

UNIVERSITY FOR DEVELOPMENT STUDIES

**EFFECTS OF WATER SERVICE QUALITY OF GHANA WATER
COMPANY LIMITED ON CUSTOMER SATISFACTION IN
THE WA TOWNSHIP**

RAYMOND MAWULI MENSAH



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COMPANY LIMITED ON CUSTOMER SATISFACTION IN
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BY

RAYMOND MAWULI MENSAH

(UDS/MEM/0011/18)

**A THESIS SUBMITTED TO THE DEPARTMENT OF ENVIRONMENT
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ENVIRONMENT AND RESOURCE MANAGEMENT**

OCTOBER, 2022



DECLARATION

Student's Declaration

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

Candidates Signature:..... **Date:**.....

Name: Raymond Mawuli Kofi Mensah

Supervisor's Declaration

I hereby declare that the preparation and presentation of this thesis were supervised per the guidelines on supervision of the thesis laid down by the University for Development Studies.

Supervisor's Signature:..... **Date:**.....

Name: Dr. Francis Issahaku Malongza Bukari



ABSTRACT

The Ghana Water Company (GWCL), until 2017 had relied on mechanized boreholes with daily production of 1,400m³ against a demand of 6,432m³ for people in the Wa township resulting in huge water supply deficit. The Wa township currently relies on a 15,500m³ capacity Jambuse Water Treatment Plant for water supply. This study sought to assess the effects of water service quality of GWCL on customer satisfaction in the Wa township with the introduction of this new plant. The specifics included the nature of water delivery systems, assessment of the effectiveness of roles of stakeholders, examine the service quality delivery of GWCL and the effect of the service quality delivery on customer satisfaction and willingness to pay. The study adopted a cross sectional design coupled with a mixed-method approach. Questionnaires, interviews and observation guides were the main instruments used in collecting data for the study. Binary logistic regression was used to determine the significance levels of some variables in relation to willingness to pay for water. The study revealed that most customers depend on private domestic connections followed by public stand pipes and mobile tanker services. The survey also revealed that the major stakeholders in ensuring water service quality in the Wa township include the Public Utility Regulatory Commission, Environmental Protection Agency, Water Resource Commission, Ministry of Sanitation and Water Resources and Ghana Water Company Limited who play different roles. The survey further revealed that the service of GWCL in respect to reliability of water supply, water quality, the tangibility of equipment and facilities being used, the empathy demonstrated in complaints management and the responsiveness of GWCL staff in attending to problems reported to them were generally good. It was revealed that the Jambuse Water Treatment Plant has led to a marginal expansion of the distribution network which has increased the accessibility and utilization of water. It was also revealed in the survey that customers were generally satisfied with the tariff regime of the company and are willing to pay for improved services. The study concludes that the Jambuse Water Treatment Plant has led to reliability and expansion of service to customers which has led to satisfaction of the quality of services rendered. It is recommended that GWCL should expand their distribution networks to reach majority of people in the Wa township.



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DEDICATION

To my wife Hubeida Mohammed and children Magdalene and Mitchell.



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ABBREVIATIONS/ACRONYMS

AIDF	Aid International and Development Forum
AIDS	Acquired Immune Deficiency Syndrome
AVRL	Aqua Vittens Rand Limited
CWSA	Community Water and Sanitation Agency
DCO	District Commercial Officers
EPA	Environmental Protection Agency
GNWP	Ghana National Water Policy
GPRS II	Growth and Poverty Reduction Strategy II
GSS	Ghana Statistical Service
GUWL	Ghana Urban Water Limited
GWCL	Ghana Water Company Limited
GWSC	Ghana Water and Sewerage Corporation
IRC	International Rescue Committee
MDGs	Millennium Development Goals
MSWR	Ministry of Sanitation and Water Resources
NEPAD	National Partnership For African Development
PWD	Public Works Department
PURC	Public Utilities Regulatory Commission
SDGs	Sustainable Development Goals
TUC	Trade Union Congress
TWAS	Third World Academy of Sciences
UFW	Unaccounted For Water
UMM	Utility Management Model
UN	United Nations



UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations Children’s Fund
UWR	Upper West Region
WASH	Water Sanitation and Hygiene
WHO	World Health Organization
WRC	Water Resources Commission
WSS	Water Supply System
WTP	Willingness To Pay
WUP	Water Utility Partners



CHAPTER ONE

INTRODUCTION

1.1 Background of Study

Service quality is the difference between the expectation of service before the delivery of the service and the judgement of the service received once it has been experienced (Weiermair, 2000). The ability of the service to meet the customers' expectations will determine the quality of the service rendered. Where the expectation exceeds the performance, service quality is perceived to be low and where the expectation is lower than the performance then service quality is perceived to be high (Hamer, 2006). Service quality measures the efficiency of service delivery as compared to what the customer expects. Businesses that meet or exceed expectations are considered to have high service quality and tend to meet customers' satisfaction (Ullah, 2012).

Satisfaction, on other hand, is more inclusive: it is influenced by perceptions of service quality, product quality, and price as well as situational factors and personal factors (Ogunnaike, and Olaleke, 2010). Sung et.al. (2017) asserted that as the service quality increases, so will customer satisfaction with the service and intentions to reuse the service also increase. The fact that customers' expectation forms the basis for customers to assess the quality of utility service delivery, (Ojo, 2011), when the customers' satisfaction drivers are improved, the organization will also improve its competitive advantage and this will result in increased patronage and willingness to pay for the services (Bolton, 1998; Ralston, 1996).

Generally, the context and the mandated service delivery of an industry determine how the service quality dimensions are measured (Qualitrics, 2020). However, the industry standard and most widely used metric is SERVQUAL. Despite the criticism



of the SERVQUAL model that it is not suitable to be used in assessing the performance of the service industry because of the differences in their mode of operation (Asubongteng et. al. 1996), it is the most popular and widely used. It is even more applicable in the water supply industry given how the five dimensions holistically cover the operations and services of the industry. It conveniently provides avenues to assess service quality, product quality, price, and other personal factors which are essential to determine the satisfaction level of a customer. SERVQUAL/RATER is based on a set of five dimensions which have been reliably ranked by customers to be most important for service quality, regardless of the service industry (Kumar et. al. 2009). These dimensions defined by the SERVQUAL/RATER measurement instrument include Reliability, Assurance, Tangibility, Empathy, and Responsiveness. Tangibles refer to the appearance of physical facilities, equipment, personnel, and communication materials. Reliability is explained to be the ability to perform the promised service consistently and accurately whilst Responsiveness refers to the willingness to help customers and provide prompt service. Assurance means the knowledge and courtesy of employees and their ability to convey trust and confidence and finally, Empathy which explains the caring, individualized attention the firm provides its customers (Roses et. al. 2009). These five SERVQUAL/RATER dimensions are used to measure the gap between customers' expectations for excellence and their perception of the actual service delivered and can therefore serve as a credible basis for assessing the performance of a water supply industry. The insistence of a quality service delivery to meet customer satisfaction cannot be over-emphasized considering the overwhelming importance of water to human beings and the need for it to be made accessible.



Access to safe water which is clean, fresh, and dependable is the basic right of all humans (Third World Academy of Sciences, 2002). The number of people who are not able to get access to safe drinking water continues to rise due to the constant increase in population although the freshwater which is available for human use remains constant. It is estimated that more than 1 billion people lack access to potable water and almost all of them live in developing countries (WHO, 2004). This puts the fate of the human race in a precarious situation given the importance of water to human beings as well as other living things. Apart from the importance of water to plants and animals, the human body is made up of 60% water which indicates the significance of water needed for its metabolic activities (Bano et al. 2017) and the need for humans to be adequately hydrated for their physiological systems to function (Aid International and Development Forum, 2017). Clean, safe, and freshwater can help the body to free itself from various toxins whilst the consumption of contaminated water can lead to deadly medical conditions like cholera, hepatitis A and typhoid (Osunla, 2017). Clean water is needed for the washing of clothes and for bathing to remove dirt and diseases from the human body, cooking, cleaning, and other similar tasks that are an essential aspect of our wellbeing (Aid International and Development Forum, 2017). It is therefore important for water producers to make water available in the right quantity and quality to meet the need of the various uses and users.

A drinking water supplier is mandated to provide water in sufficient quantities for the community and reduce or prevent the risk of contaminating water at different levels of the water supply system such as the source, treatment, and distribution (Craun and Calderon, 2001). They are also to guarantee the delivery of water that is safe and aesthetically acceptable to the point of consumption. Generally, the water suppliers



and regulators are responsible for the prevention, reduction, and removal of water contamination (World Health Organization, 2008). It is their sole responsibility to provide adequate water which is safe, accessible, acceptable, affordable, and reliable (WHO/UNICEF, 2013) to their customers.

However, the water supply industry is fraught with many challenges which affect the delivery of services to meet the expectation of its customers. The population growth in the developing countries and the inability and in some cases the unwillingness of governments to provide adequate water supply facilities in these countries (Third World Academy of Sciences, 2002) is one of the major challenges hampering quality service delivery. Governments have demonstrated a lack of commitment to prioritize and implement policies and programs aimed at improving potable water delivery to their constituents. In many cases, there is a high incidence of low water distribution coverage, no or low pressure to enable the water to get to its target users, poor water quality, and pipe leakages (Prasad, 2007). Ehrhardt et al. (2006), added that the lack of routine maintenance of plants and equipment, inadequate planning and government support, interference by politicians as well as lack of or inadequate monitoring of staff and services are serious challenges militating against service delivery.

These challenges affect the efficiency of utility companies to deliver quality service to their customers and it is, therefore, important to interrogate the level of their performance and establish if their customers find it satisfactory or not. Hence, the issue of investigation into the service quality delivery of such utility organizations comes to the fore considering especially the monopoly they enjoy. This will show how such organizations and other institutions that have roles to play can surmount the numerous challenges and meet service quality standards to serve their customers satisfactorily.



According to Lu et. al. (2015), customers of varying backgrounds have their expectations of the kind of service they want to receive when they patronize any service such as water. However, service quality cannot be effectively achieved without the engagement of various stakeholders whose contributions can be invaluable to the performance of the organization. Stakeholders' involvement in water management is widely recognized as an important component of the design and implementation of sustainable water management initiatives (Collins et.al. 2018). Stakeholder engagement is seen as a means of contributing to improved water governance, where governance is defined as the policy and practices giving rise to particular forms of water management in different contexts. It is defined as a critical principle for sustainable development and building a resilient society (Gunderson, 2003). Stakeholder involvement in water management can help to define long-term solutions to water management situations. Even though many international organizations have recognized that it is easier to work with organized groups who know what they want and need, there remains a lack of investment in helping stakeholder groups form and define their priorities. In the context of water as a situation that must be managed by human beings in perpetuity, the need to develop local capability in water management has lasting importance for the community. In water resource management, stakeholder participation has largely been influenced by a broader debate on participatory development and driven by the ascendance of new paradigms of public action and the role of the state in resource governance. These include free-thinking market deregulation and privatization, state decentralization and democratization of local institutions, co-management of natural resources, reduced political intervention in national economies, and delegation of decision-making powers to stakeholders (Mollinga and Narain, 2001). The effective participation of the



relevant stakeholders in the water supply industry will in no doubt lead to a quality service delivery and a satisfied customer base.

According to the Ministry of Sanitation and Water Resources (2007), the consumptive water requirement for the year 2020 has been estimated to be five (5) million-meter cube, which is equivalent to only some 12% of the total surface water resources (Ministry of Water Resources, Works and Housing, 2007). Nonetheless, the obtainability of water to meet water supply shows that there are deficits in coverage. Both the urban, rural, and small-town coverage for water supply is estimated to be 55% and 51.6% in 2004 and 2009 respectively (Ameyaw, 2014).

Ghana currently has about 50% of its population residing in urban areas. Although the WHO asserts that about 90% of this population has access to improved water sources which shows an improved and accessible as well as encouraging outlook (WHO/UNICEF, 2010), there is a serious constraint to regular potable water supply and accessibility. Of the 90%, 30% of the population have an intermittent supply of piped water in most cases. The remaining 60% of this percentage depends on other improved sources such as standpipes, protected dug wells, protected springs, and rainwater harvesting. Several reasons contribute to the poor accessibility of water which includes the lack of political will, weak policy initiatives, non-functioning local government, and inadequate funding (Larbi, 2006). This phenomenon poses a challenge to the service quality delivery regime which in turn can lead to a state of dissatisfaction amongst end users of these services.

