

**KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY
KUMASI, GHANA**



**PARTNERSHIP BETWEEN GHANA WATER COMPANY LIMITED AND
TANKER ASSOCIATIONS FOR WATER SERVICE DELIVERY IN ACCRA**

Yaw Owusu Kanin
MSc. Thesis February 2010

**Kwame Nkrumah University
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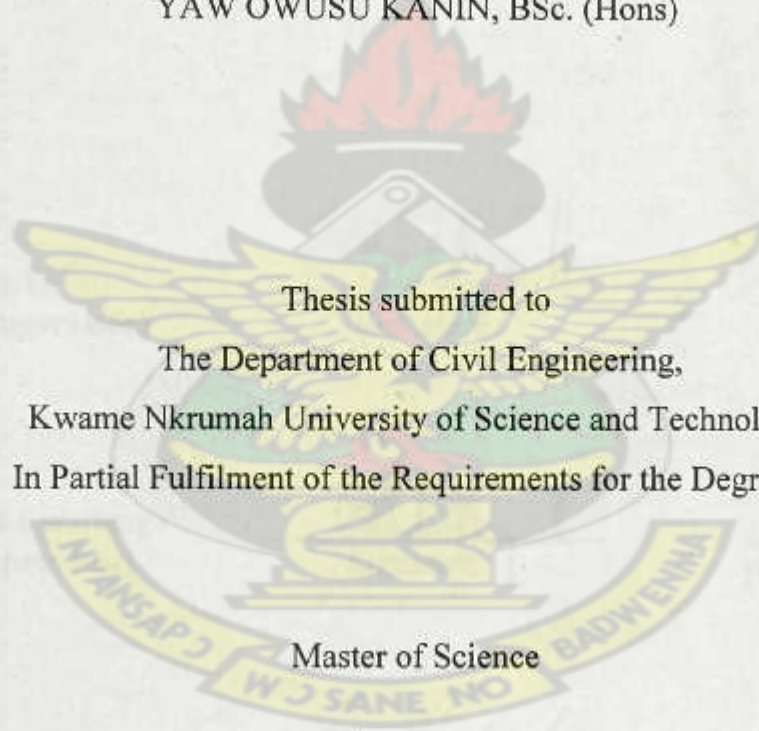
FACULTY OF CIVIL AND GEOMATIC ENGINEERING

DEPARTMENT OF CIVIL ENGINEERING

**PARTNERSHIP BETWEEN GHANA WATER COMPANY LIMITED AND
TANKER ASSOCIATIONS FOR WATER SERVICE DELIVERY IN ACCRA**

By

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Thesis submitted to
The Department of Civil Engineering,
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In Partial Fulfilment of the Requirements for the Degree of

Master of Science

In

Water Supply and Environmental Sanitation

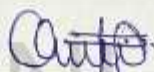
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CERTIFICATION

I hereby declare that this submission is my own work towards the MSc. and that, to the best of my knowledge, it contains no material previously published by another person nor material which has been accepted for the award of any other degree of the University, except where due acknowledgement has been made in the text.

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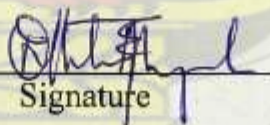


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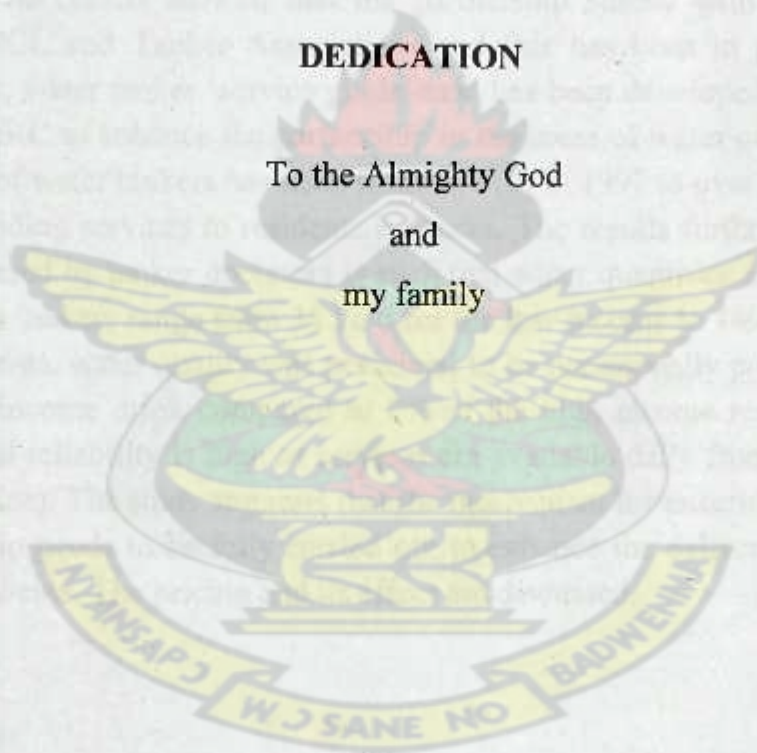


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To the Almighty God
and
my family



ABSTRACT

This study examined the partnership between the formal utility Ghana Water Company Limited (GWCL), and Tanker Associations for the provision of water services in Accra. The study was conducted mainly in the Eastern part of Accra where Tanker Associations are located. Data was gathered from stakeholders (GWCL, Tanker Associations, Public Utility Regulatory Commission (PURC) and consumers) by using structured interviews and questionnaires administered to three hundred (300) households who receive water from tanker services. The work ascertained the partnership's contribution to filling this supply gap. It looked at the partnership relation and its evolution over the years as well as its translation into improving tanker service quality relative to the situation before this partnership agreement. The results showed that the partnership started with an MOU signed between GWCL and Tanker Associations and this has been in place since 1997. Subsequently, water tanker 'service guidelines' has been developed by the economic regulator, PURC to enhance the partnership in the areas of water quality and pricing. The number of water tankers has risen from five (5) in 1997 to over six hundred (600) in 2009 providing services to residents in Accra. The results further showed that the service delivered by tanker operators is such that water quantities used by consumers of water from tankers range from 35 l/c/d for the low income to 149 l/c/d for the high income residents, water quality was perceived to be occasionally poor for drinking as 73% of low income drink compared to 0% of the high income residents. However, regulation and reliability is high as services are available daily from 7am to 5pm (10 hours of service). The study suggests that the mechanism for ensuring water quality in the partnership needs to be fully carried out to enhance the delivery of good quality water for residents. The pricing and its effect are discussed.

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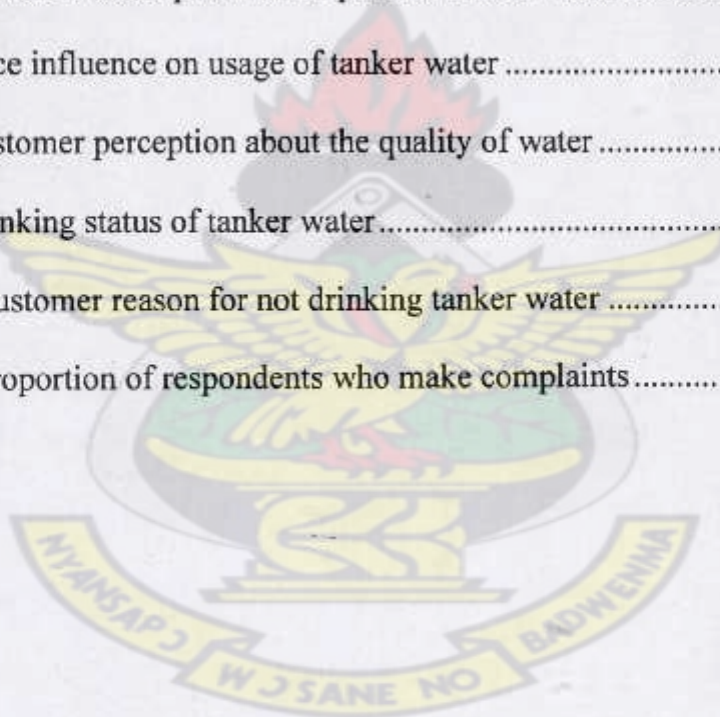
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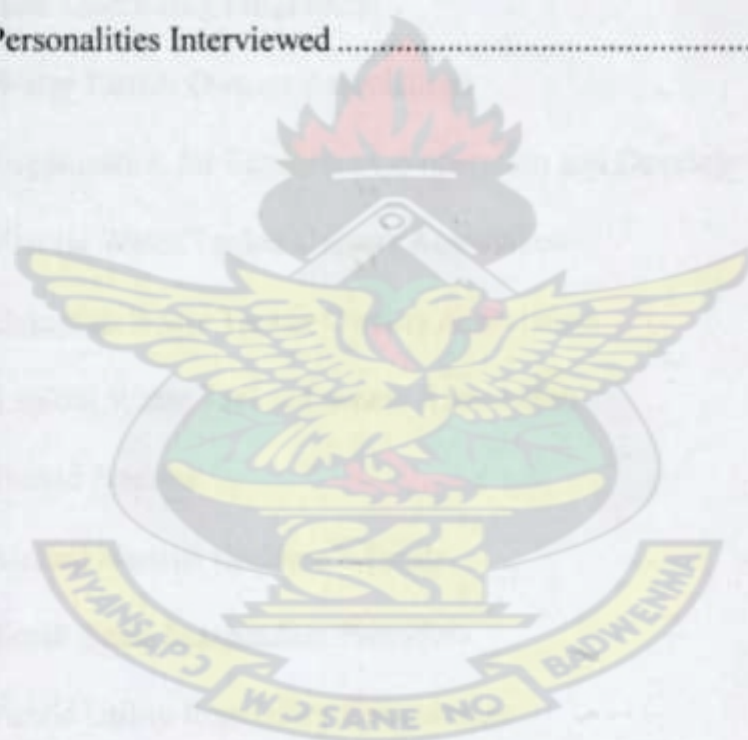
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LIST OF ABBREVIATIONS AND ACCRONYMS

| | |
|--------|--|
| AMA | - Accra Metropolitan Assembly |
| AVRL | - Aquah Vitens Rand Limited |
| BPD | - Building Partnership for Development |
| CIELAP | - Canadian Institute for Environmental Law and Policy |
| CWSA | - Community Water and Sanitation Agency |
| GWSC | - Ghana Water and Sewerage Corporation |
| GWCL | - Ghana Water Company Limited |
| JMP | - Joint Monitoring Programme |
| WTOA | - Water Tanker Owners Associations |
| OECD | - Organization for Economic Co-operation and Development |
| PWTOA | - Private Water Tanker Owners Association |
| SWTOA | - Sakaman Water Tanker Owners Association |
| LWTOA | - Lashibi Water Tanker Owners Association |
| UN | - United Nations |
| UNICEF | - United Nations Children's Funds |
| SSIP | - Small Scale Independent Providers |
| PURC | - Public Utility Regulatory Commission |
| WHO | - World Health Organization |
| WUP | - Water Utility Partnership |
| PPP | - Public-Private Partnership |
| MWH | - Ministry of Works and Housing |

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CHAPTER ONE

1 INTRODUCTION

This chapter presents the background of research, problem statement, justification, research objectives and questions, scope of study, and structure of the report. It defines the significance of having access to potable water and thus the need for water service providers (formal and informal) to team up in facilitating the achievement of the Millennium Development Goals.

1.1 Background

The concept of partnerships has recently gained recognition and hence greater insights into the prospects of partnerships are being developed by practitioners, researchers and observers, especially as a solution to the provision of urban water supply services (Franceys, 2001).

In Accra, the formal urban utility, GWCL has entered into partnership with water Tanker Associations in order to provide water services to residents in some areas. In these areas residents do not have access to direct supply due to the inability of the GWCL pipe network to cover these areas. This supply gap is probably due to uncontrolled developments. Other areas have the network but the topography affects the flow compelling residents to rely on other sources for water (Nyarko et al., 2008).

The partnership is therefore intended to provide good quality services which will promote the nations quest to achieve the Millennium Development Goals (Goal 7, target 10) which seeks to halve the proportion of people without access to safe drinking water by 2015.

Moreover, the activity of water tankers was suspected to pose threats to the formal utility and consumers who relied on their services because water tanker operators use to steal from fire hydrants whilst others fetched from rivers and sold to consumers at very high prices. It therefore prompted GWCL to provide some form of regulation and the best option considered was through partnership.

This work then seeks to investigate the extent to which the partnership has impacted on the service delivery and its effect on the consumers.

1.2 Problem Statement and Justification

The partnership that exist between GWCL and Tanker Associations is known but little research about its impact on the water service delivery is lacking and this work aims at addressing this knowledge gap by assessing the contribution of the partnership between GWCL and Tanker Associations to the provision of water services to the unserved and underserved in Accra.

The knowledge will help to provide better integration and development of tanker services to properly improve the water supply situation, particularly in areas without access to potable water in Accra.

1.3 Research Objectives

The main objective of the research is to ascertain how the partnership is working to contribute to the provision of water services to the unserved and underserved in Accra.

1.3.1 Specific Objectives

The specific objectives of this work are:

- i. To determine the nature of the partnership relation and its evolution over the years.
- ii. To determine the effect of the partnership on the service delivery.

1.4 Research Questions

In order to achieve the objectives, the following research questions will be addressed:

- i. Who are the partners and what triggered the partnership?
- ii. Has the partnership affected the water service delivery?
- iii. Are consumers satisfied with the services provided as a result of the partnership?

1.5 Scope and Limitation of Study

The research is limited to GWCL and Tanker Operators within Tanker Associations. It excludes Water Tanker Operators who are members of Associations. The work also targets the low, middle and high income consumers of tanker water in the Greater Accra region using water for domestic purposes, however, it excludes areas such as Dangme East and some parts of Dangme West where tanker services are not required because of the good supply from GWCL. The study outcomes are based on the available data.

1.6 Organization of Report

The structure of the report is organized in six main chapters. Chapter one covers the introduction of the study which comprises background of the study, problem statement, objectives of the study, justification. The chapter two elaborates the state of the current water supply in the Accra Metropolis as chapter three concentrates on review of literature relevant to the study. The research study area and methodology are addressed in chapter four and the results and discussion of the study are highlighted in the fifth chapter. Finally, conclusion and recommendations are outlined in chapter six.

CHAPTER TWO

2 OVERVIEW OF URBAN WATER SUPPLY IN GHANA

This section looks at the urban water supply situation in Ghana, particularly in the study area, Accra. It provides a brief description of the GWCL inability to meet the urban water demand and further describes the role of SSP's in the provision of water services to the people.

2.1 Institutional Arrangements of Ghana Water Supply

The Ghana water supply sector following Reforms falls under the auspices of Ministry of Water Resources, Works and Housing (MWRWH). The Ministry is responsible for overseeing the activities of the GWCL and the CWSA. The specific responsibilities include:

- Guidance in matters of general policy
- Appointment of the Managing Directorate by the order of the President
- Reviewing the annual report and financial records at any time
- Approving of any changes in the GWCL regulations
- Approving the annual budget

2.1.1 The Ministry of Water Resources, Works and Housing;

- Define policies for the water sector
- Mobilize resources and arrange especially for international funding for the water sector capital projects

2.1.2 The Ghana Water Company Limited:

- Owns the current public assets in the water sector
- Undertakes research for water sector development/investment planning
- Establishes performance targets for operators in the sector
- Undertakes construction work in the water sector

- Supervises construction works
- Monitors and enforces water quality standards

The clauses of the 1997 PURC Act support the framework for a meaningful role for PURC in regulatory social policy are (selectively) extracted as follows:

The functions of the Commission include the following:

- to protect the interest of consumers and providers of utility services
- to monitor standards of performance for provision of services
- to initiate and conduct investigations into standards of quality of service given to consumers

2.2 Providers of Urban Water

There are two distinct management arrangements for the provision of water in Ghana, with a separation into urban and rural/small town water supply. The urban water supply is classified into formal and informal (Nyarko, 2007). The formal being Ghana Water Company Ltd. (GWCL) established by the Act of parliament 310 of 1965 as the urban water utility to deliver services to all inhabitants at the moment has about 86 systems serving a total population of over six million and it effectively meets 59 per cent of urban water demand (PURC, 2005). A survey conducted by the TREND group in 2003 also revealed that only 40 per cent of urban population has reliable water. In Accra majority of residents rely of GWCL source of supply.

The 'informal water service providers' are the other service providers that supply water to residents who are unserved or underserved by the formal utility. These secondary and tertiary providers generally called vendors contribute substantially in satisfying the needs of the urban residents by conveying water from long distant sources (GWCL hydrants) to them at a fee. Another group of informal service providers is the independent providers who according to TREND, (2003) claims that

78 per cent of unserved or underserved rely on these small scale providers for water (eg. Water tankers, mobile polytank).

2.3 The State of GWCL Water Supply in Accra

The Greater Accra Region has been divided into three main operational regions called ATMA regions by GWCL, the formal utility duly recognized as the urban water provider in Ghana, and it consists of Accra East, Accra West and Tema. The two major Headworks that supply the region with water are Weija and Kpong Headworks. According the GWCL water from Weija serves the Accra west and the surplus is fed to some parts of Accra East. The Kpong Headworks serve Tema and part of Accra east as well. The Accra East which lies between Tema and Accra West is the only region without Headworks and the supply situation is the worst of the ATMA regions owing to the geographical location of the region (relative to the water production points). Therefore it only receives the “surplus” water after the two other regions take their share.

2.3.1 Reasons for Poor Water Supply in Accra

According to GWCL, the poor water supply status can be attributed to the following problems;

- **Inadequate Production**

GWCL currently produces a total of about 360,000m³ per day from its two Headworks at Weija and Kpong, whilst total demand in the metropolis is estimated at about 540,000m³ per day [a shortfall of about 180,000m³ per day or 50%].

- **Aged Pipelines and Equipment**

Due to old age of transmission and distribution pipelines as well as pumping station / booster station equipment [pumps, electrical panel, switches, etc] there are frequent

system failures which lead to interruptions. Encrustation of the pipelines due to their old age leads to reduced flows in pipelines. Physical bursts/leakages are so frequent and result in isolations in the distribution network to allow repairs to be carried out. Shut downs at booster stations/pumping stations in the system resulting from frequent breakdown due to old age of equipment also occur quite frequently.

- **Power supply interruptions**

Frequent power interruptions in the form of trip-offs or total power failures result in significant loss in production figures at the Headworks. For example, Weija Headworks with a capacity to produce 42 million gallons a day losses almost 2 million gallons as a result of one hour power failure. On the average about 5 – 10% production is lost per week due to power problems.

- **Uncontrolled Pipeline Extensions**

GWCL distribution networks are being extended to the newly developing communities such as parts of Adenta, Ashongman, Agyiringano, Teshie, Agblezaa etc ignoring the basic fact that water production is inadequate. This is exerting undue stress on operational staff discontent to customers who used to get water and high operational cost to GWCL.

