns was neither planned nor preventive. The maintenance activities carried out were reactionary meaning that parts of the water supply systems were only repaired when they broke down. Water quality monitoring is not a regular activity and data collection, record keeping and utilisation are poor even for the small towns studied. The management of the water supplies by the Water Boards in the small towns can be summed up in the words of one Water Board member, "We are all walking blindly". Sections 4.4.2 and 4.4.3 elaborate on the management by the Water Boards from the perspective of financial sustainability and quality of service, respectively.

4.4.2 Financial sustainability of water supply systems

Financial information, whilst not capturing all the information on the management of the water supply systems gives a fairly good idea of how effective management has been. Therefore, financial data was collected in the four (4) case study communities on the management of the water supply systems. It consisted of monthly revenue and expenditure data covering the period of March 2001 to January 2002 representing approximately a year of consecutive financial record keeping prior to the field study. An analysis of this data shows that the small towns are less financially sustainable compared to the rural villages under community management. Table 23 and 24 show the financial records for Avenui (R) and Bekwai (S), respectively.

Table 23: Financial data on water management for Avenui for 2001/2

Month	Revenue (mGHC)	Expenditure	Gross Profit
March_01	0.28	0.10	0.18
April_01	0.29	0.17	0.12
May_01	0.20	0.08	0.12
June_01	0.15	0.14	0.01
July_01	0.34	0.20	0.14
Aug_01	0.33	0.16	0.17
Sept_01	0.30	0.06	0.24
Oct_01	0.63	0.37	0.26
Nov_01	0.89	0.25	0.64
Dec_01	0.79	0.51	0.28
Jan_02	0.78	0.56	0.22

1 USD = 8000 GHC (Ghanaian currency).

mGHC = Million Ghanaian Cedis

Table 24: Financial data on water management for Bekwai covering 2001/2

Month	Revenue (mGHC)	Expenditure	Gross Profit
March_01	5.4	12.5	-7.1
April_01	1.8	6.5	-4.7
May_01	5.8	8.5	-2.7
June_01	7.1	8.4	-1.3
July_01	12.5	12.6	-0.1
Aug_01	8.4	11.2	-2.8
Sept_01	8.3	11.2	-2.9
Oct_01	7.8	11.2	-3.4
Nov_01	11.1	11.2	-0.1
Dec_01	3.7	11.2	-7.5
Jan_02	8.1	11.2	-3.1

1 USD = 8000 GHC (Ghanaian currency).

mGHC = Million Ghanaian Cedis

The gross profits (revenue minus expenditure) for each of the months are shown in the last columns. However, gross profits themselves do not provide enough bases for comparison as the towns vary in size and as such revenue capacity. Therefore some financial indicators were considered.

The main groups of indicators used in finance and accounting are (Lothian and Small, 2000):

- **Liquidity ratios** are designed to measure a company's ability to meet maturing short-term obligations.
- **Profitability ratios** are designed to measure managements overall effectiveness and answer the question of whether or not the organisation controls expenses and earns a reasonable return on funds committed.
- **Efficiency ratios** are designed to give an indication of how effectively an organisation has been managing its assets.
- **Capital structure ratios** are designed to measure the asset structure and financing of organisations.

Profitability ratios are the best to measure financial sustainability of the water supply systems in the communities because they are designed to measure the Water Board's overall effectiveness. Of all the profitability ratios, profit margin is used because of its simplicity. It is defined as (Lothian and Small, 2000):

$$\text{Profit margin} = \frac{\text{Profit before interest and taxes}}{\text{Revenue}}$$

The monthly profit margins for Bekwai (S) and Avenui (R) are shown in Table 25.

Table 25: Monthly profit margins for year 2001/2

Month	Bekwai Monthly profit margin (%)	Avenui Monthly profit margin (%)
March_01	-131	65
April_01	-261	41
May_01	-47	60
June_01	-18	7
July_01	-1	41
Aug_01	-33	52
Sept_01	-35	80
Oct_01	-44	41
Nov_01	-1	72
Dec_01	-203	35
Jan_02	-38	28
Mean	-74	47

The mean monthly profit margin for Avenui (R) the rural village was 47% for the period analysed whilst that of Bekwai (S) the small town was negative at -74%. According to Cromwell and Jordan (1999), 30% annual profitability is indicative of a water supply system that is financially sustainable. The analysed data therefore shows that the Water Board in the rural village was able to generate enough funds to cover operation and maintenance and also had on average about 50% of revenue available for planning system expansion to meet increasing demand as the population grows. On the other hand, the Water Boards in the small towns were not able to generate enough funds to cover operation and maintenance. From interviews with the water managers it was understood that in order for the water supply system to remain operational the national government had to subsidise the operation. The small towns were therefore not in a financial position to plan for infrastructure improvement without substantial government subsidies. The poor financial management of the Water Boards in the small towns therefore reflects the poor water supply coverage shown in Table 20. It also reflects the poor infrastructure status as analysed in Sections 4.3.2 and 4.3.3. It is therefore clear that the small towns have a less chance of long term sustainability than the rural villages under community management.

4.4.3 Quality of service from the Water Boards

The quality of service delivery by the Water Boards was investigated as part of the financial sustainability of the water supply systems in the four communities. The indicators for quality of service include customer satisfaction, time of response and effective use. However, since effective use was found to be similar in the four communities, the investigation concentrated on:

- Time of response to water emergencies – since this captures the attributes of quality of service, namely, tangibles, reliability, responsiveness, assurance and empathy as the essential attributes as stated in Section 2.8.2.
- Consumers overall satisfaction with the work of the Water Boards.

This data was collected by interviewing the household heads in the communities since they are the decision makers in the households. Analysis of the results showed that the time of response and the performance of the Water Boards as perceived by the community members were better in the rural villages than in the small towns. There is therefore better financial sustainability in the rural villages compared to the small towns. The details of the analysis are contained herein.

4.4.3.1 Time of response to water emergencies

A key determinant of quality of service is the time it takes the water management to respond to customer complaints (refer to Section 3.6.2). Customer complaints consist of reporting broken pipes to any incident that disrupts the supply of water for any length of time. In order to test the differences in the time of response in both rural and small towns the following sub-hypothesis was tested. An explanation of hypothesis testing, the Chi-square method and the associated terms can be found in Appendix 6.

Null Hypothesis: There is no difference between the time it takes the Water Boards to respond to customer complaints for the small towns and the rural villages.

As a proxy for the time of response, the households were asked, "How long does it take generally for those responsible for O&M to attend to your water supply complaints?"

The respondents were given the choices of hours, days, weeks and months as shown in Table 26.

Table 26: Time taken to respond to customer complaints in the communities

Response		TOWN				Total
		Avenui (R)	Bekwai (S)	Savelugu (S)	Tota (R)	
Months	Count	0	8	8	0	16
	% within TOWN	.0%	13%	11%	.0%	7%
Weeks	Count	0	0	40	4	44
	% within TOWN	.0%	.0%	56%	7%	19%
Days	Count	4	40	16	16	76
	% within TOWN	8%	67%	22%	29%	32%
Hours	Count	44	12	8	36	100
	% within TOWN	92%	20%	11%	64%	42%
Total	Count	48	60	72	56	236
	% within TOWN	100%	100%	100%	100%	100%

The results show that it takes only hours to attend to customer complaints in the rural villages. At the same time, it takes days to weeks to address similar customer complaints in the small towns. Table 27 shows that at a significance level (P) of 0.05, statistical significant differences in customer service quality exist between the small towns and the rural villages. The null hypothesis can therefore be rejected at a significance level of 0.05. Appendix 6 explains how to read the results of the

Chi-square tests. The theoretical Chi-square value (χ^2) for a significance level of 0.05 is 3.8 (Zar, 1999).

Table 27: Test of response time to customer complaints

Response	Avenui	Tota	Sum
No	0	4	4
Yes	48	52	100
Sum	48	56	104
Chi-square value		1.89583333	
Difference		No	
Response	Avenui	Savelugu	Sum
No	0	48	48
Yes	48	24	72
Sum	48	72	120
Chi-square value		50.5917245	
Difference		Yes	
Response	Avenui	Bekwai	Sum
No	0	8	8
Yes	48	52	100
Sum	48	60	108
Chi-square value		5.1046875	
Difference		Yes	

$P = 0.05$; $\chi^2 = 3.8$

The implication of this finding is that the small town water systems under the Water Boards yielded less quality of service and therefore more prone to being less sustainable in the long term because the community members will be unwilling to pay to sustain the system according to Mukherjee (1999).

4.4.3.2 Customers' overall satisfaction with the work of the Water Boards

Another determinant of the effectiveness of customer service is how the community perceives the work being done by the Water Board (Cromwell and Jordan, 1999). Questions of whether they are satisfied with their work or whether alternate solutions should be sought arise. To differentiate between the satisfaction

levels in the rural villages and the small towns, the following hypothesis was tested:

Null hypothesis: There is no difference in community members' perceptions regarding the work of the Water Boards in both rural villages and small towns.

Table 28 shows the ratings of the work of the Water Boards by the community members in each community.

Table 28: Customer satisfaction in the four communities

Responses		TOWN				Total
		Avenui (R)	Bekwai (S)	Savelugu (S)	Tota (R)	
Don't know	Count	0	68	8	0	76
	% within TOWN	.0%	63.0%	6.7%	.0%	22.1%
Poor	Count	0	24	48	1	72
	% within TOWN	.0%	22.2%	40.0%	.2%	20.9%
Satisfactory	Count	16	8	48	12	84
	% within TOWN	26.7%	7.4%	40.0%	21.4%	24.4%
Good	Count	44	8	12	43	108
	% within TOWN	73.3%	7.4%	10.0%	78.4%	31.4%
Total	Count	60	108	120	56	344
	% within TOWN	100.0%	100.0%	100.0%	100.0%	100.0%

The ratings ranged from "Don't know" to "Good". The community members in the rural villages rated highly the work done by their Water Boards. The Water Boards in Avenui (R) had 73% of all the respondents rating them "Good" whilst the remaining said that their work is at least "Satisfactory". The results in Tota (R) are similar. A marked difference however, occurs in the small towns. Majority (63%) of the respondents said they are not active enough in community management to really rate the Water Boards. The next largest group of respondents (22%) felt that

the work of the Water Boards is “Poor”. Only 7% perceived their work as “Good”. The results are slightly better but not markedly so in Savelugu, the second small town.

A statistical Chi-Square test was performed to determine the statistical significance of the results. A question was posed as “Are you satisfied with the work being done by your Water Board?” The “No” group comprises those answering “Poor” in Table 28 above and the “Yes” comprises those answering “Satisfactory” and “Good”. The Chi-Square test results in Table 29 show that no significant differences exist between the perceived performance of Water Boards in Avenui (R) and Tota (R), the rural villages.

Table 29: Customer satisfaction with Water Boards’ performance

Response	Avenui	Tota	Sum
No	0	1	1
Yes	60	56	116
Sum	60	57	117
Chi-square value		0.00066356	
Difference		No	
Response	Avenui	Savelugu	Sum
No	0	48	48
Yes	60	60	120
Sum	60	108	168
Chi-square value		35.1873146	
Difference		Yes	
Response	Avenui	Bekwai	Sum
No	0	24	24
Yes	60	16	76
Sum	60	40	100
Chi-square value		44.1360562	
Difference		Yes	

$$P = 0.05; \chi^2 = 3.8$$

However, comparing the rural villages to the small towns shows significant differences at a significance level (P) of 0.05 leading to the rejection of the null

hypothesis. Quality of service as perceived by the community member is therefore better in the rural villages.

The key criteria for the success of community management require that the Water Boards show good management (Cotruvo, 1999). However, the analysed results of technical sustainability and financial sustainability show that the small towns are consistently lacking in those key criteria identified in Sections 2.5 and 2.7 of the literature review as conducive to sustainable community management. Community management therefore has a less chance of sustainability in the small towns.

4.5 ORGANISATIONAL SUSTAINABILITY IN CASE STUDIES

The analysis of the sustainability of community water management culminates in an investigation of the organisational issues that arise. Organisational sustainability as defined in the literature review in Section 2.3.1 refers to whether the organisational models employed can carry on long after water system inauguration or whether the water system will collapse into disuse because essential organisational skills cannot be found. Since institutional issues complement organisational issues the two were coupled to give a more holistic overview. Institutional issues refer to the legal and regulatory issues concerning organisations. The analysis uses the indicators in Section 3.6.2. The results show that community management has a poor chance of institutional and organisational sustainability in the small towns. Since the small towns have consistently performed poorly on all the indicators of sustainability, there was a need to explore other management options. The study therefore investigated public private partnerships (PPP). The results show that PPP is a viable option for small town water management. A synthesis of the analysis is contained herein.

4.5.1 Evaluating the characteristics of small towns

Section 2.5.2.1 of the literature review stated that successful community managed water systems were found in communities with the following characteristics:

- The communities are rural with population usually less than 3000 people each (McCommon et al, 1990; Evans and Appleton, 1993; PCWS-ITN, 2001; SER, 2001; Laryea, 1994).
- The occupation of the inhabitants was predominantly farming or agriculturally based (PCWS-ITN, 2001).
- There was participation and empowerment in the service establishment (McCommon et al.'s, 1990; PCWS-ITN, 2001).
- Household heads attended water related meetings to take decisions (SER, 2001; Lammerink, 1998).
- Social pressures were used to discipline deviant community members (Lammerink, 1998; SER, 2001).

An attempt was therefore made to investigate the existence of these characteristics in small towns in order to determine the extent of organisational sustainability of community water management.

4.5.1.1 Demographic differences between rural villages and small towns

The survey concentrated on household heads as respondents with input from other members of the households as this reflects a more holistic view of the perception of the entire household. A gap identified in the literature was a lack of data on the demographic characteristics of small towns in relation to service delivery since they have been left out in the main classification of urban and rural settlements (refer to Section 2.5.2). Cromwell and Jordan (1999) drew significant correlations between water supply system performance and underlying economic and demographic indicators. Their analysis considered household poverty, age and

population decline. This research investigates physical descriptors such as age distribution, household size and the occupation of household heads as important indicators of institutional and organisational sustainability under community management. The results of the analysis are presented here.

4.5.1.1.1 Age distribution Analysis

Table 30 shows the age distribution of the household heads in the four communities. The ages follow a normal distribution with a mean of 47 years and standard deviation of 14. The distribution also shows a wide range from 25 to 90 years depicting that there was no bias against any particular age group.

Table 30: Age distribution of household heads in the four towns

Town	Description	Statistic
Avenui	Mean	51
	Median	45
	Std. Deviation	16
	Minimum	25
	Maximum	80
	Range	55
Bekwai	Mean	45
	Median	45
	Std. Deviation	15
	Minimum	25
	Maximum	90
	Range	65
Savelugu	Mean	43
	Median	40
	Std. Deviation	13
	Minimum	25
	Maximum	67
	Range	42
Tota	Mean	55
	Median	54
	Std. Deviation	7
	Minimum	44
	Maximum	72
	Range	28

The average ages for the rural villages of Avenui (R) and Tota (R) are 51 and 55 years, respectively. These are statistically greater than the average ages in Savelugu (S) and Bekwai (S), the small towns (43 and 45, respectively). The household heads in the small towns are therefore younger. This age distribution can be explained by the fact that due to rural-urban migration, the younger people move to the cities and the transition towns such as small towns leaving the older people in the rural villages. This confirms the findings of Cromwell and Jordan (1999) that an aging population can be found in rural villages. The implications of this finding are presented below.

Interviews with the younger people in the small towns show them less interested in community development such as the direct involvement in the management of their water systems. This observation differs from that in the rural villages as interviews with the older rural villagers showed them very interested in their water management. Section 4.5.1.2 elaborates on this and Section 4.5.1.1.3 elaborates on what small town dwellers spend time on. This difference in interest is corroborated by Boyd and Walker (2000) who argued that the older people have different interests compared to the young.

Since the small town dwellers are less interested in community development, the community organisation to manage water supply is less institutionally sustainable and hence affect the services. Community management is not likely to lead to long term sustainability of the water supplies.

4.5.1.1.2 Household size analysis

Household size was one of the physical descriptors used to compare both rural villagers and small town dwellers (Cromwell and Jordan, 1999). Table 31 shows the household size distribution in the four case study communities.

Table 31: Household size distribution

Town	Description	Statistic	Standard Error
Avenui	Mean	9	.62
	Std. Deviation	5	
	Minimum	1	
	Maximum	21	
	Range	20	
Bekwai	Mean	23	1.62
	Std. Deviation	17	
	Minimum	5	
	Maximum	84	
	Range	79	
Savelugu	Mean	14	.59
	Std. Deviation	6	
	Minimum	5	
	Maximum	28	
	Range	23	
Tota	Mean	10	.58
	Std. Deviation	4	
	Minimum	4	
	Maximum	19	
	Range	15	

The mean household size for Avenui (R) is 9 with a spread of 5 about the mean. Similarly, the mean for Tota (R) is 10 with a spread of 4. There are no statistically significant differences in the distribution of household sizes in the two rural villages at a significance level (P) of 0.05. On the other hand, Bekwai (S) has a mean household size of 23 whilst Savelugu (S) has a mean of 14. A test of the means shows significant differences between the rural villages and the small towns. The distribution of household sizes therefore shows that, household sizes i.e. the number of people living in a particular house, is smaller in the rural villages than the small towns.

The explanation for this difference comes from the fact that the households in rural villages consist of single-families whilst those in the small towns consist of 2 or more families living in one compound house. Some of the families in the households were even found to come from different ethnic backgrounds, which

sometimes created discord in the houses. According to Hamdi (2000) social homogeneity [which is expressed in a mono-ethnicity as in the rural villages] is a good basis for participatory planning. Participatory planning and decision making is very vital for community managed services as shown in Section 2.5.2 of the literature review. Since small towns lack social homogeneity, community management has a less chance of being organisationally sustainable.

4.5.1.1.3 Occupation of household heads

Section 2.5.2 of the literature review showed that in the successful community management cases, the occupation of the communities is predominantly farming. This study therefore investigated the predominant occupations of the case study communities. Occupation is particularly relevant because of how much spare time it leaves the community members to engage in communal work such as community water management.

Rather than asking the monetary value of householder income as Cromwell and Jordan (1999) did in their study, which would have introduced sampling bias to the results due to people unwilling to state their true income, the main source of income which is the occupation of the household head was used. Respondents fell into five main categories of artisans, farmers, traders, teachers and pensioners which are shown in Table 32.

Avenui (R) and Tota (R) had farming dominating all other professions (53 and 71 percents, respectively). Savelugu had farming and trading dominating with 47 and 33 per cents, respectively. The respondents in Bekwai are predominantly traders at 56% of all the workers sampled.

Table 32: Occupation of household heads

Town	Artisan	White collar job	Farmer	Pensioner	Trader	Teacher	Total
Avenui	12	0	32	8	8	0	60
Bekwai	20	4	12	8	60	4	112
Savelugu	4	0	56	4	40	12	120
Tota	4	0	40	4	4	4	56
Total	48	4	128	24	112	20	344

The teaching profession and pensioner are not distinguishing characteristics as to whether a town is rural or a small town. This is because one can expect to find both pensioners and teachers in all communities in Ghana. The rest of the analysis therefore focuses on the professions of trading and farming as the predominant occupations. Table 33 shows the tally for the three occupations.

Table 33: Proportion of respondents falling under each distinguishing job

Town	Farming (%)	Trader (%)	White collar job (%)
Avenui	53	13	0
Tota	71	7	0
Savelugu	47	33	0
Bekwai	11	56	4

Plotting the values from Table 33 in Figure 5 shows that the proportion of farmers in the town decreases as the town size increases. It can also be seen that the proportion of traders increases as the town size increases.