In many of the urban areas of Ghana, the principal source of water supply is through the use of conventional water treatment plants where the water used for treatment is from the abstraction from surface water sources like rivers. Amarasinghe et. al. (2016)



described a conventional water supply system as an arrangement of complex subsystems which consist of a water supply catchment area, water storage tanks, water treatment plants, and water distribution network. Water supply and distribution systems can be further described to comprise a combination of source works, treatment facilities, service reservoirs, pumping stations, pipes, valves, and meters (Rao, et al. 2007). The inability of these treatment plants to produce adequate water to meet the demands in the urban areas has been a major feature (Osmanu, 2008) which leads to a bad service quality delivery. The very first innovation was the Urban Water Reform which brought a tremendous change in the Ghana Water and Sewerage Corporation in the year 1999 to a limited liability company from which emerged the Ghana Water Company. This paved the way for the introduction of a private sector operation and management of water supply systems (Osmanu, 2010, Bukari, 2017) in a bid by the government to promote efficiency in the water delivery sector.

With an emphasis on urban water service quality delivery, the nature of services is often dictated by the utility management model (UMM). This is urban-oriented, neo-liberal in nature with private sector participation, emphasis on cost recovery through tariff imposition, regulated by a statutory utility regulatory authority, and removal of government direct services (Adank & Tuffour, 2013; Bukari, 2017). It also employs large investment capital, such as piped water systems which are dependent on treated surface water sources (Plapally and Lienhard, 2013) delivered through private home connections, public stand-pipes, and tanker services.

Wa Water Supply System has been traditionally based on groundwater. However, the production from all the drilled boreholes which were being operated by the Ghana Water Company Limited has declined because of aquifer depletion and deterioration of the boreholes (GWCL diaries, 2018). As a measure to address these problems, a



surface water scheme, based on the Black Volta River as a source, was constructed and inaugurated by the government in 2017. The expansion works involved the construction of a 15,000m³/day treatment facility at Jambuse based on the Black Volta river as the source and laying of 18Km transmission lines as well as the construction of a booster station at Dorimon, with two (2) overhead tanks for water storage and distribution pipelines (GWCL diaries, 2018). The objective of this research is to establish how the establishment of the Jambuse Water Treatment Plant has affected the service quality delivery of GWCL and how stakeholders have performed their roles to support GWCL service quality delivery in the Wa township.

1.2 Problem Statement

WHO/UNICEF, (2017), asserts that approximately 2.1 billion people in the whole world are still deprived of access to safe water sources within their homes. This emphasizes the challenges faced worldwide over the provision of good clean water in the right quantities to meet the demands of consumers. Providing clean and safe drinking water remains one of the biggest developmental challenges facing developing countries in contemporary times. Sub-Saharan Africa has not been able to meet the MDG target for potable water with a projected 32% of the population without access to an improved water source at the end of the MDG period with about 102 million people using surface water (WHO, 2015). This explain why access to safe water is considered a fundamental human right (Megersa, 2018), and often incorporated into international and national treaties and conventions, such as the UN Declaration of Water as a Right (Connor, 2015), the MDGs 7 (UN, 2015), SDGs 6 (UN, 2018) and various national water policies. Such policies often prioritize various aspects of service quality, such as water quality, adequacy in distribution and access,



regularity of supply, affordability of tariffs, effective maintenance, and sustainability (Bukari, 2017; Munasinghe, 1992).

Theoretically, the reliability theory puts reliability at the centre of a water supply system with the efficient performance of its different components (Shamir and Howard, 2015) and positions it as a cross-cutting tool of the various facets of service quality delivery whereas the stakeholder theory explains how stakeholders can impact everything and everyone in a project or organization and identifies one of the values produced by stakeholder theory as greater productivity across the organization (Kazadi et al. 2016). However, the reliability theory is premised on the functionality of plants and equipment with less focus on the role performed by humans in service provision or even production of good water quality. The stakeholder theory is also centred on the performance of the different players in service without recourse to functionality of plant and equipment. This leaves gaps in the application of the two theories. This study seeks to test these theories which were propounded on varied grounds and establish their relevance in water service delivery using a conventional water treatment plant on a growing municipality.

Empirically, there have been several studies conducted in the service sector mostly in the financial and telecom industries, but few have examined the services provided by a utility company like GWCL, especially how service quality relates to customer satisfaction with portable water services. Agyapong (2010), studied the relationship between service quality and customer satisfaction in the utility industry (telecom) in Ghana. The relationship between service quality variables and customer satisfaction has also been examined using multiple regression analysis. The results showed that all the service quality items were good predictors of customer satisfaction. Awortwe (2018) and Badu (2016) also assessed the service quality delivery by Ghana Water



Company Limited at different parts of the country but failed to assess the impact the roles of stakeholders have in the service quality delivery and more especially determine how a switch from an existing operational regime like boreholes to conventional Water Treatment Plant as in the case of Wa, impacts on service quality delivery and customer satisfaction of a growing municipality.

Studies conducted in the Upper West Region in the area of water quality and services of GWCL have also failed to look at the service delivery concerning the management and administering the supply of water to enhance service quality delivery. Research has also failed to assess the activities of the service providers like the Ghana Water Company Limited and its stakeholders concerning their plans of asset replacement to improve efficiency as well as expansion and renewal of plant and equipment to meet the growing demands of potable water in the Wa township as well as ensuring that quality standards are met.

Examples of such studies conducted include Nantomah (2010), Osmanu (2010), Kpeita and Laari (2014), and Amoah and Yahaya, (2012). Conversely, these studies focused mainly on the accessibility and utilization of water from dams and boreholes in rural areas but failed to look at urban water service quality focusing only on potable water provision in the Wa township and the assessment of the quality of the service provided by the Ghana Water Company Limited and how that impacts on customer satisfaction. The studies did not consider the various aspects of water service quality delivery which will not only focus on the provision of water in the municipality but also the performance of the staff of GWCL as well as the roles the relevant stakeholders have to play in ensuring service quality delivery. These works have also failed to look at the impact of the new water treatment plant at Jambuse on service quality delivery in the Wa township. Bukari's (2017) covered the socio-economic



impacts of water provision with a focus on northern Ghana as a whole excluding the Upper West region.

Currently, in Ghana, the G.W.C.L which has the responsibility of providing potable water to urban dwellers is continually faced with the problem of supplying water consistently to its clients to meet their demands and even in cases where water is available, there have been persistent complaints about the quality of service which brings the issues of accessibility and utilization to the fore. The Ghana Water Company before 2017 was relying on mechanized boreholes with a daily average production of 1,400m³ although the daily demand for the Wa Municipality was 6,432m³ (GWCL diaries, 2020). The number of operational boreholes had reduced from 24 to 18 with most of them having low yield as at 2016. This resulted in a significant deficit in meeting the water needs of people in the Wa township. However in 2017, GWCL started the operation of the Jambuse Water Treatment Plant to address the huge deficit in water supply and also meet the growing demands of water by the Wa township, a shift from the usage of boreholes which was inadequate to a conventional water treatment plant. Despite this shift, it is unclear if the service quality delivery to the Wa township has seen any improvement. Issues of water quality, Reliability, Assurance, Tangibility, Empathy, Responsiveness, and Expansion are important parameters of service quality (SERQUAL/RATER model) which serves as a very good framework that can be used to examine if the water service quality delivery has been improved in the face of a continuous expansion of the municipality.

In light of these available works of literature, this study seeks to ascertain:

- How relevant is the conventional water treatment plant in solving the many shortfalls in the provision of potable water in the right quantity and quality.



- What is the nature of water service delivery considering the contributions of stakeholders in the Wa township?
- And how does the nature of service quality reflect in customer satisfaction and the corresponding willingness to pay for the services?

Given the gaps established by the theoretical, empirical, and practical perspectives from the enumerated literature, this study sought to examine the quality of the service of water supply in the face of the provision of this new water treatment plant with the main focus in the Wa township.

1.3 Research Questions

The main research question is: How does the quality of water service delivery by Ghana Water Company Limited (GWCL) affect customer satisfaction in the Wa Township?

1.3.1 Specific research questions

These are as follows:

1. What are the existing water delivery systems of Ghana Water Company Limited being used by customers in the Wa Township?
2. How effective are the roles of stakeholders in helping Ghana Water Company Limited to meet service quality delivery?
3. How effective is the service quality delivery of Ghana Water Company Limited in the Wa township?
4. What is the effect of the service quality delivery by GWCL on customer satisfaction and willingness to pay for water?



1.4 Research Objectives

The main objective of the research was: To assess the effects of water service quality of GWCL on customer satisfaction in the Wa township

1.4.1 Specific research objectives

The specific research objectives are outlined as follows:

1. To investigate the nature of water delivery systems of GWCL in the Wa Township.
2. To assess the effectiveness of the roles of stakeholders in the service quality delivery by GWCL.
3. To examine the service quality delivery of GWCL in the Wa township.
4. To ascertain the effects of service quality delivery of GWCL on customer satisfaction and willingness to pay for the water.

1.5 Hypotheses

The research hypothesis for this study was based on the willingness to pay function which is expressed in terms of water tariff, water service quality, customer satisfaction, household income, and other explanatory variables such as household size.

The null hypothesis of this study which measure the relationship between willingness to pay and water tariff, water service quality, household income and household size are stated below:

1. H_0 : Water tariff amount per month has no significant relationship with willingness to pay for water.



2. H_0 : Water service quality has no significant relationship with willingness to pay for water.
3. H_0 : Household income has no significant relationship with willingness to pay for water.
4. H_0 : Household size has no significant relationship with willingness to pay for improved water service quality

1.6 Significance of the Study

The success of any project is to ascertain its capability to meet its projected goals and objectives. It is more important when the project under consideration is the provision of water without which life cannot be sustained. This research will bring to light the success story or otherwise of the first conventional water treatment plant in the Upper West Region in the provision of service quality by GWCL. I will also make efforts to publish relevant portions of this work as articles to make it accessible to the general public. This will make it possible to inform policymakers who lay hands on it. It will inform them about existing challenges in the region regarding the supply of water and the appropriate remediation strategies to be adopted to solve these challenges. The research will also contribute to knowledge in establishing the prevalent water service quality operations and constraints in the region whilst providing a basis for future research.

1.7 Scope of the Research

The geographical scope of this study is co-terminus with the water distribution coverage of the Ghana Water Company Limited in the Wa township. The thematic focus of the study is to assess the accessibility and reliability of water provision in the Wa township. It will also look at the nature of the service provided in relation to customer satisfaction and willingness to pay for services and the various standards set



by regulators as well as the effectiveness of the roles of stakeholders in ensuring water service quality.

1.8 Organization of the Research

This research has been categorized into five thematic areas to facilitate ease of analysis and comprehension of the issues under discussion. This is presented as follows:

Chapter one (1) contains the general and specific considerations of the research. This includes the introduction, the background information of the research, the problem statement, the research questions, and the objectives of the study.

Chapter two (2) entails the theoretical foundations of the study and discussion of relevant literature and secondary data that are important to the study. It also includes the conceptual framework that is relevant to water service quality and seeks to bring to focus studies that have been conducted about water service quality.

Chapter three (3) provides information about the study area which is Wa township. It also discusses the sampling procedures and the tools used in collecting data. It further looks at the research design in general and the methods of data presentation and analysis. Research ethics were also considered under this chapter.

Chapter four (4) presents the findings of the study which are presented according to the objectives of the study. The findings are discussed in relation to literature, theories, and the conceptual framework. Statistical analysis was also done to test the hypothesis of the study.

Chapter five (5) shows the summary of the key findings of the study and presents the conclusions based on the findings and the theoretical underpinnings as well as the



conceptual framework. The last part of the chapter provides the recommendations for relevant stakeholders for their attention and action.



CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter gives an overview of the theoretical and empirical review of literature that relates to the topic. It discusses two main theories namely, the reliability theory and the stakeholder theory. It also covers empirical reviews on the nature of water service delivery, roles of stakeholders, water service delivery by GWCL, customer satisfaction, and expectation. It includes reviews on the evolution of water supply in Wa and the SERQUAL/RATER model. The rest of the chapter also focused on the conceptual underpinnings of the study where reviews are made on the nature of service delivery, the effectiveness of the roles of stakeholders, service quality, and customer satisfaction.

2.2 Definition of Key Concepts

This part of the thesis sought to bring meaning to the various concepts underpinning the study. The concepts identified for definition included service quality, stakeholders, customer satisfaction and willingness to pay.