- **Pipeline Appurtenances**

Just like the pipelines the appurtenances, valves, air valves, pressure gauges, washout, fire hydrants, etc are very old and need to be replaced for effective transmission and distribution of water.

The PURC on the other hand believes the poor supply status is as a result of the following;

- previously low tariffs which affected GWCL's ability to renew its facilities and carry out expansions in water supply;
- increased urbanization which is putting tremendous pressure on utilities; management challenges; and
- Ineffective mechanisms to ensure accessibility to potable water supply to low-income and peri-urban consumer.

2.4 Water Supply Service to the Poor in Accra

The impetus that drives improvement in urban water supply usually has little to do with concern for the needs of the poor. Brocklehurst and Evans, 2001 think that wealthy residents wanting a high level of service have far greater influence than the poor who want basic levels of service and therefore many reform measures are skewed disproportionately towards providing improved services for the poor. However, in Accra the GWCL has implemented a peculiar way of offering services to the poor though highly inadequate. High capacity storages (Polytanks) have been provided in areas such Labadi and are supplied by GWCL water tankers. The poor then buys by bucket from the polytanks at domestic rate.

CHAPTER THREE

3 LITERATURE REVIEW

This chapter describes various forms of partnerships from literature, its characteristics and ability to enhance improvement of water supply services. It also dwells on the predominant forms of partnerships in the urban water supply. The chapter further explains some methodologies used in assessing the performance of partnerships.

3.1 PARTNERSHIPS

Partnership has been defined in various ways by different authors and researchers and all seem to highlight on certain key parameters and these key parameters are of relevance to this research. Murray, (2003) defines Partnership as a legal relationship formed by the agreement between two or more individuals or organizations to carry on a business as co-owners. He claims that, there is no requirement to register a partnership with a state, but most partnerships use a partnership agreement to clarify the relationship. Brinkerhoff, (2002) also claims "partnership is a dynamic relationship among diverse actors, based on mutually agreed objectives, pursued through a shared understanding of the most rational division of the labour based on the respective comparative advantages of each partner." She further says partnership encompasses mutual influence, with a careful balance between synergy and respective autonomy, which incorporates mutual respect, equal participation in decision-making, mutual accountability, and transparency. Robert, (2003) adds that the relationship may be in a form of written or oral agreement without any local or state filings required to create this type of partnership.

It is obvious that partnerships encompass the involvement of two or more parties cooperating, collaborating and benefiting from each party. The context of the

proposed research therefore defines the term 'partnership' as used to refer to cooperation between different organizations who work hand in hand, sharing responsibilities and pooling resources to achieve a common goal which will as well respond to individual interest of the parties involved.

3.1.1 Nature of Partnership

Partnership arrangements take a variety of forms and this involve: full integration as mergers or joint ventures; financial interrelationships (e.g. procurement agreements); joint service delivery; coordination of activities; or information sharing (Mwangi, 2002).

Public services and projects are generally delivered through partnerships between:

- Statutory and non statutory
- public organizations (public –public)
- Public Private Partnerships (Formal and informal).

Each type of partnering carries different risks for different parties.

3.1.2 Components of Partnerships

All the various forms of partnership have aims and objectives, the activities they engage in, the actors involved, the nature of the relationship, the socio-economic and political context and the outcomes of the partnerships (Baud and Post, 2001). McQuaid (1994) stresses the importance of three components in this respect: the mandate, including the aims and objectives of the partnership arrangement; the arrangement within each partnership; and the various outcomes.

As regards the arrangement within each partnership, we need to consider the range of actors, which may include key agencies such as central and local government, voluntary sector bodies, the local community (groups and individuals), the private

sector (formal and informal) and influential individuals. It is important to identify precisely the types of actors and their respective contribution to a partnership. Another aspect to be considered is the formal and informal structure of the partnership, which may range from formal legally binding contracts, to non-binding public agreements or informal relations based on trust and mutual benefit.

McQuaid (1994) further implied that with respect to the third component-outcomes- there is the need to examine the process-outcomes and substantial outcomes of these partnership arrangements. Issues like financial viability, legitimacy, accountability, effectiveness, inclusiveness and exclusiveness of an arrangement and political will are important outcomes to be considered. The components of partnership arrangements are summarized in table 3.1

Table 3-1: components of partnership arrangements

| COMPONENTS | EXAMPLES |
|------------------------------|--|
| MANDATE | |
| Aims | Provision of water |
| Range of activities | Transportation ,storage and strategic planning |
| Scale of intervention | Urban level |
| ARRANGEMENTS | |
| Actors involved and excluded | Who does what, how and when |
| Nature of relationships | Formal or informal |
| Decision making structure | Organizational structure |
| Division of tasks | Related to organizational structure |
| Inputs of various actors | What do different partners bring to the partnership |
| Financial arrangements | What financial resources are available to the partnership |
| OUTCOMES | What actual benefits (tangible or intangible): value added |

Source: adapted from McQuaid R. W (1994)

3.1.3 Strengths and Weakness of Partnerships

The essential quality that partnerships embody is that of complementarities in which the relative strengths and weaknesses of each partner are offset against each other to produce developments that combine the best contributions. In practical terms, these developments are economically efficient, socially responsive and environmentally sustainable (UNCHS, 2001). Partnerships therefore offer each party benefits that cannot be achieved while operating independently (Caplan *et al.* 2002). This requires actors from each sector to understand and acknowledge the legitimate interests of the other. According to Mwangi (2002) a successful partnerships should provide:

- Adequate trust between the partners
- Clarity concerning the purpose of the partnership and the individual roles of partners within it
- Possibilities for all partners to fulfil their roles
- Adequate access by all partners to essential information
- Compatibility with the prevailing political and legal climate

These issues make it possible to assess the organizational structure through which a partnership is to operate at each relevant stage. The Canadian Institute for Environmental Law and Policy (CIELAP) also believe that for a partnership to be successful the following qualities must be present; solid base of joint commitment and understanding, clear and appropriately detailed plan for achieving the goals of the partnership, each partner clearly benefits from the partnership, Sufficient and appropriate resources committed from all partners for achieving the goals of the partnership, appropriate level of formality, good leadership, clear and enforceable lines of accountability, partners communicate in productive and supportive ways, trust

in the function of the partnership and accurate and appropriate indicators are used to evaluate and improve the success and progress of the partnership.

In as much as partnerships have strengths, there are also weaknesses. Bereziat, (2009) quoted Van Tulder (2007) that partnerships are often organised from a “supply-driven” approach but not always recognising the local needs. He further declares that another disadvantage is that each partner seems to see first his individual benefit and try to maximize it and this often compromises the mutual benefits of the partnership.

3.1.4 Partnerships in Urban Water Supply

The adoption of effective partnerships as means of providing satisfactory and sustainable water services in urban areas has seen partnership as the most successful. According to Mwanza, (2001) at least 27 African governments over the last decade who have recognised the need to embark on reforms to address the problems of water services have chosen partnership as the central feature of these reforms.

3.1.5 Partnership with SSPs

Small Scale Providers of water services have now been tagged as the best alternative to Water Utility Provision (Maria, 1998). Rusca, (2009) confirms that, the increased interest for partnerships and the recognition of SSIP as operators has led to a recent development of studies over existing or potential partnership with these actors. SSIPs are known to possess certain qualities that makes them potential alternative to the formal utilities. For Kariuki and Schwartz, (2005) small scale providers are being taken seriously because they have the potential in helping to meet the MDG's and donors and governments have realized that they will have to integrate them in their sector strategies if they want to reach the coverage targets. Conan (2001) thinks that such entrepreneurs are a tool to increase civil society participation in water supply.

projects in Africa and provide a way to overcome the institutional weakness that seem to be endemic in some of the countries. He describes the roles of small scale service providers as important because:

- They are significant service providers in many countries, particularly in periurban, rural and remote regions, and may be the only viable operators for the foreseeable future
- The local private sector currently accounts for over 85 percent of all private sector investment in water security and the potential for private financing of small-scale water supply is significant
- Counting and expanding existing small scale service providers' activity may help governments reach the coverage targets set out under the Millennium Development Goals (MDGs).

(Kariuki and Schwartz, 2005) have the impression that 'Small-scale providers' have the potential to become local private operators in small towns, and over time, in medium and cities. They are known to possess some qualities such as; improving quality, improving customer service, developing new services and market-based systems of rationing.

In the last 25 years, many governments all over the world are turning to SSPs as an alternative answer to the traditional solutions based on conventional projects centred on public investments in new capacity and training Pessoa, (2007).

3.2 ASSESSING PARTNERSHIPS

The determination of success or failure of a partnership has to be achieved through a proper framework for assessment. Several frameworks for assessing partnerships have been proposed by different authors, some of which include; adaptation of organizational assessment models, cost benefit analysis and project management tools

such as the logical framework matrix which integrates monitoring and evaluation with planning (Caplan, 2007). A lot of literature focuses on the characteristics of partners with very little on the process of the partnership and what makes it successful. In this section two of such frameworks are reviewed. The first is the framework proposed by Caplan, (2007) which focuses specifically on assessing whether partnership as an approach best meets the goals of the partners. He implied that partnerships should have set criteria for measuring the success or performance and that all partners must be fully informed about the assessment and its purposes and understand how the information will be collected. The criteria set by the partners could be qualitative, quantitative or both and the assessment may be done externally or internally, that is assessment conducted by a team or individual without or with direct connection with the partnership. This framework may be difficult to be implemented in partnerships which do not make provision for a criteria set for assessing the performance.

Brinkerhoff (2002) framework for assessment targeted five key areas which include; compliance with prerequisites and success factors in partnership relationships, the degree of partnership practice, outcomes of the partnership relationship, partners' performance, and efficiency. She says that pre-requisites to effective partnership relationships include partners' tolerance for sharing power, and willingness to adapt their operations and procedures to facilitate the partnership's performance. She further states that due to varying partnership goals and relationship preference the degree of partnership can be assessed according to the presence of its defining dimensions: mutuality and organization identity. Brinkerhoff (2002) again believes that outcomes of a relationship relates to partnership value-added which seeks to confirm and articulate that partnership as a whole yields more than what would have resulted from the partners working independently. The aspect of partners performance has to do with

performance being assessed objectively, by comparing whether or not the partnership encompasses the partners and prescribed roles that were anticipated, or if not, whether or not changes were made in the service of overall objectives as a form of strategic adaptation. She finally says that assessing the efficiency of the partnership relationship implies indicators for monitoring, maintaining, and improving the partnership and its contribution to effectiveness and impact.

However based on service outcomes a framework forwarded by Tynan and Kingdom (2002) was originally developed as a framework for benchmarking, meaning that the framework would allow for a comparison between different utilities. This framework analyzes 'performance' in a variety of dimensions. it distinguishes the following seven dimensions: 'operational efficiency', 'cost recovery', 'commercial performance', 'coverage and access', 'asset maintenance', 'service quality', and 'price and affordability'. Though this framework seems to be more quantitative, it was most importantly designed for benchmarking purposes and this may not make the selected indicators the best as information concerning that indicator is not commonly collected, then for benchmarking purposes that indicator may not be very useful.

3.2.1 Performance Indicators

A performance indicator is a guide to show how well organizations are doing in meeting their goals and objectives. Indicators are pointers, numbers, facts, opinions or perceptions that measure organizational performance.

According to Arriens *et al*, (2005) indicators could be quantitative or qualitative. They explain that quantitative indicators are defined as measures of quantity such as the number of people that rely on pipe network for water. Quantitative indicators deal with outputs and are easier understood and defined. It is commonly accepted that quantitative indicators are measurements that stick to cold and hard facts and rigid

numbers, thus, there is no question as to their validity, truth and objectivity. Quantitative indicators are, therefore regarded as “objective and verifiable” as they point out numbers or percentages. They further went ahead to say that qualitative indicators on the other hand, can be defined as people’s judgment and perception about a certain subject matter such as usefulness of water resources data being collected or affordability of water rates being levied. Caplan and Jones, (2002) in their paper ‘Measuring the effectiveness of multi-sector approaches to service provision’ seems to agree that qualitative indicators are subjective and difficult to verify. They are more difficult to ascertain because these type of indicators probe into the whys of situations and contexts of action as well as perception of people. Nevertheless, they are valuable in the evaluation process because they seek to measure the impact of an action or initiative and are therefore used to evaluate long term effects and benefits (Arriens *et al.* 2005). When properly developed and interpreted, qualitative indicators can play a vital and significant role in identifying constraints to implementation of actions or initiatives and obstacles to success, which normally is not readily apparent.

3.2.2 Service Quality Measurement

Customer satisfaction with a service can be defined by comparing perceptions of service received with expectations of service desired. When expectations are exceeded, service is perceived to be of exceptional quality, and also to be a pleasant surprise. When expectations are not met, however, service quality is deemed unacceptable. When expectations are confirmed by perceived service, quality is satisfactory. Customers use dimensions such as; reliability, responsiveness, water quality and quantity to form their opinion of service quality, which are based on a comparison between expected and perceived quality. The gap between expected and perceived service is a measure of service quality (Parasuraman *et.al.* 2003).

3.2.2.1 Accessibility to water

Partnership has been described by many authors as a good strategy to improve accessibility to water. The WHO/UNICEF Joint Monitoring Programme describes reasonable access as being 'the availability of at least 20 litres per person per day from a source within one kilometre of the users dwelling'.

Accessibility therefore is determined primarily by distance, time and quantity, but also including reliability. Accessibility can be categorised in terms of service level (WHO, 2003). A summary of the degree to which different levels of service will meet requirements of accessibility is shown in table 3.2

Table 3-2: Requirements of accessibility

| Service level | Access measure |
|---|---|
| No access (quantity collected often below 5 l/c/d) | More than 1000m or 30 minutes total collection time |
| Basic access (average quantity unlikely to exceed 20 l/c/d) | Between 100 and 1000m or 5 to 30 minutes total collection time |
| Intermediate access (average quantity about 50 l/c/d) | Water delivered through one tap on plot (or within 100m or 5 minutes total collection time) |
| Optimal access (average quantity 100 l/c/d and above) | Water supplied through multiple taps continuously |

Source: (WHO, 2003).

3.2.2.2 Service Coverage

Coverage as a performance indicator has been used in several countries for measuring the fulfilment of the water aspect of the Millennium Development Goals, for instance studies conducted in Latin America by Tova (1999) reveals that 25 per cent of the urban population depends on small scale providers for water. Van Dijk, (2007) in the

paper “the importance of small scale private operators in developing countries” also based his assessment on the extent of coverage of small scale private operators in some African countries including Ghana though the emphasis was not on the total coverage in each country.

Finally, a study in Maputo in Mozambique by Matsinhe *et al.* (2006) on “Water services with independent providers in peri-urban Maputo” came out that today, roughly 38 per cent of households in Maputo rely either on SSIPs (32 per cent) or other types of alternative sources (6 per cent) for their water supply, compared to the roughly 62 per cent of households supplied through the formal network (Gumbo, 2004; Seureca & Hydroconseil, 2005).

3.2.2.3 Water Quantity and Quality

Water for the people should be of good quality and enough quantities to satisfy the needs of consumers especially in the aspect of hygiene (WHO, 2003). Failure to provide this may cause consumers to compromise on some hygiene practices which may result in contracting water related diseases like diarrhoea which might end up in increased cost of living. Households are therefore very sensitive to this feature. Water suppliers are often blamed for supplying unsafe water. For instance a survey conducted by Marteau, (2007) in Mumbai showed that people associate a certain quantity and quality of water for each use causing households to be very keen getting at least 20-40 litres of good quality water per day for drinking and cooking.

Gerlach and Franceys, (2009) in a survey conducted in Amman claim that out of 50 per cent of household depending on private tankers, 42.9 percent noted water quality as a problem. Provision of good quality and quantity of water is one key output that is expected from service providers and therefore their assessment cannot ignore these parameters.

3.2.2.4 Price and Affordability

Affordability of service according to PURC, (2002) promotes ease of access and determines the potential volumes of water used by residents depending on a particular institution for water services. Partnership in water supply aims at improving the service making sure that the service is affordable in order to increase access and so Tynan and Kingdom proposed affordability calculation of service provision by taking the price of 20 litres per day as a percentage of per capita GDP. Other researchers define affordability as taking between 3-5% of the residents' income. However the difficulty in obtaining information about resident's income makes perception a meaningful substitute.

3.2.2.5 Reliability of Service

Every household desires to have water available at all time whether or not they will be ready to pay. This is because people would want to avoid wasting time in fetching water at stand pipes and therefore ask for full time services from suppliers to provide the needed quantity of water at affordable price. In measuring reliability factors such as; the number of hours each service provider operates daily; response to customers upon request and the operators ability to provide the required quantity at the right time are relevant.

3.3 PARTNERSHIPS IN URBAN WATER SUPPLY

The adoption of effective partnerships as means of providing satisfactory and sustainable water services in urban areas has seen partnership as the most successful.

Public-private Partnership has been the most predominant in African countries being a collaborative effort between the public sector and the private sector in achieving a common objective while both players pursue their own individual interests. The definition implies according to Pessoa, (2007) that in this partnership each partner

shares in the design; contributes a fraction of the financial, managerial and technical resources needed to execute and sometimes operate the project in accordance with each partner's comparative advantage, and partially takes on the risks associated with the project and obtains the benefits expected by each partner, which the project creates.

3.3.1 Partnership Arrangements in Urban Water Supply

The Partnership in the urban water sector mostly involves contractual arrangements normally between public and private utilities ranging from service contracts, management contracts, leases, operations and maintenance concessions, capital investments to divestiture and asset ownership, through which variable levels of partnership are established to improve levels of efficiency, effectiveness, responsiveness and adequacy of public services. These collaborations can be with small-scale dependent/independent providers, nongovernmental organizations (NGOs) or the private sector (Mwangi, 2002).

In most cases, the arrangements are service or sector specific. While one option might be apt for power provision, for example, other partnerships would be more appropriate for another sector.

A recent study by the South African Institute for International Affairs, in cases where partnerships have been able to best deliver desired outcomes, concluded that "thorough planning, good communication, strong commitment from both parties and effective monitoring, regulation and enforcement by the government" was present.

Where there has been a lack of thorough planning, Partnerships in the water sector have not had much of the desired results in Africa.

According to Ogunbiyi (2004), several schemes have had a "negative impact on the poor by restricting their access to clean supplies due to high tariffs".

3.3.2 Drivers behind Partnerships

In partnerships each partner has specific but varying circumstance that determines the scope and direction. These circumstances could be framed around three interlocking areas:

(a) The external environment (for instance financial and legal issues) that directs the scope and ambitions of the partnership.