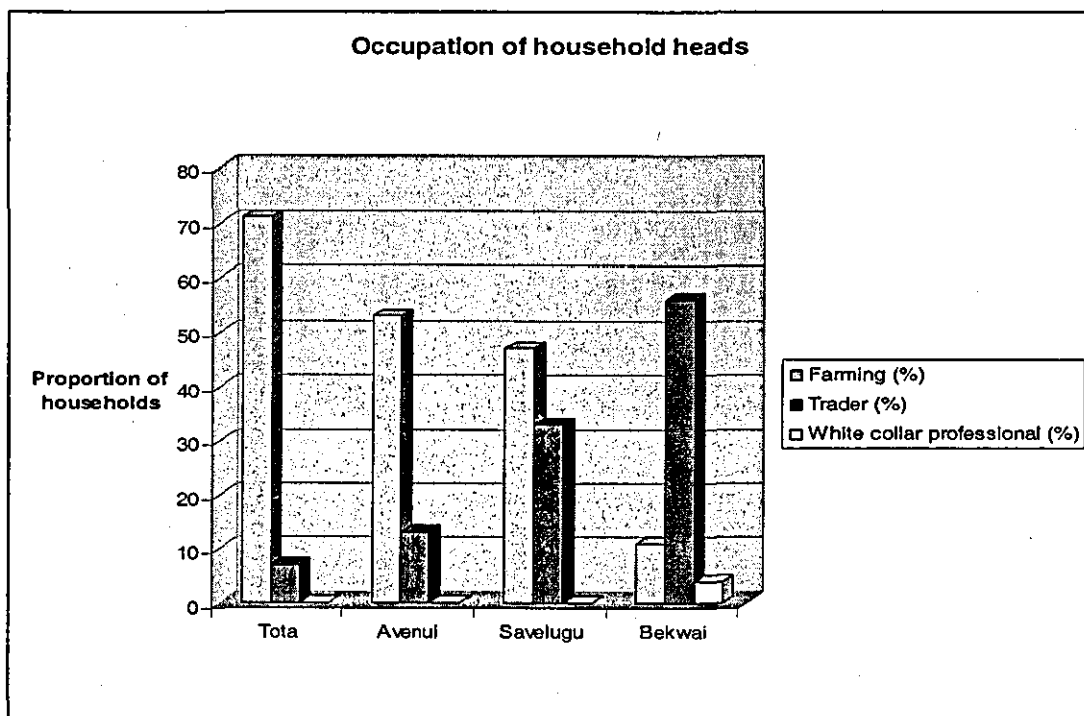


Figure 5: Proportion of household heads falling under the various professions

The question that arises is how occupation affects community management? The literature survey cited cases in Section 2.5.2 where community management succeeded in communities which are predominantly farmers or agriculturally based. It was discovered during the study that the farming (rural) communities set days within the week aside when they tend to community development. On the days referred to as “taboo” days, no one was allowed to go their farms. This practice was strongly adhered to in the rural villages because of the myths and punishments associated with disobedience. Community organisation for action planning and decision making concerning basic services such as the water supply systems were scheduled on the communal days (taboo). This is reflected in great meeting attendance and participation rates in the rural villages explored in Section 4.5.1.2. On the other hand, the small town dwellers did not have any “taboo” day. Meetings were therefore called as and when it was deemed necessary by the Water Boards. When the small town dwellers were asked where they were during the meetings, most of them said they were at work. It can therefore be concluded that

the profession of the small town dwellers makes them less prone to organisationally sustain community water management.

4.5.1.2 Community support of water supply initiatives

Community support of water supply initiatives in their respective towns can be measured by using the level of participation in decision-making and planning as well as meeting attendance to take decision as stated in the literature review in Section 2.5.2. This analysis is contained in the following sections and confirms the results contained in Section 4.5.1.1 on the characteristics of the communities.

4.5.1.2.1 Level of participation of community members in service establishment

The literature review in Chapetr 2 cites level of participation in water supply service establishment by the community members as having a positive relationship to the success of community management. The premise underlying this line of argument is that for community management to work, the community members must be involved in the planning, decision-making and contribution of money/labour (McCommon et al, 1990).

As a proxy indicator for the level of participation of the community members in the service establishment, each household head was asked, "Were you involved in the planning and decision making for the water supply system establishment?" The answers from the respondents in the communities are shown in Table 34.

A sub-hypothesis was tested in order to investigate the level of participation in the case communities. The null hypothesis was framed as:

Null Hypothesis: There is no difference in the proportions of respondents in rural villages and small towns participating in the planning and decision making toward the establishment of their water supply systems.

Table 34: Number of community members participating in decision-making

Response	TOWN				Total
	Avenui	Bekwai	Savelugu	Tota	
No	28	96	80	32	236
Yes	32	12	40	24	108
Total	60	108	120	56	344

A Chi-square test was performed on the responses from Avenui (R) and Tota (R), the two rural villages. Analysis of the results presented in Table 35 shows that there is no significant statistical difference between the proportions of community members participating in planning and decision making towards water supply service establishment using a significance level (P) of 0.05 in the rural villages.

Table 35: Chi-square test on participation responses from Avenui and Tota

Response	Avenui	Tota	Sum
No	28	32	60
Yes	32	24	56
Sum	60	56	116
<i>Chi-square value</i>		0.888125	
<i>Difference</i>		No	

$$P = 0.05; \chi^2 = 3.8$$

In order to demonstrate that differences exist between the level of participation in the rural villages and the small towns, a Chi-square test was performed on Avenui (R) and Savelugu (S) and then on Avenui (R) and Bekwai (S). The results are shown in Table 36 and Table 37, respectively.

Table 36: Chi-square test on participation in Avenui and Savelugu

Response	Avenui	Savelugu	Sum
No	28	80	108
Yes	32	40	72
Sum	60	120	180
<i>Chi-square value</i>		5.856375	
<i>Difference</i>		Yes	

$$P = 0.05; \chi^2 = 3.8$$

The results show that at a significance level of 0.05, the proportion of community members participating in decision making and planning in the rural villages of Avenui (R) and Tota (R) differs significantly from that of the small towns of Bekwai (S) and Savelugu (S). Consequently, the null hypothesis is rejected at a significance level of 0.05.

Table 37: Chi-Square test on participation in Avenui and Bekwai

Response	Avenui	Bekwai	Sum
No	28	96	124
Yes	32	12	44
Sum	60	108	168
<i>Chi-square value</i>		<i>33.4200391</i>	
<i>Difference</i>		<i>Yes</i>	

$P = 0.05; \chi^2 = 3.8$

Calculating the percentage participation from Table 34 shows that the level of participation for Avenui (R) is 53% and that of Bekwai (S) a small town is only 11%. From the interviews with household heads, it became evident that many of the small town dwellers did not pay their water user fees because they were not part of the decision-making. Since the decision making takes place at the meetings, it can be deduced that whereas it may possible to sustain community water management on a high level of participation from the community members, it may not be sustained organisationally on a participation level as low as found in the small towns. This result corroborates the findings from the technical and financial sustainability analysed in Sections 4.3 and 4.4 as well as the characteristics of the small towns. Consequently, community management has a less chance of organisational sustainability in the small towns.

4.5.1.2.2 Water supply meeting attendance in the communities

The literature review in Chapter 2 identified that one of the problems contributing to the failure of community management is that community members and leaders stop participating in meetings and issues that concern the water supply systems after system inauguration (Wegelin-Shuringa, 1998). However, meeting attendance

after the service establishment is important because, for community management to be sustainable, community members must take an active part in issues concerning the management of the water supply systems (McCommon et al, 1990). It is at these meetings that the accounts on the water system operation are discussed and decisions taken. This is where improvements to the water supply systems are proposed, agreed on and commitments made to contribute more money and time to solve particular problems to ensure the sustainability of the water supply systems.

As a proxy indicator of the meeting attendance rate in the communities, the household heads were asked, "How many meetings related to water supply have you attended in the past one year?" The question was asked with the intention of testing the sub-hypothesis stated as:

Null Hypothesis: There is no difference in water related meeting attendance in rural and small towns.

To test this hypothesis an analysis of the meeting attendance of community members was conducted as shown in Table 38. A person is taken as having been active in meeting attendance (attended) when s/he attended water related meetings for 2 or more times for the year. Water related meetings were found to be held more than four times per year in the study communities.

Table 38: Meeting attendance for the year 2001/2

Response		TOWN				Total
		Avenui	Bekwai	Savelugu	Tota	
Attended	Count	48	4	56	48	156
	% within TOWN	80.0%	3.7%	46.7%	85.7%	45.3%
Not Attended	Count	12	104	64	8	188
	% within TOWN	20.0%	96.3%	53.3%	14.3%	54.7%
Total	Count	60	108	120	56	344
	% within TOWN	100.0%	100.0%	100.0%	100.0%	100.0%

The percentage of community members participating actively in meeting attendance in the rural villages of Avenui (R) and Tota (R) were 80% or more. On the other hand, the percentage of community members actively engaged in meeting attendance in the small town of Savelugu (S) was only 47%. That of Bekwai (S), the larger of the two small towns was even worse at only 4%.

To determine if these results show any significant statistical differences, Chi-square tests of the results were performed. The results for Avenui (R) and Tota (R) are shown in Table 39. The Chi-square value shows that there is no statistical difference in the proportions of community members attending water related meetings for the year 2001 at a significance level of 0.05 in the rural villages.

Table 39: Chi-Square test of meeting attendance for Avenui and Tota

Response	Avenui	Tota	Sum
Not Attended	12	8	20
Attended	48	48	96
Sum	60	56	116
<i>Chi-square value</i>		<i>0.32286954</i>	
<i>Difference</i>		<i>No</i>	

$$P = 0.05; \chi^2 = 3.8$$

On the other hand, comparing Avenui (R), a rural village with Savelugu (S), a small town shows significant statistical differences in the attendance rates as shown in Table 40.

Table 40: Chi-Square test of meeting attendance for Avenui and Savelugu

Response	Avenui	Savelugu	Sum
Not Attended	12	64	76
Attended	48	56	104
Sum	60	120	180
<i>Chi-square value</i>		<i>16.8778466</i>	
<i>Difference</i>		<i>Yes</i>	

$$P = 0.05; \chi^2 = 3.8$$

The same holds for comparing meeting attendance rates for Avenui (R) and Bekwai (S) as shown in Table 41.

Table 41: Chi-Square test of meeting attendance for Avenui and Bekwai

Response	Avenui	Bekwai	Sum
Not Attended	12	104	116
Attended	48	4	52
Sum	60	108	168
<i>Chi-square value</i>		<i>101.518567</i>	
<i>Difference</i>		<i>Yes</i>	

$$P = 0.05; \chi^2 = 3.8$$

To conclude, the results of all the Chi-square tests show significant differences between the level of participatory planning in the rural villages and the small towns. Whereas rural villagers participated massively in their water service delivery, their counterparts in the small towns did not. This finding confirms the earlier observations in Section 4.5.1.1 that the small town dwellers were less interested in managing directly their own water supplies. This supports the arguments of the thesis that community management which relies on participation to be sustainable will be less likely to be organisationally sustainable in the small towns.

4.5.1.3 Ownership of the water supply systems

Many arguments have been made in the literature to the effect that the community members' psychological sense of ownership is crucial to their maintaining their water supply systems (Section 2.5.2). Ownership sense is distinguished from legal ownership which entails the community holding the legal rights of ownership. It is often pointed out that water supply systems are not maintained but left in a state of disrepair because the community members do not feel a sense of ownership (Cotruvo et al, 1999). Consequently all the water supply systems studied had community ownership as a central part of the water systems establishment. Legally, the water supply systems are owned by the District Assemblies but the

communities are told that the systems belong to them and they believe this wholly. Therefore it is possible to gauge a community's psychological sense of ownership by asking them who owns the water systems in their communities.

To establish whether or not the perception of ownership expressed by the community members in the rural villages and the small towns differ, the following sub-hypothesis was tested.

Null Hypothesis: There is no difference in the perception of ownership between rural villages and small towns.

Respondents were asked the question, "Does your community own the water supply system?" Table 42 shows the responses.

Table 42: Perception of ownership in the communities

Response		TOWN				Total
		Avenui	Bekwai	Savelugu	Tota	
Yes	Count	60	36	56	48	200
	% within TOWN	100.0%	33.3%	46.7%	92.9%	58.1%
No	Count	0	72	64	4	144
	% within TOWN	.0%	66.7%	53.3%	7.1%	41.9%
Total	Count	60	108	120	56	344
	% within TOWN	100.0%	100.0%	100.0%	100.0%	100.0%

High levels of perception of ownership were recorded in both Avenui (R) and Tota (R) the rural villages. More than 93% of the householders said they believe that the water supply systems belong to them. On the other hand the results from Bekwai (S) and Savelugu (S) showed low levels of ownership perception.

To determine whether or not the results from the rural villages and the small towns were significant statistically, Chi-square tests were performed at a significance level of 0.05. The analysed results are shown in Table 43. The results show that significant statistical differences exist in the perception of ownership displayed in both Avenui (R) and Tota (R), the rural villages. The test however shows statistically significant differences in the perception of ownership in Avenui (R) and Savelugu (S). Similar differences exist in the perception of ownership in Avenui (R) and Bekwai (S).

Table 43: Chi-Square test of ownership perception for the communities

Response	Avenui	Tota	Sum
No	0	4	4
Yes	60	48	108
Sum	60	52	112
Chi-square value		2.81329534	
Difference		No	
Response	Avenui	Savelugu	Sum
No	0	64	64
Yes	60	56	116
Sum	60	120	180
Chi-square value		47.3548626	
Difference		Yes	
Response	Avenui	Bekwai	Sum
No	0	72	72
Yes	60	36	96
Sum	60	108	168
Chi-square value		67.3042436	
Difference		Yes	

$$P = 0.05; \chi^2 = 3.8$$

The results point to the rejection of the null hypothesis at a significance level of 0.05 since, it is shown that significant differences exist between the perceptions of psychological ownership in the rural villages and the small towns. Since ownership is a central criterion of the community management any community that does not display ample psychological sense of ownership is not a good candidate for

community management (Cotruvo et al, 1999). Organisationally, community management has a less chance of sustainability in the long term in the small towns.

4.5.2 Summary of challenges to community water management

The analysis of the technical, managerial and institutional sustainability presented in the previous sections has shown strong evidence that the small towns are much less likely to be sustainable under community management than the rural villages. This observation confirms the literature (Sections 2.4 and 2.5) that community water management is a rural water supply and sanitation paradigm. It also shows that extending the boundaries of community management as it is to small towns will be problematic unless radical changes are implemented.

This section summarises the challenges to community management which confirm the Chi-square tests performed so far. The data for this comes from the focus group discussions with the Water Boards (WSDB) in the four communities and the key sector professionals.

The discussions revealed the following organisational/institutional weaknesses with community management in small towns:

- Data collection and records keeping have been poor even though the communities were selected based on the criterion that they have some management records. There were no records on important parameters, such as non-revenue water. Furthermore, water production trends are not available even though production meters are in use.
- The technical/administrative capacity of the Water Boards in the small towns is poor. For example in some cases the Water Boards are yet to learn the conversion of the meter readings to number of buckets (Volume of water) to enable them monitor the water vendors effectively.

- Some true costs are not factored into the cost of water production to allow a proper determination of tariffs. Consequently, the tariffs were not based on a rational analysis of the cost components needed to sustain the water supplies on a long term basis. Some of these include costs for the maintenance of the community management institution (i.e. remuneration to the Water Boards as the managers of the water supply systems), capacity building, future extension, replacement costs and operation and maintenance (O&M) costs.
- An evaluation of the O&M in relation to the CWSA policy clearly indicates that the existing practices are poor.
- Regulation and monitoring from the District Assemblies are poor and in most cases no reports are sent by the Water Boards. Even where these are sent no analysis or follow-up is done by the DA; there is no self-regulatory mechanism - for example internal and external audits and hence no accountability to check performance.
- Revenues accruing from water sales are sometimes appropriated for other purposes, like funerals and festivals.
- Membership of some Water Boards is dwindling as some members lose interest, presumably because of the poor/lack of remuneration, whilst others are transferred from their locations to other towns. This leaves a few who then take decisions that may not always be in the interest of the whole community.

- CWSA has been providing support to the Water Boards. Through Partner Organisations (PO), CWSA extends initial training to members of the Water Boards. However, subsequent data collection and monitoring of the activities of these Water Boards appears inadequate. This has implications on the agency's ability to effectively monitor the policies regarding small towns. In the Northern and Upper Regions, for example, the Water Boards feel more obliged to submit reports to the Association of Water and Sanitation Boards (AWSDB), a local association and to seek assistance from them than they do with CWSA.

The analysis of the data so far points to the fact that, extending the boundaries of community management to the small towns presents a far greater challenge than experimenting with an improved version and/or alternative management models.

4.5.3 Improving sustainability in water management using PPP

The data analysis so far has shown the weaknesses inherent in community water management in small towns which points to the need for an improved version of community management and/or alternative models. Since the private sector is active in Ghana, public-private partnerships may have a chance of ensuring the sustainability of the water supplies in small towns. "Partnerships do not happen, however, just because they are a good idea. Nor is it useful to talk in abstract ways about partnerships between sectors, such as private and public or formal and informal. Usually, participatory programmes happen if and when people and organisations are convinced that their interests will be better served in partnerships rather than not" (Hamdi, 2000). The same author observed that effective partnerships begin with a discovery of common interests with inducing a convergence of interests as a prelude to planning. Therefore, the research explored opportunities for public-private partnerships in Ghana by seeking the perceptions of the stakeholders of the small town water sector. The perceptions were compared with the common drivers for PPP identified in Section 2.5.3 of the literature

review. The data for the analysis comes from semi-structured interviews with the key sector professionals, focus group discussions with the Water Boards and the household surveys. A synthesis of the analysis is distilled into perceptions of the stakeholders and challenges to PPP which are presented herein.

4.5.3.1 Perception and attitude of Water Boards

The Water Boards in all four communities acknowledged that the private sector had been active in the water supply service establishment and that they perceive local private participation in the management of water supplies favourably so long as they are not exploited.

Typical roles played by the private sector included:

- Materials supplies.
- Consulting services for systems design and feasibility studies.
- Construction and installation of civil, mechanical and electrical equipment.

When asked about the future role of the private sector, the Water Boards were unanimously of the opinion that the private sector should continue in their current role *vis a vis* providing the services outlined above.

The private sector is not involved in any management activities and asked why this is so the Water Boards' responses differed in the rural villages and the small towns. The Water Boards in the rural villages of Avenui (R) and Tota (R) felt that the role of water management was well within their capacity hence they would like to continue managing the water supply systems themselves. The Water Boards in Savelugu (S) and Bekwai (S), the small towns were more inclined toward having the private sector handle the management because of difficulties they were experiencing. The difficulties have been outlined in Section 4.5.2 of this thesis.

The Water Boards were interviewed about PPP to find out about their level of awareness and preferences for the various sub models of PPP. Table 44 shows the ranking when the Water Boards were asked about their preferences in terms of public-private partnership models. Explanations of the various PPP sub models currently being used in the water sector has been provided in Section 2.5.3 of the literature review. The two rural communities of Avenui (R) and Tota (R) preferred service contracts and management contracts. The small towns of Savelugu (S) and Bekwai (S) preferred lease and management contracts.

Table 44: Water Board choices for PPP

Community	1 st Choice	2 nd Choice	3 rd Choice
Avenui	Service contract	Management contract	-
Tota	Service contract	Management contract	-
Savelugu	Lease	Management contract	Service contract
Bekwai	Management contract	Lease	Service contract

The reasons advanced for these choices are that the rural communities felt they were capable enough and would only have minimal input from the private sector in the management and operation and maintenance hence the preference for service contracts. Lease was more attractive to the small towns which were feeling the burden of managing large and complex water supply systems as shown in Section 4.3.1. They preferred lease contracts because they present an opportunity for more private sector involvement.

The Water Boards were next asked what kind of advantages they see in PPP. Except in Avenui (R), all the Water Boards in all the communities said that the following are some of the advantages to be gained from PPP:

- Better customer service
- Better overall management
- Private capital

- Better sustained system
- More free time to the Water Boards

It was felt by the Water Board of Tota (R) that the private company may attract more respect and thus the community members would be more willing to pay the user fees towards O&M. The Water Board in Avenui (R) however, felt that the only advantage to be gained from the private sector is the input of private capital.

The Water Boards were also asked about the perceived disadvantages of including the private sector in PPP. Despite the acceptance that the private sector in the management of water supply systems carry some benefits, the following were some of the disadvantages which the Water Boards mentioned that make them wary of private management:

- Increased tariffs
- Monopoly power / exploitation

Since the Water Boards perceive major advantages to involving the local private sector in PPP for the management of the water supplies, sub-models that maximise benefits to the community but at the same time prevent the private sector from exploiting the community members are likely to have a great chance of long term sustainability.

4.5.3.2 Perception of the community members

As stated earlier in the literature review in Chapter 2, sometimes decisions are taken without first of all getting input from the users of the service (Saywell, 2000). Their perceptions and reactions to certain policy instruments are therefore never accounted for. This has major implications since policy success is rooted in the reaction and behaviour of the community beneficiaries. Furthermore, the level of awareness and perception of the community members is important in designing management models that can gain their trust and acceptance thereby having a

greater chance of sustainability. The results show that, the community members are not averse to PPP in the management of their water supplies. Rather the lack of the private sector in the management is rooted in the lack of knowledge/information dissemination.

The private sector has been collaborating with the communities to establish water supply systems in almost every community in Africa. However, this does not necessarily mean that the community members are aware of their role. Determining the level of awareness of this role was an important part of this research since if the community members are aware of their contribution, then improved models could centre on more private sector involvement. Table 45 shows the number of community members who were aware of the roles played by the private sector in their communities.

Table 45: Level of awareness of the private sector by the community members

Responses		TOWN				Total
		Avenui (R)	Bekwai (S)	Savelugu (S)	Tota (R)	
Aware	Count	60	32	16	48	156
	% within TOWN	100.0%	29.6%	13.3%	85.7%	45.3%
Unaware	Count	-	76	104	8	188
	% within TOWN	-	70.4%	86.7%	14.3%	54.7%
Total	Count	60	108	120	56	344
	% within TOWN	100.0%	100.0%	100.0%	100.0%	100.0%

In Avenui (R) and Tota (R), the proportions of respondents that were aware of the role of the private sector in service establishment are 100 and 86 per cent, respectively. In Savelugu (S) and Bekwai (S), the small towns the respective figures are 13 and 30 per cent. This clearly shows that the role of the private sector is more recognised in the rural villages which are more involved in their water supply system establishment as shown in Section 4.5.1.2.