2.2.1 Concept of Service Quality

Service quality is the delivery of services that meets or exceeds the expectation of customers by an organizations (Parasuraman et al. 1988). According to Asubonteng et al. (1996), service quality is the difference between what the customer's expect for a service performance before the service encounter and their perception of the service received. When an organization provides services that meets or exceeds the customers' expectation, then that organization is said to have a high service quality and one that does not meet the customers' expectation is said to have a poor service



quality (Hamer, 2006). An organization that is perceived to have high service quality standards has a competitive advantage over its peers and is likely to satisfy customers and gain customer loyalty (Kitapci et al., 2013). The service is a process which comprises of various activities which brings both service providers and customers together through business transactions. The service quality itself is the result of the service process. In this study, service quality is contextualized to mean the delivery of the mandated services of GWCL, supported by the effective performance of roles by other stakeholders to meet the expectation of water users.

2.2.2 Stakeholder Concept

The stakeholder concept originated from the work in business science (Freeman, 1984). The concept can be traced to the work of Adam Smith which he titled as *The Theory of Moral Sentiments*. Stakeholders are individuals or groups that have interests in the activity of an organization. Bourne (1995) posited that stakeholders are people or institutions whose interaction positions them as interested parties to the activities or ownership of an organization. According to the Stanford Research Institute, the survival of an organization is dependent on the backing of stakeholders (Strand, R., and Freeman, R. E., 2015). The contributions of the stakeholders affect the organization whilst the operations of the organization also affect the stakeholders. For this study, stakeholders are considered to be institutions that have an interest in the activities of GWCL. The effective performance of the roles of these identified stakeholders will result in service quality delivery of GWCL.

2.2.3 Concept of Customer Satisfaction

Customers' encompasses all individuals or organizations that receive services from one organization or the other. Whilst the organization positions itself to provide services that meets the needs of the client, the ability of the customer to be satisfied is



however dependent on the way the services meets the customers expectation (Bhatt & Bhanawat, 2016). Customer satisfaction can then be defined as a state of fulfilment from an experienced service (Dehghan, 2011). Customers' satisfaction also determines how the services of an organization meets the expectation of the customer and how the customer evaluates the service received. The expectation may affect the way that customers' even approach the service provision, meaning that it is important for researchers to first interrogate what customers expect before receiving service from the provider (Jun & Palacios, 2016). Evans & Lindsay (2002) further clarified that without first increasing satisfied customers, a business will not build reliable customers; this occurs when services and goods reach or surpass consumer standards. For this research, customers' satisfaction is defined to mean the sense of fulfilment derived from the total services of GWCL to meet the water needs of the people in the Wa Township through service quality delivery.

2.2.4 Concept of Willingness to Pay (WTP)

Willingness to Pay is the highest price a customer is ready to pay for services he/she enjoys (Bechwati, 2011). Willingness to Pay informs a service provider on the right price to charge for a service or product. According to Boksberger and Melsen, (2011), there should always be a convergence as to the price the service provider thinks the service or product is worth and what the customer perceives to be the right amount to pay for the service. Willingness to Pay is the estimation of the strength of the preference of what people desire against the amount they are willing to spend to actualize that desire. WTP can be measured in two main ways: First, the "revealed preferences" approach which focuses on consumer behaviour in the market and can be measured based on the information acquired from actual real market purchase of individuals and second, "stated preferences"; an indirect technique in which



consumers are asked to explicitly state their WTP (Saadatfar and Jadidfard, 2020). In the context of this study, WTP means the highest tariff a customer of GWCL is ready to pay for water considering service quality delivery of GWCL and other variables.

2.3 Theoretical Review

This section of the work focused on the theories that guided the work. According to Essaw (2014), theories are rules that help to position a study within a particular argument or help in establishing the relations between facts. In line with the objectives of this work, this section reviewed two (2) theories namely; the reliability theory and the stakeholder theory.

2.3.1 Reliability theory

This theory was first propounded in the work of Shamir and Howard (2015). They defined water supply reliability as, having constant water flow without interruptions. The concept of the reliability theory deals with the robustness of a system to function on a consistent basis and the time it takes to repair failures. It takes into consideration the effect of average time to conduct repairs in relation to the overall system failure rates. It also considers the importance of performance relative to operational failures because they are the system-level response to avoid failures of technical installations (Jin and Wang, 2012). The theory is based on four indicators as the key determinants of reliable water supply. That is, having additional water sources, standby pumping capacity, having large storage capacities and finally, regular and frequent maintenance of pumps, wells, pipes, and other water sources (WHO, 2006).

Teklitz et al. (2021) looked at the reliability theory concerning water quality. They asserted that although there is a need to forecast the contamination level of water and assess the water resources sustainability, this is difficult to achieve. In view of this,



they defined failure as a breach of water contamination standards and system components as disruptions in the surface water network. They then posited that, the careful study of the reliability of each component in the context of water quality using a stochastic variability process will result in spatially distributed probability- and physics-based sustainability measures of reliability, vulnerability, resilience, and the sustainability index. However, Cranfield University (2009) looked at water supply reliability theory in terms of technical and organizational reliability of a defined section in the water utility sector. It noted that reliability stems from the organizational reliability in operations and complaints management coupled with the technical reliability of water supply systems.

Shamir and Howard (2015), held that the reliability theory puts reliability at the centre of a water supply system and positions it as a cross-cutting tool of the various facets of service quality delivery. The reliability of a utility system has a direct correlation with the adequacy, provision of access, and utilization, and goes a long way to build and earn the trust of customers to a utility company (Nakata and Zhu, 2006). To achieve the desired level of reliability, the various relevant stakeholders have to play their assigned roles to the latter in a coordinated way to achieve the desired satisfaction of customers (Owen et al. 2001).

The reliability theory has however been criticized in its application. Bergman (1985) held that all man-made systems cannot be said to be perfect. He said some of the imperfections which can result in failure might come from the environment where the system is operated or the way the system itself is operated. They added that the manufacturer can introduce some defects in the system when building it or use materials that might hamper the smooth operation of such systems. They held that these inherent imperfections can result in failures and prevent the system from



functioning to its designed capacity. It is also added that the advent of computer science and demand in the upgrade of technology in systems makes the analogy of reliability to be very complicated. They asserted that analysis of the reliability of various components has to be made to establish the overall reliability of a system. The components to be considered includes reliability modelling, reliability analysis, reliability evaluation, reliability prediction, reliability allocation, reliability testing, etc. which they hold will support holistic system performance.

Despite these criticisms, this theory is very relevant to this study because it focuses on measures that GWCL has to take in the areas of quality service delivery with the right technical installations, consistent supply of quality water, and a good customer management regime for sustainable service delivery. Objectives 1 of this study relates to the reliability theory because it seeks to ascertain the installations which are available in the Wa township from which customers can draw water. The ability of these installations to function consistently will demonstrate their reliability to both GWCL and its customers. Objective 3 of this study also relates effectively to the reliability theory and provides enough grounds for this study. It will establish if GWCL has the framework in place to maintain a functioning installation that will supply good quality water and manage customer services and complaints to ensure service quality delivery.

2.3.2 Stakeholder theory

The Stakeholder theory was propounded by Edward Friedman in 1984 (Philips, 2010). The term stakeholder was however first used in a memorandum in the year 1963. A stakeholder is a person who has contributed his/her resources, knowledge/expertise and is affected by the output of an organization. It denotes all the interest groups whose activities can support an organization (Freeman and Reed,



1983) and can also be said to be a group of people who have come together to achieve a purpose or a goal. The concept of stakeholder can be broadly considered as a group of individuals or organization/organizations who consider themselves as having a stake in an endeavour.

According to Bryson (1995), the stakeholder theory seeks to study the importance of the relationships between all stakeholders in an organizational setting and also introduce business-based ideology into operations in the public sector (Jones and Wicks, 1999). Harrison & Wicks (2013), argue that stakeholder theory can help an organization to thrive higher even in a very tempestuous situation. This is critical because all organizations have stakeholders to cope with. The stakeholder theory can therefore be seen as a means which makes it possible for Public decision-makers to perceive in their surroundings of operations to find the existing opportunities and threats. Because of this, it can be deduced that the stakeholder theory comprises two approaches: the organization tailoring the right managerial practices to better serve its stakeholders, and the way stakeholders access their rights from the organization (Gomes, 2006). This can be seen as a two-prong kind of relationship where one side deals with how an organization/organizations acts when dealing with its stakeholders whilst the other relates to how stakeholders hold the organization/organizations to be accountable.

It is therefore important that institutions or organizations collaborate to deliver their roles effectively to their stakeholders in a way that will meet the expectations of its clients to draw a positive attitude from them. The clients' in-turn have a responsibility to live up to their responsibilities (e.g. tariff payment) in order to promote the sustenance of the organization/organizations activities and operational levels (Bukari, 2017).



When stakeholders are treated well, they contribute their all and all to the success of the organization. Walsh (2005), puts it that, when an organization achieves high outputs, all stakeholders benefit and when an organization fails, all stakeholders suffer. Bosse et al. (2009), suggest that stakeholder theory is important in research because it seeks to find out the relationship between stakeholders, especially in the water sector and their clients.

In his criticism of the theory, Keys (1999), argued that the stakeholder theory lacks specificity and cannot be put in a scientific context to demonstrate its relevance. They however suggested that a contractual agreement to underpin stakeholder relationship as in any economic venture will be vital to compel stakeholders to live up to their responsibilities. Ambier and Wilson (2006), questions stakeholders in making a claim in the success story of an organization. They held that the stakeholder theory diverts the attention of an organization from creating an economically reliant venture and rather concentrates on roles others have to perform and partaking in its dividends.

However, considering the existing framework within which various identified stakeholders operate, the theory is very relevant to objective two of this study which seeks to establish the effectiveness of the roles the various stakeholders have to play.

2.4 Empirical Reviews

This section of the study will be focusing on the practical dynamics of what various researchers have written in the field of water service quality delivery and customer satisfaction. This will be reviewed from the global perspective and narrowed down to what is prevailing in Ghana.



2.4.1 Nature of water service delivery

Globally, systems and utilities of water differ particularly in terms of private or public sector proprietorship. Despite this, it is important management concerns are looked at as this will help to improve the nature of water service delivery. Kawamura (2000), posited that it doesn't matter where the water is being utilized, certain scopes must be studied to be able to manage its delivery effectively. The nature of water service delivery can be identified in two different models. These are the Utility management model and community ownership model. In this study, the nature of water service delivery will be discussed using the Utility management model which was used by Adank and Tuffuor (2013). They asserted that the main model for urban water supply is the utility management model. This is because; the utility management model has an unblemished formal and supervisory outline. It also offers a great level of water service delivery through household connections. The rate with regards to gaining access to these water services is moderately low. GWCL is mandated to be innovative by rehabilitating and expanding the organization since they are the owners of the assets (Chan and Ameyaw, 2013).

Collaboratively, Dukelow (2015) alluded that, despite the possibility of charges for wasteful use of water, the State will continue to be vital in the provision of water than the stumbling market environmentalist models. One good thing about the market environmentalist model of water provision is that it is wholly costed and also demand-led. For the market environmentalist model of water delivery, water is not seen as a public good but rather it is seen as an economic good. In his work, Bukari (2017:252), asserted that during the era of Ghana Water and Sewage Corporation (GWSC), public water was provided as a social good under the supply-driven approach. However, with the policy shift to water provision as an economic good under the present demand-



driven approach, the rural and peri-urban communities are too poor to pay urban water tariffs to GWCL hence; price is the main tool for determining demand and supply of water. GWCL owns the urban water and is also responsible for producing and distributing water to households and institutions (Adank and Tuffour, 2013).

GWCL/GWUC as part of its responsibilities, through standpipes and domestic connections, supply water to its customers. Based on failed attempts by the District Assemblies and committees responsible for water, now agents who are paid 20% of their total sales are appointed by the utility to sell water through standpipes to customers. In order to ensure that the agents are not cheated and the utility is not also cheated by the agent, meters are placed to record the amount of water dispensed (Ghana Water Company, 2019). The diagram beneath provides an overview of institutional measures for the utility management model (Figure 2.1).