(b) the organizational environment (as reflected in each partner's scope, mission, strategy, and capacity) that dictates the resources the partners showcase, their analysis of the opportunity presented and the level of risk they are willing to take.

(c) The individual partner representative's incentives and disincentives to engage (influenced by their own beliefs, interests, position and accountabilities) that dictates the attention and value that they place on the partnership (Caplan *et al* 2002). It is the circumstances that determine what drives the partners to engage in the partnership in the first place. The drivers are then negotiated between the parties into desired targets reflected by proposed outputs, outcomes and effects or impacts. They then conclude that a partnership will by definition not be successful if the drivers for partners to participate are not sufficiently met as this may result in unilateral decisions by one partner to alter its engagement.

3.3.3 Successful Partnership with Informal Service Providers

So many countries have benefited enormously from partnering the formal utility and informal private operators all over the world. A research by Maria, (1998) found the following;

In Bangladesh, the water agency has joined forces with private kiosk vendors and with community groups to avoid unaccounted for water. Over the past year, Dhaka has seen the number of privately managed water points in low-income Bustee neighbourhoods

grow from two to thirty. The arrangement has favoured the water agency which, otherwise, would lose the water to outright theft.

In Mali, the study focused on independent operators that provide water services in the suburbs of Bamako, primarily in zones where the dominant operator (Energie du Mali) is absent. The contractual framework governing their operations is almost non-existent, despite the fact that a few have made significant personal investments.

In Mauritania, the operators were all small private companies that provide water services in small towns (ranging from 500 to 20,000 inhabitants). Since 1993, more than 300 independent operators have signed contracts with the State and they have strongly contributed to developing the level of service enjoyed by small town residents.

3.4 Outcomes of Partnerships Involving SSIPs

Apoya (2004) in his assessment of the contribution of the partnership to improvement of service delivery in terms efficiency, effectiveness, equity and financial sustainability in Savelugu in Ghana observed that the 'Savelugu model' is one such partnership that has successfully harnessed the strengths of a public utility and a community to the fullest to improve the efficiency of water supply to community members whilst creating several benefits for a public water utility, the Ghana Water Company Ltd (GWCL). He also acknowledges the fact that despite some constraints and challenges the partnership has emerged strongly and both parties as well as consumers are satisfied. In his assessment several methods were adopted some of which includes interviews with management of the Savelugu Water system and the GWCL, Discussions with community members of Savelugu, review of financial records of the Savelugu Water system for a period, review of previous research work

about the Savelugu Water system and discussions with other stakeholders including the Community Water and Sanitation Agency and the District Assembly. Although this research focuses on an informal partnership it is believed that it will be prudent to assess the performance which will guide us as to whether there will be the need to enter into a formal partnership or look elsewhere to bridge the gap created by the formal utility.

A survey conducted in fourteen households in Teshie and Ashalley Botwe in Accra and 20 Tanker operators and vendors by McGranahan *et al*, (2007) concluded that both settlements are central but informal with low-income levels that are not adequately served with water by GWCL and therefore rely so much on tanker services for water. For reasons of economic and health implications upon relying on these providers there was the need to thoroughly investigate their activities and to bring out some of the lapses to light so that a lasting solution may be found. They obtained their findings through household questionnaire and interviews with managers of service providers and consumers. This research seeks to toe the same line but may include other methods.

Matsinhe *et al* (2006) who wrote on the topic "Water services with independent providers in peri-urban Maputo" obtained all information in the report through interview with households and managers of various systems and concluded that because of the formal water network not reaching most of periurban Maputo, SSIPs have, over the past few years, become an integral part of the supply chain of services to the suburbs of greater Maputo. They play the predominant role in service provision to such areas, and the quality of their services is highly appreciated by consumers though most independent providers operating in greater Maputo are currently unregulated.

A research on the 'scope and scale of small scale independent private water providers in eight Asian cities' by Conan, (2001) used a common customer survey that has been implemented in each 8 selected cities by national consultants under ADB regional studies. The household samples were designed to cover the different water supply contexts present at city scale, inside and outside the area covered by the water utility. Representative areas for survey were selected for each context, and the sample size was defined according to the percentage of households living in such a context where interviews were conducted. This paper was also based on study reports provided by the eight national consultants involved in the city surveys and case studies. He however did not obtain the information acquired because the sample size was limited compared to the population living in the eight cities and so the results was not statistically a representative but an approximate estimate of the scope and scale of the small scale independent water providers. This research on the other hand seeks to widen the scope as much as possible to attain results that will best represent or reflect the true picture of the situation in Ghana.

Similar assessments have been undertaken by other people using different indicator variables. This research will combine quite a number of indicators used to assess partnerships of this nature. The indicators are price and affordability, water quality, quantity of water, availability of service and responsiveness to customer complains as well as challenges and constraints that come the way of water service providers.

CHAPTER FOUR

4 RESEARCH METHODOLOGY

This chapter gives a brief description of the area of study and the methods used in carrying out the study. The study area presents information about the Accra with regards to size, location, population, relief features and the water supply situation of the study area. The methodology on the other hand explains the sampling procedures, methods of data collection, sources of data and questionnaire formulation and administration and the framework for assessing the partnership.

4.1 Description of Study Area

The Greater Accra Region covers about 1.4 per cent of the total land size of Ghana and it is the smallest among the ten administrative regions in Ghana though has a very high population density of about 15.5 per cent of Ghana's total population. Accra, the capital of Ghana has been divided into six (6) sub-metros and managed by Accra Metropolitan Assembly (AMA). The sub-metros are Okaikoi, Ashiedu Keteke, Ayawaso, Kpeshie, Osu Klotey and Ablekuma. The Accra Metropolitan Area lies in the Savannah zone. The average annual rainfall is about 730mm, which falls primarily during the two rainy seasons. The first rainy season begins in May and ends in mid-July. The second season begins in mid-August and ends in October. The annual average temperature is 26.8°C and the humidity is 65% in the afternoon and 95% at night. The map of Accra showing the location of Tanker Associations and areas where they serve is shown in the figure 4.1 below

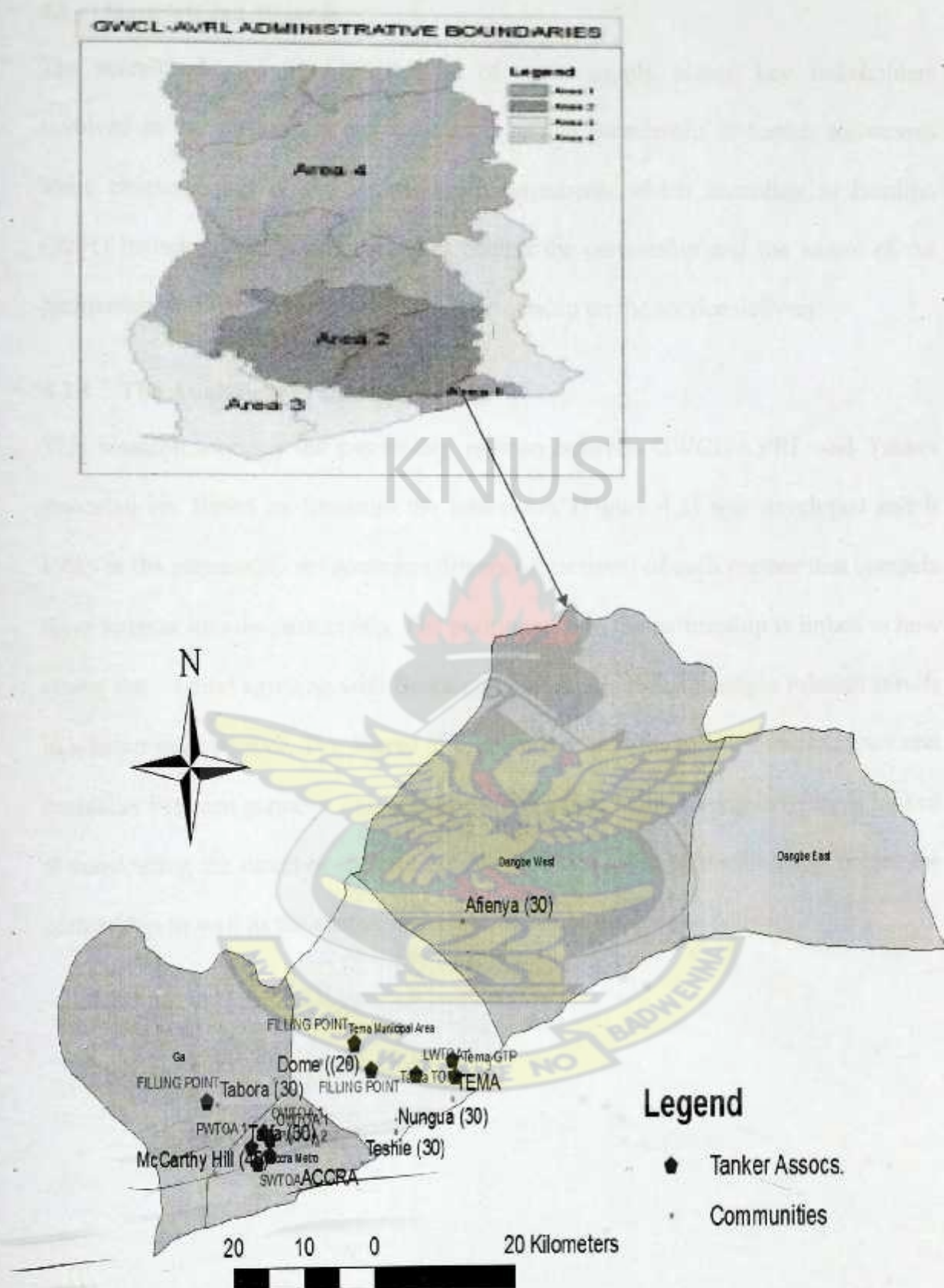


Figure 4-1: Map of Ghana showing study area: Accra

4.2 Materials and Methods

The research begins by Identification of water supply sector, key stakeholders involved in the partnership and the history of the partnership. It further showcases some characteristics of the partnership arrangements which according to Hordijk, (2001) includes; drivers and resources behind the partnership and the nature of the partnership and finally the impact of the partnership on the service delivery.

4.2.1 The Analytical Framework

This research assesses the partnership relation between GWCL/AVRL and Tanker Associations. Based on literature the framework (Figure 4.2) was developed and it looks at the partnership set goals and drivers (objectives) of each partner that compels them to enter into the partnership. The performance of the partnership is linked to how strong the relation agreeing with Bereziat (2009) claim that a stronger relation results in a better performance. The degree of relation is seen through trust, transparency and mutuality between partners. The outcome with respect to the service delivery is looked at considering the direct or indirect contribution compared to the situation before the partnership as well as the customer perception about the service delivery.

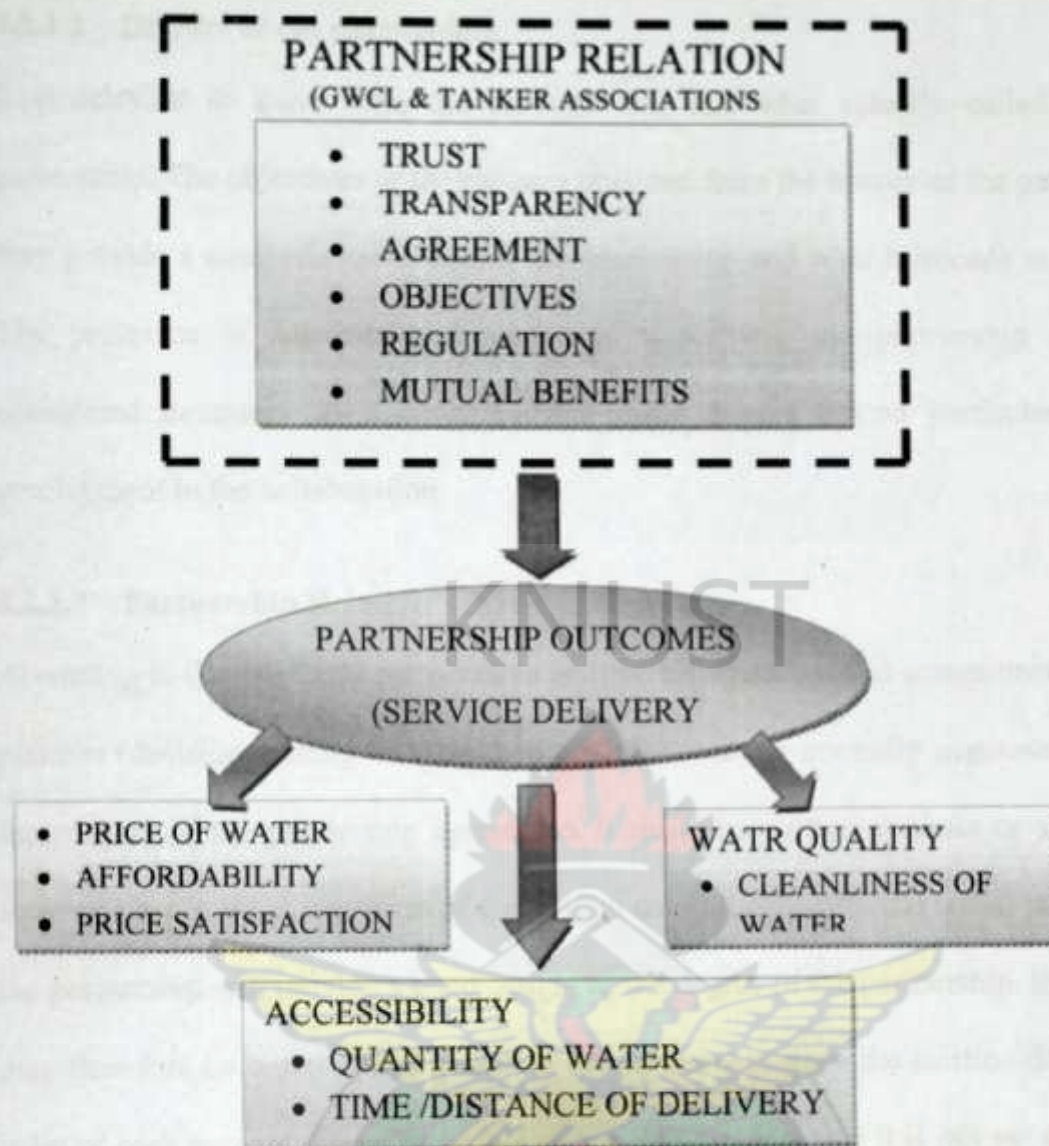


Figure 4-2: Framework analysing the partnership

4.2.1.1 History of the partnership

The key stakeholders who were part or observers or witnesses of the process of the partnership were interviewed to understand all the steps involved in the agreement. It also gave an idea of how and why the partners decided to join forces conforming to Caplan, (2007) perception about knowing the history of partnerships.

4.2.1.2 Drivers of the partnership

It is relevant to know who the partners are, and what actually called for the partnership. The objectives of the partners obtained from the history of the partnership may provide a comprehensive idea of the relationship and what it intends to address. The prospects of interests and incentives underlying the partnership are also considered necessary as it could be the major drivers behind particular party's involvement in the collaboration.

4.2.1.3 Partnership Relation

According to Caplan, 2007 partnerships involve engagements and commitments of the partners (decision making and common goals). These are normally negotiated during the process of the partnership agreement. It could be written contract or agreement form and hence the comparison of the written commitment with the actual progress of the partnership will provide a good insight to the degree of the partnership. Evaluation may therefore be based on the nature of the partnership since the relation defines the roles of each partner. Agreeing with Rusca's, (2009) view that it is not yet clear how to measure the parameter that Caplan and Jones (2002) defined '*healthiness*' of the partnership. In this research therefore different approach and indicators have been used in the analysis and for the purpose of this research, the analysis of the partnership relation will consider, the capacity of the partnership to function, the ability of the partners to work together and to combine their resources (mutuality and complementarities, levels of co-operation), the construction of mutual trust, transparency and accountability.

4.2.1.4 Outcomes of the partnership

This section of the research intends to look at the results or outcomes of the partnership. It focuses on the partnerships' influence on the service quality (that is,

impact on partners and on performance) and the effects on the beneficiaries (partners and end-users) of the relation. A successful partnership is here defined as a relation which partners reach their individual goals by reaching the agreed objective/s of the partnership. It is relevant to determine the extent to which partnership goals have been achieved and maintained over the years, this being in agreement with Caplan and Jones (2002) opinion that partnership is not the end goal but a tool to deliver the set goals. However, in this partnership the partners did not put in place any quantitative indicators during the signing of the partnership agreement making the agreement and results somewhat difficult to compare. It has therefore become necessary to adopt certain indicators from the seven proposed indicators used by Tynan and Kingdom (2002); price and affordability, coverage and access as well as service quality. Comparative analysis using these indicators modified to suit this research is done with respect to the income classes (grouped by AMA).

4.2.1.4.1 Price and Affordability

Residents in the study area refused to provide information on their household income for lack of trust in the researcher. For this reason affordability is measured in this research based on the description or perception of the consumers on the price of water by the various income groups of consumers, the effect of price of water on the consumer and nature of the alternative source of water especially in the low income areas.

4.2.1.4.2 Coverage and Access

Coverage and access is calculated in this research using four indicators in the areas served by the Tanker Associations. The indicators are; the provision of water that will allow for at least 20l/p/d usage, water delivery of within 2 hours after request and

within 10 mile radius from source and finally the population of household served by the Tanker Associations.

4.2.1.5 Service Quality

The hours of operation (availability of service) of Tanker Associations is considered coupled with the quality of water that is provided in compliance with the set guideline by the regulatory body. The customers' assessment of time of delivery of service provides an idea about the quality of service delivered by Tanker Services. The overall perception of the service quality assessed by consumers is calculated using the formula below;

Calculation of service quality

$$\text{score for service quality(\%)} = \frac{\sum((n_1 \times 1) + (n_2 \times 2) + (n_3 \times 3) + (n_4 \times 4) + (n_5 \times 5))}{\sum(N \times 5)} \times 100$$

Where

n_1 = number of respondents who ticked very poor (1)

n_2 = number of respondents who ticked poor (2)

n_3 = number of respondents who ticked fair (3)

n_4 = number of respondents who ticked good (4)

n_5 = number of respondents who ticked very good (5)

N = Total number of respondents

4.3 Procedure for Data Collection

Literature reveals that in the assessment of partnership the best methods for data collection are review of documents, observation, interviews, gathering of secondary data, questionnaire formulation and administration. These therefore were adopted in the data collection for this research even though Caplan, (2007) claims they have some disadvantages.

4.3.1 Desk Study

To gain the needed understanding of the research several documents were reviewed. A desk study on relevant literature pertaining to previous studies conducted in various parts of the world regarding partnerships, particularly in the water and sanitation sector was conducted throughout the research period.