The increased campaign against private sector participation in Ghana and other parts of the developing world as shown in Section 2.5.3.4 makes it important to find out what the community members think the future role of the private sector should be. Table 46 shows the opinions of the community members.

Table 46: Community members' opinions on PPP

Responses		TOWN				Total
		Avenui	Bekwai	Savelugu	Tota	
Don't know	Count	4	12	80	0	96
	% within TOWN	6.7%	11.1%	66.7%	0	27.9%
Should stop	Count	8	0	0	12	20
	% within TOWN	13.3%	0	0	21.4%	5.8%
Continue as it is	Count	44	96	24	44	208
	% within TOWN	73.3%	88.9%	20.0%	78.6%	60.5%
Non-response	Count	4	0	16	0	20
	% within TOWN	6.7%	0	13.3%	0	5.8%
Total	Count	60	108	120	56	344
	% within TOWN	100.0%	100.0%	100.0%	100.0%	100.0%

Taking an aggregate survey of opinions, about 61% of all responding household heads were of the opinion that the private sector should continue rendering the services they already do. They also would like to see increased input from the private sector in terms of management of water supplies. The disaggregate figure for the various towns show a similar proportion except in Savelugu (S) where the majority of the people do not have an opinion. This was explained in Section 4.5.1.2.2 that many of them do not attend the water user meetings.

The household heads were next questioned about perceived advantages of PPP similar to the Water Boards. Table 47 shows the proportion of the target groups that perceive advantages with the participation of the private sector in the

management of water supplies in the communities. Each respondent was allowed to choose as many advantages as they pleased.

Table 47: Perceived advantages of PPP by the community members (%)

Response	Bekwai	Savelugu	Avenui	Tota
Better customer service	7	17	0	0
Better overall management	31	19	9	39
Private capital	12	13	58	15
Better sustained management	24	27	0	0
No disadvantage	26	24	33	46
Total (%)	100	100	100	100
Sample size (N)	168	192	48	52

The community members were also asked about perceived disadvantages of PPP. The results are shown in Table 48. Each respondent was given the opportunity to tick as many as choices as they please.

Table 48: Perceived disadvantages by the community members

Response	Bekwai	Savelugu	Avenui	Tota
Increased tariffs	25	12	32	35
Worse customer service	10	9	16	13
Monopoly	20	6	30	26
Exploitation	25	21	22	22
Don't know	20	52	0	4
Total (%)	100	100	100	100
Sample size (N)	160	132	148	92

It can be concluded from the data analysis that, the community members are not averse to the participation of the private sector in the management of their water supplies even though they acknowledge some potential problems. This implies that PPP as an alternate water management model may have a good chance of sustainability in the small towns by addressing those concerns.

4.5.3.3 Perception of local service providers

The fieldwork involved a series of semi-structured interviews with a variety of key informants in the water sector from the Ministry of Works and Housing (MOWH), the Community Water and Sanitation Agency (CWSA) and the District Assemblies (DA) as stated in Section 3.7.2 of the methodology. These interviews were designed to uncover sector professionals' perception regarding community management and public-private partnerships and to provide greater detail on the research questions underpinning the thesis. These interviews are important because the key informants are responsible for the policies followed in the small town water sector in Ghana. Furthermore, the interviews were not limited to the case studies but covered all the small towns in Ghana which they deal with on a regular basis. According to them, public-private partnership in the management of small town water supplies is a viable alternative to the generally weak Water Boards under community management. Full-text transcripts of these interviews can be found in Appendix 7.

The key informants supplied the following information when questioned about the challenges facing community management in the small town water sector:

- Dwindling interest of some Water Board members.
- Difficulty in collecting water user fees.
- Difficulty in managing complex water supply systems.
- Misappropriation of water user fees.
- The burden placed on some of the District Assemblies by non-performing Water Boards.

The key informants, especially from the CWSA observe that a sizable number of Water Board members are losing interest in their management role. Consequently, they do not manage their water supplies and do not attend meetings. This

corroborates the findings in Section 4.5.2. It was discovered during the study that part of the loss of interest is due to the fact that the Water Boards are not remunerated.

The key informants also observed that some of the Water Boards in the small towns find it difficult to collect water user fees from the community members because of lack of expertise even though they have been trained. Another problem the Water Boards face is the inability to manage effectively the large and complex water supply systems as confirmed by this study in Sections 4.3 and 4.4. There is also a tendency for some Water Boards to misappropriate the water user fees collected for other purposes different from water service provision. This was confirmed during the field work when the author was asked by some Water Board members to suggest ways by which they can ensure that no one misappropriates collected revenue.

The key informants also observe that the Water Boards not performing their duties make it difficult for the District Assemblies which own the legal rights to the water supply systems. The District Assemblies therefore have to send personnel to resensitize the Water Boards. But the resources of the DA are very limited.

Because of the reasons outlined above, many of the key informants who were previously advocating community management are now of the opinion that it is prudent to move on to trying out alternative management models in small towns water management that have worked elsewhere. They felt that PPP are especially needed in towns where the supply of water is beset with serious managerial and technical problems. In these towns, the private sector is perceived as a means of introducing greater efficiency, extending services and introducing effective bill collection.

Interviews with the key sector personnel shows that, a potential source of private sector players is the employees of the public utility GWCL who will be laid off when the national water utility is privatised. These include technical and commercial managers who are soon to retire from the services of the company. It was estimated that the ongoing reforms of the urban water sector are likely to see a reduction in size (38%) of GWCL's manpower from about 4,000 to 2,500. This is expected to provide a large pool of experienced water supply professionals who on their own or in partnership with other entrepreneurs, may wish to take up challenges in the small towns water sector. Another source of private sector managers are the companies already providing some services in the water sector.

In line with the views of the key informants, it became important to interview the company heads of potential water management companies to establish whether or not the needed expertise can indeed be found. The data from these interviews are analysed in Section 4.5.3.4.

4.5.3.4 Perception of the private sector

PPP cannot work without the active participation of the private sector because they may not be interested in investing in the small town water sector. Therefore, in order to determine the level of interest and expertise of the private sector, the researcher interviewed all the major water supply consulting and contracting companies who showed an interest in small town water management. A list of 35 private companies compiled by the CWSA as having an interest in small town water management was used. A cross-section of the Executive Officers of these companies was phone-interviewed followed by twelve (12) face to face interviews. A list of those interviewed can be found in Appendix 5. The data shows that they have the requisite expertise and interest to enhance long term sustainability of the water supplies in small towns. However, some capacity building may be required initially.

Some of the firms are quite sizable and have been in the water sector as consultants, suppliers of machinery and equipment and in commercial management. Interviews with these indicated considerable enthusiasm and interest in committing resources to small town water management.

The private sector respondents believed that PPP should be introduced as quickly as possible. One particular consultant, who provides support to small towns, was unequivocal in his view that the private sector should be brought in quickly to ensure sustainability of the systems that have been handed over to the Water Boards.

On the issue of the financial attractiveness of the small towns, some of the private sector respondents were of the opinion that the smaller community systems should be clustered to ensure sufficient revenue and to enable economies of scale. They stated that their main aim was to do good business.

The analysis from the perception of all the stakeholders to the PPP water management in small towns shows that they all agree on one thing: that PPP is a viable option which must be explored. The interest, expertise and willingness of the stakeholders to invest time and money in the management of the small town water sector shows a strong likelihood of long term sustainability of the water supply systems in small towns.

4.5.3.5 Problem/Challenges to PPP in small towns water supply

Despite the fact that PPP, especially employing local private investment enjoys sufficient support from stakeholders as shown by the data analysis so far, a number of challenges were identified during the field work. This research focuses on the challenges that need to be dealt with in order to attract and keep local private investment in PPP. They include policy and regulatory issues as well as barriers of

entry into the small town water market. The data comes from the key sector informants and the private sector interviews and are contained herein.

Table 49 aggregates those issues that were most frequently referenced and cross referenced during the interviews as problem areas that need to be addressed for effective PPP in the small towns. The table shows the subject of reference (highlighted) and the derivative within the structure of the data.

Table 49: List of aggregated issues arising from qualitative data analysis

Rank	Number of references	Topic
1	7	Policy formation > Poor clarity of policies
2	6	Policy implementation > Bureaucratic impediments
3	5	Private sector > Managerial and technical competence
4	4	Communication > Lack of information on PPP opportunities

Full-text transcripts of the interviews with key sector personnel can be found in Appendix 7. The issues identified are discussed in the following sections.

4.5.3.5.1 Clarity of policies

Key informants interviewed agreed that current guidelines for water supply in Ghana predispose small towns toward community management as an exclusive option. This is because even though there are guidelines for PSP much of the issues relating to the private sector are not clearly defined.

To find out if indeed there were clear policies within the small town water supply, the key informants were asked, “Do you agree that there are no clear policies and regulations for PPP in small town water supply?” Figure 6 gives a synthesis of the responses.

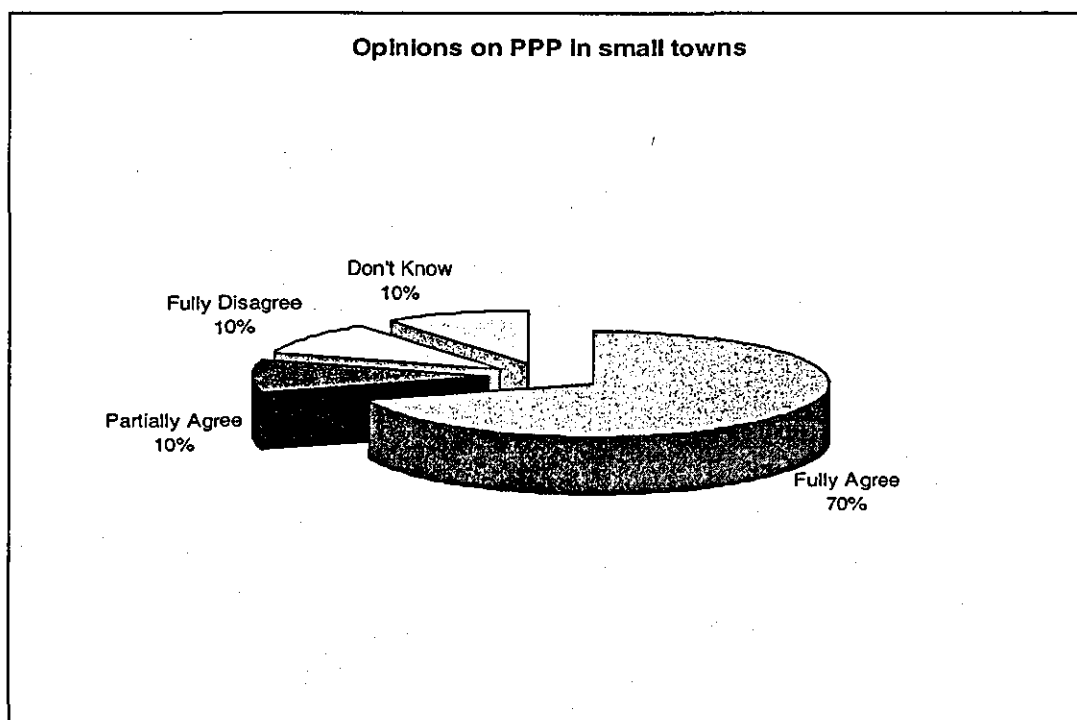


Figure 6: Response that there are no clear policies

Seventy percent of the key informants agreed to the statement that there are no clear policies and guidelines for PPP in small town water supply. One bureaucrat explained the situation that even the policy makers themselves seem to be confused about what steps to take. This could be further explained by the fact that the policy makers are largely politicians who do not want to lose votes (political power) by implementing policies that they think will lose votes for them. At the moment community management seems popular among the small town communities. The problem is compounded by the fact that there is currently a lot of opposition against the on-going public-private partnership in the urban water sector especially from NGOs. The data however, points to the fact that the fears of politicians are unfounded since users and other stakeholders are not averse to public-private partnership in areas where community management does not adequately fulfil the objectives of small town water supply.

4.5.3.5.2 Bureaucratic impediments

To determine the extent to which bureaucratic behaviour influences PPP in small town water supply the respondents were asked, "Do you agree that bureaucratic behaviour retards the active participation of the private sector in the management of small town water supply?" The responses of the key informants to the above statement are shown in Figure 7.

Some key informants acknowledged that the private sector finds it difficult when dealing with the bureaucrats especially when they try to get information at the district level. The bureaucrats at the district level tried to explain this by saying that, all spheres of the developing world have problems of bureaucracy tied to corruption.

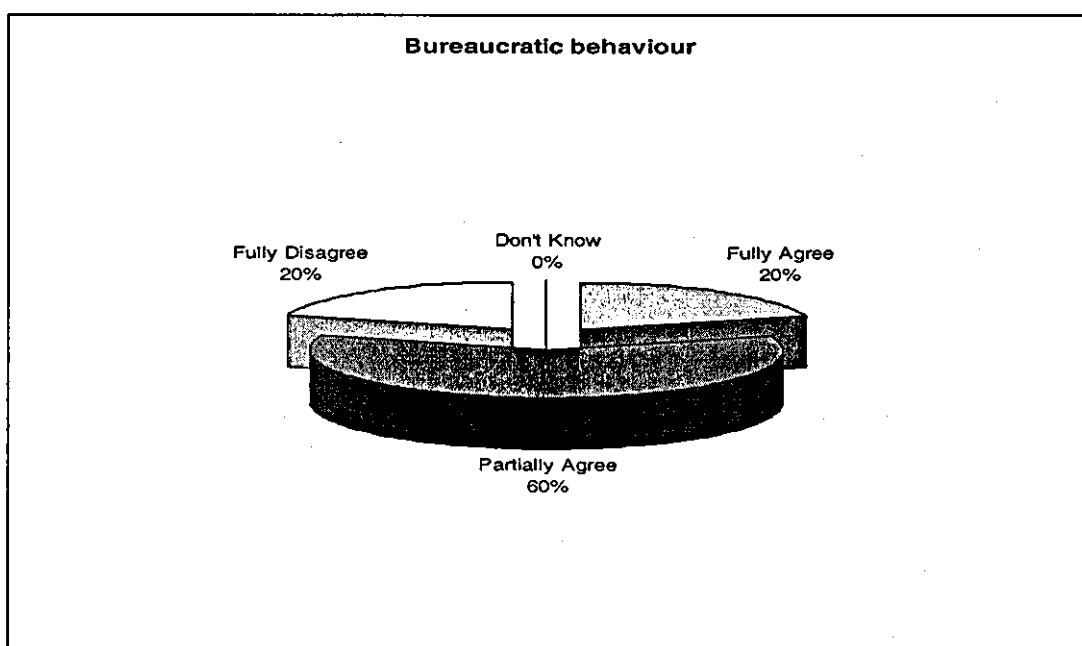


Figure 7: Proportion responding that bureaucratic behaviour poses obstacles

Sixty percent of the key informants partially agreed that bureaucratic behaviour poses obstacles to PPP and 20% fully agreed. These are high figures considering that this is coming from the very key informants.

4.5.3.5.3 Competence of local private investors

A common reason given by donors and foreign consultants to explain the lack of active participation of the private sector in the management of water supplies is lack of capacity of local entrepreneurs. When asked whether the lack of involvement of the private sector in small town water management could be attributed to lack of competent local private companies in the country to take over the management, Figure 8 shows that 50% of the key informants disagreed. Twenty percent (20%) were of the opinion that there are no competent local companies whilst the remaining 30% partially agree that there are no competent local private investors.

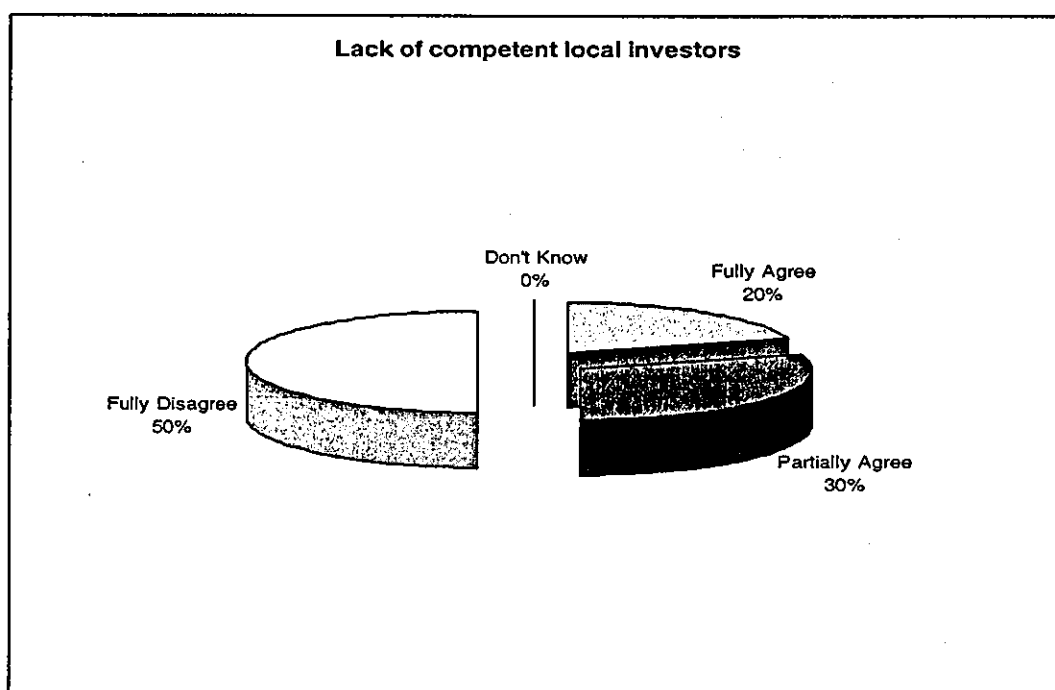


Figure 8: Respondents that there are no competent local private investors

Those who were of the opinion that there is a competent local private investment base gave the following reasons:

- The private sector has not been given the opportunity yet.

- The requisite expertise exists but the private sector must be re-oriented and given proof that investment opportunities exist in the area.

They also pointed out that the GWCL has dominated the water sector for a very long time. Consequently, the private operators find it difficult to rise. Therefore, now that the responsibilities of the GWCL has been limited to urban water supply, it is hoped that the staff shed off can take on the duties of water management in small towns with the years of experience they have acquired with GWCL.

It was also recognised that water utilities serving small towns can balance the requirement for financial self-sufficiency with the need for significant investment for improving services to meet the needs of consumers. All key informants agreed to this since it is common knowledge that those in the poorer areas actually pay more for the cost of water than their counterparts in the cities (Stoveland and Bassey, 2000).

4.5.3.5.4 Lack of information

Data analysis points to communication as a major problem. To test the efficacy of this, the respondents were asked, "Do you agree that there is a problem of lack of information on investment in small towns and PPPs generally?" This question was posed because the lack of involvement of the private sector could be due to the fact that local private investors lack access to information that an avenue for investment exists in the small towns sector. Figure 9 shows the responses. Only 30% of respondent fully disagreed which pointed to the fact that in deed lack of information and poor communication plays a role in the private sector not entering into PPP for small town water supply.

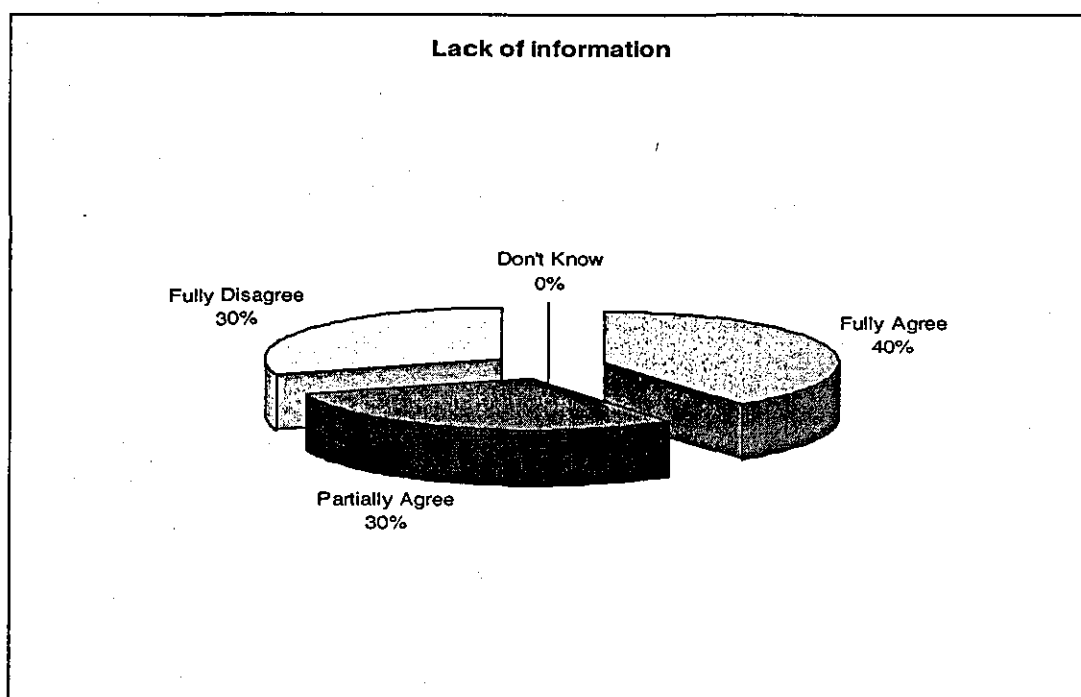


Figure 9: Lack of information retards private investment

The willingness of the private sector to invest in the small town water sector has already been confirmed by the fact that 70% of the key informants said that the private sector at one time or the other approached them to ask about investment opportunities. This is buttressed by the fact that in 1999, the CWSA requested statements of interest in managing water supply in small towns and 35 local companies responded to this (refer to Section 4.5.3.4). However, after more than 3 years, the CWSA is still deciding on what to do about these expressions of interest further confirming that a majority of the problem is of policy implementation origin.