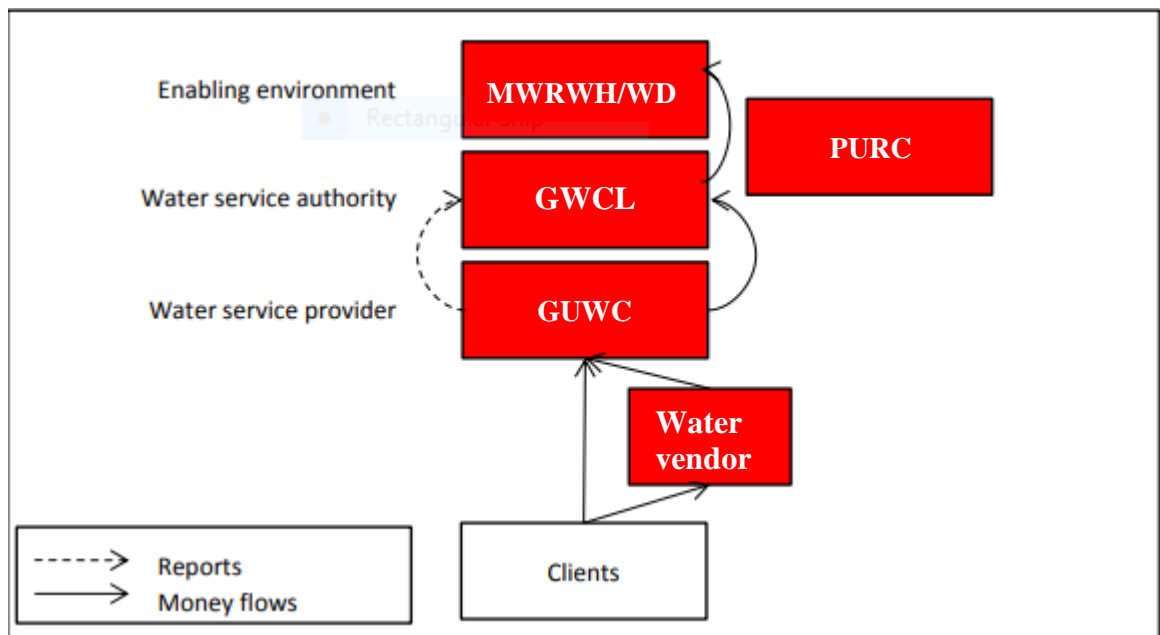


Figure 2.1. Utility Management Model

Source: Adapted from Adank and Tuffour, (2013).



2.4.2 Effectiveness of the roles of stakeholders in the service quality delivery by GWCL

Various stakeholders play significant roles in service quality delivery (Freeman & Reed, 1983). It is important to identify the various stakeholders and their assigned roles and responsibilities which can contribute to the effective service delivery of an organization like GWCL. According to International Water Association (IWA, 2004), "access to good, safe and reliable drinking water is one of the most basic needs of human society and as such requires an integrated approach, close cooperation, and partnership between all stakeholders". Some of these stakeholders are the Public Utility Regulation Commission, Ministry of Sanitation and Water Resources, Ghana Water Company Limited, and the Water Resource Commission.

2.4.3 Ministry of Sanitation and Water Resource

This ministry acts on behalf of the government of Ghana to direct the affairs of Ghana Water Company Limited (Ministry of Sanitation and Water Resources, 2020). It acts on behalf of the President to oversee the work of the management through the Board of Directors and formulates policies in line with the government urban water provision objectives. The ministry also fronts the Ghana Water Company Limited in soliciting financial support for major infrastructural works, expansion, and maintenance works (Parliament of Ghana, 2017).

The provision of funds through the Ministry of Sanitation and Water Resources enables GWCL to build new Water Treatment Plants in areas that do not have access to potable water and provide a sustainable and consistent means by which people can get access to water (Smiley et. al. 2020). Building of water treatment facilities usually involves huge investment and experts in the field to make it possible. The government through the ministry therefore contracts multi-nationals to undertake the projects at



places which have been earmarked within the framework of its developmental agenda. Without the provision of these treatment plants, it will be difficult for GWCL to provide water on consistent basis. The policy direction and provision of funds by the Ministry also helps GWCL to solicit funds to expand their distribution network to areas where they are already operating but with limited network and conduct major maintenance works on their installations (Parliament of Ghana, 2017). This ensures improvement in accessibility and consistent water supply to customers which invariably lead to a quality service delivery by GWCL.

2.4.4 The Public Utility Regulatory Commission (PURC)

In October 1997, the government of Ghana upon realizing the need instituted the PURC under Act 538 of 1997 to help regulate the utility services which are water and electricity in the country (Tufour, 2016). Functions of PURC include but are not limited to; helping in the determination of utility rates, supervising the performance of all utility service providers, ensuring that, service providers and consumer's rights and interests are protected, researching the effectiveness of utility service providers, and advice accordingly and many more (PURC, 2018).

The supervisory role of the PURC over GWCL ensures that GWCL maintains a consistent water supply to its customers with strict compliance to water safety standards (Doe, 2007) and also a harmonious customer care environment in their service delivery. It also offers consumers an opportunity to seek redress and assert their rights whenever they feel unsatisfied with the service been rendered to them by GWCL. The PURC acts as a referee by ensuring that there is quality service delivery by GWCL which is commiserated with the tariff being paid by the consumer. The commission also has the mandate to ensure that water users are paying the right amount for the water they use (WaterAid, 2010). The ability of the company to



recover the cost incurred in treating and distributing the water to its customers will also promote the efficient delivery of services which is essential to service quality delivery. According to Tuffour (2016), the membership of PURC includes Chairman, Secretary, Representatives from the Trades Union Congress, Industry, consumers, and four experts in respective fields. It is important to note that, the head of the commission is selected by the President. Every country has a way of protecting and supervising its water-related activities because of the importance of water to both humans and animals (Mergassa, 2018).

2.4.5 Water Resources Commission (WRC)

This commission was created under Act 522, 1996 (Water Resources Commission, 2018). This was necessary as a law was required to protect water resources in a country that just started practicing democracy. According to Bukari (2017), the WRC performs water quality analysis on the various water bodies in the country and also embarks on educational programmes at riparian communities. The water quality analysis helps the commission to monitor the trend in the quality of the various water resources and to ascertain its suitability for intended use as well as put measures in place to safeguard the water.

The commission also plays many functions some of which include, designing plans that will help in utilization and conservation of water resources, supervising all activities tailored towards the development of water resources, collation, and dissemination of vital information on water, bring all agencies on board to conduct scientific research on water and give recommendations to government on matters that have the possibility of affecting water resources in the country (Yeleliere et al., 2018).



With the GWCL as its major stakeholder serving on its committees and the board, there is a continuous collaboration between the two bodies (Suleiman and Cars, 2010). The supervision of the Water Resources Commission on activities pertaining to the usage and development of the water resources ensures that the quality of the water resources available including the ones that GWCL relies on for its water supply is not comprised in quality and quantity to ensure the sustainability of water supply to the populace (Monney and Antwi-Adjei, 2018). The inability of the Water Resources Commission to protect the water bodies through its laws, policies, and programs can lead to the deterioration in the quality of water which will have cost implications in the treatment of water for consumers and in turn result in a high tariff regime. A high tariff for the services of water provision can hamper service quality delivery. In the worst-case scenario, such water bodies might dry up or may be unsuitable for treatment by GWCL leading to potable water scarcity.

2.4.6 Ghana Water Company Limited (GWCL)

The Ghana Water Company Limited is the main stakeholder in the water service delivery in urban areas of Ghana. The company was established in 1928 at Cape Coast (Kessey and Ampaabeng, 2014). Again, the company was tasked with the responsibility of providing water to Ghanaian households in the urban areas after a change in policy in supply-driven bases when it was Ghana Water and Sewerage Corporation (GWC) to demand-driven approach (Bukari, 2017). GWCL was previously attached to the Public Works Department but was subsequently detached and placed under the Ministry of Works and Housing in 1957 when Ghana gained independence (Ministry of Works and Housing, 2005).

Since 1993, various reforms have been introduced to address the problems of the sector. The key objectives of the reforms were to separate rural and urban services,



introduce independent regulatory agencies, and promote private sector participation. To pay more attention to water supply and sanitation in rural areas, the Community Water and Sanitation Division was founded as a semi-autonomous division of GWSC in 1994. Four years later, it changed its name to the Community Water and Sanitation Agency (CWSA) and became fully independent. In 1999, the GWSC was replaced by the publicly-owned GWCL. At the same time, the responsibility for rural water supply and sanitation was decentralized to the District Assemblies. In addition, sanitation was separated from water supply and became a responsibility of the District Assemblies in urban and rural areas (Community Water and Sanitation Agency, 2004). The Act, which established the company, defines the company's objectives as follows;

- 1) The provision, distribution, and conservation of the supply of water in Ghana for domestic and industrial purposes.
 - 2) The establishment, operations, and control of sewerage systems for such purposes.
- The company was mandated among others to construct and operate works, set standards relative to water supply and sewerage, determine rates, charges, and effective methods of revenue collection (Government of Ghana (GoG). 1993).

The oversight responsibilities over GWCL have since been placed under the Ministry of Sanitation and Water Resources which was created in the year 2017 (Parliament of Ghana, 2017). GWCL has roles to play as expected by all stakeholders.

2.5 Water Service Delivery by GWCL

GWCL has the sole mandate to supply potable water to the urban population of Ghana (Amoah, 2013). This mandate comes with roles and responsibilities to supply water to the majority of people in Ghana in the face of rapid urban population growth and development. The expected services to be delivered by GWCL include the



abstraction, treatment, and supply of potable water to serve the urban communities. The Company is also to plan and develop water supply systems whilst conducting research and engineering surveys relative to water and related subjects (Agyeman, 2007). In addition, GWCL is also responsible for contracting out the design, construction, rehabilitation, and expansion of existing as well as new water supply infrastructure. This will ensure that there is the provision of potable water at places of need and improve water accessibility. Furthermore, GWCL is also expected to provide quality service delivery to its customers with the provision of water in the right quantity and quality (Ameyaw and Chan, 2013). By this, customers will be assured of having wholesome water which is enough to meet their needs and quality service expectation.

In terms of customer relations and services, GWCL is to manage the applications of new service connections, new subscriptions, and customer files to ensure that customers are connected within the stipulated time range and introduce efficiency in the management of customer complaints (Agyeman, 2007). The GWCL also has the responsibility to ensure that meter readings are taken accurately and there is the timely issuance of water bills to customers which will smoothen the company's revenue mobilization from customers (Awortwe, 2018). Concerning customers who default in settling their water bills, GWCL has the right to disconnect and prosecute them for non-payment of water bills and other offenses. The procedures to be followed by GWCL in providing excellent customer relations are well spelt out in the customer charter of the company (GWCL, 2018).

The ability of GWCL to live up to these expected roles and responsibilities will result in service quality delivery that will lead to customer satisfaction.



2.5.1 Challenges of Water Sector Performance

As indicated earlier, Africa has the worst water supply and sanitation coverage and also, 1 out of 3 households lacks clean and adequate water (WUP, 2003). Prasad (2007), also added that most developing countries are suffering due to a lack of potable water. Those countries in the developing world who manage to have access to water supply still suffer issues such as low coverage, no or low pressure, poor quality of water, and pipe leakages among others. Ehrhardt et al. (2006), suggests that in order to get the above problems resolved, the root causes must be unearthed as it will provide workable solutions to getting the issues resolved. Ehrhardt et al. (2006), further identified some possible causes, some of which include, lack of regular maintenance of assets of water supply machinery, lack of planning and government support, interference by politicians, ambiguous policies, low or no monitoring of staff and services, etc.

In Ghana, over nine million people have inadequate access to potable water (WaterAid, 2006). In most cases, there are long periods of consistent interruptions to the water supply to consumers which affects the adequacy of water available for use. The lack of routine maintenance to plants and installations of GWCL causes frequent breakdowns of these assets which affect the consistent supply of water across the Country (Tutu, 2016). In many cases, there is a lack of political will by governments to provide funds through the Ministry for Sanitation and Water Resources to build new Water Treatment Plants and expand existing networks to grant access to people who do not have access to potable water. Another major challenge is the over politicization of water provision and interference by governments in tariff setting which prevents GWCL to rake in the needed revenues to better manage its assets and ride on policies that will enhance its efficiency (Ainuson, 2010).



Most of the localities in the Greater Accra Region and other parts of the country depend on rivers, streams, and canals for their water supplies (Sarpong, 2004). Though this region hosts the capital city of the country, it is no exception when it comes to issues surrounding access and management of potable drinking water. It is expected to have the better condition than the other regions in the country since it is the seat of government. However, due to the unequal distribution of facilities, increasing population resulting in competition between industrial and domestic water demands, many communities within this region still have inadequate supply of potable water (Oteng-Ababio et.al., 2017).

Margueron (2001) added that abuse of water resources, lack of transparency by the staff of GWCL, lack of inspection by authorities, and improper tariff calculations are all challenges faced by customers of water services. However, Bukari (2017) noted that the inability or the failure of customers to pay their water tariff affects the ability of GWCL to provide quality services because GWCL is forced to do more disconnections because of the indebtedness and there are also fewer days of water supply. On the contrary, other challenges were identified by the World Bank. These challenges are, low performance by utility companies, no competition among utility sectors, lack of motivation for staff, and lack of planning (World Bank report, 1994; 2004).