4.3.2 Field Survey/observation

Whilst reviewing literature and other relevant documents, a field survey was undertaken to observe the activities of the different stakeholders, more especially the operations of tanker operators and GWCL. Through this, minor interviews were conducted with tanker drivers, owners and some observers of the activities of the key stakeholders.

4.3.3 Structured interviews

The manager of GWCL, the water directorate head and manager of water directorate of PURC, Heads of various tanker associations, tanker owners and tanker driver's association heads were interviewed on issues regarding the evolution of the partnership, nature of agreement, role played by each party and impact of the partnership on the service delivery. A minimum of three members were selected from each Tanker Associations to understand the operations and to find out if there were differences in their operations.

4.4 Household Survey

The analysis of the service impacts on the consumer and service quality was obtained through questionnaire and interviews with consumers at the household level in areas that rely on tankers for water supply services.

4.4.1 Questionnaire formulation and administration

Questionnaires were formulated and administered to households in areas where there is no or poor flows from the formal utility. The questionnaires were aimed at seeking the views of the service provided by tanker services and its effects on them in terms of cost, quantity, quality and availability of water provided by tanker services.

Prior to the commencement of the main survey, 10 questionnaires were administered in order to ensure the 'workability' of the questionnaire, guiding against ambiguous wording and illogical sequencing of questions.

In the process three hundred (300) questionnaires were administered focusing on households in distress (no/poor flow) areas where dependency on tanker services is on the high side for water services. Households were selected based on supply to the various income classes (high, medium and low) as classified by the AMA. Details of the survey areas and number of households is shown in table 4.1

Table 4-1: Areas where questionnaires were administered

| High income (100) | Middle Income (100) | Low Income (100) |
|-------------------|---------------------|------------------|
| Cantoments | Adenta | Tabora |
| McCarthy Hill | Nungua | Taifa |
| East Legon | Madina | Sowutuom |
| | | Teshie |

The questionnaire consist of demographic issues, water accessibility and cost, water usage and water quality as well as customer satisfaction and reliability on the tanker services. In order to ensure good geographical spread of the survey at least 30 household were targeted in each community. Even though the number is statistically accepted, more than this number could have provided a more truthful representation of the real situation, however the duration of the research was taken into account. Sample questionnaire is displayed in appendix 1, 2 and 3.

CHAPTER FIVE

5 RESULTS AND DISCUSSIONS

This chapter presents the findings on the history, drivers and the outcome of the partnership between GWCL/AVRL and Tanker Associations. It also discusses the partnership relation and assessment of the partnership outcomes based on indicators explained in the previous chapter. The partnership objectives and conditions that affect it as well as the effect of the service delivery resulting from the partnership on the end user are also considered.

5.1 NATURE AND EVOLUTION OF THE PARTNERSHIP

5.1.1 History of the Partnership

During the late 1980s the GWCL, then Ghana Water and Sewerage Corporation (GWSC) was struggling to meet the urban water demand through pipelines compelling residents to adopt coping strategies such as buying from vendors (Nyarko et al., 2008) though the quality of water was suspect.

Some business minded people took advantage of the supply gap and started selling water by mounting barrels on pick-up trucks to serve residents who could afford the price charged. However, the demand became too high for pick-ups and hence higher capacity trucks (water tanker trucks) became necessary services. So in 1987, a man purchased a 'water tanker' truck which he used to serve residents. Later in the year four other tanker truck owners joined, having noticed that it could be a good venture. They then named the venture 'tanker services'.

The services remained on individual bases until 1996 when GWCL asked the tanker owners to form an Association of tanker owners which will be led by at least three executives (Chairman, Vice Chairman and secretary) to aid effective communication between GWCL and the tanker owners. A memorandum of understanding (MoU) was

then signed in 1997 between GWCL and the Association and this allowed them to fetch water from designated points (hydrants) for onward sales to domestic vendors, households and other consumers at an agreed price as well as quality assurance guidelines.

5.1.1.1 Operation of Tanker Associations

During the process of formalization an MoU was signed between GWCL and the first Tanker Association (PWTOA). The MoU was later developed into a code which is used by all Associations that were formed later. According to the heads of the Associations, it is required that a minimum of four tanker owners who have completely registered their business with the AMA come together to form one association after which a request is put in for a hydrant. The application is considered after GWCL has agreed to the proposed location of the hydrant (filling point). The hydrant is then provided with a meter. The Association is responsible for payment of the bills as registered on the meters. It is required that the Associations employ a full time attendant who normally works from 6am to 5pm daily, who sells the water to the tanker drivers. He is responsible for inspecting the conditions of tankers in terms of cleanliness.

Telephone numbers have been inscribed on tankers and sometimes radio announcement are made by the Associations informing customers about how to contact them for water services. The liaison responsibility between the GWCL and Tanker Associations lies with the Commercial Manager and the Public Relations Manager of the Accra-Tema Metropolitan Area (ATMA) office of the GWCL.

5.1.1.2 Objectives of the Partnership

From literature, a vast range of partnerships was found to exist for different reasons (Oliver, 1990) but that between GWCL and Tanker Associations seeks to provide

potable water to the unserved and underserved by the formal utility in some parts of Accra.

Though the partners have a common goal, the individual partners also have their main aims or objectives which they hope to achieve alongside achieving the common goals.

The formal utility wanted to exercise some control over Tanker Services especially in the aspect of quality of water (source) and price of water so that consumers will be comfortable relying on Tanker Services until residents can be served through the GWCL network. This goes to confirm Munger's, (2008) conclusion that such partnerships are aimed at formalizing the small scale providers in order to regulate whilst the assets and water resources remain in the hands of the formal utility.

The Tanker Associations on the other hand are more interested in profit since their 'services' is more of a profit making venture. They however tend to cooperate with the formal utility to provide improved and organised services to the people knowing they can still achieve their aim.

The PURC on the other hand being the regulatory body got involved to guide both partners to provide safe drinking water within the reach of residents in the metropolis.

5.1.2 Development of the Partnership

With time as the Tanker Services proved to be a good medium of supply, the formal utility and the Public Utility Regulatory Commission (PURC) established under the PURC act 538, 1997 whose ultimate interest is safe water for the people at affordable price decided to join the partnership as regulators/facilitators to ensure that tanker services provide safe water and consumers can rely on it as long as the formal utility is unable to satisfy the urban water demand in Accra. So in 2000, they recognised the role of Tanker services in supplying water to the unserved or underserved and began

developing 'water tanker service guidelines' which was finally launched in March, 2008. The 'water tanker service guidelines' was developed by the water inspectorate of PURC and it provides regulatory mechanisms that will ensure safe water delivery at reasonable price charged by Tanker Associations.

The partnership started with one Association and five water tankers but currently has more than six hundred (600) water tankers in operation and eight (8) registered Water Tanker Owners Associations in the Accra Metropolis (refer to Table 5.1, page 38). Each Association manages at least one hydrant which has been located very close to service areas in order to reduce the haulage distance which ends up increasing access to safe water.

5.2 PARTNERSHIP RELATIONS

In this research 'partnership' has been defined to inculcate a collaborative effort between a public entity (GWCL) and private entity (Tanker Associations) to achieve a common goal which would have not been attained by the individual entities acting separately. This is through an agreement on objectives, methods and division of labour which go hand in hand with individual entities striving to achieve their individual goals. The level of relationship which is seen through the existing level of trust and transparency determines the strength and weakness of the partnership.

5.2.1 Trust and Transparency

The degree of confidence in the partnership is based on the level of transparency and trust between GWCL and Tanker Associations. However, the transparency between the GWCL and Tanker Associations here seems quite limited owing to the fact that the GWCL believes that Tanker Associations do not actually comply with the agreed cost and source of water that is to be sold to consumers. They claim that the Tanker

Associations will not agree to reduce the prices of water even when water is sold to them at the GWCL domestic rate which they have been demanding.

Secondly, the formal utility believes that some water tanker operators still steal from GWCL hydrants whilst others draw from rivers. Tanker operators interviewed however denied drawing water from other sources apart from the Association hydrants. They said operators who indulge in such illegal activities do not belong to Associations but this is doubtful because residents claim some tankers with Associations inscription on them draw water from rivers.

Thirdly, the general lack of trust and transparency may also be attributed to the formal utility's perception that tanker operators think more of making profit than improving the quality of service, however, the Tanker Associations believe this issue of profit making could be put to an end by providing more incentive packages from the formal utility or government in order to relieve them of some of their tasks.

Finally, looking at the partnership it could be perceived that GWCL is taking the risk of involving the tanker services considering the possible effect of the outcomes should it be negative even as the partnership seems not to have much impact on the formal utility.

5.2.2 Partnership Regulatory Framework

'Water tanker service guidelines' has been developed to ensure safety of drinking water to consumers which make it necessary for some key issues to be undertaken. It provides the defined roles and responsibilities of all stakeholders (GWCL, PURC, Tanker Owners, drivers and Associations) to ensure that good quality water is delivered to consumers. It is required that only fit operatives and properly registered tankers supply water to consumers as filling points are provided on all supply systems

facing supply shortfalls. However, from observation, the outfit of some tankers in Accra does not befit the services they render simply because the PURC is not doing enough to ensure that tankers are fit to deliver water services.

5.2.3 Shared Responsibilities

5.2.3.1 Ghana Water Company Limited (GWCL)

The formal utility, GWCL has provided tanker filling points in some parts of Accra. According to GWCL the provision of hydrants takes into consideration distance between the hydrants and consumers. Each hydrant is designed to serve customers within ten mile radius with reference to the location of the hydrant.

It was also agreed that cost of operating the filling points for instance operation and maintenance and replacement of the facility rest in the hands GWCL and this the Tanker Associations claim the formal utility has been excellent in the fulfilment of this responsibility. In the provision of water services GWCL has ensured that safe water is given to water tankers by providing tanker filling facilities with 'top of tanker filling' to reduce the risk of contamination.

Periodic checks on the residual chlorine levels of water from hydrants show that the water provided at filling points meets the minimum requirement of 0.1mg/L residual chlorine. However, as of the time of research deliberations were still on-going as to who bears the cost of disinfection of tankers.

5.2.3.2 Tanker Associations

Interviews with executives of Tanker Associations disclosed that tanker owners comply with the rule that tankers should not be used to fetch non-potable water. They claim that, for the few instances where tanker operators have gotten involved in such activities operators were banned for six months from operation with fellow tanker operators as monitors making sure the operator complies. Upon resumption tankers

are made to undergo appropriate disinfection before getting back in business. Observation made showed that generally tankers looked clean and storage facilities of equipment such as hoses were in good conditions. It also came out that Tanker Associations do their best in making sure that owners comply with the sixth month 'disinfection' requirements. This was confirmed when some operators provided receipts for disinfection of their tankers.

Though the Tanker Associations have managed to operate in accordance with the 'guidelines' the aspect of random checks by Associations on tankers within a minimum of three months was not actually been observed in the Associations.

5.2.3.3 Public Utility Regulatory Commission

5.2.3.3.1 Quality Assurance

The Tanker Guidelines clearly requires the PURC to undertake random checks (twice or thrice in a year) on tankers by an appropriate testing agency. According to the PURC, the first sampling of tankers incurred the wrath of some consumers who described this monitoring as being frustrating for fear that these operators may end up not providing them with water anymore. In spite of this the GWCL claim to have sampled some water tanker four years ago and the result was encouraging though some tankers did not meet the required guideline values.

Finally, from time to time the PURC review the arrangements with both GWCL and Tanker Associations check that the quality control provisions are providing adequate consumer protection and that they are being carried out in a way which does not result in an unreasonable impact on the tanker operations.

5.2.3.3.2 Tariffs Charged By GWCL and Tanker Associations

In order to increase accessibility the GWCL/PURC set the volumetric charges for water supplied to tanker operators. On the other hand prices of water sold by the Tanker Associations is determined by taking into account measures taken by GWCL and the PURC to reduce the overall cost of water delivered to customers and these include:

- Establishment of more filling points to reduce travelling distances and increase volumes available to tankers.
- Regulating the volumetric tariff charged by GWCL
- Recognizing the role of tankers and mainstreaming their activities into the distribution chain

Tariffs charged by tanker operators are determined through consultations between PURC and the Tanker Associations and these are based on distance and bear reference to bulk haulage rates provided by the State Transport Corporation or Ghana Private Road Transport Union. Tariffs are then published by the Associations at filling points and in the media for the benefits of consumers.

5.2.4 Level of Partnership

The level of relationship is studied in relation to accountability and responsiveness in terms of decision-making and means of communication between actors. In this partnership the GWCL has the urge over the Tanker Associations in terms of power relations. The formal utility has more control over their partner. Though decision making is always in a form of dialogue, it is normally in the hands GWCL and the PURC. However, when it comes to making demands the Tanker Associations also call for dialogue. This strongly suggests a clear indication of coordination between the

partners. The Tanker Associations is also known according to the formal utility to have a high level of accountability and responsiveness in terms of decision making and communication and even in payment of bills.

The level of the partnership relation is also described from the perspective of division of labour where each partner has been assigned specific duties. Table 5.3 shows how the role of various actors in the partnership has been distributed.

Table 5-1: Summary of actor's role and responsibilities

| AREAS | RESPONSIBLE INSTITUTION |
|---------------------------|---------------------------------|
| Legal ownership | GWCL, Tanker Associations |
| Management | GWCL, Tanker Associations |
| Financing of operations | GWCL, Tanker Associations |
| Regulation and monitoring | PURC |
| Tariff structure | PURC, GWCL, Tanker Associations |
| Water quality | PURC, GWCL |
| Consumer protection | PURC |

The relationship is such that bulk water from GWCL provided through metered hydrants is sold at commercial rates to tanker operators for onward sales to consumers at rates negotiated and approved by PURC. These rates though subject to the countries inflation rates are charged throughout the year until the required increment is negotiated and approved by the PURC.

5.2.5 Conditions Affecting the Partnership

5.2.5.1 Legal Conditions

The written agreement in the form of MOU signed makes the relation formal.

Tanker Owners are also made to formalize their activities by going through legal processes in ensuring that the business is legally fit to operate in the metropolis. They obtain DVLA license and register with AMA even before entering into the informal water service delivery process with GWCL. Tanker Operators are therefore duly recognised by the formal utility, they pay taxes and can be sued for improper delivery of service by consumers.

5.2.5.2 Institutional Factors

GWCL has recently extended pipelines to several places which used to depend on tankers services. Flow is also rationed and residents with high capacity storage facilities store water when the tap flows. Boreholes and stand pipes have also been provided at some distress areas and sold to residents. It has also began implementing pro-poor projects where storage facilities which are filled with GWCL tankers are placed at some joints (for instance at Labadi) and sold to the poor at domestic rates.

The ongoing developments by the formal utility put fear in some tanker owners, this makes them think of ways of sustaining the business. This could create atmosphere of mistrust because Tanker Operators may want to make enough profit before they go out of business. This has reflected in some Associations charging a little above the approved prices by the PURC.

5.2.5.3 Social Conditions

Implementation of certain policies is still on hold for fear of reaction from consumers or the public. For instance, the PURC has been unable to embark on the random tanker water quality checks as stated in the water tanker service guidelines because they are of the view that the public will see that as harassment. It is therefore not very clear as to how effective the disinfection of water tankers has been over the years.

5.2.5.4 Economic Conditions

According to the Tanker Associations the formal utility should provide certain privileges such as bearing the cost of disinfection of tankers instead of owners themselves. This is because the Tanker Associations think their service is complementing the efforts of the formal utility. However, GWCL seem to lack the funds involved in disinfecting over 600 tankers at least twice every year. Besides this they want the government to subsidize taxes paid by tanker operators since they play a major role in the provision of water services which is a responsibility of the government. This goes to buttress the point made by Batley, (2006) that very few governments provide support for non-state service providers through finance.

5.3 OUTCOMES OF THE PARTNERSHIP

The evaluation of the potential of the partnership to provide water supply services requires taking a good look at the outcomes of the partnership. The result of interviews with stakeholders of the partnership and household survey through questionnaires provides the necessary information.

5.3.1 Improvement of Service Delivery through the Partnership

Interview with stakeholders clearly indicates that the mutuality that exists between the parties suggests that their objectives would not have been met if they were working independently. It is important to note that without the partnership tanker water service delivery would still be in existence but the service impact on economy and health of consumers might be negatively greater.

Secondly, the provision of hydrants or filling points by GWCL close to distress areas has contributed immensely in reducing haulage distance. This has resulted in reducing the risk of possible contamination of water before it gets to the customer.

Finally, Tanker operators feel recognised as their services have been recognised by the formal utility and the regulatory body, PURC. They see themselves as the most influential and second to the formal utility and this makes them operate in such a manner that befits that status.

Unlike previously when there used to be no collaboration between GWCL and Tanker Associations, the number of tankers today who indulge in fetching water from unsafe sources has, according to GWCL has reduced significantly as some Associations even sell water to tankers who have not registered with any Association.

With PURC coming on board the partnership has also successfully curbed the situation of tanker operators charging extortionate prices(relative though) for water even though people still think the price of water is too high especially for the low income groups in the Region.

The organized nature of tanker services has contributed in earning the trust of consumers specifically with the source of the water sold to them. It has also attracted business persons and this has resulted in a significant increase in the number of tankers serving the metropolis and hence improved coverage and reliability especially during the dry seasons when demand is so high

5.3.2 Performance of Partners

The GWCL, Tanker Associations and PURC to some extent are satisfied with each party's performance but will like to achieve more than they have. The Tanker Associations believe that GWCL could reduce tariffs and also provide special incentives like free disinfection of tankers. They also think GWCL could on their behalf secure packages like importing water tankers and selling to Associations at a reduced cost from the government or government providing fiscal incentives which

may help cut down certain expenditure. These they think would help to achieve their aim of maximizing profit as consumers adequately enjoy their services.

5.3.3 Benefits from the Partnership

According to McGranahan *et al.* (2006) literature suggests that small scale water providers have difficulties obtaining permission to operate the water business, however the GWCL through an agreement has formalized the operation of water tanker operators in the water provision business which is being regulated by the recognized regulatory body of Ghana, PURC.

The Tanker owners also indicated that despite their inability to charge prices of water on their own, their profit margin is still adequate. The service has not only provided a livelihood for tanker owners alone but drivers and drivers mates and hydrant attendants.

The provision of hydrants at highly noticeable surroundings for tankers has to some extent cleared the doubts about the source of tanker water and this was confirmed by the interview with consumers. It is therefore not surprising as patronage recorded a vast increment over the last thirteen years.

The ultimate aim of the formal utility is to meet the urban water demand in Accra and according to them the partnership has done remarkably well in increasing access and coverage to a significant portion of the unserved or underserved. Though it is the wish of GWCL and PURC that all residents could be reached through pipe connections, they are content with the current situation since tanker services is now seen as a very good substitute for urban water service provision even with a few lapses that needs to be patched.