It can therefore be concluded that even though PPP is accepted by stakeholders in small towns water management, the issues of poor clarity of policies, bureaucratic impediments, managerial and technical competence and communication need to be addressed in order to make it a sustainable model for water supply management.

4.6 SOCIAL SUSTAINABILITY

Social sustainability was also investigated under community management in the four communities used for the case studies. As stated in Section 2.6 of the literature review, social sustainability is concerned mainly with issues of water quality and equity. Analysis of the results from the field shows that unlike the other facets of sustainability, social sustainability is similar in all the four communities studied.

4.6.1 Water quality issues

The water supplies in all four communities have not been reported to cause any serious health concerns. However, as stated in the literature review, whilst parameters of drinking-water such as colour, taste, odour and turbidity may not pose significant health risks similar to arsenic, they may give rise to complaints from consumers. They also therefore affect the sustainability of the water supplies since the consumers may not be willing to maintain a water supply whose quality they find unacceptable (Cotruvo, et. al., 1999). The researcher therefore examined the water coming out of the taps in the four communities. Box 6 shows the results of this assessment.

Box 6: Status of water quality in the case study communities	
• Avenui (R) :	4
• Tota (R):	4
• Savelugu (S):	3
• Bekwai (S):	3

1-Poor.....5-Excellent

The scores are based on the researcher observing the taste, colour and odour of the water from the three communities. Statistically the results are not significantly different at a significance level of 0.05 pointing to the fact that significant differences do not exist in the water quality in the rural villages and the small towns due to poor management by the Water Boards. This is due to the fact that

periodic water quality testing is done by the District Assemblies to ensure that the water supplies meet acceptable national standards. Quality therefore even though a good measure in determining sustainability, will not distinguish between small towns and rural villages for the purposes of this study.

4.6.2 Equity in water supply

As stated in Table 6 of the literature review equity was studied in the four communities based on:

- Water user charges
- Access to water supply
- Vulnerability of some community members

The results show that water user fees charged in the all the communities were similar. Twenty (20) litres of water cost about 100 to 150 Ghanaian Cedis in the rural villages. This amounts to about 50 to 75 cents per cubic water. The cost of water in the rural villages were slightly less than in the small towns. However, the results show that within each community tariffs were determined on a flat rate basis. Different social groups therefore did not pay different charges.

The type of water supply access in the two rural villages was through public tap stands. In the small towns, except for government residencies, access to the water was also predominantly through public tap stands. The water supply was used mainly for domestic use in all the four communities.

Forty one percent of all the surveyed household heads were female. Box 7 shows the breakdown according to community. None of the female respondents made any allegation of being discriminated against in getting access to water.

Box 7: Proportion of female headed households in the case communities	
• Avenui (R) :	40%
• Tota (R):	48%
• Savelugu (S):	33%
• Bekwai (S):	44%

Table 20 showed that whereas the water supply systems in the rural villages were able to meet all the demand of the community members, those in Bekwai and Savelugu were only able to meet partial demands of the community members. The Water Boards in the small towns managed this situation by opening the taps in the different segments of the towns at different times. No particular segments were said to receive any preferential treatment pointing to the fact that even though the water available was limited, the poorer community members were not disadvantaged. Another observation was that both the poor and the rich lived together. They therefore received similar access.

Finally no environmental issues such as over-abstraction of the water supply was observed in any of the communities. Hydrogeological records on the communities showed that the water abstraction rates were less than the ground water recharge rate.

In conclusion, since the issues of equity and water quality were not markedly different in all four communities, the use of social sustainability as a distinguishing characteristic of community water management is not significantly different in the communities examined. The subsequent discussion of the thesis will therefore not treat this facet of sustainability into anymore detail.

4.7 CHAPTER SUMMARY

The purpose of this chapter was to present the data collected during the research against the key research questions outlined in Chapter 3. Dividing the chapter into sections covering technical, managerial and organisational sustainability, facilitated

the process of explaining the key findings from the fieldwork and underlined the methodology adopted for the study.

On a general level, the following key points emerge from the Chapter:

- The accumulation of findings provides a more coherent view of community management in small towns than appears in the prevailing literature.
- The analysis reflects the specific concerns that water users in small towns possess with regard to management of their water supplies.
- The findings advance understanding of the issues that may crop up in the use of the alternative management option of PPP in water management.
- Qualitative data such as key informant interviews provided a wider and strategic perspective on the provision of water supply in small towns.

More specifically, the following detailed findings can be summarised:

- The population of small towns is significant justifying that they deserve better treatment in basic service provision. Small towns consist of 30% of the national population of Ghana thereby confirming that the range small towns could be as many as 1.2 to 2 billion of global population as stated in Section 2.3.3.2 of the literature review.
- The small towns have the following characteristics which offer less chance of institutional and organisational sustainability of community managed water supplies:
 - A younger population of mean age 43 to 45 years compared to 51 and 55 year in rural villages. The younger people in small towns are less interested in sustaining their water supplies.
 - Larger household sizes of 14 and 23 members compared to 9 and 10 in rural villages. The larger household size of small towns is not

conducive to social homogeneity (community cohesion) which was identified in the literature review in Section 2.5.2 as critical to the sustainability of community management.

- More commercially minded inhabitants compared to rural villages that are predominantly farmers. The small town inhabitants which are mostly traders have less time for sustaining their water supply systems.
- Technical and financial performance of small town water supply under community management is poor due to the size and complexity of the water supply systems. This is reflected in the fact that the small towns are not able to satisfy their water supply objectives unlike their counterparts in the rural villages under community management.
- Social sustainability was not markedly different in the both rural villages and small towns.
- The level of participation of small town inhabitants in water supply services is much less than those in rural villages.
- Rural villagers are much more informed and more involved in their water supply than small town dwellers.
- Some of the Water Boards that manage the water supplies under community management in small towns are losing interest in their duties due to poor or no remuneration.
- Some of the true costs (such as remuneration to the water managers, replacement costs, future expansion) were not taken into account for tariff determination.
- Public-private partnership is a viable alternative to community water management in small towns with management and lease contracts as the preferred options from the perspective of stakeholders.

- Water users in small towns are not averse to management by the private sector. If they seem to hold a contrary view, then it is more a question of lack of information. This was quite evident during the interactions with Water Boards and community members. After PPP options were explained, it became clear that most of those interviewed are not averse to PPP.
- There is poor clarity of water supply policies with regards to the private sector in small towns. Current policies actually predispose small towns to community management as an exclusive choice.
- Policy implementation in the small town water supply faces bureaucratic impediments such as restriction of access to information.
- The private sector is willing to take on the challenges of small town water management.
- Even though the private sector may have the requisite managerial and technical competence, it has not been tested, hence the need for some initial capacity building.
- The sizes of some of the small towns, coupled with the low per-capita demand for water, may not generate sufficient revenue to make them very attractive alone. Clustering as a way of increasing potential revenue may need to be explored.

5. DISCUSSION AND IMPLICATIONS OF FINDINGS

5.1 CHAPTER OUTLINE

This chapter considers the analysed data within a broader framework. The thesis' key research questions and hypothesis are revisited with a view to discuss the implications of the findings following the presentation of the data analysis in Chapter 4. The findings were tested in a post hoc way by seeking the opinion of the key professionals in focus groups (see Table 11). A broader discussion of the implications of this research for the research framework is presented. The chapter concludes with guidance points for enhancing public-private partnerships for the management of small town water supplies.

5.2 RESPONSE TO RESEARCH QUESTIONS AND HYPOTHESIS TESTING

This section presents the implications of the findings in relation to the primary and secondary research questions that were identified in Chapter 3 (Section 3.2). The primary research question was stated as:

How sustainable is small town water service delivery under community management?

The secondary research questions examined in order to answer the research primary question in detail included:

- How different are small towns and rural villages from the perspective of water service delivery?

- What is the status of technical sustainability of small town water service delivery compared to rural villages?
- What is the status of social and financial sustainability of small town water service delivery compared to rural villages?
- What are the challenges that arise in the consideration of alternative water management models in small towns?
- What are stakeholder perceptions of alternative water management models in small towns?

The section ends with an examination of the thesis' hypothesis in relation to data analysis.

5.2.1 Primary research question

How sustainable is small town water service delivery under community management?

The research question led the researcher to an investigation of the dimensions of sustainability of community water management in the four case study communities chosen. The dimensions of sustainability investigated included:

- Technical sustainability – the management model must be capable of adequately addressing the technical issues including, expansion of the infrastructure to meet increasing demand, size and complexity and keeping the water supply facilities in a good physical state.

- Financial sustainability – the issues identified include managerial efficiency, user fees collection and accountability.
- Organisational sustainability – the domains include the organisational issues that arise in the choice of a particular management model, institutional issues comprising legal and regulatory issues associated with the choice of the particular management model.

An examination of the dimensions of sustainability shows that community water management in small towns is limited, hence modifications are needed in approach to the issues of small town water supply. The primary research question is explored in more detail in the examination of the secondary research questions below.

5.2.2 Secondary research question 1

How different are small towns and rural villages from the perspective of water service delivery? Objective: To investigate whether or not differences exist between water service delivery characteristics of small towns and rural villages. The criteria for comparison included demographic factors, community support and ownership of water supply initiatives

The literature review in Chapter 2 pointed to the fact that small towns have been neglected in most studies and development assistance projects because they do not subscribe to the definition of urban or rural settlement. Consequently, little is known about their characteristics and how this relates to water service sustainability. An objective therefore of this thesis was to throw light on the characteristics of small towns.

The data shows the following key points:

- Demographically, the small towns visited have larger household sizes compared to the rural villages.
- The mean age of the household heads in the small towns is lower than their counterparts in the rural villages.
- The predominant occupation in the small towns is trading unlike the rural villages where most of the population are farmers.
- Community support for the water supply management was significantly lower in the small towns:
 - Participation in decision making was significantly lower in small towns compared to the rural villages.
 - Very low levels of meeting attendance were recorded in the small towns compared to the rural villages.
- Very low expressions of psychological sense of ownership were recorded in the small towns compared to rural villages.

The characteristics of the small towns are in contrast to the sustainable criteria of community management identified in the literature review (Section 2.5.2.1) which showed that successful community managed systems have the following characteristics:

- The communities are rural with population usually less than 3000 people each (McCommon et al.'s, 1990; Evans and Appleton, 1993; PCWS-ITN, 2001; SER, 2001; Laryea, 1994).

- The occupation of the inhabitants was predominantly farming or agriculturally based (PCWS-ITN, 2001).
- There was participation and empowerment in the service establishment (McCommon et al.'s, 1990; PCWS-ITN, 2001).
- Household heads attended water related meetings to take decisions (SER, 2001; Lammerink, 1998).
- Social pressures were used to discipline deviant community members (Lammerink, 1998; SER, 2001).

The findings therefore show that, in terms of water service delivery, small towns are different from rural villages. This has implications for the long term organisational sustainability of water service delivery. These findings are explored in greater detail in the following sections.

5.2.3 Secondary research question 2

What is the status of technical sustainability of small town water service delivery compared to rural villages? Objective: To carry out a technical assessment of the water supply systems in selected small towns to determine how well they have been managed under community management since establishment compared to rural villages employing community management under similar intervention.

The literature review indicated a lack of knowledge of the technical performance of small towns under community management since community management is mainly a model for rural water supply (Section 2.7). This study therefore investigated the technical sustainability of the small town water supply systems using the indicators of sustainability identified in Section 3.6.2.

The data from the field study shows that:

- The water supply systems in the small towns are larger and more complex compared to those in the rural villages.
- The water supply systems in the small towns were in poorer physical states compared to those in the rural villages.
- The water supply systems in the small towns were unable to meet 100% coverage in the communities unlike in the rural villages.

The implication of these findings is that the small town water supplies do not have much chance of technical sustainability under community management. Explanations for this lie in investigating the management activities of the Water Boards which is done.

5.2.4 Secondary research question 3

What is the status of social and financial sustainability of small town water service delivery compared to rural villages? Objective: To investigate the social and financial sustainability of small town water service delivery compared to rural villages employing community management under similar intervention.

Social sustainability has however been omitted (refer to Section 4.1). One of the key questions of this research was whether the success of community management in rural villages could be replicated in small towns for sustainability. An examination of the first research question shows that small towns are different. An examination of the second research question showed that the small towns are less technically sustainable than the rural villages. This research question complements

the previous two by investigating how the management of the water supply systems explains the poor technical performance of the small town water systems.

The data shows the following key points:

- The Water Boards in the small towns are less effective in carrying out their management roles than those in the rural villages.
- The small towns were unable to generate sufficient revenue from the user fees to cover the full costs associated with financial sustainability unlike the rural villages.
- The quality of service provided by the Water Boards in the small towns to the community members was inferior to that provided by the rural village Water Boards.

The implications of these findings are manifested as:

- The ability of the small town Water Boards to effectively plan for infrastructure expansion to meet water system demand is seriously hampered by their inability to generate sufficient funds from the water user fees.
- The water supply systems are too complex for the Water Boards in the small towns to manage unlike their counterparts in the rural villages.
- Considering that the small towns are different from the rural villages in terms of water service delivery as shown in Section 5.2.2, and much less technically, organisationally and managerially sustainable (Sections 5.2.3 and 5.2.4), community management is less likely to be sustainable in the

long term since longer term commitment can not be expected from the community.

5.2.5 Secondary research question 4

What are the challenges that arise in the consideration of alternative water management models in small towns? Objective: The objective was to investigate problems and barriers of entry to alternative management models in the water sector in small towns.

After observing that it would take considerable effort to make to make community water management sustainable in the long term in the small towns and also observing that the private sector is likely to be active in Ghana, the option of PPP as a management model in small towns was investigated.

The data shows the following:

- Small town water supply policies with regards to public-private partnerships are not clearly defined and therefore predispose the communities towards community management as an exclusive management model.
- Even though the private sector may have the requisite managerial and technical competence, it has not been tested.
- The private sector is apprehensive of excessive controls from Water Boards and local authorities, particularly with respect to tariff-setting and imposition of taxes/fees.

- Bureaucracy and regulatory issues limit access to information in the small town water sector.

The implications of the findings are:

- The private sector may require some initial capacity building in order to take on the job of water supply management in small towns.
- Better channels of communication are required between the stakeholders of public-private partnerships in the management of small town water supply.
- There is a need for clear policies regarding the involvement of the private sector in the management of the water supplies.
- The small towns need to be made aware of the opportunities that exist in applying public-private partnerships in water management.

5.2.6 Secondary research question 5

What are stakeholder perceptions of alternative water management models in small towns? Objective: to investigate the level of awareness and readiness of users and other stakeholders to accept public-private partnerships as a water management model.

This research takes a further step by documenting the perception of stakeholders in the small town water sector on PPP. Stakeholder satisfaction is very important as their support promotes sustainability of the water supply systems (Saywell, 2000). Furthermore, the literature review points to opposition against PPP from NGOs that claim to represent the water users (refer to Section 2.5.3.4). This thesis is therefore important because it documents the perception of the actual users of the water services.

The data shows the following:

- Community members and Water Boards in small towns see advantages to involving the private sector in the management of their water supply systems.
- A majority of the households surveyed would like the private sector to continue in their current role or increase their involvement.
- Key sector personnel see advantages to the participation of the private sector in the management of water supplies in small towns.
- The private sector is willing and capable of taking on the role of water management in small towns.

The implications of the findings are:

- Stakeholders are open to other management models other than community management making it easier to implement sustainable changes.
- Opportunities exist for public-private partnership in the management of small town water supply.

5.2.7 Hypothesis testing

The guiding hypothesis tested in order to answer the research questions is:

Community management is limited in achieving sustainable water supply solutions in small towns of developing countries; hence modifications are needed in approach to the issues of small town water supply.

The hypothesis directs the thesis towards an examination of the key tenet of the proponents of community water management; that the approaches of community management developed in the rural context can be automatically applied in small towns.

A set of sub-hypotheses were examined in addition to the general research findings in order to test the research hypothesis. The null sub-hypotheses were stated as:

- There is no difference between the time of response to customer complaints in small town and rural village water supply systems under community management.
- There is no difference in the participation of community members in the planning and decision making toward the establishment of their water supply systems in rural villages and small towns.
- There is no difference in water related meeting attendance in rural villages and small towns.
- There is no difference in the perception of ownership between small towns and rural villages.

- There is no difference between the quality of service in small towns and rural villages under community management.
- There is no difference in the satisfaction of the community members with the performance of their Water Boards in small towns and rural villages.

The null hypotheses were rejected in all cases at a statistically significant level of 0.05 pointing to the fact that significant differences exist between the small towns and rural villages in terms of sustainable water service delivery under community management. Furthermore, on reviewing the data gathered and analysed for the thesis in the four case study communities (Chapter 4), it is clear that the hypothesis is proven. The findings that emerge provide strong evidence that community management should not be automatically seen as the only option for achieving sustainable water supply solutions in small towns of developing countries. Options like public private partnership should be explored. Furthermore, water service delivery in small towns ought to be given better attention similar to rural villages and urban cities in national, regional and global fora. This would go a long way in helping achieve the Millennium Development Goal of halving the number of people without access to clean drinking water by 2015.

5.3 IMPLICATIONS ON THEORETICAL FRAMEWORK

The primary purpose of this research was to investigate the extent of sustainability of small town water service delivery. From the literature review in Chapter 2 (Section 2.3.1), sustainability of water supplies was defined as multifaceted since it relies on various disciplines including engineering, management, finance, planning etc. Consequently, there was a need to apply a framework that adequately evaluates sustainability. This section reflects on how the conceptual framework of sustainability has been impacted by this study.

5.3.1 Implications on facets of sustainability in water supply management

As the literature review in Section 2.3.1 of the thesis has shown, current attempts by researchers has been towards developing conceptual frameworks for illustrating ways in which social, economic and environmental indicators can be combined to tell a coherent story about the sustainability of human well being. The current interest in this topic peaked following the United Nations Conference on Environment and Development held in Rio de Janeiro (Hodge, 1997). The trend marks a departure from earlier approaches to measuring well-being based purely on economic indicators.

As stated in the literature review in Section 2.3.1, the sustainable development models that have gained the broadest appeal are those based on a three-part model that integrates environment, economy and society (Saddler, 1988; Hancock, 1990; Evans and Stoddard, 1991; Dorcey, 1991). A major strength of the three-part model is that it has its roots in resource use and therefore can be applied to develop more specific framework for the measurement of the sustainability of water supply in communities such as small towns.

Mukherjee (1999) implicitly applied the three-part model to develop the dimensions of sustainability in water supply evaluation which has been used by the World Bank since 1997. The dimensions of sustainability include, as stated in Section 2.3.1:

- Social sustainability
- Organisational sustainability
- Technical sustainability
- Financial sustainability

The indicators associated with these dimensions of sustainability were pilot tested and applied to this study as stated in Section 3.6. The author also investigated a wider scope of indicators than those originally covered by the Mukherjee framework which is shown diagrammatically as in Figure 10 in an attempt to improve the framework. The improvements to the framework include the expansion of the indicators of technical, financial and organizational sustainability to give a more holistic treatment of the issues of sustainability in water supply.