2.5.2 Evolution of Wa water service delivery by GWCL

Amoah and Yahaya (2013), in studying the evolution of potable water supply in the Wa Municipality retraced the historical antecedent of the provision of water in the municipality. As part of their findings, they observed that the provision of public potable water in the Wa municipality of the Upper West Region dates back to the 1950s. They asserted that the Upper West Region was carved out of the then Upper



Region in 1983 with the view to accelerating development due to the deprivation in the area. The hydraulic unit of the Public Works Department (PWD) at the time was responsible for the treatment and pumping of water in the region. The primary focus of the department was geared towards ensuring that people within the catchment area have access to potable water for their countless uses (Ghana Water Company, 2019). Prior to the operation of the PWD, the people in the region for that matter, the municipality largely depended on hand-dug wells and dams for their daily water needs (Amoah and Yahaya, 2013). Due to the lack of adequate surface water in the catchment area, the department depended on underground water in the form of drilled boreholes. These boreholes were fixed with mechanized pumps that are connected to the treatment tank. This was the primary source of the potable water supply in the Municipality. It was so because the Region was not endowed with adequate surface water sources hence the department resorting to the use of boreholes. The PWD unit in charge of the water supply started \operating with three (3) boreholes. These boreholes were mechanized to pump water to the sole water storage tank which was situated at the centre of the city of Wa. With a storage capacity of 40,000 gallons, the storage tank at the time was too small to meet the increasing water demand of the people. With the prevailing technology, six standpipes were erected at the city center and connected to the storage tank to supply water to the people.

With a regional total population of about 438,008 in 1984 (Ghana Statistical Service, 2000) the population growth was not corresponding with the available and operational infrastructure for the treatment and pumping of water. The situation, therefore, necessitated an infrastructural expansion to increase the production capacity of the PWD to meet the increased water demand of the people (Doe, 2007). To this end, in the 1980s, a concrete reservoir with a capacity of one thousand eight-hundred-meter



cube (1800 m³) was constructed to improve the situation. The tank had a daily production capacity of about one thousand, three hundred and twenty-meter cube (1320 m³). It became evident that the drilled and mechanized boreholes which supplied water to the treatment plant in the 1950s have increased from three (3) to sixteen (16). It is worth mentioning that, additional seventeen (17) boreholes were drilled to further better the water supply situation. The operational infrastructural expansion in terms of the number of boreholes has seen an increase of only 18% since the advent of potable water supply in the area (Amoah and Yahaya, 2013). This situation can explain the overwhelming pressure on the infrastructure and its attendant water shortages in the municipality. Typical of almost all cities in Africa, the ever-increasing population rates (Songsore, 2003) were not growing with a commensurate expansion in the water infrastructure exerting undue pressure on the limited available facilities.

In light of this, in 2013, the Government of Ghana through the Koren Axim bank sponsored the construction of a 15,000m³ capacity water treatment plant at Jambuse community in the Wa West District of the Upper West region (GWCL, 2018). This waaaas accompanied by two storage tanks with capacities of 1000m³ each at Kpaguri and Konta.

2.6 Customer Satisfaction

Customer satisfaction in relation to customer-organization relationships has remained a priority among every company's leadership. However, George and Kumar (2013) noted that it is considered very difficult to quantify the excellent service of any organization whilst it is equally necessary to assess the company's efficiency. It records that the perceived cost of the service affects customer satisfaction and choice (Dehghan, 2011). Therefore, the customer satisfaction dimension helps to raise



awareness of customer outcomes and promote changes in the promotion methods and processes used within the business (Waris et al., 2010).

Parasuraman et al. (1988) previously referred to managed consumer satisfaction or happiness, given pre-purchase expectations, referring to the consumer assessment of services or goods. Since service providers and consumers are unique, the same customer may be distinct from the distinctive service provider (Bhatt & Bhanawat, 2016). The expectation may affect the way that clients even approach the service business, meaning that it is important for researchers to first interrogate what customers expect before receiving service from the provider (Jun & Palacios, 2016) with the expectations and observations of customers at a certain point dependent on the amount of communication with the service providers. Customer satisfaction is a barrier to customer loyalty which leads companies to retain customers (Markovic & Horvat, 1999). The expectations of customers that define their satisfaction might depend on some acquired ideas about such a company and not a one-day meeting (Ali et al., 2016). This link is formed by Zahorik and Rust (1993), who claimed that service quality drives loyalty charges, leading to a more desirable market share (Trubik & Smith, 2000). Two distinct concepts are happiness and loyalty; the delight is attitude and devotion is behavioral. Although buyers who are merely satisfied can often buy from rivals regularly because of sheer comfort, discounts, and/or various components, loyal customers typically end up spending more and are likely to pay higher prices. This can refer to existing consumers and are more cost-effective to try to deal with such a company (Evans & Lindsay 2002). They further clarified that without first increasing satisfied customers, a business will not build reliable customers; this occurs when services and goods reach or surpass consumer standards (Evans and Lindsay 2002).



2.7 Willingness to Pay

Willingness to Pay is the highest amount a customer is ready to pay for a service or product. Willingness to pay serves as a meeting point for customers and service providers to ascribe value to a product (Rao, 2020). It affords an organization an opportunity to better segment its market by considering issues of demographics, income, location and other factors when placing prices on its products.

One of the factors that influences a customers' willingness to pay for services is the economy and expenditure. The state of the economy affects the amount the customer earns and therefore might affects his/her ability to pay for services even if he/she finds the price to be reasonable (Zhang and Wu, 2012). Also, referencing of products with other competitive prices also has the ability to affect the Willingness to Pay. This is because when customers compare the price of products with other market prices of similar goods and find them to be high, they might not be willing to pay at that price. Rao (2020) added that another important factor that has to be considered is the product scarcity or the availability of alternative products. Accordingly, when an essential product such as water is not available, people would be willing to go at lengths to pay for the price given. Also when products that can serve as alternative are available, there will be less likelihood of customers incurring a high expenditure to pay for that particular product.

The expectation of a product quality to meet the customers' expectation is another major determinant to tell if a customer will be willing to pay a certain price for particular service (Zhang and Wu, 2012). If the product quality is perceived to be high then the probability of the customers' willingness to pay for it is more than when the product quality is perceived to be low. It is therefore important to maintain a high product quality to maintain a competitive advantage. The ability of a service provider



to create a strong brand image also influences the customers' willingness to pay for the price given for its products (Homburg et. al. 2005). The brand image prepares the minds of customers as to the cost of its services and products and therefore affects their willingness to pay for the services once they decide to patronize the brand. Another influencer is the seasonality associated with the demand of the product. There are products which are needed within a particular period and therefore enjoys a high demand during the peak season resulting in price hikes and a dip in prices during the off season (Rao, 2020). Although water is an essential commodity, it suffers seasonality with regards to willingness to pay for its tariff. This is because people will opt to harvest rain water and fetch from wells for some needs during the rainy season than to pay for water supplied by GWCL. This case is however different during the dry season. Depending on the place customers' live and their preferences, their willingness to pay for products and services will also be different.

2.8 The Service Quality (SERVQUAL/RATER) model

One of the oldest methods introduced by Parasuraman, et al. (1985) to assess the efficiency of service providers in terms of the quality of their goods was the SERVQUAL model. First-rate service was characterized by the SERVQUAL scale of performance as the distinction is between expectations of the customers and the expectations of the customer through the service provider. Mainly, the service providers rely on the differences between some of the services expected by clients and the perception of service (Cronin & Taylor, 1992). The SERVQUAL model is relevant in the statement of Buttle (1996) in a number of areas including, but not limited to, the banking industry, retail and shop facilities, restaurants and bars, telecommunications firms, the catering and hospitality sectors, the health sector and many more. The consistency of the service given strengthens customers' confidence in



continuing to support the service with the excitement of recommending it to friends and relatives (Torres-Moraga et al., 2008). The results concluded that when assessing the charge distribution of agencies, the correlation between service quality and customer satisfaction is to be full-scale. However, this was illustrated by Matzler and Sauerwein (2002), who grouped variables that can affect the enjoyment of customers into three systems; success components, enthusiasm factor, and fundamental variables as the current level for a customer to be dissatisfied with the product of a business. These variables do not inherently inspire satisfaction, but if absent, they induce disappointment. The factors that induce enjoyment, however, are overall performance components such as reliability and friendliness. The elements of enthusiasm are variables that, if fulfilled, ramp up the pride of clients. Therefore, Douglas and Connor (2003) argued that there might be an opening here between the expectations and experiences of clients.

The study of Waris et. al. (2010), identified the status of punctuality, frequency, speed, space, reliability, comfort, protection, operations, and offerings as crucial determinants. The SERVQUAL scale is the ideal instrument for assessing any company's outstanding service because customer satisfaction is very significant in marketing as it measures customer loyalty and motivation (Sheeba & Kumutha, 2013). So far, among the customer provider market, the convergent validity has remained the highest giant assessing service satisfactory element in a specialized shape (Ho & Lin, 2010; Kassim & Abdullah, 2010). They stated in earlier works by Parasuraman et al. (1988) that SERVQUAL has long-lasting opportunities to explore many entities and institutions, from both the private and public sectors (Rhee & Rha, 2009). The SERVQUAL tool is preferable because it offers a significant client-angle approach to the scale of the service offered (Curry & Hebert, 1998). This is true



because relevant data on provider gaps can be helpful for managers to figure out the overall progress in a business's results on concrete measurements, efficiency, responsiveness, guarantee, and empathy (Parasuraman et al., 1985).

Given the uniqueness of the SERVQUAL tool, it has been criticized on a theoretical and operational basis (Butt & de Run, 2010). Butt and Run (2010) theoretical complaint is characterized by the following reasons; they claim that the 5 dimensions of the unit are not common across board and that the large range of dimensions comprising first-class service is unique to the framework of the research undertaking. Objects are often no longer explicitly loaded to the reference image and there is an unacceptable degree of inter-correlation between the five dimensions (Rauch, et al., 2015). The key issue at an operational level is that the term "expectations" is not always beyond inherent difficulties, the number of dimensions per the scope cannot capture their complete span because their meanings can cause a misrepresentation amongst respondents.

Despite the above criticisms against the SERVQUAL system, it is still very effective in modern research and commonly used by many scientists without inherently altering the method significantly (McCollin et al., 2011; Saraei & Amini, 2012). The point is that the SERVQUAL method continues to be stronger, more valid, and more efficient than any other more desirable variant suggested using the literature (Tan et al., 2016). Chodzaza and Gombachika (2013), have previously stated that the main advantage of this technique is that it can be used as a legitimate method for quantitative tests to compare various stress testing purposes and to benefit from it. Therefore, measuring the quality of service in all fields, notably in the field of water service delivery, is still highly relevant.



The RATER model was adapted from the initial SERVQUAL approach that was used for quality of product measurement in a more detailed form of assessing service quality, but now involves the service industry (Parasuraman, 1988). The RATER model describes 5-dimensional characteristics that consumers are expected to recognize in their service quality evaluation (Parasuraman, 1988). These five dimensions are being found to be applicable to most organizations and industries although it was derived from the collapse of the previous ten SERVQUAL components. The value of each dimension can vary across industries. This is represented in Table 2.1.