The partnership has not only been beneficial to the partners but to the residents as well. Interview with consumers of tanker water indicates that the tanker water service delivery has been beneficial to them. The following reasons were given;

- Customers doubt about the source of water is gradually been cleared since tanker filling points are made close to customers bringing the operations to full consciousness of the public.
- It has also provided a reliable source of drinking water for residents especially the low income who cannot buy sachet or bottled water.
- Finally, the improved service delivery has provided a source of livelihood to some customers who buy, store in polytanks or concrete tanks and resell to consumers incapable of buying directly from tanker services.

5.3.4 Sustainability of the Partnership

According to the formal utility complaints about cost and quality of water supplied by tanker services have come to their notice. This has prompted them to provide more hydrants or filling points closer to low or poor supply areas in order to cut the extra cost incurred as a result of long haulage distances before delivery of water from tankers. More Tanker Owners Associations are in the process of formation and therefore more tankers are expected to come on board to increase service coverage and accessibility to new developing areas in the region.

The PURC hopes to embark on customer awareness of the type of services provided by Tanker Associations and it is hoped that residents who have doubts about some activities and operations will earn more trust and customers will continue to be served through Tanker Services. It is also clear that as long as the population and development increases tanker services will also be needed in Accra.

5.4 PARTNERSHIP EFFECT ON QUALITY OF SERVICE

The partnership contribution is also looked at in terms of increasing accessibility to safe water, price and affordability and reliability of service. Information on the above mentioned indicators was obtained through questionnaire administration and interview with customers. Service quality was also sought from the view of customers who are the beneficiary of the service.

5.4.1 Characteristics of Respondents and Water Supply Chain

5.4.1.1 End-user Survey

The survey targeted 300 respondents who purchase and use water from tanker services. The respondents were responsible adults whose ages go beyond thirty years with 83.3% representing 250 persons being females and the other 16.4% being males.

5.4.1.2 Characteristics of Tanker Associations

There are currently eight (8) registered Tanker Associations in Accra and each is led by five member executives namely; Chairman, Secretary, Treasurer and two executive members. At least three people were picked at random and interviewed from each association (Table 5.2) and these were executive members, tanker owners or tanker driver/operators. Details of the Tanker Associations in Accra are shown in Table 5.1. Table in appendix 8 shows details of personalities interviewed in Accra.

Table 5-2: A summary of the registered water tanker associations in Accra

| Name of Association | Year of Formation | Number of Tankers In Operation at time of study | No. of Tanker Owners/members |
|---------------------|-------------------|---|------------------------------|
| PWTOA (Awoshie 1) | 1987 | 250 | 157 |
| PWTOA (Awoshie 2) | 2001 | 50 | 18 |

| | | | |
|-------------------|------|----|----|
| OWTOA (Odorkor 1) | 2001 | 42 | 21 |
| OWTOA (Odorkor 2) | 2003 | 18 | 12 |
| SWTOA (Sakaman) | 2004 | 20 | 5 |
| LWTOA (Lashibi) | 1997 | 80 | 31 |
| Tema (GTP & TOR) | 2000 | 45 | 23 |

Source: Tanker Associations

Table 5-3: Consumers served by Tanker Operators interviewed

| Name of Association | Number of Operators interviewed | Average Number of customers served by each Operator |
|---------------------|---------------------------------|---|
| PWTOA (Awoshie 1) | 8 | 14 |
| PWTOA (Awoshie 2) | 3 | 9 |
| OWTOA (Odorkor 1) | 5 | 6 |
| OWTOA (Odorkor 2) | 5 | 12 |
| SWTOA (Sakaman) | 3 | 6 |
| LWTOA (Lashibi) | 5 | 9 |
| Tema (GTP & TOR) | 4 | 7 |

Tanker operators within each association have particular customers who call for water. From the survey the average number of customers served by each operator in various associations was determined. It shows that the most prominent associations have the highest number of customers. A detail of the results is provided in Table 5.2.

5.4.2 Tanker water supply chain

The research discovered two main consumers based on the kind of reliance on tanker service for supply. The first are the consumers who rely solely on tanker services for

water and these may be high income, middle income or low income. The other is those that fall on tanker services when the main source falls short.

The consumers of water from tanker services, especially the high and middle income groups buy directly from tankers. The middle income residents who find themselves in low income areas have purchased high capacity storage facilities (polytank and/or concrete tanks). They then buy directly from tanker services and sell to neighbouring low income residents by the bucket or 20 litre gallons. These consumers are described as indirect consumers. However, some low income residents manage to buy directly (share with neighbour) from tankers and supplement with well or boreholes (wells or boreholes may be salty). Figure 5.1 shows tanker water supply chain in Accra.

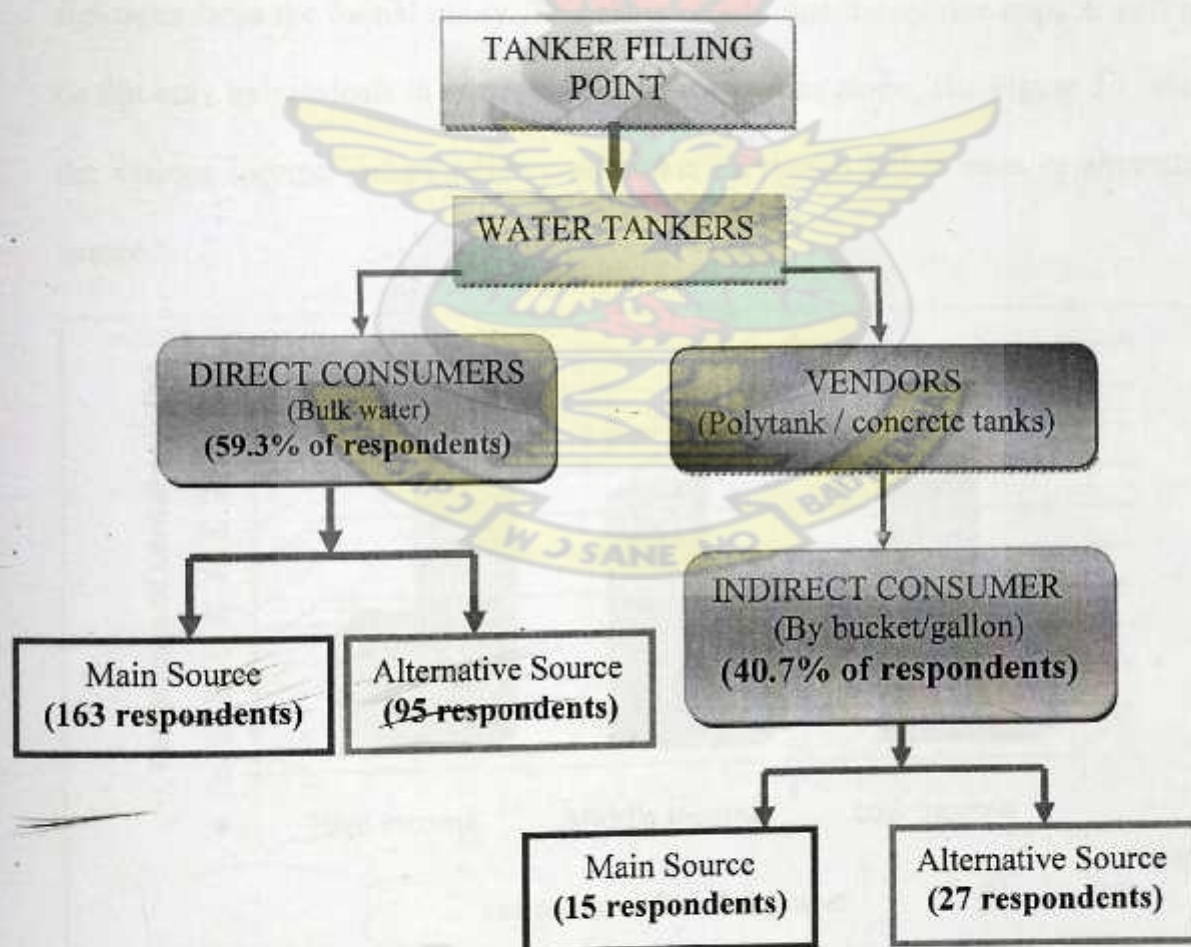


Figure 5.1 Tanker water supply chain

The results further showed that 59.3% of the 300 households rely on tanker services as their main source of water and 40.7% as alternative source. Details of the results showing the various forms of reliance on tanker services is shown in Table 5.3

Table 5-4: Consumer reliance on tanker water

| | Direct Consumers | Indirect Consumers |
|------------------|------------------|--------------------|
| Main source | 163 | 15 |
| Alternate source | 95 | 27 |

Details of the results showed that 31% of the high income, 62% middle income and 70% of the low income groups depend on tanker services as their main source of water. However, the 69%, 38% and 30% respectively fall on tanker services during shortages from the formal utility. This show clearly that the service impacts will not be felt only by residents in areas without pipe networks alone. The Figure 5.1 show the various income groups reliance on tanker service as either main or alternative source.

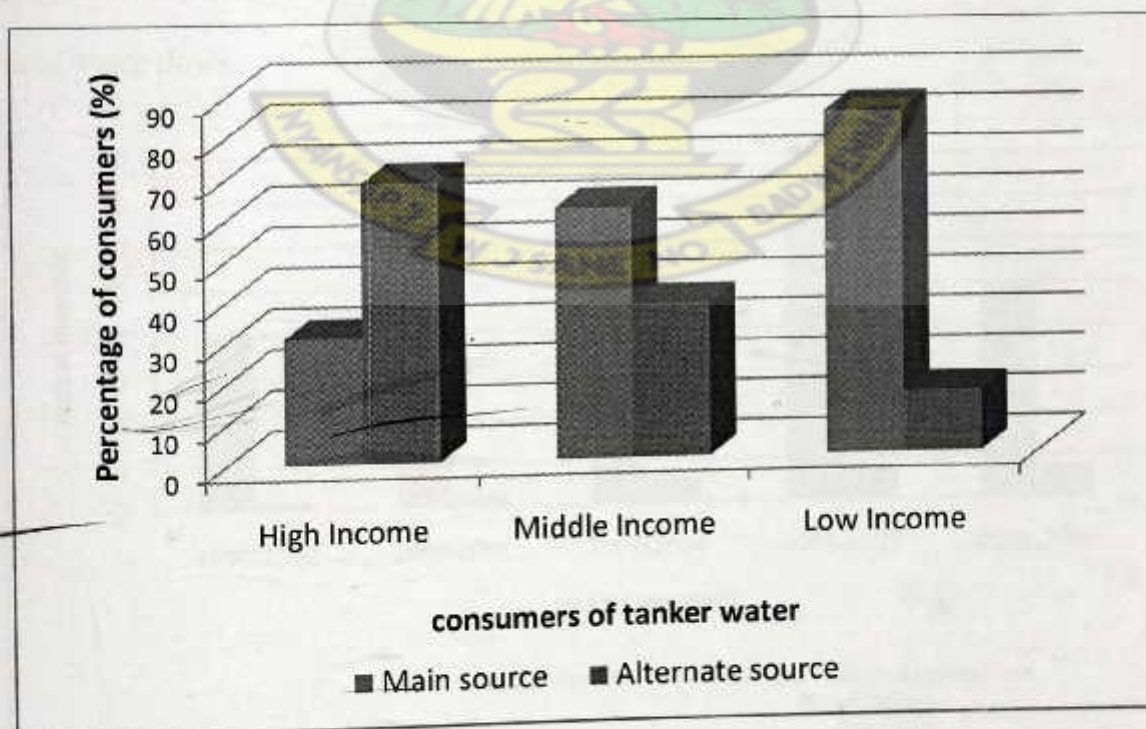


Figure 5-1: Dependency on tanker service as the main or alternative source

5.4.2.1 Customer base of tanker services

The results also show that over the years the customer base of tanker services have improved considerably and this might have influenced the increasing number of tankers as well as Tanker Associations in the Accra Metropolis. It clear that as the years go by the population that rely on tanker services increases. This is likely due to general population growth which would have as well increased the pressure on the GWCL to extend water to these areas. Nonetheless, the tanker services is still seen to provide services to the unserved. From the interviews with customers, some residents have used tanker water from 1996 to date. It could be infered from the graph (figure 5.4) that the customer base increased from 1996 to 2004 alongside number of Tanker Associations formed and this is probably due new developments. However, between 2005 and 2009 the customer base recorded a decline in numbers because of GWCL's recent increase in its coverage through extention of pipelines to some distress areas. The other reason is that, currently water is being rationed and consumers have purchased high capacity storage faciliteis that can store as much water before the next time water flows.

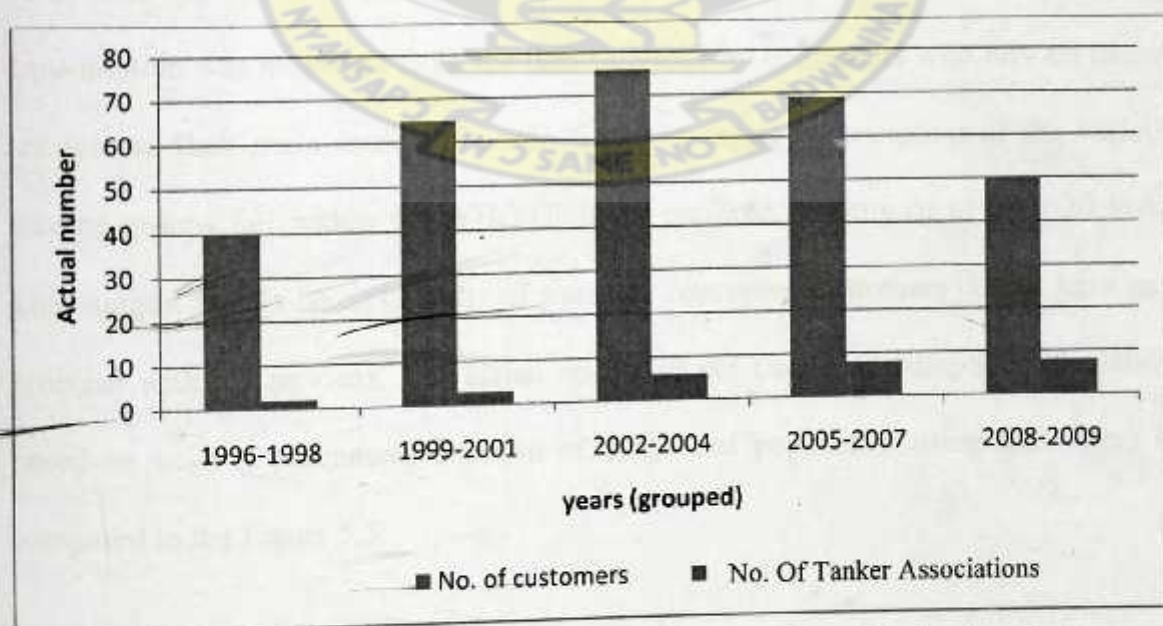


Figure 5-2: Comparison of the annual customer base with number of Tanker Associations

Finally, judging from the fact that customers are provided with adequate quantity of water coupled with satisfactory time of delivery of service to consumers as well as improving customer base yearly of both dependant types (main/alternative source), one can conclude that tanker services has contributed in providing to some extent access to water and hence a potential tool in helping achieve the MDG target 10. The 2000 census recorded tanker service coverage of 7.3% in Accra and this likely to rise during the next population and housing census.

5.4.3 Accessibility

5.4.3.1 Quantity of water

Interview with Tanker operators showed that before the partnership operators were unable to provide the right quantities of water to consumers because they stole from unapproved sources. However, respondents claim that though the quantity of water supplied by tanker services depends on the quantity one can afford, upon request tanker operators deliver exactly the quantity that is asked for. It came out clearly that the high income group recorded the highest average per capita consumption of 149 l/c/d, followed by the middle, 101 l/c/d and the low income 51 l/c/d. The per capita consumption was measured from the data provided by consumers who rely on tanker services as their main source of water. This per capita consumption of the various income groups fall within the WHO/UNICEF required quantity of at least 20 l/c/d. This suggests that as far as quantity of water is concerned customers do not have any problem with the services. The actual results of per capita consumption (calculation based on volume purchased, duration of usage and population using the water) is compared in the Figure 5.3.

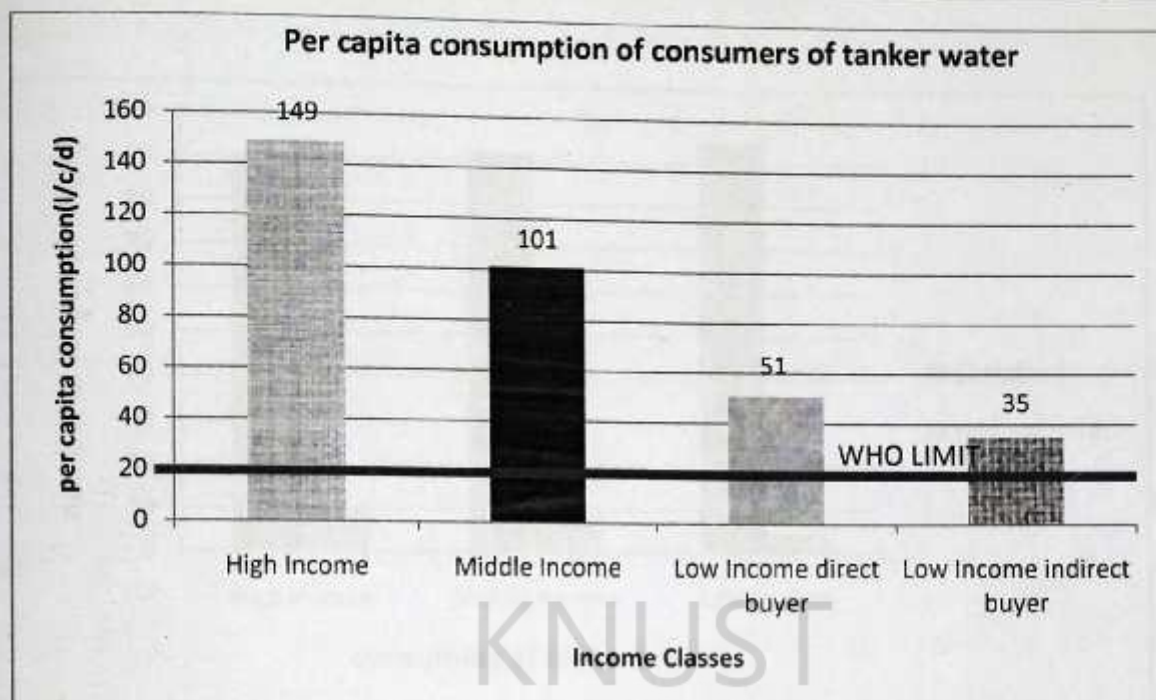


Figure 5-3: *Per capita consumption for tanker water consumers*

5.4.3.2 Time and distance of water delivery

Survey results indicates that significant number of respondents (91%) are satisfied with the time of delivery of water after request from tanker services unlike before the partnership where it took some operators even days before being able to deliver water. It can be deduced from the graph in Figure 5.4 that almost all respondents are happy with the time of delivery of service after request. This is so because currently the hydrants have been located very close to service areas contributing to reduced haulage distance and hence time of delivery. However a few consumers (9%) claim not to be satisfied and this is because they rely on tanker operators who do not operate within the 16km radius. The location of some customers also makes access difficult for instance customers in areas without access roads and on hilly areas.