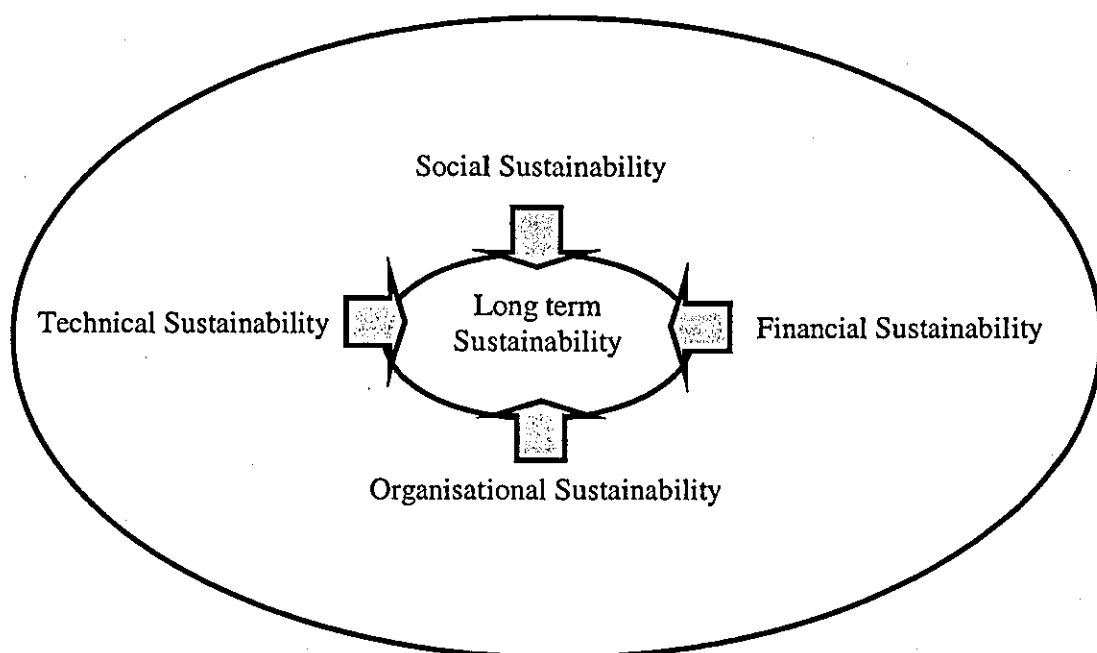


Figure 10: Dimensions of sustainability in water supply management

Since financial issues alone do not adequately cover the managerial skills of the water management personnel, financial sustainability was expanded to include more managerial issues such as management efficiency and quality of service. Organisational sustainability was expanded to cover institutional issues. This was necessary because organisational issues deal with how things are done collectively in a group and institutional issues encompass the legal and regulatory issues that enable organisations to function (Wakely, 2001). It was therefore logical to include institutional issues to do justice to the organisations in small town water

supply. Technical sustainability's indicators were also improved. The modified indicators associated with each of the dimensions of sustainability are presented in Section 5.3.2.

5.3.2 Implications of study on indicators of sustainability

The initial indicators used by Mukherjee in Figure 2 have been modified by this study. The most significant modification of indicators relate to technical and financial sustainability.

Mukherjee's (1999) definition of technical sustainability covered only an assessment of the physical status of the water supply systems. However, as the study has shown (Sections 4.3.1 to 4.3.3), an understanding of the type of water system technology as well as the operation and maintenance activities can provide useful insight to the technical sustainability of the water supply systems. Tables 50 to 53 show the improved indicators.

Table 50: Indicators of technical sustainability in water supply management

Dimension	Sub-category	Indicators
Technical sustainability	<ul style="list-style-type: none"> • Type of water supply technology • Operation and maintenance • Physical status of water supply systems 	<ul style="list-style-type: none"> • What type of technology is employed? <ul style="list-style-type: none"> • Is it a hand pump based system? • Is it a piped gravity system? • Is it a conventional system? • Are the following activities undertaken? <ul style="list-style-type: none"> • Routine maintenance • Preventive maintenance • Rehabilitation and expansion of system to meet demand • Water quality monitoring • Data collection, interpretation and reporting • What functioning systems exist? • What physical condition are they in? • What is the physical quality of system design? • What is the quality of workmanship? • What differences exist between original and current designs as a result of user modification?

Table 51: Indicators of financial sustainability in water supply management

Financial sustainability	<ul style="list-style-type: none"> • Management efficiency • Quality of Service • Financial issues 	<ul style="list-style-type: none"> • What is the technical capacity of the management committee? • Is there a designated treasurer? • Has the water management board been given adequate training? • Is there transparency of the financial management? • What are the customers overall perceived satisfaction with services? • What is the time of response to water emergencies? • Is there effective use? <ul style="list-style-type: none"> • The cleanliness and safety of the water at the point of distribution. • The safety of the water at the point of consumption. • The water quality parameters of greatest concern to the consumer. • What is the willingness to pay? • What is the profitability (annual)? • Do tariffs cover all costs? <ul style="list-style-type: none"> • Compensation of workers. • Operations (power, upkeep, maintenance, management). • Renewal of equipment. • Future extensions. • Reserves for emergencies?
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Table 52: Indicators of organisational sustainability in water management

Organisational sustainability	<ul style="list-style-type: none"> • Modes and models of water supply delivery? • Organisation • Legal and regulatory framework 	<ul style="list-style-type: none"> • What water supply models are available to the community? • How adaptive is the model? • What is the organisational structure? • What is the participation in planning and decision-making? • What is the participation of women? • Are there clear rules for water usage and fees? • Is there ownership and rights?
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Table 53: Indicators of social sustainability in water management

Social sustainability	<ul style="list-style-type: none"> • Health • Equity • Environmental sustainability 	<ul style="list-style-type: none"> • Does the water quality meet national water quality standards? • What portions of a town's population pay what charges for water obtained from the utility? • How are intermittency and hours of service distributed across the town? • Do different socio-economic groups have different access to household connections and taps? • Does abstraction of water adversely affect the water table and the local hydrology.
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Financial sustainability as used by Mukherjee (1999) has been expanded to capture managerial efficiency, quality of service in addition to an assessment of the full costs for the sustainability of the water supply systems.

In addition to the modifications, the following lessons were learnt from this study in the application of the indicators:

- Not all the indicators need to be enumerative (involving the measurement of actual numbers as most indicators are (Michalos, 1997). Much insight can be gained from qualitative indicators as in this thesis (e.g. Sections 4.3.2, 4.4.1).
- In comparing two or more water supply systems, if the performance of the systems is similar on any of the dimensions of sustainability, that dimension can be omitted so that the study can concentrate on those that differentiate the water systems. This makes a pilot study very important in developing a methodology for the evaluation. In this study, social sustainability was

found to be similar in all the case studies; hence the actual field work did not focus on it as much as the rest of the other dimensions.

- The indicators were left in question form to allow for local contextual adaptation.
- Sustainability must be seen as an explicit expression of interdependence since all the dimensions of sustainability impact each other.

In conclusion, this study confirms and improves the sustainability model employed.

5.4 IMPLICATIONS OF FINDINGS: GUIDANCE ON SUSTAINABLE BASIC SERVICE PROVISION

The thesis so far has addressed the findings from the data gathered in a logical manner. Initially, the results were compared to the guiding hypothesis and the research questions with a view to testing their validity. Furthermore, the implication of the research on the theoretical framework used was discussed. In this section, a further analytical step is taken by applying the findings to existing practice. It is not always possible to prescribe precise routes for selecting a particular water management model because, it is always difficult to allow for local contextual influences that affect the choices made by the stakeholders. However, some guidance points can be derived from this study to enhance decision-making, especially in attracting private sector involvement in PPP management of the water supply. Data from the field study in Ghana shows that the sustainability of basic service delivery in small towns can be enhanced by:

- Making better information available
- Changing the existing market frameworks

- Encouraging shared investment

These points are discussed herein.

5.4.1 Making better information available

Information can be used in several ways to inform strategic judgement (Gentry, 2001). However, Hamdi and Kalra (1998) observe that whereas there is a substantial volume of knowledge on sustainable development, the challenge is making this information available. The first step in this process includes thinking on how one might apply the information to the problems/contexts one cares about for creating fundamental change. Information, in the case of Ghana small town water sector is vital for informing an array of stakeholders, including the Water Boards, community members as well as the private sector. The community members and the Water Boards needed to be educated about the various sub models available for water supply management in small towns in addition to community management. The private sector needed to know that an investment opportunity exists in small town water management. This information must flow from the Community Water and Sanitation Agency and the District Assemblies to the stakeholders. Making better information available will therefore enhance the sustainability of water management in the small towns.

Sections 4.5.3.1 and 4.5.3.2 of the case study showed that the Water Boards and the community members did not understand the various sub models of PPP (refer to Section 2.5.3.3) available for the management of their water supplies. They therefore were not ready to accept PPP until an explanation was offered by the researcher. Then they realised they are not averse to it at all and also that the private sector has been working with them all along. They realised that PPP is not such a bad thing after all.

It was also discovered during the fieldwork in Ghana that the local private companies that can invest in water supply management in small towns lack access to information about such opportunities (Section 4.5.3.5). This problem stems from the fact that the CWSA and the DA personnel who are street level bureaucrats responsible for small town water supply do not make the required effort to get the information to the local investors and the general public. Street level bureaucrats are defined here as public officials, who in their work are responsible for carrying out the work of governmental agencies, interact with the community members and who often enjoy immense discretionary powers (Winter, 1990). One fairly universal problem is that street-level bureaucrats feel that their own resources are chronically and seriously insufficient to meet the demands placed on them (Weatherly and Lipsky, 1977). The result is that they resort to a number of conscious and subconscious coping strategies. Winter (1990) lists some of the strategies as:

- Limiting information about services
- Making clients wait
- Making access difficult
- Imposing a variety of other psychological costs on clients
- Concentration on a limited number of selected clients, types of program and solutions

These behaviours were observed in Ghana (Section 4.5.3.5) and inevitably have significant impact on the sustainability of the water supply systems in small towns. Such coping strategies cause the implementation of policy programs to be distorted in a systematic way (Winter 2000). When questioned as to why the local private investors have not been invited to take part in the investment in the provision of water services, some bureaucrats at the Ministry of Works and Housing replied that

they will get there eventually since they are now preoccupied with urban water systems privatization.

Interviews with the executive officers of some private companies in Ghana (Section 4.5.3.4) about their willingness to invest in the small town water sector, showed all of them interested. Better information availability will therefore highlight the fact that an opportunity does exist for local private investment in the water sector. It will provide useful information to the investors as well as the public on why the private investment is needed. It can also provide information on the supply versus demand and the need for price increases. This has the ability of drawing a wider political support for the private sector involvement. Political support is necessary because there have been non-governmental organizations rallying the public against the involvement of the private sector participation in the water sector in Ghana as stated in Section 2.5.3.4.

Some of the information that can be made available includes:

- The towns where the investment opportunities exist.
- The financial status of the treatment plant where the investment is needed.
- Information on the physical status of the water production and distribution facilities.
- A mapping of stakeholders.
- The amount of investment needed.

Gentry (2001) list some strengths of information availability:

- Fills gap in knowledge
- Brings flexibility in designing response
- Encourages participation/support

- Process of collecting information itself can be powerful

Information availability provides knowledge thereby filling gaps in understanding. Information availability brings flexibility in designing response to problems. For instance, if adequate information is available, stakeholders would realise that PPP is a viable option in small town water management. It encourages participation and support by bringing transparency into the planning process. The process of collecting information can be powerful because, it brings about interaction between the disseminators and the receivers (stakeholders).

The weaknesses of information include (ibid):

- No control can be exercised over responses.
- Information only changes behaviour if it fits the interest of the target group or they are forced to care.
- There is no certainty of any substantive impact.
- It is not free and it is not certain that the costs are worth the results obtained.

The disseminators cannot always exercise control over responses. According to Hamdi (2000) people do not always want to get involved not unless their energies and time can result in tangible improvements to their quality of life. There is however no certainty that any substantive impact can result from the information. It can therefore be seen that even though better information availability is a powerful tool, it is not adequate on its own to attract local private investment nor sustainability of the water supplies in small towns. Other strategies such as changing existing market frameworks and shared investments are necessary as can be deduced from the analysed data.

5.4.2 Changing the existing market frameworks

Market frameworks include institutional and organisational issues. The institutional and organisational issues include legal and regulatory requirements. It is clear so far that the current market framework in Ghana does not encourage local private investment in the water sector for small towns. A change is therefore necessitated in order to make small town water supply more sustainable.

Growth, economic reform and improvements in the regulatory frameworks of many countries are increasingly recognized by both domestic and foreign investors (UNCTAD, 1998). Governments therefore need to change market rules to encourage investment in environmental 'goods' such as water supply.

Glynn et al (1992) identify key economic features of water supply which have impact on the regulation. They include:

- Wherever water supplies are piped the business of providing the service is a natural monopoly i.e., one supply can generally provide the service more cheaply than two or more. The subject of monopoly power, its potential undesirable effects and how they can be addressed, is one that has absorbed the attention of most economists. Ownership also raises similar issues of monopolistic behaviour especially if the source is privately owned, or privately run and the renewability and transportability of other sources are limited.
- The production and consumption of water services imposes important economic externalities on individuals and communities not directly involved. E.g. positively, where increased water usage reduces public-health risks, or negatively, the consumption of water from a lake means that it cannot be used for fishing.

- The third economic feature, particularly of services delivered through well-developed infrastructure, is that assets tend to be very long-lived. Many are underground and out of sight, so that the neglect of those assets only reveals itself through the quality of the water services after a lag of years.
- Water is a joint product and thus lacks differentiation in the product.

Effective government control is therefore needed through (ibid):

- Price control
- Regulation of quality
- Investment control
- Environmental considerations
- Dynamic interaction between companies' obligations and price control

As stated in Section 4.2.2.5, the Public Utility Regulatory Commission (PURC) of Ghana is expected to regulate the private involvement of multinational corporations in public utilities in urban centres. However, the mandate of the PURC has not been extended to cover small towns yet. This regulatory duty falls on the District Assemblies (DA). Yet the data from the study (Section 4.5.2) shows that the capacity and the resources of the DA are severely limited. To foster PPP there is a need for an appropriate regulatory regime which not only protects consumers from the monopolistic tendency of private investing firms (Section 4.5.3.2) but accords the firms also protection under the law. The function of government under such circumstances will be to control use of the quantity of water resources, introduce competition and act as facilitator.

Strengths of a market framework are that it (Gentry, 2001):

- Encourages investment
- Promotes lowest cost solutions
- Defines rules of the game

As Olson (2000) observed ‘...a legal system and political order that enforces contracts, protects property rights, provides for limited liability corporations, and facilitates a lasting and widely used capital market that makes the investments and loans more liquid than they would otherwise be...’ is necessary for promoting sustainability in small town water management using the PPP model.

5.4.3 Encouraging shared investments/responsibilities

Shared investments allow the risks of investments in the water sector to be shared among the stakeholders including government, private sector and civil society. No single stakeholder has to bear all the risks. PPP is therefore an effective way for shared investments. Different options of PPP through which shared investments can be realized for water supply have been presented in Section 2.5.3.4 of the literature. The study showed lease and management contracts as the preferred options in the small towns studied. What is missing in these sub models is the exact role of the various stakeholders. Figure 1 of the literature review presented the widest spectrum of possible relationships between public and private environmental service providers. Based on the findings of this study, this can be narrowed down for small town water supply management.

In the application of PPP the question that arises is whether or not community management should be abandoned altogether in communities where it is not sustainable. Rather than consider the question of abandonment, it is perhaps better to consider the scope for integration of the two models. Evidence from the data analysis in Sections 4.5.3.1 and 4.5.3.2 showed that community management overlaps with PSP. This is evident in the fact that the private sector participates in

the provision of consulting services by designing the water supply systems, procuring spare parts, providing mobilisation services as well as construction services. This forms a very good beginning point for building trust among the stakeholders in the application of PPP in the management of water supplies in small towns.

Under PSP, the role of the private sector is more temporary and borders on providing certain services and then leaving the scene. PPP on the other hand connotes longer term relationship and where long term partnerships can be found, it forms a solid basis for long term sustainability of the water service delivery. The interface of community management and PPP is defined mainly by examining the roles of the various stakeholders in the provision of small town water supply.

Much insight can be gained into the shared investment/responsibility assignment by considering the following questions which the Yale/UNDP PPP group derived from Figure 1:

- Who controls the water facilities in small towns?
- Who affects the decision-making?
- Who would benefit from the private investment?
- Who would be harmed by the investment?

Who controls the water facilities in small towns?

The institutional responsibilities for water supply in small towns can be divided into two broad categories:

- The study shows that District Assemblies (DA) and the town administrations legally own the water systems and are responsible for mobilization and long term support.

- Water and Sanitation Development Boards are responsible for planning and management.

In adopting PPP, the main difference between community management and PPP stems from moving the management, operation and maintenance roles of the Water

Boards to the private sector as implied by the responses of the stakeholder analysis (Sections 4.5.3.1 to 4.5.3.4).

Who affects the decision-making?

The issue of small towns has many important stakeholders and these are:

- The local elite / opinion leaders and the community members who use the water.
- The Government through:
 - Community Water and Sanitation Agency
 - The Ministry of Works and Housing
- Bilateral and multilateral development partners such as the World Bank, USAID, CIDA, Danida, EU, GTZ etc. etc.

The local elite are usually very vocal on the issues of local development and tend to dominate decision making on water supply. The government plays the role of facilitator. The responsible Ministry (Ministry of Works and Housing) sets policies/guidelines and the regulatory framework for the small town water supply and sanitation program and mobilizes national and international financial resources. The CWSA together with the District Assemblies implement the policies for the Ministry (Section 4.2.2).

The third group that influences decisions on water supply are the multilateral partners, which make available grant funding for the water supply. They usually affect policy setting and capacity building for local institutions.

Under PPP, the private sector will also have a say in decision-making since this is only logical.

Who would benefit from the private investment?

The beneficiaries of private investment include:

- The local private firms
- The government
- Communities/users

Table 4 of the literature review provides important drivers for understanding the interests and motivations of the various actors. The local private sector whose main aim is to pursue commercial interests would have the opportunity to make money in the small town water sector (Section 4.5.3.4). The government which had been the provider of the water services historically gets to release this burden to the private sector whilst assuming the responsibility of facilitator. The driver for the government would be mainly pragmatic meaning that the introduction of PPP would lead to more cost-effective public services. With an effective private sector, government gets to fulfil its policy goals for the water sector (Section 4.5.3.3). The communities on the other hand get to have sustainable and efficient water supply all year round (Section 4.5.3.2).

Who would be harmed by the investment?

Those who may be harmed are the communities' representatives who misappropriate the water user fees for other purposes (refer to Section 4.5.2) when

the private sector takes over user fee collection. Informal businesses which used to provide water services may also lose. Those engaged by the Water Boards to do revenue collection and O&M also stand to lose. An effective solution would be to design tool kits for the integration of stakeholders. Where possible, local competent workers should be used by the private sector.

Since the discussion draws from existing theoretical works by other professionals, it is evident that the findings of this thesis can be abstracted into broader frameworks thereby strengthening those frameworks.

5.5 CHAPTER SUMMARY

The logical sequence of arguments within the thesis is completed by this chapter. The research findings were compared with the hypothesis and the research questions. Implications for practice have been developed from the analysed data. The significance of this chapter lies in how this work relates to existing thinking and practice in small towns water management selection for sustainability.

The following key points can be highlighted from this chapter:

- Hypothesis testing: The hypothesis that community water management is limited in its ability to provide sustainable water service delivery to small towns was proven. The implications are that, there is a need for service providers not to promote community management as an exclusive *soulient*. Other management models such as PPP ought to be given equal opportunity for exploration. The thesis shifts thinking away from mechanistic approaches. E.g. “community management works in rural villages so let’s apply it to small towns”.

- Testing of the relevant theoretical framework: The thesis contributes to the development of theory on sustainability framework for water supplies by testing an existing framework and improving upon it. The particular areas include the narrowing of the dimensions of sustainability and an expansion of the indicators of the dimensions in order to present a more holistic evaluation of the water supply systems.
- Guidance points for decision-makers: PPP can be enhanced by making better information available, changing existing market frameworks and by encouraging shared investments and responsibility among all stakeholders.
- Decision-narrowing: The study showed that lease and management contracts are good PPP models to use as starting points in the introduction of PPP in water management.

6. CONCLUSION AND RECOMMENDATIONS

6.1 CHAPTER OUTLINE

This chapter concludes the thesis by reflecting on the salient points that arise from the research in relation to the process and outcomes. The recommendations that emerge from the study with respect to future research are contained herein.

6.2 CONCLUSIONS

This research has examined the sustainability of community water management in small towns in Ghana which constitute about 30% of the national population. The governing hypothesis of the thesis guided the researcher to investigate technical, financial, social and organisational issues that impact the sustainability of small town water service delivery. Key research questions focussed on the characteristics of small towns, the performance of community management in the small towns, stakeholder perceptions and public private partnerships as an additional management option in small towns.

A comprehensive literature review facilitated the process of defining the gaps that exist in knowledge and practice with regard to small town water service delivery. The literature review confirmed that indeed, existing knowledge was weak on the sustainability of small town water supplies and was weakest on the extent to which community management could be applied as an exclusive model for water supply in small towns.

The findings from the data analysis can be discussed at both the general and specific levels. At the most general level, the data provided insight into small town water stakeholder perceptions, community management and public-private partnership which contrasts markedly with existing practice. The evaluation of the

water supply systems by direct observation and the qualitative data from household interviews reinforced the quantitative data analysed. At the same time, the semi-structured interviews with sector personnel highlighted the importance given broad sectoral concerns such as agency roles, institutional conflicts concerns involved in the small town water sector.