Table 1.1: Modified service quality dimensions

Important Requirements		Service Quality Attributes
Reliability	Reliability	<ul style="list-style-type: none"> • Continuous water supply • Time of supply (when promised) • Consistency of supply
Responsiveness	Billing	<ul style="list-style-type: none"> • Accuracy in meter reading/billings • Regular meter reading/bill delivery • Reflection of payments
Tangible	Pressure	<ul style="list-style-type: none"> • Adequate pressure to high rise buildings • Constant pressure at all times
	Colour	<ul style="list-style-type: none"> • Physical appearance
	Taste	<ul style="list-style-type: none"> • Particle free • Taste free • Odourless
Assurance	Relevant knowledge	<ul style="list-style-type: none"> • Disconnecting without damage to pipes • Disconnecting only customers owing rather than groups in multi-tenancy dwellings • Prompt repairs of burst pipes and service provider bearing the costs • Staff exhibiting professionalism in carrying out duties
Empathy	Helpfulness	<ul style="list-style-type: none"> • Affordable Tariff • Responding promptly to customer's needs/complaints • Constant dissemination of information to customers • Provision of individual meters • Flexible meter/connection fee payment terms (installment)
	Courtesy	<ul style="list-style-type: none"> • Dealing with motivated staff • Notice before any disconnection • Notice should be adequate

Adapted from Parasuraman, 1988



2.9 Conceptual Framework

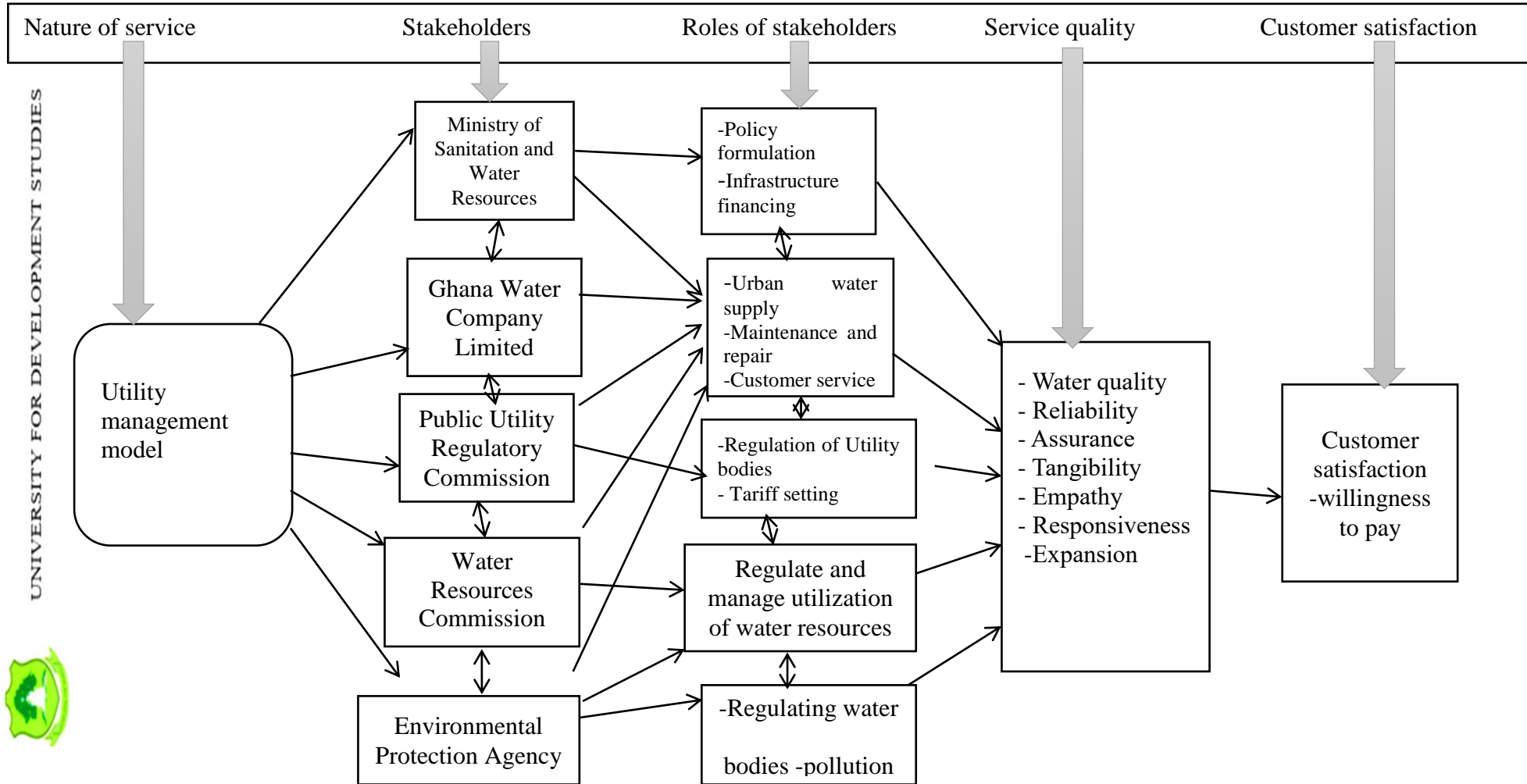


Figure 2.2. Urban water service quality management framework

Source: Adapted from Adank and Tuffour, (2013).

According to Adank and Tuffour, (2013), the utility management model is the main model for urban water supply in Ghana. It has a clear institutional and regulatory framework and provides high-level water services through household connections. The tariff related to accessing these water services is relatively low. As the owner of the assets, GWCL is responsible for the supply of water to urban areas, implementation of new infrastructure, and rehabilitation and expansion of existing infrastructure (Fuest and Haffner, 2007). To ensure that GWCL meets its mandate of ensuring service quality, other stakeholders have to effectively dispatch their roles towards water service delivery (Adank and Tuffour, 2013).

The Ministry of Sanitation and Water Resources (MoSWR), is a Ministry in the Infrastructure Sector under the Office of the Head of Civil Service (Parliament of Ghana, 2017). It was established in January 2017 to act and play a major role in the national, regional, and global effort to provide the needed support to the sanitation and water sector (Ministry of Sanitation and Water Resources (MoSWR), 2017). Until its establishment, the water sector was part of the Ministry of Water Resources, Works and Housing, and the sanitation sector was part of the Ministry of Local Government and Rural Development (Agyenim and Gupta, 2011). The goal of the Ministry is 'to contribute to improvement in the living standards of Ghanaians through increased access to and use of safe water, sanitation and hygiene practices and sustainable management of water resources' (Parliament of Ghana, 2017). The Water Resources Commission (WRC) is responsible for the regulation and the management of the country's water resources and the related coordination of policies and collaboration with other stakeholders in the water sector (Yeleliere et al., 2018) including GWCL. The responsibilities of the commission are set out in the Water Resources Commission Act, 1996 (Act 522) (Agyenim and Gupta, 2011). The Act



stipulates that ownership and control of all water resources are vested in the President on behalf of the people, and clearly defines the WRC as the overall body responsible for water resources management in Ghana (Water Resources Commission (WRC), 2017). The Commission is supposed to regulate the abstraction of water resources and institute a system for registering all drilling companies and their activities.

The economic and drinking water quality regulation for utility water supply in urban areas and small towns with utility water supply is undertaken by the Public Utilities Regulatory Commission (PURC) (Nyarko et al. 2016). The PURC is an independent multi-sector regulator, established by an Act of Parliament (Act 538), Oct. 1997 to oversee the provision of utility services, including water, electricity, and gas. For administrative purposes, PURC falls under the office of the President (PURC, 2018).

The Environmental Protection Agency (EPA), was established on December 30th, 1994, (Act 490) and given the responsibility to regulate the environment and to ensure the implementation of governments policy on the environment (Appiah-Opoku, 2001). It is the leading public body for protecting and improving the environment in Ghana and has regulatory and enforcement roles (Peprah et al. 2018). Some of the functions of EPA include:

- To secure by itself or in collaboration with any other person or body the control and prevention of a discharge of waste into the environment and the protection and improvement of the quality of the environment;
- To issue environmental permits and pollution abatement notices for controlling the volume, types, constituents, and effects of waste discharges, emissions, deposits, or any other source of pollutants and of substances that



are hazardous or potentially dangerous to the quality of the environment or a segment of the environment;

- To prescribe standards and guidelines relating to the pollution of air, water, land, and any other forms of environmental pollution including the discharge of waste and the control of toxic substances;
- To ensure compliance with the laid down environmental impact assessment procedures in the planning and execution of development projects, including compliance in respect of existing projects (Environmental Protection Agency (EPA), 2019).

The effectiveness of the roles of these stakeholders can result in good service quality as propounded by the stakeholder theory. Parasunaman, (1983), identified the attributes of service quality to be Reliability; Responsiveness, Tangibility; Assurance, and Empathy. These are explained for the study that whilst reliability means the consistency of water supply at the time promised, responsiveness deals with the accuracy of the billing regime and the ability of the company to respond to customers' complaints. Tangibility refers to the verifiable attributes of the water supply organization. This includes adequate pressure to high rise buildings, constant pressure at all times, physical appearance, particle-free water, taste-free, and odourless water but for the sake of this study, the water quality part (taste, color, odour) has been separated to enhance its analysis thereof (Vigneswaran and Visvanathan1995). Assurance is concerned with relevant knowledge which also includes disconnecting without damage to pipes, disconnecting only customers owing rather than groups in multi-tenancy dwellings, prompt repairs of burst pipes and service provider bearing the costs, and staff exhibiting professionalism in carrying out their duties. Empathy as explained by Parasunaman, (1988), means helpfulness and courtesy.



This is further explained to mean affordable tariffs, responding promptly to customer's needs/complaints, constant dissemination of information to customers, provision of individual meters, flexible meter/connection fee payment terms (installment), dealing with motivated staff, notice before any disconnection and notice should be adequate. For this study, expansion has been added to the various service quality attributes to help in the assessment of the impact of the Jambuse Water Treatment Plant in the expansion of facilities in the Wa township. The efficient delivery of these service quality attributes in the provision of water through the collaboration of all stakeholders will inevitably lead to customer satisfaction and hence willingness to pay for the services being provided. Oliver (1997). defined customer satisfaction as a customer reaction to a state of fulfillment and the customer judgment of the fulfilled state.



CHAPTER THREE

STUDY AREA AND METHODOLOGY

3.1 Introduction

This chapter has been divided into two (2) sections. The first section brings into focus the geographical setting and the demographic characteristics of the study area. Also discussed in the first section are the socio-economic attributes of the study area. The second part of the chapter deals with the research methodology with emphasis on the techniques or methods employed in data collection, presentation, and analysis.

The primary objective of this chapter is to highlight and define the location of the Wa Municipality which includes the Wa township which is the area of the study. This chapter is also meant to give information on the economic underpinnings of the municipality and the social structure of the area to demonstrate the various needs of water in the municipality and the ability of the people to afford the service being provided by Ghana Water Company Limited. The chapter also discusses the methodology to explain how the field research work was organized and the reasons for choosing such procedures. It further showed how the data was presented and analyzed.

The Wa township was chosen for the study because the research is focused on urban water supply which is within the scope and the responsibility of Ghana Water Company Limited.

3.2 Study area

The study focuses on the Wa township of the Wa Municipal Assembly. The area is best suited for this study because GWCL is mandated to supply water to the urban communities of the country whilst the Community Water and Sanitation Agency



supplies water to the rural communities. The location, demography as well as economic attributes of the township which form part of the Wa municipality as a whole are discussed as follows.

3.2.1 Location

According to Ghana Statistical Service (GSS) (2012), the Wa Municipality serves as the capital of the Upper West Region and has eleven District Assemblies. The Municipality shares administrative boundaries with Nadowli District to the north, the Wa East District to the east, and the Wa West district to the west. The Municipality lies between latitudes 9°50'N to 10°20'N and between the longitudes 9°40' W and 10°15'W (GSS, 2014). It has an area of approximately 234.74 km², about 6.4% of the area of the Upper West Region. The implication of the location of the municipality for development is, enhancing bilateral trade and commerce with Francophone countries (GSS, 2013). The Wa town has the potential to grow and be upgraded into both an industrial and commercial hub for the north-western corridor of Ghana.

Figure 1 (map) below shows the location of the Wa Municipality with some of the peri-urban communities that fall within the rapidly urbanizing process in the municipality which forms GWCL water supply coverage.