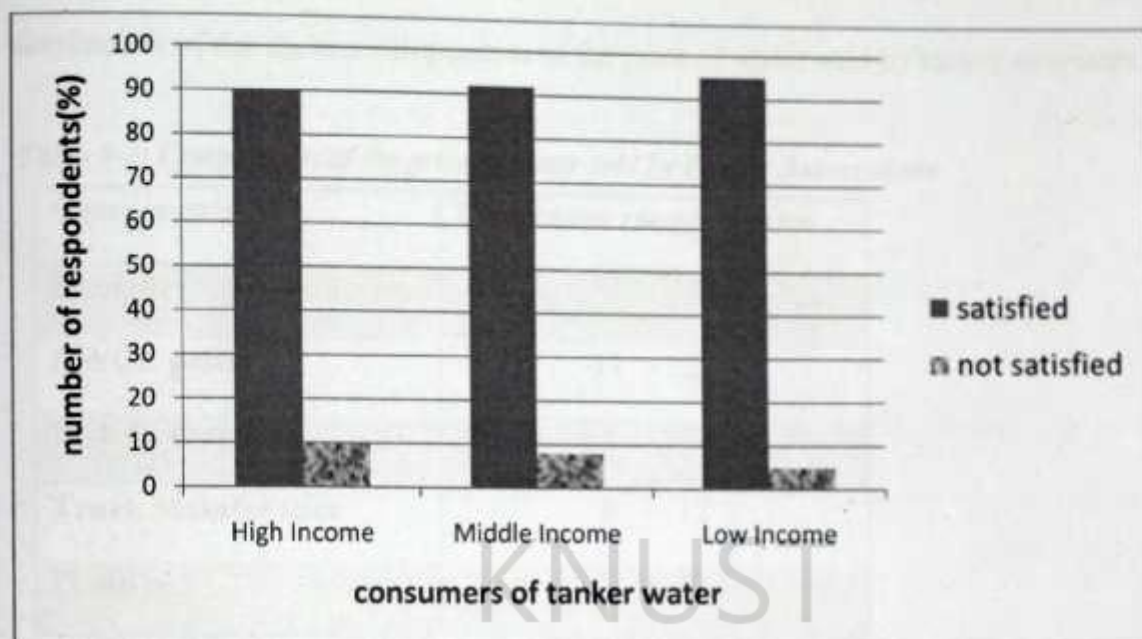


Figure 5-4: Customer assessment of time of delivery of service

5.4.4 Price and Affordability

One of the aims of the partnership is to provide water to the unserved or underserved at affordable prices. For this reason the price and the customer perception of how the price is needs to be considered.

5.4.4.1 Price of water

The situation before the partnership was such that there was no uniformity in the price of water since it was set by operators leaving customers at their mercy. However after the partnership the price is determined and agreed upon by the partners. This has brought some uniformity as each size of tanker water is sold at the same price throughout the Region. According to GWCL and PURC the determination of the price of water that is sold to consumers take into account the price of water sold to the tanker operator which is estimated to be between 17.5% and 26% of the total price. The link haulage distance being the major factor in the price determination takes about 52.6% with 10% of the total cost going into truck maintenance. Cost of disinfection is

estimated to be 7% whereas 8% goes into other factors as profit. Table 5.5 shows the distribution of the various components of the price of water sold by tanker operators.

Table 5-5: Components of the price of water sold by Tanker Associations

| Components | Percentage range of price |
|-------------------------|---------------------------|
| Haulage (> 16km radius) | 50 - 56 |
| GWCL price | 17 - 27 |
| Disinfection | 5 - 9 |
| Truck Maintenance | 8 - 12 |
| Profit | 7 - 13 |

Source: GWCL and PURC

The survey shows that the high income group purchase water ranging from 3000 gallons to 4500 gallons from the Tanker Services. This represents an average of five Ghana Cedis and seventeen Ghana Pesewas (GH¢ 5.17/m³) per cubic metre which is equivalent to about eight (8) times as much as a consumer who takes water directly through pipe connections. The middle income group which is no different pays almost as much as the high income for purchasing water between 2000 gallons and 3000 gallons. However, the low income groups who buy directly (share with neighbour) from tanker services pay almost eleven (11) times as much as paid by the consumer of pipe water. The other low income person who buys water by the bucket or 20 litre gallon pays nineteen(19) times as much as paid by consumer of domestic tap water from GWCL. The result is displayed in Figure 5.5.

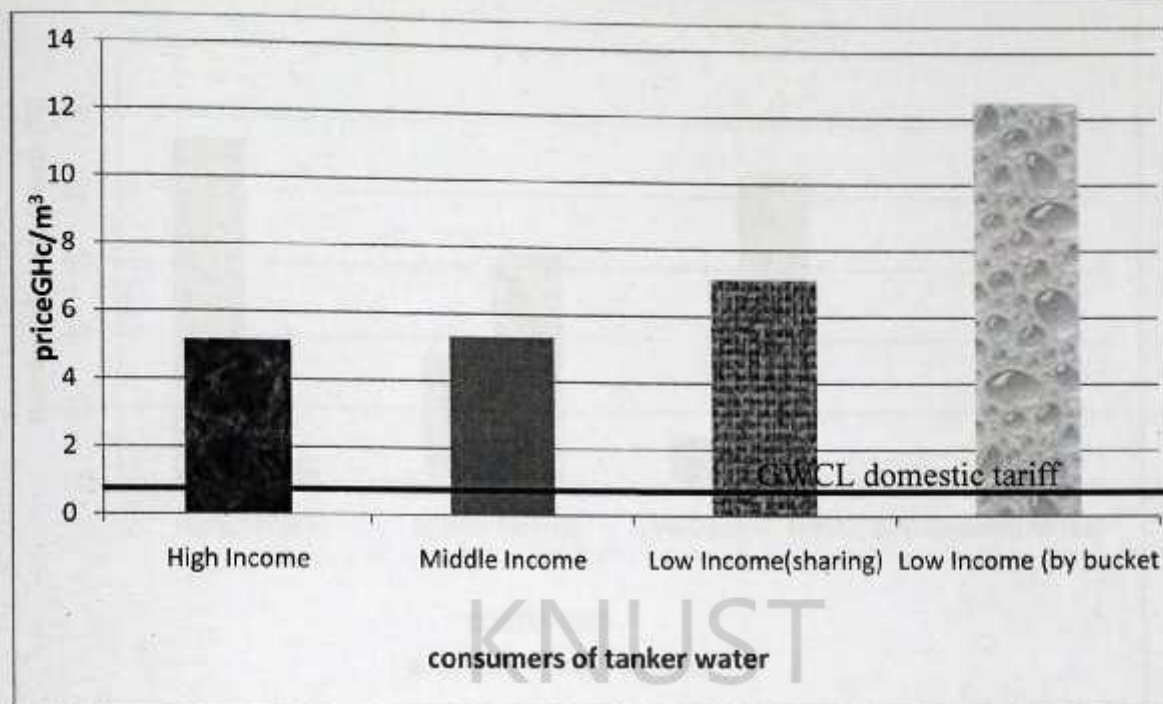


Figure 5-5: Cost /m³ of tanker water using tap water as benchmark

It appears from the graph in Figure 5.5 that the high and middle income pay less and this is attributed to their ability to purchase larger volumes of tanker water whereas the low income buy and share or buy by the bucket.

5.4.4.2 Price Satisfaction

Despite the above stated cost situation, 51.6% of respondents said they are satisfied with the price at which water tanker services sell water to them. Out of this, 23.5% are in the high income class with 11% in middle income whilst 3% are found in the low income class. However, the 48.4% who are not satisfied with the cost have 41.5% representing the low income, 19% middle income and 1.5% high income. The Figure 5.8 shows the percentage of customers who are either satisfied or not with the cost of water from tanker services. It is clear that the high and the middle income find the cost reasonable unlike the low income residents.

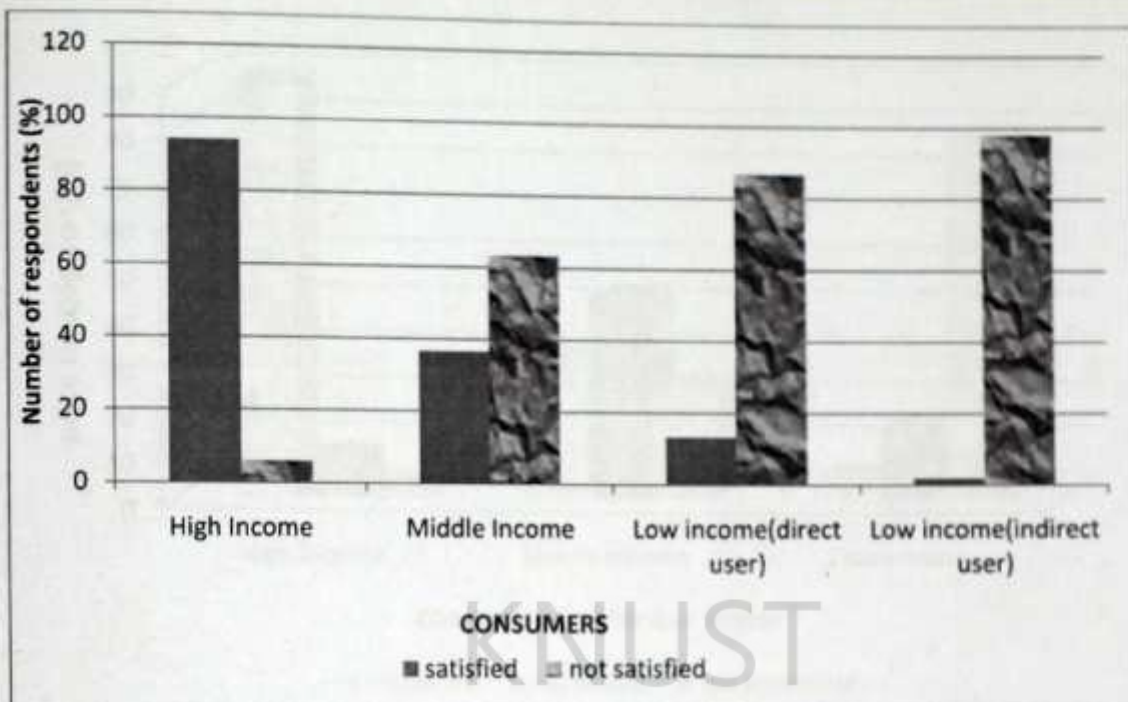


Figure 5-8: Consumer opinions about the cost of tanker water

5.4.4.3 Price Description by consumers

The results further show that 34% of the respondents described the cost of water as moderate whereas 23.5% felt it is expensive with 42.5% claiming it is too expensive wishing something could be done to drastically reduce the cost of the water. It was also found that out of that 34%, 90% of the high income, 31.7% of middle income and 4.4% of low income agreed with the price as being moderate. 10% high income, 68.3% middle income and 95.6% low income said the price is either expensive or too expensive. A summary of the results is shown in Figure 5.7.

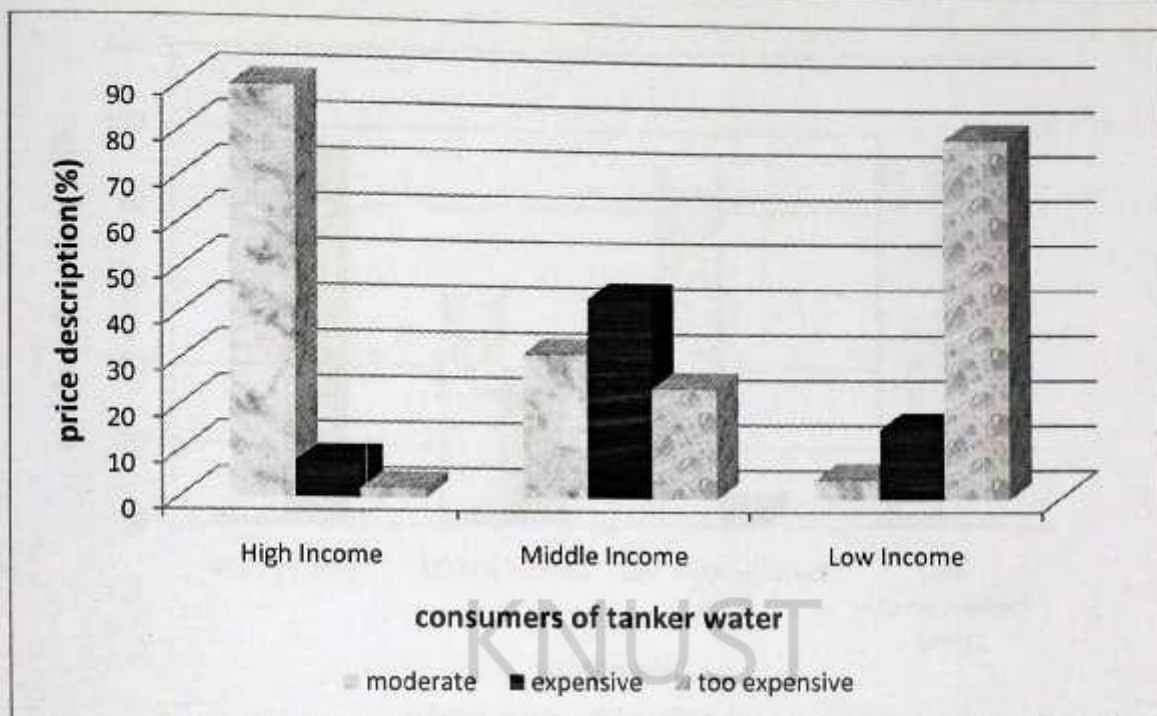


Figure 5-6: Customer description of the price of tanker water

5.4.4.4 Influence of Price on Water Usage

When customers were asked if the cost of water from tanker services limits the quantity they would have liked to use, the results were as follows; 36.5% said it does not influence their water use practices whereas 62.5% of them claim the cost of the water from tankers services affect their water use practices especially in the aspects of hygiene and sanitation. Specifically, 4% of high income respondents said the cost limits the water use practices as against 96% who claim to be unaffected. 61.7% of the middle income respondents said the price of water reduces their water usage whilst 38.3% felt they are unaffected. The low income class which seems the most affected had 95.6% claiming they are very much affected with 4.4% thinking differently. A summary of the results has been depicted in Figure 5.8.

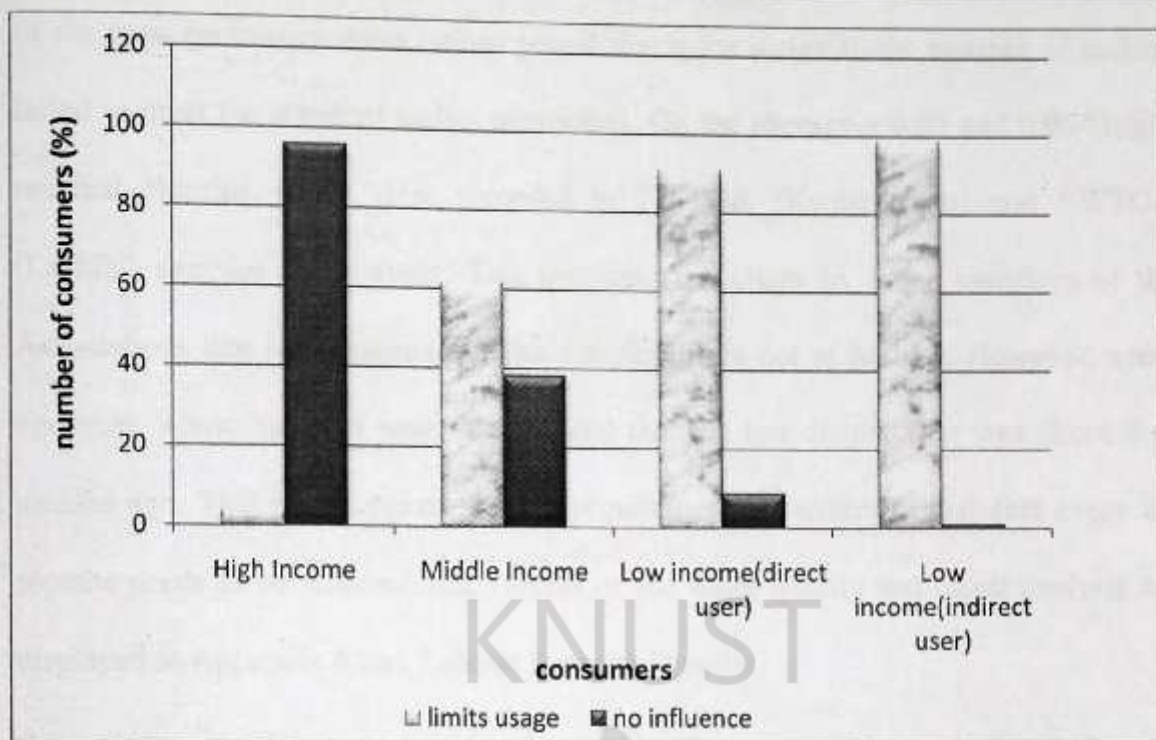


Figure 5-7: Price influence on usage of tanker water

Though the price of tanker water compared to GWCL rates showed vast difference it is still described by the high income group as affordable. The low income consumers who actually believe the price is too much are then compelled to cut down on their water usage which they say makes them compromise on their hygiene practices.

5.4.4.5 Reliability of Service

Reliability of service as defined in this research to incorporate quantities, quality, and duration of delivery after request and availability of service from the customer point of view. However, these indicators have been elaborated in the previous sections and the service availability is between 7am and 5pm (ten hours a day) and this seems to go down well with consumers.