The following key points are concluded from the fieldwork and analysis:

- Significant differences exist in the characteristics of small towns and rural villages that it is not expedient to promote a rural water supply model such as community management as an exclusive option in small towns. On the contrary other options such as PPP should be explored and given equal opportunity.
- Large community size limits the community participatory and mobilisation process and therefore affects the planning and decision making for the management of small town water supply.
- Communication channels in small towns are poorer than in rural villages, therefore planners need to take this into account in planning mobilisation programmes.
- The study confirms that the population of small towns is significant and is about 30% of global population.
- Small town water supply stakeholders are not averse to private sector management implying that opportunities exist for PPP in small towns.

- The absence of public-private partnerships in the management of small town water delivery in Ghana can be attributed to policy formation and implementation failure.
- Local private firms are willing and capable of participating in small town water supply. Management and lease contracts are the preferred choices from the perspective of the communities' representatives.
- Trust among stakeholders, appropriate policy mandate governing the PPP process, enforced regulations, better information availability on PPP and local private investment opportunities, less bureaucracy can go a long way to enhance the sustainability of PPP in small town water service delivery.

The significant contributions of this study can be summed up as:

- It gives a special context to small towns different from rural and urban settlements for sustainable water service delivery.
- It points out that the assumption that community water management is automatically applicable in the context of small town as in the rural context, is erroneous.
- It raises the issue that Public private partnerships is an option worth attempting for sustainable water services in small towns.
- It adds to sustainable development theory by applying it in the context of sustainable water service delivery in small towns.

The scope of this study was designed to enhance the knowledge of water service providers such as governmental organisations and NGOs in the application of community management in the small town context. The findings are especially applicable for policy formation and implementation in the water sector. On a wider scope, since the results relied on concepts such as participation, ownership and sustainability, the findings can be abstracted to other fields such as housing and health that rely on the community management model. Specifically, the findings of this thesis challenge development practitioners on the assumption that once a model works in one setting it can be automatically replicated in other community types.

The limitations of the study lie in the fact that social sustainability which is an important facet of sustainability was not particularly relevant in the outcomes of this study. Furthermore, the model of public private partnership used is rather conceptual. The issue of public private partnership is much more complex requiring contextual adaptation to be effective in real life.

6.3 RECOMMENDATIONS FOR FUTURE RESEARCH

In the course of this study, certain issues came up where a better understanding will enhance the sustainability of water supplies in developing countries, especially small towns. These are detailed below as possible future research areas:

- Even though this research shed some light on the need to disaggregate population data globally in order to cater better for intermediate settlements such
- as small towns which often get left out in the allocation of basic services because they neither fall into the broad category of rural or urban classifications, the scope of this study was not broad enough to cover the

subject matter adequately. There is therefore a need for further research into settlement classifications and how this can improve basic service delivery to marginalised populations in developing countries.

- Due to the initial poor public sector management of water supplies, the trend has been to shift away from that. However since 'one size does not fit all', there is a need for research that revisits the situations under which public sector management of water supplies in developing countries can actually provide effective sustainable services.
- Even though this research suggests that local private investment may hold the key to small town water supply, the scope was not broad enough to treat in-depth certain important aspects of the subject. More research is therefore needed in the various financial and contractual arrangements that would be more suitable to small town water supply. For example, there is a need for studies that examine water user fees payment arrangements for customers that take into account their ability to pay and deferred payment options.
- Even though, independent private operators fall within the broad spectrum of private sector participation, the scope of this thesis was not designed to cover them. Therefore, further study is needed in this area on how the capabilities of independent private operators can be used effectively for small town water supply.
- There is a need for further research into how the participatory and useful components of community management can be effectively integrated into improved/new management models for water supply in small towns.

- The role of civil society is often ambiguous in public-private partnerships. There is therefore a need for studies that examine how the role of civil society can be integrated effectively into public-private partnerships for sustainable water management.
- The issues surrounding water supply in developing countries are generally complex. There is therefore a need for researching frameworks for systemising planning in water supply in developing countries. A further step would be to test the framework for evaluating sustainability used in this thesis in urban settings.
- Data collection and analysis points to the fact that, the process of policy formation and its implications for implementation success is poorly understood in developing countries. A study which looks into the process of policy making and implementation for water supplies will provide useful insight into why these policies fail.
- The interfaces at which different stakeholders physically interact are critical to promoting wider participation in Public-Private Partnership for service provision. Studies that build on this study to explicitly map out the roles of the various actors in small town water management will provide valuable lessons.

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APPENDICES

1. HOUSEHOLD SURVEY PROFORMA

WATER USERS (HOUSEHOLDS)

Town:

Date:

Sex of household head:

Age of respondent:

1. What is your occupation?

2. How many people live in your house (household size)?

3. In the establishment of the water supply systems were you involved in the Planning & Decision-making?

Yes No

Please explain what you did.

4. How many meetings related to water supply have you attended the past 1 year?

Please provide any additional response/ comment.

5. Who owns the water supply systems?

Community	Agree	Disagree
Government	Agree	Disagree
District Assembly	Agree	Disagree
Don't know	Agree	Disagree

Please explain.

6. Indicate areas/activities that you know the private sector has been involved in your town in water supply? Please tick all that apply.

- a. Materials and input supplies
- b. Consulting
- c. Construction, maintenance of electrical equipment
- d. Operation and maintenance
- e. Revenue collection
- f. Water quality monitoring
- g. Other _____
- h. Don't know

7. What are your views about the existing private sector involvement?

a. Should stop	Agree	Disagree
b. Continue as it is	Agree	Disagree
c. Increased involvement	Agree	Disagree
d. Don't know	Agree	Disagree

Please explain

8. What do you think are the advantages of involving the private sector in the management of your water supply? Tick all that apply.

- Better customer service
- Better management
- Private capital
- Better sustained water system
- None of the above

Please explain.

9. What do you think are the disadvantages of involving the private sector in the management of small town water supply?

- Increased tariffs (water bills)
- Worse customer service
- Monopoly
- Exploitation
- Don't know

Please explain.

10. What do you use the water for and do you get enough of it? Tick all that apply.

- Domestic use (washing, cooking, cleaning etc.)
- Agricultural use (watering of garden, crops etc. etc)
- Industry (factory, school etc.)
- Other_____

11. What is the quality of the water like most of the time? Please circle your choice.

Taste:	Good	Satisfactory	Bad
Colour :	Good	Satisfactory	Bad
Odour/smell:	Good	Satisfactory	Bad

12. When you observe something wrong with the water system, who do you report to? _____. How long does it take them to correct what is wrong?

Hours
Days
Weeks
Months
Don't know

Please explain.

13. How do you rate the work being done by the Water Board?

Good
Satisfactory
Poor
Don't know

Please explain.

2. WATER SYSTEM EVALUATION PROFORMA

WATER SYSTEM EVALUATION

Town:

Date:

General description

Town / District / Region	
Type of water supply system technology	
How system was established:	
Total project cost	
Financing from government	
Financing from donors	
Financing from community	
Financing from private sector (if any)	
Date since operation started	
Who is responsible for Management	
How many communities (suburbs incl. names) use the water	
Design population:	
Population served by system at present	
Physical description of system components	
Supply capacity of source (m3/h)	
Reservoir capacity (m3)	
Distribution (total pipeline length)	
Type of water treatment:	
No. of household connections	
No. of disconnections (at the moment):	

- How many components of the water system are working?

Source works

- Status (describe):
 - protected
 - not protected

▪ Nature/status of surroundings (pool, drainage, fence):

- Pool yes / no
- drainage yes / no
- fence yes / no

▪ Check flow:

▪ Retaining walls and wing walls:

Status: good satisfactory poor

▪ Storm water cut off drains (in place and clear):

Status: good satisfactory poor

Distribution system/ reservoir

▪ Soundness of structures (cracks, quality of materials used etc.):

Cracks: none few many

Quality of materials used: good satisfactory poor

▪ Pipelines and joints for leakage:

Leakage: none few many

▪ Foot valves whether they hold water:

Yes / No

▪ Meters (operational or not):

Operational / Not operational

▪ Level of pump delivery (production):

Good Satisfactory Poor

▪ Any other losses in the system: Please state:

▪ Water quality parameters (e.g. colour, taste, odour/smell).

Taste:	Good	Satisfactory	Bad
Colour:	Good	Satisfactory	Bad
Odour/smell:	Good	Satisfactory	Bad

▪ Other gadgets in place and their functionality e.g. water level indicators, access to manholes etc.:

Boreholes (incl. Hand pumps)

▪ Existence of cracks in the platform:

- Pump (firmly fixed):
- Drainage channel:
- Functionality (operational or broken down):
- Existence of a fence:
- Nature and conditions of surrounding

Stand pipes/ household taps

- Checking taps for leakage:
Good Satisfactory Poor
- State of taps:
Good Satisfactory Poor
- Hygiene and general condition:
Good Satisfactory Poor
- Drainage channel:
Good Satisfactory Poor

Other observation/ Sketch rough outline of distribution system:

3. FOCUS GROUP DISCUSSION PROFORMA FOR WATER BOARDS

WATER BOARDS / OPERATORS

Interviewee:

Position:

Date:

Duration:

Water Board membership / O&M staff.

Name	Position	Level of education	Occupation	Gender	Remunerati on /month

1. What is the process for the selection of water board members/operators? How long does a term last?

2. Why did you take the job?

3. How are tariffs decided?

- Based on consumption
- Based on ability to pay
- Rising block consumption based

Please provide any additional response/ comment.

4. Indicate areas/activities that you know the private sector has been involved in your town?

- a. Materials and input supplies
- b. Consulting
- c. construction, maintenance of electrical equipment
- d. Operation and maintenance
- e. Revenue collection
- f. Water quality monitoring
- g. Other
- h. Don't know

Please provide additional comment.

5. What are your impressions about existing private sector involvement?

Should stop	Agree	Disagree
Continue as it is	Agree	Disagree
Increased involvement	Agree	Disagree
Don't know	Agree	Disagree

Please explain.

6. What are the preferable options for PS involvement? Please rank.

- Service contract
- Management contract
- Lease
- Enhanced lease (lease + private capital)
- BOT
- Concession
- Franchise
- Full privatisation (100% privately owned and managed)
- Don't Know

Please explain

7. What do you think are the advantages of involving the private sector in the management of small town water supply?

Better customer service

- Better management
- Private capital
- Better sustained water system
- None

Please explain.

8. What do you think are the disadvantages of involving the private sector in the management of small town water supply?

- Increased tariffs
- Worse customer service
- Monopoly
- Exploitation
- Don't know

Please explain.

9. Financial information for water supply system.

Months											
Revenue											
Water revenue											
Miscellaneous											
-Connection fee											
Other income											
(specify)											
Total Revenue											
Expenditure											
Salaries/											
Payment of											
Vendors											

Administrative cost (travel)											
Energy											
Materials											
Chemicals											
Repairs and maintenance											
Water quality tests											
Operating surplus or deficit											
Other non-operating expenses -financial charges -Others											
<u>Total Expenditure</u>											
Net Income											

10. Other

1. How do you handle defaulters?
2. How do you respond to customers' complaints?
3. Who checks the water quality?
4. How often is it checked?
5. Does it meet acceptable standards?
6. What is your repair and maintenance schedule /(fault reporting format) like?
7. Are there demand/requests for private connections?
8. Where and how do you get your spare parts supply?

4. SEMI-STRUCTURED INTERVIEW FOR THE PRIVATE SECTOR

<p>PRIVATE COMPANIES (WATER SECTOR)</p>
--

Interviewee:

Position:

Date:

Duration:

1. What is your company's area of expertise and how long have you been in operation?

--

2. How many staff do you have? Please write number and qualification against (e.g. secondary school = SS, University degree=UD).

- Civil Engineers
- Electrical/Mechanical Engineers
- Planners
- Socio-economists
- Finance / accounting specialists
- Technicians
- Other

Please provide any additional response.

3. What was your annual profit for last year in US Dollars? Please tick range.

- 0 - 10000
- 10000 - 20000
- 20000 - 30000
- 30000 - 40000
- over 40000

4. What is your primary motivation for wanting to get involved in small towns water supply?

5. Do you have any experience in the water sector?

- Materials and input supplies
- Consulting
- Construction, maintenance of electrical equipment
- Operation and maintenance
- Revenue collection
- Water quality monitoring
- Other _____

6. Will your company be willing to provide working capital or initial capital for water supply in small towns?

- Yes
- No
- Undecided

Please provide any additional response/ comment.

7. What do you consider as barriers to entry?

Lack of Policy/regulatory framework

Lack of access to credit

Insufficient returns

Technical inadequacies

Managerial inadequacies

Other_____

Please provide any additional response/ comment.

8. Please provide any additional response/ comment.

5. LIST OF KEY INFORMANTS/FIRMS INTERVIEWED

LIST OF KEY INFORMANTS/FIRMS INTERVIEWED

1. Community Water and Sanitation Agency

Head Office

R. P Van Ess	-	Technical Director
Charlotte Engmann	-	Water and Sanitation Systems Coordinator
Atsu Dartey	-	World Bank Group Focal Person
Ernest Doe	-	Water and Sanitation Systems Coordinator

Regional Offices

Volta Region

A. Asima	-	Regional Director
John Aduachie	-	Head of Technical Services Unit
F. Morley	-	Extension Service Specialist
Foster Soley	-	O&M Engineer
Samuel Hansen Gale	-	Environmental Health Officer
Patience Samanhyia	-	Extension Officer
Oscar Ahiango	-	Extension Officer

Northern Region

Francis Awindago	-	Regional Director
Jacob Kombian	-	Services Coordinator

2 Ministry of Works and Housing

S. A Darkwa	-	Director for Water
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3 Ghana Water Company Ltd

J.N.A Nunoo	-	Managing Director
R. B. Maison	-	Ashanti Regional Director

4. District Assemblies (DA)

Kwame Oppong	-	District Coordinating Director, Amansie East DA
Fred Agyemang	-	Planning Officer, Amansie East DA
Edmund Baffoe-Twum	-	District Engineer, Ho DA
Alhassan Mumuni	-	Deputy Coordinating Director, Savelugu DA

5. Water Supply and Sanitation Boards (Water Boards)

Bekwai

Nana Attakora Poku	Chairperson
S Ohene Larbi	Secretary
Adwoa Sanaa	Treasurer
Margaret Brago	Member
Mildred Muika	Member
P.K Okai	Member
J.K Otchere	Treasurer
T. Tweneboa	Member
Nana Gyemi	Member
I Agyei	Member
S Kantanka	Member
M Ofosu-Appiah	Member

Savelugu

	Vice
Abukari Alhassan	Chairperson
Anim Kwabena	Secretary
Mumuni Abdulai	Chairperson
Alhaji Sumani	Member
Mahama Mumuni	Treasurer
Hajia Gurupaga	Member
Abukari Idrisu	Member
Alhasan Abukari	Member
Abukari Sayibu	Member
Nashiru Bawa	Systems operator
Abdulai Waa	Plumber

Tota

Cecilia Akuaku	Chairperson
Winfred Tenuo	Vice Chairperson
Elisabeth Atobra	Member
Atikuma Kwaku	Secretary
Alex Amenu	Secretary
Samuel Adzovie	Treasurer
Makafui Atobra	Treasurer
Mary Morte	Member
Kesia Kpo	Member
Patrick Hlo	Member
Gideon Akonude	Member
Helen Madugu	Member

Avenui

Ben Anyomi	Chairperson
John Agbemenyale	Vice Chairperson
Celestine Anyomi	Member
Nelson Nkrumah	Treasurer
Emmanuel Gbede	Treasurer

Joseph Okai	Secretary
Ferdinand Dzaga	Member
Bright Addai	Member
Janet Ohene	Member
Margaret Vigodza	Member
Elisabeth Etsoe	Member
Ruby Avotri	Member
Victoria Adzebu	Member

6. Association of Water and Sanitation Boards

Danumin Subiniman	-	Executive Secretary
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7. List of Private Company Executive Officers

A. Malafosse	-	Burgeap
Kolly Dorcoo	-	Afrowood
Samuel Ayikwei	-	Water and Energy Systems
Abaidoo	-	Water and Energy Systems
Hakim Wemah	-	Tropical Developers
K. A. Kena	-	Kenaco
S. O. Quansah	-	Environtech
Agyenim Boateng	-	Colan Consult
Collins Annoh	-	Colan Consult
Colly Dorcoo	-	Afrowood
K. Atta-Mensah	-	E.W. Associates
Alhaji Sannie	-	Water Quality Specialist

6. METHODOLOGICAL NOTE

Chi-square test

The description of the Chi-square test is taken from Zar (1999) and Saywell (2000).

A major goal of statistical analysis is to draw inferences about a population by examining a sample from that population. A very common example of this is the desire to draw conclusions about one or more populations.

We begin by making a concise statement about the population called *Null Hypothesis* (H_0) because it expresses the concept of “no difference”.

If it is concluded that it is likely that a null hypothesis is false, then an *alternate hypothesis* (H_A) is assumed to be true.

Chi-square tests the hypothesis of whether or not proportions taken from different populations are equal. The Chi-Square test is used to verify whether two variables are independent of each other or not.

The results of interest are the levels of significance associated with the Chi-Square. This value which is the probability that the results were produced by random chance can range from 0.00000 to 1.0000. The lower the significance value, the less likely that the results were produced by random chance. An acceptable level of significance generally used is 5% or 0.05.

Chi-Square test is usually recommended for categorical data, where frequencies or proportions are measured instead of numbers. The procedure tests the fit or match between the theoretically expected and observed frequencies/proportions and it is often referred to as the goodness of fit test.

The Chi-square value (X^2) is calculated by summing over all the cells the squared residuals divided by expected frequencies.

$$X^2 = \sum_{ij} \sum_{ij} (O_{ij} - E_{ij})^2 / E_{ij}$$

Where O and E are observed and expected frequencies respectively.

The calculated Chi-square is compared to the critical points of the theoretical Chi-square distribution (found in statistical tables) to produce an estimate of how likely (or unlikely) this calculated value is if the two variables are in fact independent. If the two variables are independent the probability that a random sample would result in a chi-square value of at least that magnitude is low.

The value of chi-square depends on the number of rows columns in the table being examined. The degree of freedom can be viewed as the number of cells of a table that can

be arbitrarily filled when the row and column totals (marginal) as fixed. Thus for a table containing 'r' number of rows and 'c' number of columns; $r \times c$ table, the degree of freedom is $(r-1) \times (c-1)$.

For this study, the number of variables used for each of the tests was 2 hence the degree of freedom was 1. From statistical tables, the theoretical Chi-square value was read to be 3.8 at a significance level of 0.05. If the calculated Chi-square value was less than 3.8, the null hypothesis was accepted. If higher than 3.8, the null hypothesis was rejected.

Data analysis software used - SPSS

The following description of the software used during the data analysis period of the thesis are taken from the manuals supplied with the software. Statistics Package for Social Scientists (SPSS) is a commonly used statistical analysis software package that facilitates data entry, coding analysis and presentation. A range of parametric and non-parametric tests can be applied to data sets entered into SPSS.

7. FULL-TEXT TRANSCRIPT OF KEY SECTOR INFORMANT INTERVIEWS

KEY SECTOR PERSONNEL / GOVERNMENT / POLICY MAKERS

Interviewee: Ms. Charlotte Engmann (CE)

Position: Water and Sanitation Systems Coordinator

Date: 15 Feb 2002

Duration: 90 minutes

SD (Researcher)

Can you please describe what your responsibilities are/were?

CE

My job includes major problem handling on O&M. I handle mainly small towns, policies and strategies, organize training arrangements for the various stakeholders as well as monitoring guidelines- large multi-regional projects, guiding consultants. I also act as the liaison for conferences.

SD

Current policies for water supply systems in small towns in Ghana predispose them toward community management. Do you agree?

CE

Fully Agree
Partially Agree
Fully Disagree
Don't Know

SD

Can you please elaborate?

CE

I have been working on the small towns draft policies now but they have not been operationalised. Over the next 6 months hopefully, they should be operationalised after approval by those at the top. Talking of predisposition, I think it all depends on the technology available in the town. For instance if the system is very simple, it makes sense to have the communities handle it themselves but when it is a large system, there is no

way the communities themselves can handle this.

From my experience, if the technology is a gravity system with community population under 5000, O&M should be by the community. It is not worthwhile for private involvement as no heavy machines are involved. The communities can usually handle simple valve such as gland parking.

If the technology is a piped gravity system. Well under this technology we have slow sand filtration and GWCL linked systems. I think that O&M should be by the community but they can contract maintenance of civil, mechanical and electrical equipment to the private sector when problems arise. Under this technology, I am thinking of up to a population of 10000 or 8000 for the least efficient systems.

For populations beyond 10000 people, the communities are more heterogeneous and they have larger systems. There is a need for a full contract for the private sector to come in. If the water system is conventional, whatever its size, it cannot be managed by the community.

SD

Even though, small towns are encouraged to allow private companies to manage their water systems, this has not happened so far. Do you?

CE

Fully Agree
Partially Agree
Fully Disagree
Don't Know

SD

Please explain.

CE

No one has really explained the implications of O&M to the communities hence the reason they want to manage the systems themselves.