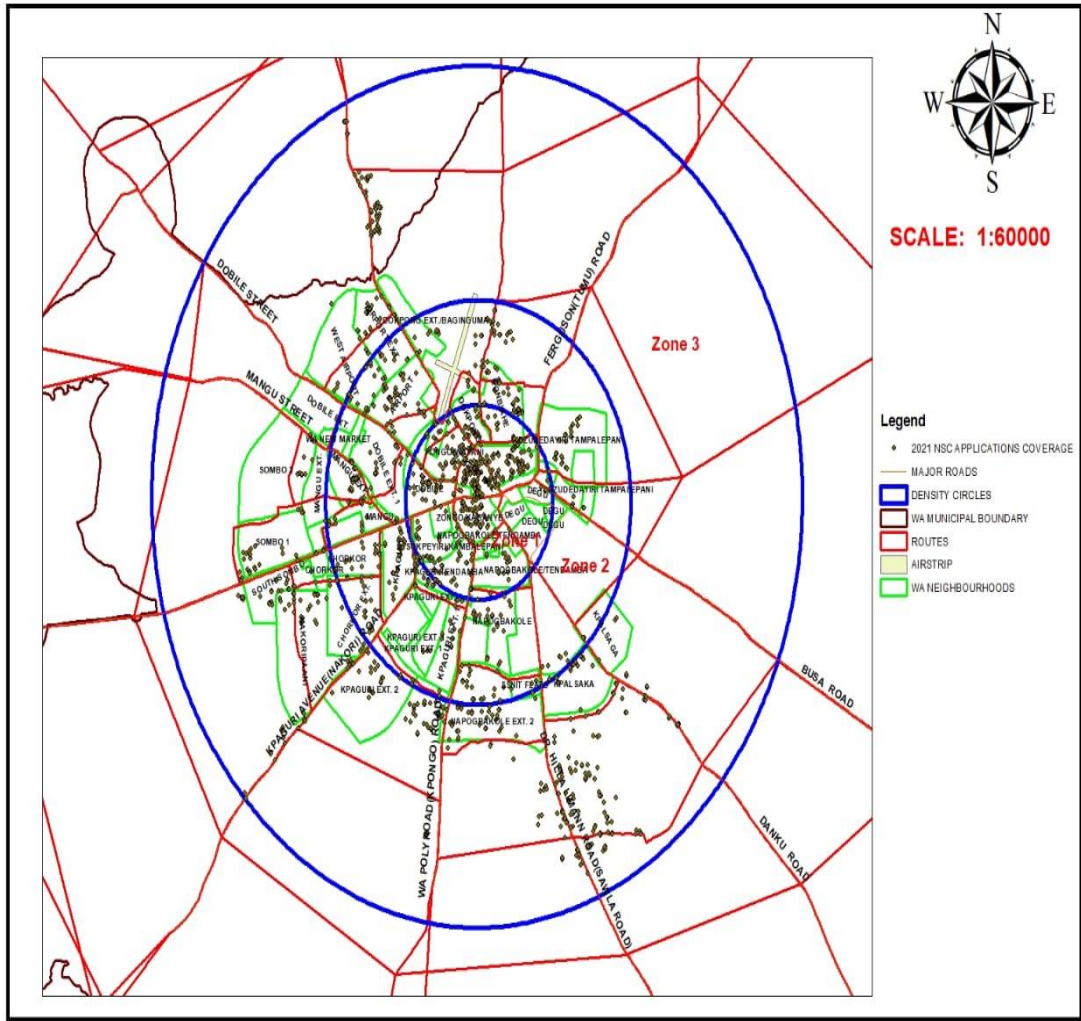


Figure 3.1. GWCL water distribution coverage in the Wa township

Adopted from GWCL, (2020)

3.2.2 Demography

The 2010 housing and population census conducted by the Ghana Statistical Service gives the population of the region to be 702,110 with an annual growth rate of 1.9%. The 2010 housing and population census also revealed that the Wa Municipality has a total population of 107,214. In 2012, the population increased and was given as 127,264 of which 61,826 are males and 65,458 are females. The urbanized population was 71,051 (GSS, 2016) representing 66.3% compared to the national urbanized share of 50.9% and the regional urbanized share of 16.3%. This indicates that the Wa

Municipality alone represent a 62% share of the region's urbanized population in the year 2010. The Municipality is also reported as having an urban population growth rate of 4% as compared to the national urban growth rate of 3.4% (GSS, 2019). The youth form 49% of the total population with a potential working population of 47% and 4% aged (GSS, 2019). This means a high dependency ratio since the economically active population is 47% compared to the dependent population of 53%. The population density is 542 persons per square kilometre with its associated development implication in the areas of housing, education and health facilities, environmental sanitation, water supply, pressure on land, and socio-economic infrastructure due to the rapidly urbanizing township (GSS, 2013).

3.2.3 Economy

In the previous years, Agriculture has been very dominant in the structure of the economy in the Municipality. This situation has however changed according to the 2010 housing and population census as cited in the 2014 analytical report. From the Population and Housing Census conducted in 2010, the service sector employs about 51.3%, agriculture 30.2%, and the industry sector employs 18.4% (GSS, 2014). Additional essential sectors which were identified include tourism, energy, communication, and transport. With regards to agriculture, the majority of the farmers are engaged in peasant farming and the crops which are grown are mainly, cowpea, rice, maize, millet, sorghum, and ground-nut which is normally on a consistent basis (GSS, 2016). Those that are grown as cash crops include soya beans, groundnuts, and Bambara beans. The economic trees which were identified within the municipality comprise shea nuts, dawadawa, baobab, teak, mango, and others (GSS, 2012).



3.3 Research Philosophy

This part of the inquiry takes a look at the principles that influence the methodical investigation of the conceptualization of the causalities, as well as how to establish the truth and realities (Sarantakos, 1996; Weaver & Olson, 2006) of the provision of urban water supply and the roles of stakeholders in ensuring service quality delivery and customer satisfaction in the Wa township. The researcher has discussed the following philosophical paradigm which underpins the study. The quantitative approach has positivism as its philosophical standpoint and is discussed as follows;

3.3.1 Positivism

From a philosophical point of view, positivism is deeply rooted in science and mathematics. It is premised on the fact that there should be a possibility to have verification on anything that is said to exist through experimentation, observation, and mathematical or logical proof (Wicks, 1998). Whatever cannot be confirmed through these scientific processes does not exist. Additionally, the proponents of positivism hold the view that developments as a result of science will remove or reduce significantly most of the challenges facing the human race (Freeman, 1998). Positivists are almost always strong realists and that is to say, they believe that what we experience as reality is out there in the world. In other words, they believe in objective truth. They are also inclined to deny the influence of things like theoretical and cultural biases that get in the way of science. Positivism divides all statements into three categories: true, false, and meaningless (neither true nor false).

A statement having a meaning can be said to be either true or false. But that doesn't mean we necessarily know which one it is. In principle, though, it could be verified through scientific observation which just doesn't have the actual means to carry out the study (Wicks, 1998). Positivism as a philosophical paradigm fits very in the



context of this study because it relates to the aspects of the research questions that deals with observable and measurable occurrences, such as the size of household income and service quality on willingness to pay which would be determined by the use of quantitative approach, which goes with the objective position of positivism.

3.4 Research Design

Research design can be described as the structure for the development of research and for finding the research answers. Research design is what holds the whole research work together and informs both the one conducting the research and the readers how the various components of the research are connected (Agyapong & Adam, 2019). The objective of research normally leads the researcher to select a particular research design from the different types available for the research work. This research design includes experimental, longitudinal, cross-sectional design, case study amongst others. The cross-sectional design was adopted for this study. Cross-sectional design involves the collection of information from any given sample of population elements only once. They may be either a single cross-sectional or multiple cross-sectional. Betensky et al (2003) indicated that cross-sectional designs have three distinctive characteristics: no time dimension, reliance on existing differences rather than change following intervention; and groups are selected based on existing differences rather than random allocation.

The study employed the cross-sectional design because data was collected and analyzed at one point in time. The purpose was not to explore any change but rather, focus on studying and drawing inferences from existing differences between people, subjects, or phenomena.



The triangulation design is the most common design associated with the mixing of research methods (Creswell, 2003). As a social scientist, I followed the concurrent method as a way to effectively establish a relationship between dependable and independent variables. I, therefore, used the concurrent approach to interpret the research results with both the quantitative and qualitative results from the field (Creswell & Clark, 2006).

3.5 Research Approach

Cresswell (2007) affirmed the significance of a research approach as an effective strategy to increase the validity of social research. The main approaches which have been adduced in literature are quantitative and quantitative. The third research approach is known as the mixed-method approach.

Quantitative research is centered on gathering numerical data (Agyapong & Adam, 2019). In this research approach, statistical models are used to analyze and explain the data collected. The use of a questionnaire is a typical example of tools used for collecting data for this type of research.

Qualitative research unlike quantitative research seeks to describe or interpret whatever is being researched. This type of research provides data in the form of words or visual representations. The researcher must observe, record, and analyze what happens (Agyapong & Adams, 2019).

The mixed-method approach is a blend of quantitative and qualitative approaches. Creswell (2009) explained that the mixed method approach has gained popularity in both the social and human sciences despite the roles that quantitative and qualitative approaches have played. Mixed methods often create an avenue for the researcher to harness the strengths of both quantitative and qualitative approaches and bring a



broader perspective to the phenomenon under study. Considering the advantages and suitability of using the mixed method approach and also taking into account the research objectives which require both quantitative and qualitative data for analysis, the mixed-method approach was adopted for this research.

3.6 Methods of Data Collection

This section delves into how the mixed-method approach was used in collecting data for the research work. It seeks to give an understanding of how the instruments for data collection were used under both the quantitative and qualitative approaches to collect data and the reason why these instruments were chosen for the data collection.

3.6.1 Quantitative Approach

This deals with the objectivity part of the research where numerical data is obtained by ascribing numbers to the findings in the research. It involves the use of mathematical and statistical correlations (Cresswell, 2009; Sarantakos 1996). This approach also involves the presentation of data in the form of numbers, percentages, and statistical coefficients. The collection of data using the quantitative approach is discussed below;

Survey

A survey is a research strategy that is used to collect data from a relatively large sample of the population in a systematic way and which can be expressed quantitatively (de Leeuw, Hox, and Dillman, 2008). According to Groves et al. (2009) and Salant and Dillman (1994), because the survey is related to objectivism, it is important to avoid errors by ensuring construct validity. They explained that construct validity refers to the extent of reliability of the findings concerning what was intended, and viewed in the context of the research focus and survey questions.



In line with the criteria defined by Groves et al. (2009) and Salant and Dillman (1994), the first step in the survey process of this study was the objectives and associated research questions. Accordingly, the major and specific research objectives and questions were stated in Chapter 1.

Survey questions on the background of respondents and other measurable variables related to specific survey questions under the research questions had options based on the specific characteristics to be measured. For instance, ranges were given for variables such as age, household size, monthly income, and tariff rates respondents were willing to pay at varying amounts of water and other service conditions, while categories were specified for sex, education, employment status, and occupation among others.

The questions were set using empirical indicators for the measurement of the concepts generated by the theoretical bases of the study, as well as policy and other socio-economic influences that shaped the research problem. These are all stipulated in the conceptual framework (Hox, 1997).

This study first determined the target population. A population is a group of elements or cases, whether individuals, objects, or events, that conforms to specific criteria and to which a researcher intends to generalize the results of the research (Asamoah & Duodu, 2006). GWCL operations in the Upper West region cover the urban areas of the Wa municipality. The total customer strength as of January 2020 stood at 4,609 and was distributed into two broad zones. The first zone had eight (8) subzones and the second zone also had eight (8) subzones. The lottery method was used to choose two operational areas randomly from each broad zone. The number of customers



within the four operational areas selected which was 943 constituted the population from which the sample was chosen for the study.

Since it was very difficult or practically impossible to allow all the members of the three different population types (domestic, commercial, and government customers) to respond to the questionnaire due to inadequate resources and time constraints, samples were selected for the study. A sample is a representative unit or subset of a universe (population). Sampling procedure is the process or steps taken to select samples from a study population. Sampling enables a researcher to study a relatively small number of units in place of the target population, as well as obtain data that are representative of the target population (Sarantakos, 1988). A total of 281 respondents were purposively selected from the population (943) chosen for this study as presented in Table 3.1. The 281 respondents were selected using Taro's equation on the number of customers in each of the four operational areas selected to constitute the sample frame. This was done using purposive sampling. In purposive sampling, researchers purposely choose subjects who, in their opinion, are thought to be relevant to the research topic. In this case, because the research borders on people who are using potable water from GWCL, the researcher made customers of GWCL his target for obtaining information for the research work. This is corroborated by Sarantakos, (1988) who asserted that the judgment of the investigator is more important than a probability sample. The population of the various zones selected and the target sample size are presented in Table 3.1 below:



Table 3.1: Summary of population and sample size from the study area

S/N	Communities	Population	Sample size
1	Dobile Low Cost	138	46
2	Kabanye No. 1 & 2 / A-Line	264	51
3	Kambale/ Kpaguri	231	41
4	Dondoli/ Jejeyiri	310	61
	Total	943	281

Source: GWCL Customer Care, (2020).

The selection was to ensure that customers were selected across all the areas under the coverage of GWCL in the Wa township. After the sample for each zone had been identified, the accidental sampling method was used to select the respondents for the study. The accidental sampling method involves choosing the nearest or available individuals to serve as respondents and continuing the process until the required sample size has been obtained (Sarantakos, 1988). Respondents who use the same water delivery facility in the same compound especially private home connection with the same meter were treated as a single respondent because it was assumed that their experience with the service delivery will be the same.

The instruments used for the quantitative approach of data collection were a set of questionnaires for the target sample. Kerlinger (1973), observed that the questionnaire is widely used for collecting data in educational research because it is very effective for securing factual information about practices and conditions of which the respondents are presumed to know. A questionnaire is a useful and widely used instrument for collecting survey information, providing structured and often numerical data. Also, it is useful for the collection of data without the presence of the



researcher, and it is often comparatively straightforward to analyze (Cohen et al. 2005).