5.4.5 Water Quality

A major requirement of tankers as stated in the tanker guidelines provided by the PURC is for tankers to supply water with residual chlorine of not less than 1mg/L with a pH between 6 and 8 to consumers. However, samples taken from tankers from two

of the most prominent Associations reveal that quite a significant number of tankers failed to meet the standard earlier mentioned. On the average a 0.09 and 0.054 mg/L residual chlorine levels were recorded in PWTOA (Kwashieman) and LWTOA (Lashibi) samples respectively. This confirms the claim by some members of the Associations that reinforcement of the disinfection is not at its best. However, some operators whose samples were taken stated that the last disinfection was about four months ago. This also suggests that the requirement of tankers to disinfect every six months needs to be reconsidered. Details of the water quality test result analysis are displayed in Appendix 6 and 7 shows the actual results.

On the other hand consumers of tanker water who responded to questionnaires and interviews showed diverse opinions about the quality of water provided by tanker service. The results indicates that 77% of the respondents' feel the water bought from tanker services always look clean, however, 22% admitted that the water is not always clean. Only 1% claims the water from these tanker services does not look clean. Figure 5.9 shows the details of the views of consumers of the various income groups.



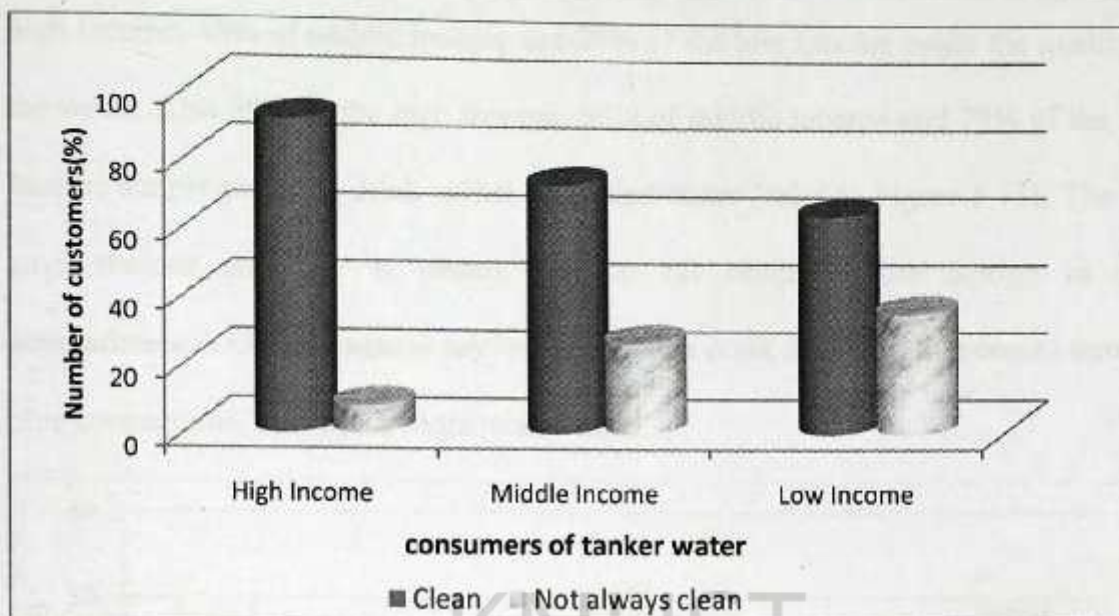


Figure 5-8: Customer perception about the quality of water

When customers were asked if they drink water from tankers directly, the results (refer to Figure 5.9) showed that none of the high income group drinks the water, 8% of the middle income drink but may either boil or filter before whilst 73% of the low income groups drink the tanker water directly. It can be inferred that if the quality of water is really bad then it is the low income that will feel the consequences.

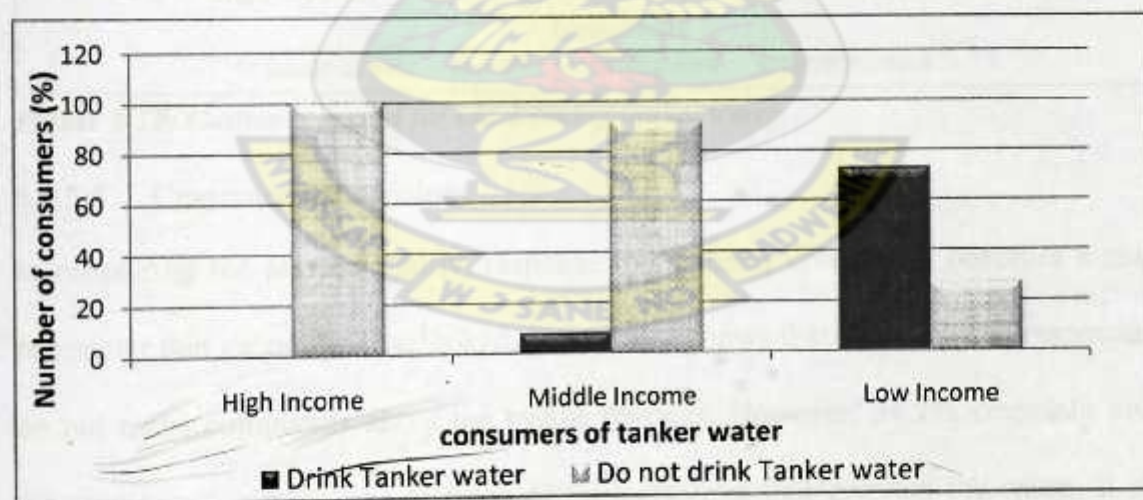


Figure 5-9: Drinking status of tanker water

Although quite a significant number of consumers see water from tanker services to be clean, only 26.5% of the 300 respondents drink the water directly. The other 220 representing 73.5% who do not drink the water have their own reasons, 50% of the

high income, 46% of middle income and 29% of the low income doubt the quality of the water. Also 29% of the high income, 50% of middle income and 29% of the low income simply prefer to drink sachet or bottled water (refer to Figure 5.11). The rest gave reasons such as 'it wastes time to fill bottles before storing in cold compartments'. Others vaguely say 'we don't even drink the water that comes through pipe connections, how much more tanker water.

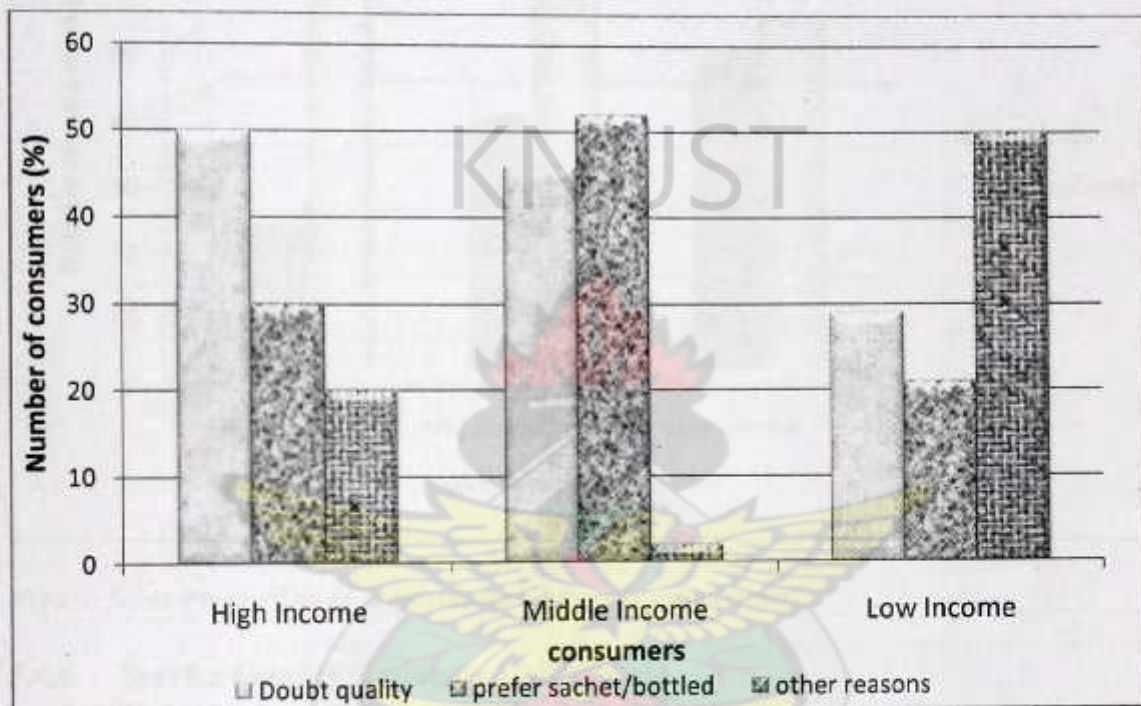


Figure 5-10: Customer reason for not drinking tanker water

5.4.5.1 Customer Complaints

In measuring the service quality, response to customer complaints becomes a major parameter that cannot be overlooked. The survey shows that 65.8% of the respondents do not make complaints about the tanker services. However, 34.2% complain about the water cost, quality and hygiene of the personnel that delivers the water. It also shows that 80% of the high incomes do not make complaints, the reason being that the water is not for drinking purposes, however, the other 20% complains about hygiene of personnel and quality of the water. Also 63% of the middle incomes do not make complaints as against the 37% who complains about cost and quality. The low income

records the highest number of complaints, 47% and it was about the cost of the water, whereas 53% do not complain. The results is summarized in Figure 5.12

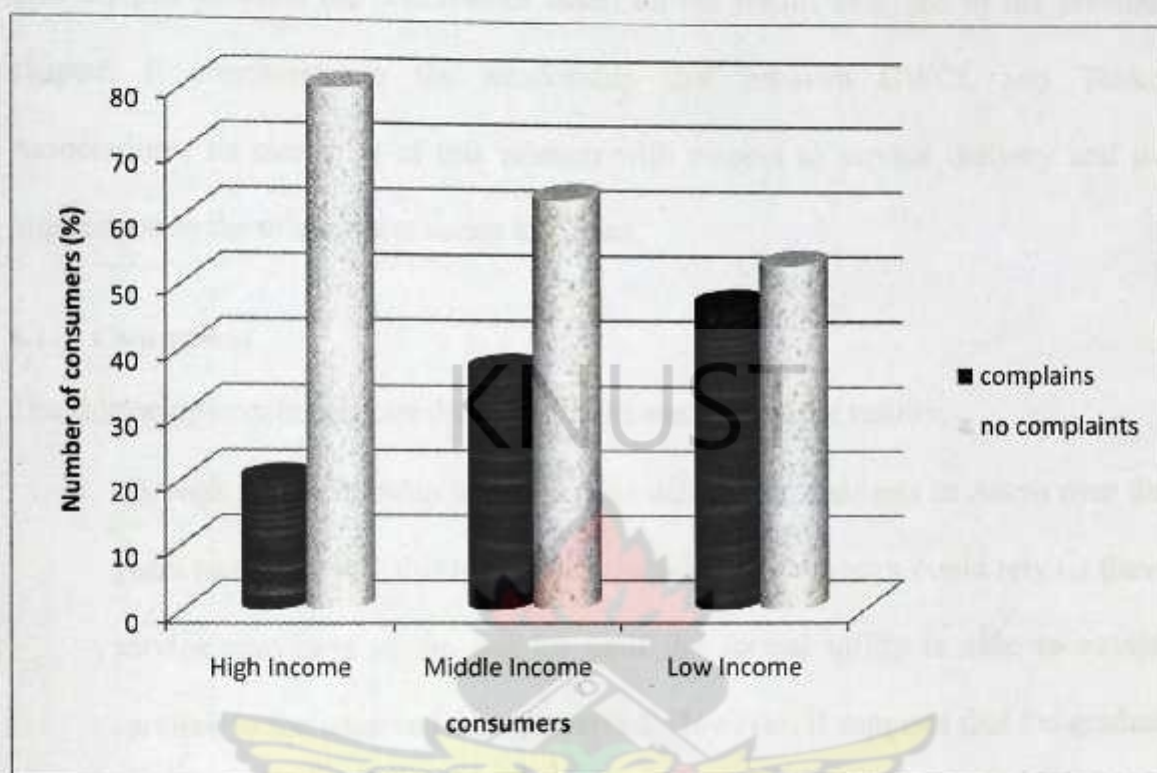


Figure 5-11: Proportion of respondents who make complaints

5.4.6 Service Quality Rating by Consumers

Notwithstanding the complaints about the cost, quality and hygiene of personnel customers, the overall rating of the services provided by tankers services was at 70.2% implying that tankers services are delivering very good services.

CHAPTER SIX

6 CONCLUSIONS AND RECOMMENDATIONS

This chapter presents the conclusions based on the results analysed in the previous chapter. It concludes on the relationship that between GWCL and Tanker Associations, its outcomes of this relation with respect to service delivery and the implication to the urban water sector in Ghana.

6.1 Conclusions

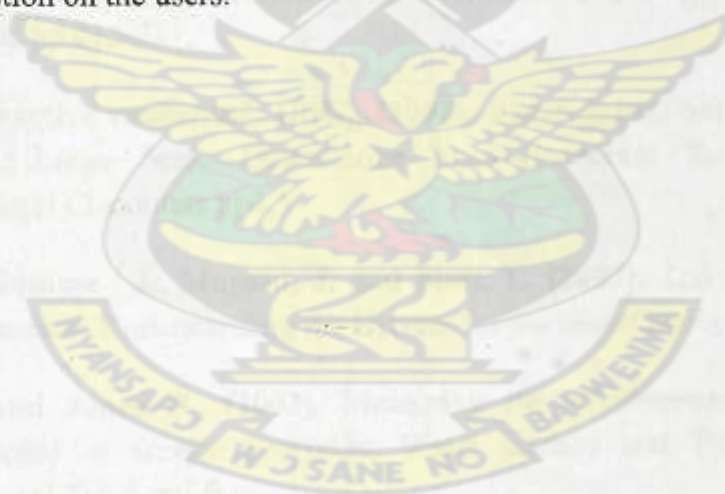
The following conclusions are drawn from the analyses of the results;

- Through the partnership tanker service delivery to residents in Accra over the years has improved; this means that the urban water sector could rely on these service providers in the interim until the formal utility is able to extend services to the unserved or underserved. However, it suggests that the gradual extension of the formal utility's pipe network could give priority to low income areas since the high and middle income residents have the ability to purchase enough volume of water from tanker services.
- The PURC water 'tanker guidelines' which has enhanced the provision of good quality water to residents by tanker services could also be extended to other small scale entrepreneurs in order to deliver potable water to consumers who rely on them.
- The formalisation of tanker services through an MOU has provided security and development for tanker operators and this could be replicated in the other urban areas in Ghana having similar supply gap.

6.2 Recommendations

Based on the conclusions it is suggested that;

- Stakeholders of the partnership need to fully carry out their responsibilities in order to ensure that absolute good quality water is provided for the people.
- The stakeholders of the partnership should agree on a criterion for assessing the performance of the partners.
- Further studies should be done to find the actual cost effect on the low income groups who depend solely on tanker services for water.
- Some low income residents rely on sources such as boreholes and wells which are salty, it is recommended that further studies is done to find the impact of such action on the users.



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APPENDICES

Appendix 1: Questionnaire for household survey

| | | | |
|--|-----------------|---|---------------|
| A. Survey Data | | Tanker Assoc. | |
| 1. Date: | 2. Interviewee: | | |
| B. Location | | | |
| 4. Region: | 5. District: | 6. Community: | |
| 7. Settlement type: <input type="checkbox"/> urban <input type="checkbox"/> Peri-urban <input type="checkbox"/> City | | | |
| Household (HH) General | | | |
| 8. Sex: <input type="checkbox"/> M or <input type="checkbox"/> F | 9. Age: | 10. Marital Status: <input type="checkbox"/> Married <input type="checkbox"/> Separated <input type="checkbox"/> Divorced <input type="checkbox"/> Single | 11. House No: |
| 12. What is your household or family size? | | | |
| Household Wealth | | | |
| 13. What is the type of housing structure (by observation) | | <input type="checkbox"/> Modern (block, brick, sandcrete blocks, and rendered house) <input type="checkbox"/> Traditional (Mud/thatched house, hut, tent, kiosk) | |
| 14a. What is your status in the house? <input type="checkbox"/> Owner <input type="checkbox"/> A tenant <input type="checkbox"/> Rent free (Family relation, friend, other). | | | |
| 14b. How long have your family been in the house? | | | |
| 15. What is your occupation? <input type="checkbox"/> Health personnel <input type="checkbox"/> Farmer <input type="checkbox"/> Trader <input type="checkbox"/> Tailor/Dressmaker <input type="checkbox"/> Mason <input type="checkbox"/> Plumber <input type="checkbox"/> Carpenter <input type="checkbox"/> Other (specify) | | | |
| E. Access to water supply | | | |
| 17a. What is your main source of water? <input type="checkbox"/> GWCL <input type="checkbox"/> Tankers <input type="checkbox"/> borehole <input type="checkbox"/> vendors <input type="checkbox"/> others (specify) | | | |
| 17b. What is your alternative source of water? <input type="checkbox"/> Tankers <input type="checkbox"/> borehole <input type="checkbox"/> vendors <input type="checkbox"/> others (specify) | | | |
| 17c. How long have you relied on tanker services if your answer is tankers in 17a&17b | | | |
| 17c. How do you contact Tankers Services when you need water? <input type="checkbox"/> by phone <input type="checkbox"/> going to their office <input type="checkbox"/> other means(specify)..... | | | |
| 17d. Are you satisfied with the time of delivery of water after request? <input type="checkbox"/> Yes <input type="checkbox"/> No | | | |
| 17e. Do you normally get the quantity of water you want from tanker services? <input type="checkbox"/> Yes <input type="checkbox"/> No | | | |

F. Cost of water

| |
|--|
| 18a. How much does it cost to buy the quantity of water you want from tanker services? GH¢.....for..... m ³ /gallons |
| 18b. Are you satisfied with the price at which you buy the water from tanker Services? <input type="checkbox"/> Yes <input type="checkbox"/> No |
| 18d. How will you describe the price of water from tanker Services? <input type="checkbox"/> low <input type="checkbox"/> moderate <input type="checkbox"/> expensive <input type="checkbox"/> too expensive |
| 18c. How often do you experience increase in the price of water by tanker operators. <input type="checkbox"/> Ones in a year <input type="checkbox"/> twice in a year <input type="checkbox"/> three times in year <input type="checkbox"/> more than three times |
| 18d. Does the price of water affect your water use practices? <input type="checkbox"/> yes <input type="checkbox"/> No If yes, how? |

G. Quantity of water

| |
|--|
| 19a. How long do you use the quantity you buy from tanker services? <input type="checkbox"/> 1 day <input type="checkbox"/> three days <input type="checkbox"/> one week <input type="checkbox"/> two weeks <input type="checkbox"/> three weeks <input type="checkbox"/> one month <input type="checkbox"/> other (specify) |
| 19b. What is the capacity of your storage facility? |
| 19c. what is the type of your storage facility? <input type="checkbox"/> polytank <input type="checkbox"/> gallons <input type="checkbox"/> barrels <input type="checkbox"/> buckets <input type="checkbox"/> other (specify) |
| 19d. Are you satisfied with the quantity of water that is delivered to you? <input type="checkbox"/> Yes <input type="checkbox"/> No |