SD

Do you think that the lack of involvement of the private sector can also be attributed to policy implementation failure?

CE

Fully Agree
Partially Agree
Fully Disagree

Don't Know

SD
Why?

CE

The draft policy has not been approved yet and we are in the process of operationalising it.

SD

Do you also think that the lack of involvement of the private sector can be due to the fact that there are no competent local private companies in the country to take over the water supply systems in small towns?

CE

Fully Agree
Partially Agree
Fully Disagree
Don't Know

SD

Can you provide any additional comment to this?

CE

We advertised for private companies interested in management in small towns in 1999. The result was very encouraging since we had 35 expressions of interest. Furthermore we are in the process of making another call and then we will decide on modalities for allocating. However at the moment calls for private sector participation have been made specifically in Atebubu, one small town. Furthermore GWCL will shed some workers when the urban water privatization is completed, we expect that some of these people will start companies that will manage small towns water supply.

SD

Can it also be said that the lack of involvement of the private sector is due to the fact that people lack information that an avenue exists for local private investment in water supply?

CE

Fully Agree
Partially Agree
Fully Disagree
Don't Know

SD

Please provide any additional response/ comment?

CE

I think the earlier statement I made in the previous questions answers this also.

SD

Do local individuals and organisations ask for the possibility of investing in small towns water supply?

CE

Fully Agree
Partially Agree
Fully Disagree
Don't Know

SD

It is often said that water utilities serving small towns can balance the requirement for financial self-sufficiency with the need for significant investment for improving services to meet the needs of the consumers. Having so much experience in this area, what are your views?

CE

Fully Agree
Partially Agree
Fully Disagree
Don't Know

Let's make a calculation for our selves. Let's assume 20l/capita/day water consumption and a population of 10000. If the profit is set to 10% of the revenue and using 300 days for the time that people will fetch water, at a tariff rate of 100 Cedis per bucket (20l). This should give 3000 US dollars as profit for that small town. Will you be satisfied with that as a private operator?

SD

I won't mind at all. Anyway, there are several PPP models by which small towns water supply can be managed. Are you familiar with the term PPP?

CE

Yes, well
Yes, partially
No

SD

Which of the following constraints do you think the private involvement in the management of small towns water supplies face at the moment? Please rank in order of importance.

- No policy / regulation
- Lack of managerial capacity
- Lack of access to credit/finances
- Small towns do not want them

CE

Lack of managerial capacity first and then Small towns do not want them. These two mainly because of lack of information.

SD

Does bureaucratic behaviour and implementation obstacles retard the active participation of the private sector in the management of the water supply systems in small towns?

CE

- Fully Agree
- Partially Agree
- Fully Disagree
- Don't Know

SD

For the management of water supply systems in small towns please rank the following models in order of preference.

- Full community management
- Service contract
- Management contract
- Lease
- Enhanced lease (lease + private capital)
- BOT
- Concession
- Franchise
- Full privatisation (100% privately owned and managed)
- Don't Know

CE

For population above 10000, management contract followed by service contract. The higher you go up the privatization ladder, the more the risk for the private sector hence the more the cost. So my choices are the best for developing countries.

SD

Is there anything else you would like to add?

CE

At the CWSA, we hope to pre-qualify some private operators. This bidding will be opened to everyone. In order for the small towns water management to be really attractive, we may need to cluster some of the towns together to gain economies of scale. However, we believe that clustering will take away the autonomy of the communities in this era of decentralization. A particular problem faced by the CWSA is that the small towns in the Northern Regions look up to the Association of Northern Development Water and Sanitation Development Boards instead of seeking the CWSA for help. I guess I have said enough.

SD

That will be all for now. Thank you for your help.

Interviewee: Mr. Ernest Doe (ED)

Position: Water and Sanitation Systems Coordinator

Date: 22 Feb 2002

Duration: 30 minutes

SD

Thank you for agreeing to talk to me?

ED

You are welcome.

SD

Current policies for water supply systems in small towns in Ghana predispose them toward community management. Do you agree?

ED

Fully Agree
Partially Agree
Fully Disagree
Don't Know

SD

Even though, small towns are encouraged to allow private companies to manage their water systems, this has not happened so far. Do you?

ED

Fully Agree
Partially Agree
Fully Disagree
Don't Know

SD

Please explain.

ED

Now at least some are on the verge of starting in some small towns.

SD

The lack of involvement of the private sector can also be attributed to policy implementation failure? Do you agree?

CE

Fully Agree

Partially Agree
Fully Disagree
Don't Know

SD
Why?

ED

The idea of PSP came up recently and there is the need to prepare all the stakeholders who would be involved, particularly in the area of capacity building and re-orientation.

SD

Do you also think that the lack of involvement of the private sector can be due to the fact that there are no competent local private companies in the country to take over the water supply systems in small towns?

ED

Fully Agree
Partially Agree
Fully Disagree
Don't Know

SD

Can you comment on your answer?

ED

As stated above, the requisite expertise exists in the private sector, however, the PS must be re-oriented and given proof that investment opportunities exist in that area.

SD

Can it also be said that the lack of involvement of the private sector is due to the fact that people lack information that an avenue exists for local private investment in water supply?

ED

Fully Agree
Partially Agree
Fully Disagree
Don't Know

SD

Do local individuals and organisations ask for the possibility of investing in small towns water supply?

ED

Fully Agree
Partially Agree
Fully Disagree
Don't Know

But not as many as I would expect. This is because for a long time now, the idea of water supply has remained in the domain of the public sector.

SD

It is often said that water utilities serving small towns can balance the requirement for financial self-sufficiency with the need for significant investment for improving services to meet the needs of the consumers. Having so much experience in this area, what are your views?

ED

Fully Agree
Partially Agree
Fully Disagree
Don't Know

SD

There are several PPP models by which small towns water supply can be managed. Are you familiar with the term PPP?

ED

Yes, well
Yes, partially
No

SD

Which of the following constraints do you think the private involvement in the management of small towns water supplies face at the moment? Please rank in order of importance.

No policy / regulation
Lack of managerial capacity
Lack of access to credit/finances
Small towns do not want them

ED

In the following order:
No policy / regulation
Lack of managerial capacity
Lack of access to credit/finances
Small towns do not want them

SD

Bureaucratic behaviour and implementation obstacles retard the active participation of the private sector in the management of the water supply systems in small towns? Do you agree?

ED

Fully Agree
Partially Agree
Fully Disagree
Don't Know

SD

For the management of water supply systems in small towns please rank the following models in order of preference.

Full community management
Service contract
Management contract
Lease
Enhanced lease (lease + private capital)
BOT
Concession
Franchise
Full privatisation (100% privately owned and managed)
Don't Know

ED

Management contract followed by service contract, full community management, lease and so on.

SD

Thank you for your help. You have been very helpful.

Interviewee: Mr. Van Ess (VN)

Position: Technical Director, CWSA

Date: 15 Feb 2002

Duration: 30 minutes

SD

What does your job entail?

VN

I coordinate all technical activities at the CWSA.

SD

Current policies for water supply systems in small towns in Ghana predispose them toward community management. Do you agree?

VN

Fully Agree
Partially Agree
Fully Disagree
Don't Know

SD

Even though, small towns are encouraged to allow private companies to manage their water systems, this has not happened so far. Do you?

VN

Fully Agree
Partially Agree
Fully Disagree
Don't Know

SD

The lack of involvement of the private sector can also be attributed to policy implementation failure. Do you agree?

VN

Fully Agree
Partially Agree
Fully Disagree
Don't Know

The policy we have has been developed in-house.

SD

Do you think that the lack of involvement of the private sector can be due to the fact that there are no competent local private companies in the country to take over the water supply systems in small towns?

VN

Fully Agree
Partially Agree
Fully Disagree
Don't Know

SD

Can it also be said that the lack of involvement of the private sector is due to the fact that people lack information that an avenue exists for local private investment in water supply?

VN

Fully Agree
Partially Agree
Fully Disagree
Don't Know

SD

Why?

VN

Because, CWSA has not moved this far.

SD

Do local individuals and organisations ask for the possibility of investing in small towns water supply?

VN

Fully Agree
Partially Agree
Fully Disagree
Don't Know

SD

It is often said that water utilities serving small towns can balance the requirement for financial self-sufficiency with the need for significant investment for improving

services to meet the needs of the consumers. Having so much experience in this area, what are your views?

VN

Fully Agree
Partially Agree
Fully Disagree
Don't Know

It depends on a number of factors. The fear is that if the consumption goes down as in the rainy season, the private operator might not make enough money to recover costs.

SD

Anyway, there are several PPP models by which small towns water supply can be managed. Are you familiar with the term PPP?

CE

Yes, well
Yes, partially
No

SD

Which of the following constraints do you think the private involvement in the management of small towns water supplies face at the moment? Please rank in order of importance.

No policy / regulation
Lack of managerial capacity
Lack of access to credit/finances
Small towns do not want them

VN

All of them in decreasing order of importance.

SD

Does bureaucratic behaviour and implementation obstacles retard the active participation of the private sector in the management of the water supply systems in small towns?

VN

Fully Agree
Partially Agree
Fully Disagree

Don't Know

SD

For the management of water supply systems in small towns please rank the following models in order of preference.

Full community management
Service contract
Management contract
Lease
Enhanced lease (lease + private capital)
BOT
Concession
Franchise
Full privatisation (100% privately owned and managed)
Don't Know

VN

Service contract, management contract, full community management, franchise and the rest.

SD

Any further comments?

VN

The issue of small towns really started becoming important from 1997. I believe the private sector is important to take care of complex systems that the communities cannot take care off. The inclusion of the involvement of the private sector in our small towns guidelines is based on an optimistic view. Under community management, we have identified that small towns have problems. There is a need to determine critical sizes for community management. That is why your research is so important to us. A lot depend on what contractual agreements we get into with the private sector. We also need strong regulation, because if there is not, there will be a problem of exploitation by the private operators. A major question also to consider is if the small towns want the private sector.

SD

Thank you for your help.

Interviewee: Mr. Atsu Dartey (AD)

Position: Personnel Manager / PPFLAF Focal Person

Date: 15 Feb 2002

Duration: 40 minutes

SD

Can you please elaborate on your duties?

AD

I am responsible for administration of the CWSA, field studies. I ensure that there is coordination, I find out if a project is worth pursuing. Furthermore, I am the liaison person for World Bank's PPIAFF projects.

SD

Current policies for water supply systems in small towns in Ghana predispose them toward community management. Do you agree?

AD

Fully Agree
Partially Agree
Fully Disagree
Don't Know

SD

Can you please elaborate?

AD

This is a policy issue, it is not in dispute.

SD

Even though, small towns are encouraged to allow private companies to manage their water systems, this has not happened so far. Do you?

AD

Fully Agree
Partially Agree
Fully Disagree
Don't Know

SD

Please explain.

AD

However, we are in the process of having PSP. Wassa Akropong a small town just recently applied for private management.

SD

Do you think that the lack of involvement of the private sector can also be attributed to policy implementation failure?

AD

Fully Agree
Partially Agree
Fully Disagree
Don't Know

SD

Why?

AD

The draft policy is a recent introduction and the process is still going on. We are in a transition period.

SD

Do you also think that the lack of involvement of the private sector can be due to the fact that there are no competent local private companies in the country to take over the water supply systems in small towns?

CE

Fully Agree
Partially Agree
Fully Disagree
Don't Know

SD

Can you provide any additional comment to this?

AD

We have not tried them.

SD

Can it also be said that the lack of involvement of the private sector is due to the fact that people lack information that an avenue exists for local private investment in water supply?

AD

Fully Agree

Partially Agree
Fully Disagree
Don't Know

SD

Please provide any additional response/ comment?

AD

Pilot call showed for expressions of interest showed strong interest from the private sector.

SD

Do local individuals and organisations ask for the possibility of investing in small towns water supply?

AD

Fully Agree
Partially Agree
Fully Disagree
Don't Know

SD

It is often said that water utilities serving small towns can balance the requirement for financial self-sufficiency with the need for significant investment for improving services to meet the needs of the consumers. Having so much experience in this area, what are your views?

AD

Fully Agree
Partially Agree
Fully Disagree
Don't Know

I think that it is a question of management and the appropriate investments made.

SD

There are several PPP models by which small towns water supply can be managed. Are you familiar with the term PPP?

AD

Yes, well
Yes, partially
No

SD

Which of the following constraints do you think the private involvement in the management of small towns water supplies face at the moment? Please rank in order of importance.

No policy / regulation
Lack of managerial capacity
Lack of access to credit/finances
Small towns do not want them

AD

Lack of access to finances and lack of managerial capacity. I don't think the other two are problems.

SD

Does bureaucratic behaviour and implementation obstacles retard the active participation of the private sector in the management of the water supply systems in small towns?

AD

Fully Agree
Partially Agree
Fully Disagree
Don't Know

For example when trying to get information at the District level, it can be quite difficult.

SD

For the management of water supply systems in small towns please rank the following models in order of preference.

Full community management
Service contract
Management contract
Lease
Enhanced lease (lease + private capital)
BOT
Concession
Franchise
Full privatisation (100% privately owned and managed)
Don't Know

AD

In order of decreasing importance, management contract, service contract, enhanced lease, lease, BOT, franchise, concession, full privatization and the last choice is community management. This is because I have seen the bad effects of community management.

SD

That will be all for now. Thank you for your help.

Interviewee: Mr. S.A. Darkwa (SAD)

Position: Director, Water / Chief Hydrogeologist, MOWH

Date: 15 Feb 2002

Duration: 30 minutes

SD

Current policies for water supply systems in small towns in Ghana predispose them toward community management. Do you agree?

SAD

Fully Agree
Partially Agree
Fully Disagree
Don't Know

SD

Can you please elaborate?

SAD

Policy is initiated by the government and we try to include all stakeholders. In the implementation we include stakeholders as well.

SD

Even though, small towns are encouraged to allow private companies to manage their water systems, this has not happened so far. Do you?

SAD

Fully Agree
Partially Agree
Fully Disagree
Don't Know

SD

Please explain.

SAD

It is too early to bring in the Private Sector.

SD

Do you think that the lack of involvement of the private sector can also be attributed to policy implementation failure?

SAD

Fully Agree
Partially Agree
Fully Disagree
Don't Know

SD

Do you also think that the lack of involvement of the private sector can be due to the fact that there are no competent local private companies in the country to take over the water supply systems in small towns?

SAD

Fully Agree
Partially Agree
Fully Disagree
Don't Know

SD

Can you provide any additional comment to this?

SAD

We are in the process of privatizing the urban water and the workers laid off from the GWCL will form companies to run small towns water supply.
--

SD

Can it also be said that the lack of involvement of the private sector is due to the fact that people lack information that an avenue exists for local private investment in water supply?

SAD

Fully Agree
Partially Agree
Fully Disagree
Don't Know

SD

Do local individuals and organisations ask about the possibility of investing in small towns water supply?

SAD

Fully Agree
Partially Agree
Fully Disagree
Don't Know

SD

It is often said that water utilities serving small towns can balance the requirement for financial self-sufficiency with the need for significant investment for improving services to meet the needs of the consumers. Having so much experience in this area, what are your views?

SAD

Fully Agree
Partially Agree
Fully Disagree
Don't Know

SD

There are several PPP models by which small towns water supply can be managed. Are you familiar with the term PPP?

SAD

Yes, well
Yes, partially
No

SD

Which of the following constraints do you think the private involvement in the management of small towns water supplies face at the moment? Please rank in order of importance.

No policy / regulation
Lack of managerial capacity
Lack of access to credit/finances
Small towns do not want them

SAD

Lack of managerial capacity first and then Small towns do not want them. Finally lack of access to finances. I do not think lack of policy is a problem per se.

SD

Does bureaucratic behaviour and implementation obstacles retard the active participation of the private sector in the management of the water supply systems in small towns?

SAD

Fully Agree
Partially Agree
Fully Disagree

Don't Know

SD

For the management of water supply systems in small towns please rank the following models in order of preference.

Full community management
Service contract
Management contract
Lease
Enhanced lease (lease + private capital)
BOT
Concession
Franchise
Full privatisation (100% privately owned and managed)
Don't Know

SAD

I would choose management contract followed by service contract.

SD

Thank you.

Interviewee: Mr. Edmund Baffoe-Twum (EB)

Position: District Engineer, Ho District Assembly

Date: 21 Feb 2002

Duration: 30 minutes

SD

Can you please describe what your responsibilities are/were?

EB

I coordinate technical and extension staff under water and sanitation. I manage the District Water and Sanitation office. We have 5 staff at the headquarters here and 6 staff in the field. I also conduct quality assurance on all projects undertaken.

SD

Current policies for water supply systems in small towns in Ghana predispose them toward community management. Do you agree?

EB

Fully Agree
Partially Agree
Fully Disagree
Don't Know

SD

Can you please elaborate?

EB

I believe that community management boosts morale and accountability.

SD

Even though, small towns are encouraged to allow private companies to manage their water systems, this has not happened so far. Do you?

EB

Fully Agree
Partially Agree
Fully Disagree
Don't Know

SD

Please explain.

EB

There are no particular policies to take care of this even though we have some guidelines.

SD

Do you think that the lack of involvement of the private sector can also be attributed to policy implementation failure?

EB

Fully Agree
Partially Agree
Fully Disagree
Don't Know

SD

Do you also think that the lack of involvement of the private sector can be due to the fact that there are no competent local private companies in the country to take over the water supply systems in small towns?

EB

Fully Agree
Partially Agree
Fully Disagree
Don't Know

SD

Can it also be said that the lack of involvement of the private sector is due to the fact that people lack information that an avenue exists for local private investment in water supply?

EB

Fully Agree
Partially Agree
Fully Disagree
Don't Know

SD

Please provide any additional response/ comment?

EB

There has not been much publicity. People are virtually not aware of small towns.

SD

Do local individuals and organisations ask for the possibility of investing in small towns water supply?

EB

Fully Agree

Partially Agree
Fully Disagree
Don't Know

Yes. I have had people asking me if they will be allowed to mechanise old water systems. I have also had people who are interested in water quality monitoring for the communities.

SD

It is often said that water utilities serving small towns can balance the requirement for financial self-sufficiency with the need for significant investment for improving services to meet the needs of the consumers. Having so much experience in this area, what are your views?

EB

Fully Agree
Partially Agree
Fully Disagree
Don't Know

SD

I won't mind at all. Anyway, there are several PPP models by which small towns water supply can be managed. Are you familiar with the term PPP?

EB

Yes, well
Yes, partially
No

SD

Which of the following constraints do you think the private involvement in the management of small towns water supplies face at the moment? Please rank in order of importance.

No policy / regulation
Lack of managerial capacity
Lack of access to credit/finances
Small towns do not want them

EB

No policy/regulation followed by lack of access to credit /finances, small towns do not want them and finally lack of managerial capacity.

SD

Does bureaucratic behaviour and implementation obstacles retard the active participation of the private sector in the management of the water supply systems in small towns?

EB

Fully Agree
Partially Agree
Fully Disagree
Don't Know

SD

For the management of water supply systems in small towns please rank the following models in order of preference.

Full community management
Service contract
Management contract
Lease
Enhanced lease (lease + private capital)
BOT
Concession
Franchise
Full privatisation (100% privately owned and managed)
Don't Know

EB

Service contract followed by management contract are the only options worth considering here.

SD

Is there anything else you would like to add?

EB

It was very nice to have you here. Even though tomorrow is the weekend, I have arranged for one of the environmental health officers to take you to the field. The work you are doing is very important to us.

SD

Thank you for your help.

Interviewee: Mr. Fred Agyemang (FA)

Position: Planning officer, Amansie East District Assembly

Date: 15 Feb 2002

Duration: 30 minutes

SD

Can you please describe what your responsibilities are/were?

FA

I am responsible for coordination between the communities and CWSA. I also monitor and evaluate all development projects in the district including water supply.

SD

Current policies for water supply systems in small towns in Ghana predispose them toward community management. Do you agree?

FA

Fully Agree
Partially Agree
Fully Disagree
Don't Know

SD

Even though, small towns are encouraged to allow private companies to manage their water systems, this has not happened so far. Do you?

FA

Fully Agree
Partially Agree
Fully Disagree
Don't Know

SD

Please explain.

FA

The policies and guidelines are yet to be implemented. The small towns also distrust the private sector.
--

SD

Do you think that the lack of involvement of the private sector can also be attributed to policy implementation failure?

FA

Fully Agree
Partially Agree
Fully Disagree
Don't Know

SD

Do you also think that the lack of involvement of the private sector can be due to the fact that there are no competent local private companies in the country to take over the water supply systems in small towns?

FA

Fully Agree
Partially Agree
Fully Disagree
Don't Know

SD

Can it also be said that the lack of involvement of the private sector is due to the fact that people lack information that an avenue exists for local private investment in water supply?

FA

Fully Agree
Partially Agree
Fully Disagree
Don't Know

SD

Do local individuals and organisations ask for the possibility of investing in small towns water supply?

FA

Fully Agree
Partially Agree
Fully Disagree
Don't Know

SD

It is often said that water utilities serving small towns can balance the requirement for financial self-sufficiency with the need for significant investment for improving services to meet the needs of the consumers. Having so much experience in this area, what are your views?