F. Quality of water and cost of alternate source of water

| |
|---|
| 20a. Does the water from tankers Services look clean to you? <input type="checkbox"/> Yes <input type="checkbox"/> No |
| 20b. Does the water smell, have taste or colour? <input type="checkbox"/> smell <input type="checkbox"/> taste <input type="checkbox"/> colour |
| 20c. Do you drink the water provided by Tanker Operators? <input type="checkbox"/> Yes <input type="checkbox"/> No |
| 20d. Is there any reason other reason for not drinking the water bought from tanker services? Please specify |
| 20e. How much then do you spend on drinking water, if your answer in 20c is No? GH¢..... |
| 20f. How do you use water bought from tanker services? <input type="checkbox"/> cooking <input type="checkbox"/> washing <input type="checkbox"/> bathing <input type="checkbox"/> others (specify) |

H. Customer complaints

| |
|---|
| 21a. Do you make complains to the tanker operators? <input type="checkbox"/> Yes <input type="checkbox"/> No |
|---|

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| |
|---|
| 21b. How fast do they respond to your complains? |
| 21c. What do you normally complain about? |
| 21d. How will you rate the quality of service provided by tanker services? <input type="checkbox"/> very poor <input type="checkbox"/> poor <input type="checkbox"/> fair <input type="checkbox"/> good <input type="checkbox"/> very good |
| 21e. What other information about water services will you like to share? |

Appendix 2: Questions for interview with Tanker Associations

A. History and nature of the partnership

| stakeholder | Question |
|---------------------|---|
| Tanker Associations | <ul style="list-style-type: none"> • When did you form the Association and why? • What is your legal status? Who do you work for? • How do you operate? What are your resources? Do you have competitors? • What are your interests, strengths and weaknesses? • Who regulates your activities? • Do you depend on other organizations for something? • What is your relationship with GWCL/PURC? • How and when did the idea of joining forces with GWCL start? • Who initiated the whole idea of the partnership? • What were the steps involved in the whole partnership process? • What is the nature of the agreement between the partners? • What is your role in the partnership? • Is there a regulatory body? If yes, what are their roles and responsibilities? • Who defines the roles and responsibilities of for the partners? • Are there penalties for non-compliance with rules and regulations? |

B. The partnership process

| Stakeholders | Questions |
|--------------|-----------|
|--------------|-----------|

| | |
|---------------------|---|
| Tanker Associations | <ul style="list-style-type: none"> • Are there standard procedures or contractual agreement that need to be respected? • How are conflicts among partners addressed? How often? • Are there rules governing decision making in the partnership? • Who is incharge of decision making? Is it respected? • Do you trust your partner, GWCL? • How is power shared in the partnership? • Are there secrets and confidentialities in the partnership? • Do you normally have meetings with partners where relevant information beyond specified agreements is shared? • What kind of risks is being taken in the partnership, if there is? • How difficult has it been? |
|---------------------|---|

C. Drivers behind the partnership

| Stakeholders | Questions |
|---------------------|---|
| Tanker Associations | <ul style="list-style-type: none"> • What is the main purpose of the partnership? • Who are the target groups? • What problem is the partnership intended to solve? • What do you hope to achieve from the partnership? • What are the objectives of the partnership? • How has the partnership affected you? • Are you given special incentives from GWCL or the government? • Do you pay tax? • What benefits do you hope to achieve from the partnership? |

D. Activities

| Stakeholders | Questions |
|---------------------|--|
| Tanker Associations | <ul style="list-style-type: none"> • How many Associations are in Accra? • How many members in your association? • How many tankers does your association have? • Which communities does your association serve? • Who do you serve (household, hotels, hostels, industries, etc)? • How many customers do you serve in a day? • What percentage of the population relies on tankers for water? • At what cost is water sold to you by GWCL? • How much do you sell to consumers? What factors affect the price of water charged by your association? • How often do you increase the price of water and under what conditions? • How do you ensure that the water delivered to customers meet the quality standards? • Through what media do you receive customer complaints? • How many complaints do you receive each month? • What are the most common amongst the complaints? • How long do you take to respond to customer demands? |

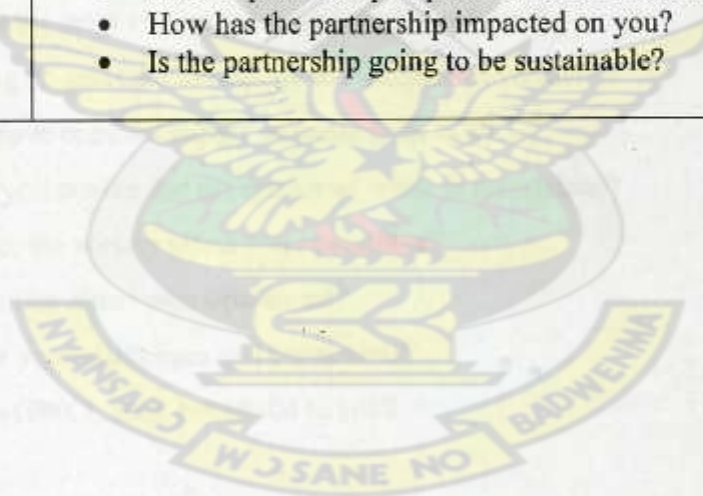
- | | |
|--|---|
| | <ul style="list-style-type: none"> • Do you have constant supply of water from GWCL? |
|--|---|

E. Challenges and constraints

| Stakeholders | Questions |
|---------------------|--|
| Tanker Associations | <ul style="list-style-type: none"> • How does the partnership hope to ensure that good quality of water is delivered to consumers? • Do legal and institutional systems interfere with the partnership? If yes, how? • How does the society interfere with the partnership? • How does the economy affect the partnership? • Does the political system affect the partnership? • Does culture influences the partnership? • What other challenges or constraints come your way? |

F. Outcomes of the partnership

| Stakeholders | Questions |
|---------------------|--|
| Tanker Associations | <ul style="list-style-type: none"> • Are you satisfied with your GWCL/PURC's performance and yours as well? • Is the partnership meeting its goals? • Is the partnership helping to achieve the individual aims of each party? • Has the partnership improved the service delivery? • How has the partnership impacted on you? • Is the partnership going to be sustainable? |



Appendix 3: Interview with Tanker operators/drivers

- Which area in Accra do you supply water?
- Who do you serve? Households, hotels, industries, vendors etc
- How many customers do you serve in a day?
- How often does a particular customer request for water?
- What other options do you have for water aside GWCL?
- What percentage of the population relies on tankers for water?
- At what cost is water sold to you by GWCL?
- Who decides how much you should sell your water?
- How much do you sell to consumers? What factors affect the price of water charged by your association?
- How often do you increase the price of water and under what conditions?
- How do you ensure that the water delivered to customers meet the quality standards?
- How often do you disinfect your tank?
- Through what media do you receive customer complaints?
- How many complaints do you receive each month?
- What are the most common amongst the complaints?
- How long do you take to respond to customer demands?
- Do you have constant supply of water from GWCL?
- How do you ensure that the quality of water is maintained?
- How does the society affect you operations?
- Does politics affect your operations?
- What are your challenges and constraints?
- How has GWCL been beneficial to you?

Appendix 4: Interview with GWCL

G. History and nature of the partnership

| Stakeholders | Questions |
|--------------|--|
| GWCL | <ul style="list-style-type: none"> • When did the idea of joining forces with Tanker Operators start? • Who initiated the whole idea of the partnership? Who are the partners? • What is the basis in choosing Tanker Associations as a partner? • What were the steps involved in the whole partnership process? • What is the nature of the agreement between the partners? • Who defines the roles and responsibilities of for the partners? • What is GWCL's role in the partnership? • Is there a regulatory body? If yes, what are their regulatory mechanisms? • Are there other institutions that matter in the partnership apart from the Tanker Associations? • If yes, what part do they play? • Who defines the roles and responsibilities of each partner? • Are there incentive mechanisms for compliance? • Are there penalties for non-compliance with rules and regulations? • Are there incentives for compliance? |

H. The partnership process

| Stakeholders | Questions |
|--------------|---|
| GWCL | <ul style="list-style-type: none"> • Are there standard procedures or contractual agreement that need to be respected? • How are conflicts among partners addressed? How often? • Are there rules governing decision making in the partnership? • Who is incharge of decision making? Is it respected? • Do you trust your partner? • Are there secrets and confidentialities in the partnership? • Do you normally have meetings with partners where relevant information beyond specified agreements is shared? • What kind of risks are taking in the partnership? • How difficult has it been? |

I. Drivers behind the partnership

| Stakeholders | Questions |
|--------------|---|
| GWCL | <ul style="list-style-type: none"> • What is the main purpose of the partnership? • Who are the target group? • What problem is the partnership intended to solve? • Have other approaches been used in trying to solve this problem before? • What is your interest? • What are the objectives of the partnership? • What influences your participation in the partnership? (political, economic or cultural) • What benefits do you hope to achieve from the partnership? |

J. Activities

| Stakeholders | Questions |
|--------------|---|
| GWCL | <ul style="list-style-type: none"> • What percentage of the urban population do you currently serve directly? • What percentage of the population depends on tankers for water? • Do you give special considerations to Tanker Associations? • Are you able to provide water for Tankers at all times? • Is the cost of water sold to Tanker Associations regulated by PURC? • Do you test the quality of water in the tankers? • How often do you test the quality of water in the tankers? • How often do you receive complains from tanker services or consumers? • What do they usually complain about? • Do you have special service for the poor? |

K. Challenges and constraints

| Stakeholders | Questions |
|--------------|---|
| GWCL | <ul style="list-style-type: none"> • How does the partnership hope to ensure that good quality of water is delivered to consumers? • Do legal and institutional systems interfere with the partnership? If yes, how? • How does the society interfere with the partnership? • How does the economy affect the partnership? • How do political systems affect the partnership? • How does culture influences the partnership? • What other challenges or constraints come your way? |

L. Effects of partnership

| Stakeholders | Questions |
|--------------|-----------|
|--------------|-----------|

| | |
|------|--|
| GWCL | <ul style="list-style-type: none"> • Are you satisfied with your partner's performance and yours as well? • Is the partnership meeting its goals? • Is the partnership helping to achieve the individual aims of each party? • Has the partnership improved the service delivery? • How has the partnership impacted on you? • Is the partnership going to be sustainable? • Is the partnership able to address the problems which the partnership intends to solve? • What is the future of the relationship? |
|------|--|

KNUST



Appendix 5: Calculation of Service Quality

$$\text{score for service quality(\%)} = \frac{\sum((n_1 \times 1) + (n_2 \times 2) + (n_3 \times 3) + (n_4 \times 4) + (n_5 \times 5))}{\sum(N \times 5)} \times 100$$

Where n_1 = number of respondents who ticked very poor (1)
 n_2 = number of respondents who ticked poor (2)
 n_3 = number of respondents who ticked fair (3)
 n_4 = number of respondents who ticked good (4)
 n_5 = number of respondents who ticked very good (5)
 N = Total number of respondents

$$n_1 = 0$$

$$n_2 = 13$$

$$\text{service quality(\%)} = \frac{\sum((0 \times 1) + (13 \times 2) + (146 \times 3) + (116 \times 4) + (25 \times 5))}{\sum(300 \times 5)} \times 100$$

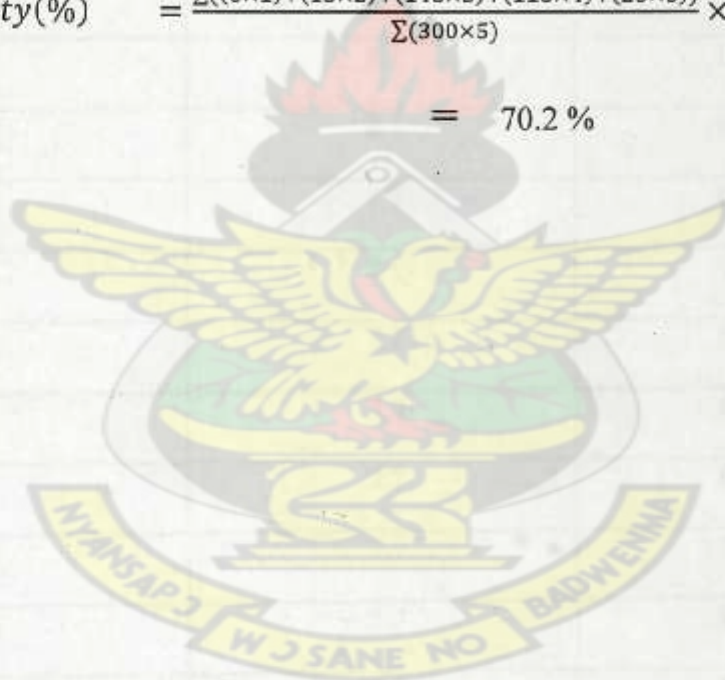
$$n_3 = 146$$

$$n_4 = 116$$

$$n_5 = 25$$

$$N = 300$$

$$= 70.2 \%$$



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Appendix 6: Sampled tanker water quality test results

Aqua Vitens Rand Ltd

Accra East REGION

acting for and on behalf of Ghana Water Company Ltd. as the Operator
pursuant to the "Management Contract for Ghana Urban Water"
dated 22nd November 2005.

Source: Water Tankers (Lashibi.)

Water Quality

Assurance Office

Date of Sampling: 15/09/2009

September, 2009.

BACTERIOLOGICAL EXAMINATION

| Sample Identification | pH | Residual Chlorine (mg/L) |
|-----------------------|-----|--------------------------|
| LWT 007 | 8.1 | 0.15 |
| LWT 013 | 8.1 | 0.05 |
| LWT 014 | 7.9 | 0.05 |
| LWT 018 | 8.1 | 0.15 |
| LWT 020 | 7.7 | 0.05 |
| LWT 021 | 7.7 | 0.01 |
| LWT 021 | 7.7 | 0.05 |
| LWT 024 | 7.7 | 0.15 |
| LWT 025 | 7.7 | 0.05 |
| LWT 030 | 7.5 | 0.01 |
| LWT 032 | 7.5 | 0.0 |
| LWT 033 | 7.5 | 0.1 |
| LWT 035 | 7.5 | 0.1 |
| LWT 038 | 7.5 | 0.0 |
| LWT 040 | 7.5 | 0.05 |
| LWT 044 | 7.5 | 0.01 |

| | | |
|----------------|-----|------|
| LWT 048 | 7.5 | 0.05 |
| LWT 051 | 7.5 | 0.1 |
| LWT 055 | 7.5 | 0.0 |
| LWT 057 | 7.5 | 0.01 |
| LWT 059 | 7.5 | 0.0 |

Source: Water Tankers (Kwashieman)

Water Quality

Assurance Office

Date of Sampling: 16/09/2009

September, 2009.

BACTERIOLOGICAL EXAMINATION

| Sample Identification | pH | Residual Chlorine (mg/L) |
|------------------------------|-----------|-------------------------------------|
| PWTOA 44 | 6.9 | 0.1 |
| PWTOA 135 | 6.9 | 0.1 |
| PWTOA 169 | 6.9 | 0.1 |
| PWTOA 216 | 6.9 | 0.1 |
| PWTOA 259 | 7.1 | 0.0 |
| PWTOA 318 | 6.9 | 0.0 |
| PWTOA 415 | 7.2 | 0.0 |
| PWTOA 415 | 7.2 | 0.1 |
| PWTOA 471 | 7.1 | 0.1 |
| PWTOA 472 | 7.1 | 0.1 |
| PWTOA 453 | 7.1 | 0.15 |
| PWTOA 478 | 6.9 | 0.1 |
| PWTOA 481 | 6.9 | 0.1 |
| PWTOA 370 | 6.9 | 0.1 |
| PWTOA 413 | 7.2 | 0.1 |

| | | |
|-----------|-----|------|
| PWTOA 334 | 6.9 | 0.1 |
| PWTOA 438 | 7.2 | 0.1 |
| PWTOA 310 | 7.2 | 0.15 |
| PWTOA 447 | 7.2 | 0.05 |
| PWTOA 371 | 7.2 | 0.1 |
| PWTOA 450 | 6.9 | 0.1 |
| PWTOA 305 | 6.9 | 0.2 |

Aqua Vitens Rand Ltd., acting for and on behalf of Ghana Water Company Ltd. as the Operator.

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|------------|---|--|
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Appendix 7: Result of water quality test of tankers in LWTOA and PWTOA

| Quality Parameter | Minimum | Maximum | Average | GWCL/ PURC | Standard Error |
|-----------------------------|---------|---------|---------|---------------|-------------------|
| pH | 6.9 | 7.2 | 7.03 | 6.8 - 8.8 | 0.041 |
| Residual Chlorine (mg/L) | 0.0 | 0.2 | 0.09 | 0.1 | 0.0098 |

(Sample size = 21/80) CI = 95%, Margin of Error = 8.2%

| Quality Parameter | Minimum | Maximum | Average | GWCL/ PURC | Standard Error |
|-----------------------------|---------|---------|---------|---------------|-------------------|
| pH | 7.5 | 8.1 | 7.65 | 6.8 - 8.8 | 0.028 |
| Residual Chlorine (mg/L) | 0.0 | 0.15 | 0.054 | 0.1 | 0.0096 |

(Sample size = 22/250), CI = 95%, Margin of Error = 5.2%

Appendix 8: Personalities Interviewed

| NAME | ORGANISATION | POSITION |
|------------------------|--------------------|-----------------------|
| Boniface Asare Bediako | PWTOA (Kwashieman) | Chairman |
| Felix Owusu | PWTOA (Kwashieman) | Supervisor |
| Richard Sarpong | PWTOA (Kwashieman) | Secretary & operator |
| Mr. Stephen Adu | PWTOA (Kwashieman) | Head of Drivers |
| J. K. Andoh | OWTOA (Odorkor 2) | Chairman |
| Emmanuel Agyei | OWTOA (Odorkor 2) | Operator |
| Mrs. Felicia Kuekey | SWTOA (Sakaman) | Chairperson |
| Mr. Kwei Gaba | SWTOA (Sakaman) | Hydrant attender |
| Mr. Adjetey Owusu | LWTOA (Lashibi) | Chairman |
| Name withheld | LWTOA (Lashibi) | Head of Drivers |
| Mr. Kenneth Agbetteh | GWCL, Accra | Customer care manager |
| Mr. Francis Lamptey | GWCL, Accra | Project manager |
| Mrs. Margaret Macauley | GWCL, Accra | |
| Mr. Haruna | GWCL, Kumasi | PRO |