FA

Fully Agree
Partially Agree
Fully Disagree
Don't Know

Everyone uses water so the market will always be there.

SD

I won't mind at all. Anyway, there are several PPP models by which small towns water supply can be managed. Are you familiar with the term PPP?

FA

Yes, well
Yes, partially
No

SD

Which of the following constraints do you think the private involvement in the management of small towns water supplies face at the moment? Please rank in order of importance.

No policy / regulation
Lack of managerial capacity
Lack of access to credit/finances
Small towns do not want them

FA

Lack of access to credit/finances, no policy or regulation, lack of managerial capacity and then small towns do not want them.

SD

Does bureaucratic behaviour and implementation obstacles retard the active participation of the private sector in the management of the water supply systems in small towns?

FA

Fully Agree
Partially Agree
Fully Disagree
Don't Know

Bureaucracy kills private sector initiative due to their being tossed up and down.

SD

For the management of water supply systems in small towns please rank the following models in order of preference.

Full community management
Service contract
Management contract
Lease
Enhanced lease (lease + private capital)
BOT
Concession
Franchise
Full privatisation (100% privately owned and managed)
Don't Know

FA

Lease, enhanced lease, service contract, management contract, full community management, concession, BOT and full privatization.
--

SD

Is there anything else you would like to add?

FA

That will be all. I think the Water Board members are here.

SD

Thanks for the help.

Interviewee: Mr. M.A. Alhassan (MA)

Position: Deputy Coordinating Director, Savelu-Nanton District Assembly

Date: 5 March 2002

Duration: 30 minutes

SD

Can you please describe what your responsibilities are?

MA

In the absence of the Co-ordinating Director, I act. I mainly handle administration.

SD

Current policies for water supply systems in small towns in Ghana predispose them toward community management. Do you agree?

MA

Fully Agree
Partially Agree
Fully Disagree
Don't Know

SD

Can you please elaborate?

MA

GWCL does not wish to relinquish its powers to the private sector.

SD

Even though, small towns are encouraged to allow private companies to manage their water systems, this has not happened so far. Do you?

MA

Fully Agree
Partially Agree
Fully Disagree
Don't Know

SD

Please explain.

MA

The PPP concept has not been explained to the communities who are used to being spoon-fed.

SD

Do you think that the lack of involvement of the private sector can also be attributed to policy implementation failure?

MA

Fully Agree
Partially Agree
Fully Disagree
Don't Know

SD

Why?

MA

The main problem here is that even the policy makers themselves seem to be confused about what steps to take. We must also bear in mind that policy makers are politicians who would not like to lose power by implementing policies that will lose votes for them. At the moment private sector management is not so popular.

SD

Do you also think that the lack of involvement of the private sector can be due to the fact that there are no competent local private companies in the country to take over the water supply systems in small towns?

MA

Fully Agree
Partially Agree
Fully Disagree
Don't Know

SD

Can you provide any additional comment to this?

MA

The Water sector has been the monopoly of GWCL. So other private operators find it difficult rising.

SD

Can it also be said that the lack of involvement of the private sector is due to the fact that people lack information that an avenue exists for local private investment in water supply?

MA

Fully Agree

Partially Agree
Fully Disagree
Don't Know

SD

Do local individuals and organisations ask about the possibility of investing in small towns water supply?

MA

Fully Agree
Partially Agree
Fully Disagree
Don't Know

SD

It is often said that water utilities serving small towns can balance the requirement for financial self-sufficiency with the need for significant investment for improving services to meet the needs of the consumers. Having so much experience in this area, what are your views?

MA

Fully Agree
Partially Agree
Fully Disagree
Don't Know

SD

Anyway, there are several PPP models by which small towns water supply can be managed. Are you familiar with the term PPP?

MA

Yes, well
Yes, partially
No

SD

Which of the following constraints do you think the private involvement in the management of small towns water supplies face at the moment? Please rank in order of importance.

No clear policy / regulation
Lack of managerial capacity
Lack of access to credit/finances
Small towns do not want them

MA

No clear policy / regulation, Small towns do not want them, Lack of

managerial capacity and
Lack of access to credit/finances.

SD

Does bureaucratic behaviour and implementation obstacles retard the active participation of the private sector in the management of the water supply systems in small towns?

MA

Fully Agree
Partially Agree
Fully Disagree
Don't Know

All spheres of the developing world is plagued by bureaucracy which is tied to corruption.

SD

For the management of water supply systems in small towns please rank the following models in order of preference.

Full community management
Service contract
Management contract
Lease
Enhanced lease (lease + private capital)
BOT
Concession
Franchise
Full privatisation (100% privately owned and managed)
Don't Know

MA

Full community management, BOT, Enhanced lease, service contract, management contract, lease and full privatisation.

SD

Is there anything else you would like to add?

MA

That would be all.

SD

Thanks.

Interviewee: Mr. Samuel Appiah (SA)

Position: Zonal Hydrogeologist, CWSA – Northern Region

Date: 6 March 2002

Duration: 30 minutes

SD

Can you please describe what your responsibilities are/were?

SA

My job includes major problem handling on O&M. I handle mainly small towns, policies and strategies, organize training arrangements for the various stakeholders as well as monitoring guidelines- large multi-regional projects, guiding consultants. I also act as the liaison for conferences.

SD

Current policies for water supply systems in small towns in Ghana predispose them toward community management. Do you agree?

SA

Fully Agree
Partially Agree
Fully Disagree
Don't Know

SD

Even though, small towns are encouraged to allow private companies to manage their water systems, this has not happened so far. Do you?

SA

Fully Agree
Partially Agree
Fully Disagree
Don't Know

SD

Please explain.

SA

The private sector provides good and services. The DAs hold the water systems in trust for the communities but the DAs are not prepared due to lack of logistics.

SD

Do you think that the lack of involvement of the private sector can also be attributed to policy implementation failure?

SA

Fully Agree
Partially Agree
Fully Disagree
Don't Know

SD

Why?

SA

There is a draft policy which is changing all the time.

SD

Do you also think that the lack of involvement of the private sector can be due to the fact that there are no competent local private companies in the country to take over the water supply systems in small towns?

SA

Fully Agree
Partially Agree
Fully Disagree
Don't Know

SD

Can it also be said that the lack of involvement of the private sector is due to the fact that people lack information that an avenue exists for local private investment in water supply?

SA

Fully Agree
Partially Agree
Fully Disagree
Don't Know

SD

Do local individuals and organisations ask for the possibility of investing in small towns water supply?

SA

Fully Agree
Partially Agree
Fully Disagree
Don't Know

SD

It is often said that water utilities serving small towns can balance the requirement for financial self-sufficiency with the need for significant investment for improving services to meet the needs of the consumers. Having so much experience in this area, what are your views?

SA

Fully Agree
Partially Agree
Fully Disagree
Don't Know

SD

There are several PPP models by which small towns water supply can be managed. Are you familiar with the term PPP?

SA

Yes, well
Yes, partially
No

SD

Which of the following constraints do you think the private involvement in the management of small towns water supplies face at the moment? Please rank in order of importance.

No policy / regulation
Lack of managerial capacity
Lack of access to credit/finances
Small towns do not want them

SA

All of these are equally important.

SD

Does bureaucratic behaviour and implementation obstacles retard the active participation of the private sector in the management of the water supply systems in small towns?

SA

Fully Agree
Partially Agree
Fully Disagree
Don't Know

SD

For the management of water supply systems in small towns please rank the following models in order of preference.

Full community management
Service contract
Management contract
Lease
Enhanced lease (lease + private capital)
BOT
Concession
Franchise
Full privatisation (100% privately owned and managed)
Don't Know

SA

Management contract followed by service contract. The others are not so good.

SD

Is there anything else you would like to add?

SA

There is a lot of politics involved in the management of water in some of the communities. I however believe that, it is possible for the private sector to do a better job than the communities. The fear however is that, with too much involvement of the private sector, tariff control may become problematic. You should talk to Mr. Van Ess and Ernest Doe at CWSA headquarters. They know a lot on these things.

SD

Thank you.

Interviewee: Mr. Subiniman (S)

Position: Executive Secretary, Association of Water and Sanitation Development Boards (AWSDB)

Date: 5 March 2002

Duration: 40 minutes

SD

Can you please describe what your responsibilities are/were?

S

The AWSDB is an association of Water Boards in the Northern, Upper East and Upper West Regions. My job is to run the associations office which handles financial management, community development, civil, mechanical and electrical maintenance works. At the moment we have one financial and accounting specialist which is myself and four (4) community development specialist. The association was formed in Nov 1995 with help from CIDA and has as its objective to promote productivity, economic development and poverty alleviation. As an association we cover a third of the land area of Ghana.

SD

Current policies for water supply systems in small towns in Ghana predispose them toward community management. Do you agree?

S

Fully Agree
Partially Agree
Fully Disagree
Don't Know

SD

Can you please elaborate?

S

I believe that the water systems should be properly constructed and those in charge of management should be properly trained. I also believe that District Assemblies should be more involved.

SD

Even though, small towns are encouraged to allow private companies to manage their water systems, this has not happened so far. Do you?

S

Fully Agree
Partially Agree
Fully Disagree

Don't Know

SD

Do you think that the lack of involvement of the private sector can also be attributed to policy implementation failure?

S

Fully Agree
Partially Agree
Fully Disagree
Don't Know

SD

Do you also think that the lack of involvement of the private sector can be due to the fact that there are no competent local private companies in the country to take over the water supply systems in small towns?

S

Fully Agree
Partially Agree
Fully Disagree
Don't Know

SD

Can it also be said that the lack of involvement of the private sector is due to the fact that people lack information that an avenue exists for local private investment in water supply?

S

Fully Agree
Partially Agree
Fully Disagree
Don't Know

SD

Do local individuals and organisations ask for the possibility of investing in small towns water supply?

S

Fully Agree
Partially Agree
Fully Disagree
Don't Know

SD

It is often said that water utilities serving small towns can balance the requirement for financial self-sufficiency with the need for significant investment for improving

services to meet the needs of the consumers. Having so much experience in this area, what are your views?

S

- Fully Agree
- Partially Agree
- Fully Disagree
- Don't Know

When you take small towns individually, some of them may not be attractive enough. However, if you cluster some of them together, you may get a better interest from the private sector.

SD

I won't mind at all. Anyway, there are several PPP models by which small towns water supply can be managed. Are you familiar with the term PPP?

S

- Yes, well
- Yes, partially
- No

SD

Which of the following constraints do you think the private involvement in the management of small towns water supplies face at the moment? Please rank in order of importance.

- No policy / regulation
- Lack of managerial capacity
- Lack of access to credit/finances
- Small towns do not want them

S

I think their importance is n the right order of importance. These issues are all very important.

SD

Does bureaucratic behaviour and implementation obstacles retard the active participation of the private sector in the management of the water supply systems in small towns?

S

- Fully Agree
- Partially Agree
- Fully Disagree
- Don't Know

SD

For the management of water supply systems in small towns please rank the following models in order of preference.

Full community management
Service contract
Management contract
Lease
Enhanced lease (lease + private capital)
BOT
Concession
Franchise
Full privatisation (100% privately owned and managed)
Don't Know

S

I support full community management followed by service contract, management contract, enhanced lease, lease, concession, franchise and full privatization is last.

SD

Is there anything else you would like to add?

S

The AWSDB will not take over the management of the water supply systems as a private company. However, the capacity of the water boards needs to be built.

SD

Thank you for your help.

8. DETAILED ANALYSED DATA

Notes		
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Comments		
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Syntax		CROSSTABS /TABLES=partip2 BY town2 /FORMAT=AVALUE TABLES /STATISTIC=CHISQ /CELLS= COUNT EXPECTED .
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PARTIP2 * TOWN2		344	100.0%	0	.0%	344 100.0%

PARTIP2 * TOWN2 Crosstabulation							
			TOWN2				Total
			Avenul	Bekwa i	Savelugu	Tota	
PARTIP2	No	Count	28	96	80	32	236
		Expected Count	41.2	74.1	82.3	38.4	236.0
	Yes	Count	32	12	40	24	108
		Expected Count	18.8	33.9	37.7	17.6	108.0
Total		Count	60	108	120	56	344

	Expected Count	60.0	108.0	120.0	56.0	344.0
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Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	37.663(a)	3	.000
Likelihood Ratio	40.585	3	.000
Linear-by-Linear Association	.058	1	.809
N of Valid Cases	344		
a 0 cells (.0%) have expected count less than 5. The minimum expected count is 17.58.			

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Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics for each table are based on all the cases with valid data in the specified range(s) for all variables in each table.
Syntax		CROSSTABS /TABLES=partc2 BY town2 /FORMAT=AVALUE TABLES /STATISTIC=CHISQ /CELLS= COUNT EXPECTED .
Resources	Dimensions Requested	2
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Case Processing Summary						
	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
PARTC2 * TOWN2	344	100.0%	0	.0%	344	100.0%

PARTC2 * TOWN2 Crosstabulation

			TOWN2				Total
			Avenui	Bekwa i	Savelugu	Tota	
PARTC2	No	Count	4	40	0	8	52
		Expected Count	9.1	16.3	18.1	8.5	52.0
	Yes	Count	56	68	120	48	292
		Expected Count	50.9	91.7	101.9	47.5	292.0
Total		Count	60	108	120	56	344
		Expected Count	60.0	108.0	120.0	56.0	344.0

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	65.184(a)	3	.000
Likelihood Ratio	74.506	3	.000
Linear-by-Linear Association	4.790	1	.029
N of Valid Cases	344		
a 0 cells (.0%) have expected count less than 5. The minimum expected count is 8.47.			

Notes		
Output Created		04-JAN-2002 02:35:06
Comments		
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Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics for each table are based on all the cases with valid data in the specified range(s) for all variables in each table.
Syntax		CROSSTABS /TABLES=wtaste BY town2 /FORMAT=AVALUE TABLES /STATISTIC=CHISQ CORR /CELLS= COUNT EXPECTED .
Resources	Dimensions Requested	2
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Warnings
CORR statistics are available for numeric data only.

Case Processing Summary						
	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
WTASTE * TOWN2	344	100.0%	0	.0%	344	100.0%

WTASTE * TOWN2 Crosstabulation							
			TOWN2				Total
			Avenui	Bekwa i	Savelugu	Tota	
WTASTE	Bad	Count	0	4	0	0	4
		Expected Count	.7	1.3	1.4	.7	4.0
	Satisfactory	Count	20	44	36	4	104
		Expected Count	18.1	32.7	36.3	16.9	104.0
	Good	Count	40	56	64	52	212
		Expected Count	37.0	66.6	74.0	34.5	212.0
		Count	0	4	20	0	24
		Expected Count	4.2	7.5	8.4	3.9	24.0
Total		Count	60	108	120	56	344
		Expected Count	60.0	108.0	120.0	56.0	344.0

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	60.779(a)	9	.000
Likelihood Ratio	68.167	9	.000
N of Valid Cases	344		
a 6 cells (37.5%) have expected count less than 5. The minimum expected count is .65.			

Symmetric Measures(a)	
	Value
N of Valid Cases	344
a Correlation statistics are available for numeric data only.	

Frequencies

Notes		
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Comments		
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	N of Rows in Working Data File	344
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on all cases with valid data.
Syntax		FREQUENCIES VARIABLES=age hsize /FORMAT=NOTABLE /STATISTICS=STDDEV MINIMUM MAXIMUM MEAN /HISTOGRAM NORMAL /ORDER= ANALYSIS .
Resources	Total Values Allowed	149796
	Elapsed Time	0:00:01.32

Statistics			
		AGE	HSIZE
N	Valid	332	340
	Missing	12	4
Mean		46.96	15.14
Std. Deviation		14.397	11.890
Minimum		25	1
Maximum		90	84

Notes		
Output Created		04-JAN-2003 00:48:00
Comments		
Input	Data	C:\ZPhD\Analysis\hsehold survey (all).sav

	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	344
Missing Value Handling	Definition of Missing	User-defined missing values for dependent variables are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any dependent variable or factor used.
Syntax	EXAMINE VARIABLES=hsize BY town /PLOT BOXPLOT STEMLEAF /COMPARE GROUP /STATISTICS DESCRIPTIVES /INTERVAL 95 /MISSING LISTWISE /NOTOTAL.	
Resources	Elapsed Time	0:00:01.43

Case Processing Summary							
		Cases					
		Valid		Missing		Total	
	TOWN	N	Percent	N	Percent	N	Percent
HSIZE	Avenui	60	100.0%	0	.0%	60	100.0%
	Bekwai	108	100.0%	0	.0%	108	100.0%
	Savelugu	116	96.7%	4	3.3%	120	100.0%
	Tota	56	100.0%	0	.0%	56	100.0%

Descriptives				
	TOWN		Statistic	Std. Error
HSIZE	Avenui	Mean	8.60	.623
		Std. Deviation	4.826	
		Minimum	1	
		Maximum	21	
		Range	20	
	Bekwai	Mean	22.63	1.624
		Std. Deviation	16.876	
		Minimum	5	
		Maximum	84	
		Range	79	
	Savelugu	Mean	14.17	.592


```

12.00    2 . 555555555555
4.00     3 . 0000
8.00     3 . 55555555
8.00     4 . 00000000
.00      4 .
4.00     5 . 2222
4.00 Extremes  (>=84)

```

```

Stem width:    10
Each leaf:     1 case(s)

```

HSIZE Stem-and-Leaf Plot for
TOWN= Savelugu

Frequency Stem & Leaf

```

4.00    0 . 5555
12.00    0 . 666677777777
24.00    0 . 888888888888999999999999
8.00     1 . 00001111
4.00     1 . 3333
24.00    1 . 444444444444444444444444
8.00     1 . 77777777
4.00     1 . 8888
4.00     2 . 0000
12.00    2 . 222222223333
8.00     2 . 55555555
.00      2 .
4.00     2 . 8888

```

```

Stem width:    10
Each leaf:     1 case(s)

```

HSIZE Stem-and-Leaf Plot for
TOWN= Tota

Frequency Stem & Leaf

```
.00  0 .
8.00  0 . 44445555
12.00  0 . 666666666666
4.00  0 . 8888
20.00  1 . 00000000000000001111
.00  1 .
4.00  1 . 5555
4.00  1 . 6666
4.00 Extremes  (>=19)
```

Stem width: 10

Each leaf: 1 case(s)

Notes		
Output Created		04-JAN-2003 01:16:13
Comments		
Input	Data	C:\ZPhD\Analysis\hsehold survey (all).sav
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	344
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics for each table are based on all the cases with valid data in the specified range(s) for all variables in each table.
Syntax		CROSSTABS /TABLES=town BY gender /FORMAT= AVALUE TABLES /CELLS= COUNT EXPECTED .
Resources	Dimensions Requested	2
	Cells Available	116508
	Elapsed Time	0:00:00.77

Case Processing Summary						
	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
TOWN * GENDER	344	100.0%	0	.0%	344	100.0%

TOWN * GENDER Crosstabulation						
			GENDER			Total
			Female	Male		
TOWN	Avenui	Count	24	36	0	60
		Expected Count	24.4	34.9	.7	60.0
	Bekwai	Count	48	60	0	108
		Expected Count	44.0	62.8	1.3	108.0
	Savelugu	Count	40	76	4	120
		Expected Count	48.8	69.8	1.4	120.0
	Tota	Count	28	28	0	56
		Expected Count	22.8	32.6	.7	56.0
Total		Count	140	200	4	344
		Expected Count	140.0	200.0	4.0	344.0

Notes		
Output Created		04-JAN-2003 01:19:48
Comments		
Input	Data	C:\ZPhD\Analysis\hsehold survey (all).sav
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	344
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics for each table are based on all the cases with valid data in the specified range(s) for all variables in each table.
Syntax		CROSSTABS /TABLES=town BY occupati /FORMAT= AVALUE TABLES /CELLS= COUNT EXPECTED .
Resources	Dimensions Requested	2
	Cells Available	116508

	Elapsed Time	0:00:00.39
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Case Processing Summary						
	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
TOWN * OCCUPATI	344	100.0%	0	.0%	344	100.0%

TOWN * OCCUPATI Crosstabulation										
			OCCUPATI							Total
			Artisan	Civil service or white collar professional	Farmer	Pensioner	Trader	Teacher		
TOWN	Avenui	Count	12	0	32	8	8	0	0	60
		Expected Count	8.4	.7	22.3	4.2	19.5	3.5	1.4	60.0
	Bekwai	Count	28	4	0	8	60	4	4	108
		Expected Count	15.1	1.3	40.2	7.5	35.2	6.3	2.5	108.0
	Savelugu	Count	4	0	56	4	40	12	4	120
		Expected Count	16.7	1.4	44.7	8.4	39.1	7.0	2.8	120.0
	Tota	Count	4	0	40	4	4	4	0	56
		Expected Count	7.8	.7	20.8	3.9	18.2	3.3	1.3	56.0
Total		Count	48	4	128	24	112	20	8	344
		Expected Count	48.0	4.0	128.0	24.0	112.0	20.0	8.0	344.0