After an intensive review of literature, the questionnaire was designed based on the salient points in the literature review and the specific research questions formulated. The questions were set using empirical indicators for the measurement of the concepts generated by the theoretical bases of the study which influenced the shaping of the research problem. These are all stipulated in the conceptual framework (Kerlinger, 1986; Hox, 1997). The questionnaire was administered to the respondents who could read, understand and respond to the items accordingly. Where respondents were unable to read, the researcher converted the questionnaire into an interview guide to solicit the required information. The questionnaire was divided into six sections. Section A comprised of 11 items structured to find out the socio-economic-demographic characteristics of respondents. Section B consisted of 9 items structured to find out the nature of water service delivery systems in the Wa township. Section C and D had 5 items each which were designed to solicit information on the expected roles and performed roles of the major stakeholders. Section E dealt with the assessment of water service delivery of GWCL in ensuring service quality with 21 items. The final part was section F which had 21 items structured to get information on customer satisfaction and 8 items to obtain information on willingness to pay for water supplied by GWCL. The questionnaire consisted of closed-ended and open-ended questions and some categorical questions relevant to the research topic.

3.6.2 Qualitative approach

This is where the study adopted information gathering and analytical methods that are non-quantitative to support the quantitative approach concurrently. 'While the quantitative facet used survey method, the qualitative approach was exploratory, and



theoretically influenced by hermeneutics, phenomenology and symbolic interactionism' (Bukari, 2017:175). By the exploratory character, the study sought to obtain detailed information using the trajectory specified by Barton and Lazarsfeld (1979) and Bukari, (2017). In other words, analysis of research objects was facilitated through this approach by interpreting, understanding, and relating published research findings to the contextual basis of the current study as a feature of hermeneutics. Because of this, specified instruments were used in collecting data for the qualitative approach.

These instruments included a qualitative semi-structured observation guide, structured questionnaire with open and close-ended questions for Ministry of Sanitation and Water Resources officials, GWCL officials, Public Utilities Regulatory Commission, Water Resources Commission; Environmental Protection Agency; and semi-structured focus group discussion guide with close and open-ended questions for water vendors. The application of these instruments in the collection of data are discussed as follows;

3.6.2.1 Key informants Interview

An interview can be explained as a face-to-face interaction between the researcher and the respondents. Specifically, a key informant interview was conducted on the management of the PURC, the WRC, EPA, and the GWCL who were deemed to have adequate knowledge of the subject under investigation. An informant is someone who possesses knowledge about the social phenomenon the researcher is interested in and is willing to tell the researcher what he or she knows about the phenomenon (Babie, 2005). Key informant interviews often demand interviewing a selected group of people who are deemed likely to have rich information, ideas, and insights on a



particular subject (Kumar, 1989). In this study, an interview guide which was in the form of a questionnaire with close and open-ended questions was used which covered the topic, and issues on the subject were listed. The interview of these institutions was necessary to establish the roles they are performing in the Wa municipality regarding water service delivery quality and to find the correlation between the findings of the interview and the response of the customers who are direct or indirect beneficiaries.

3.6.2.2 Focus Group Discussions

The researcher used a semi-structured interview guide for the Focus group discussions. Focus group discussions enabled the incorporation of group stories from a mixed-gender perspective into the findings. The researcher employed focus group discussion to examine the performance of some water service providers in the Wa township and also to ascertain the challenges they face in their line of duty in providing quality service. These service providers included the water vendors who man the public standpipes on behalf of GWCL. The information solicited from these discussions established how the water vendors as a third party evaluated the services of GWCL in providing water for the public and how they as intermediaries see themselves as part of the value chain in providing quality service delivery to water users. It also brought to light the challenges they face in rendering the service and what they think should be done to improve the provision of water service delivery quality. The problems of time management with interviews and focus group discussions, due to encounters with 'talkative' respondents, and the effect of poor interpretation of questions on response errors were foreseen. The use of close-ended questions and the guided prompts were the adopted strategies to solve such problems.



3.6.2.3 Personal Observation

Observation means a method of data collection that employs vision as its main means of data collection (Sarantakos, 1993). The researcher thus took note of the environment and the state of the various household pipe connections and the public standpipes as well as the offices and operations of GWCL using a semi-structured observation guide. The additional merit of observation was to triangulate what respondents say they do, to what they do (Taylor-Powell & Steele, 1996). Hence, observation of these installations and activities went a long way to confirm the information being gathered and also communicate to the researcher even incidents or activities which are not provided in the responses. This observation technique also gives the researcher an avenue to probe further into responses given to get more information as well as gain clarity to such responses.

The researcher also employed the use of cameras to take pictures of some installations like the household pipe connections and the public standpipes as well as the mobile tankers to bring a better appreciation of the nature of water service delivery systems in the Wa township.

The collected data were documented by transcribing responses into the appropriate margins of the instruments and field notebooks. Mobile phones were also used to record the voices of respondents. The notes and recordings were studied on the field. The purpose was to determine how to code them under specific themes based on the research questions so that they correspond to those covered in the quantitative approach for triangulation.

Before executing the survey questions, it was evaluated by the researcher's supervisor who determined the appropriateness of the wording and responding categories for the



survey population. Where respondents were found to be illiterates, the researcher and other trained assistants turned the questionnaire into an interview schedule and read it to the research discussants for their response.

3.7 Data Presentation and Analysis

Data presentation for the quantitative approach took the form of summarized tables and diagrams using statistical tools such as percentages. The qualitative data was presented using narratives and quotations. The researcher then used interpretive, discursive, and narrative analytical methods in ascribing meaning to the data collected.

The study also used both qualitative and quantitative data analysis. Analysis of the responses was done in accordance with the research questions. Responses from the various categories of respondents were discussed systematically in line with the research objectives and questions. Thus, the data that was collected was coded and sorted into themes (thematic analysis) and the analysis and discussions were generally based on the thematic areas. The responses to the questions were coded and entered into the SPSS computer software and subjected to descriptive statistics for analysis and interpretation. Coding is used where observation categories have been developed and the items of observation are clear, specific, and known in advance. Codes serve as symbols, a shorthand recording, where actions and behaviours are replaced by numerals or keywords (Sarantakos, 2005).

3.7.1 Binary Logistic Regression

The logit model or logistic regression is a way of using statistics by virtue of a logistic function in a collective logistic distribution to determine the association between a categorical dependent variable and one or more independent variables by estimating



probabilities. All of the independent variables could be dichotomous and categorical, but some could be continuous (Pallat, 2005). Leech, Barret, and Morgan, (2005) also assert that Logistic regression is used when the dependent variable is dichotomous with only two options usually by discreet choice.

Binary logistic regression also assumes that the outcomes are independent or mutually exclusive. This means that a single case must belong to one group or another and represent only once. This statistic was used to test the willingness to pay model adopted for this study, and related factors used in the CVM for research question one.

3.7.2 Data Analysis

Once the data was put together, it was logged and categorized to make it easy for analysis. The relationships between concepts and variables were identified and both qualitative and quantitative analyses were done concurrently.

Qualitative data presentation took the form of pictures, maps, tables, and boxes. For example, picturistic evidence was given on the state of public standpipes and private home connections. Maps were also used to show the study area and the extent of coverage of piped water services in the municipality. Tables showing non-numerical coding that rank nominal and ordinal data (e.g. on nature of water services) into high, medium, and low; sometimes, good, bad; and other descriptions relating to colour, taste, and smell of the water was also used. The narration of some responses from focus group discussions and interviews was also presented.

The analysis was based on a candid description of the phenomena being discussed to include narrations and explanations as to why the observed situations were so. This included confirmation of findings from the categorization process described earlier, as well as making reference to the theoretical, conceptual, empirical, and policy



frameworks expressed in the literature. The aim is to fulfil the underpinnings of the main philosophical paradigm of positivism. This was done by examining how the different facets of the study integrate the multiple relationships among the several constructs of realities through interpretations, explanations, narrations, and verbal correlations.

The last part of the analysis sought to test the hypothesis of the study by using the binary logistic model. This model aided the researcher to determine the significance level of the variables of the dependent and independent variables which were presented in the willingness to pay function. The willingness to pay function is presented as follows:

$$D=D(P, R^*, Y, Z)$$

Where D= Willingness to pay for water

P= price of water (tariff)

R*= service quality consumers expect to receive;

Y= level of economic activity (Household income); and

Z= vector for other explanatory variables (Household size).

3.8 Ethical Consideration

The researcher was courteous and also ensured that the privacy of respondents was not invaded during the interview process and also assured participants of anonymity and confidentiality. According to Agyepong and Adam (2019), ethics relate to moral choices affecting decisions and standards, and behaviour and as such, it is quite hard to lay down a set of clear rules, which cover all possible moral choices, especially in research, where the practical aspects of the study such as, how and when to meet



people for interview, how to deal with some respondents changing their mind about being part of the study.



CHAPTER FOUR

PRESENTATION OF RESULTS

4.1 Introduction

This chapter presents the results of the study. The section presents the demographic features of the respondents as well as results which are presented according to the objectives set out for this study. It also looked at the nature of water service delivery by G.W.C.L in the Wa township, analyses of the effectiveness of the roles of stakeholders, the examination of the effectiveness of the service delivery of GWCL, and finally, the customer satisfaction based on the service quality delivery and the willingness of the customers to pay. It also included some discussion of the findings of each objective.

4.2 Background of Respondents

This section presents the demographic features of the respondents. It looks at the households' characteristics such as age, sex, educational background, employment status, occupation, monthly income, the respondents in the household, and the household size. Table 4.1 below depicts the findings on background characteristics of respondents in the study:



Table 4.1: Background of respondents

Background characteristics	Frequency	Percentage
Age		
18-59yrs	182	64.8
60yrs+	99	35.2
Total	281	100
Sex		
Male	157	55.9
Female	24	44.1
Total	281	100
Educational Background		
Literate	229	81.5
Illiterate	52	18.5
Total	281	100
Employment Status		
Employed	235	83.6
Unemployed	36	16.4
Total	281	100
Occupation		
Farmer	36	12.8
Nonfarmer	245	87.2
Total	281	100
Monthly Income GHC		
445 or less	108	38.4
446 or more	173	61.6
Total	281	100
Household size		
6 or less	66	23.5
7 or more	215	76.5
Total	281	100

Source: Field survey, (2020).

4.2.1 Age

The study revealed from Table 4.1 that most of the respondents interviewed were between the ages of 18-59 years which is the economically active age grouping according to the Ghana Statistical Service. This manifested in 64.8% found to be within the age of 18-59 years whilst 35.2% of the respondents were above the age of 60 years.



This means that most of the respondents who took part in the study were mature and independently minded to make an assessment of the services being delivered by GWCL and other stakeholders and draw a conclusion as to whether these services meet their expectations. Their economic viability also positions them to evaluate the services they are receiving and the satisfaction they are deriving from it as against the amount they are paying for those services.

4.2.2 Gender and literacy

Again, 55.9% of the respondents were males with 44.1% being females. This was so because although the Ghana Statistical Service indicates that there are more females than males in the municipality from the 2010 housing and population census, most households interviewed preferred the males in the house to respond to the questionnaire where they are available. Females interviewed responded where they were the household heads or the males were absent. This gender information will also demonstrate how the work of GWCL is seen with regard to gender perspective. In most households, the man is the head of the house and is therefore expected to know about the expected services of GWCL and decide whether the services received are commiserated with the tariff being paid for it. In contemporary times, however, the economic viability of both sexes and the ability to assert their rights give both genders the ability to make an informed decision as to whether the services of GWCL are satisfactory or not.

Furthermore, the study also revealed that 81.5% of the respondents were literates whilst 18.5% were illiterates. These findings confirm the 2010 housing and population census which stipulated that the majority of the people in the municipality are literates and placed the literacy rate at 65.2% and the non-literary rate at 34.3%.



The level of literacy of the respondents also showed that they can, first of all, comprehend the questions been asked by the researcher and give answers from an informed standpoint. This also means that they can interrogate issues pertaining to GWCL and its stakeholders with regards to their service delivery based on what they know from literature and what they have experienced as being delivered which will inform their satisfaction level.

4.2.3 Employment status

The results from the employment status are in tandem with the age variable which shows that majority of the respondents are economically viable. This is represented by 81.5% of the respondents who are employed and have a consistent source of livelihood as against 18.5% of the respondents who are not employed. This is an important variable that will determine the ability of the respondents to pay for the services they receive from GWCL. It will establish whether the respondents' willingness to pay for the services is informed by their employment status, the quality of the service received or other variables discussed in this study. With the majority of the respondents gainfully employed it can be deduced that they have the capacity to pay for the services being delivered by GWCL if they perceive that their services meets or exceeds their expectation.

4.2.4 Occupation and income level

12.8% of the respondents were also found to be farmers and 87.2% of them were nonfarmers, this again confirms the 2010 population census which found the majority (29.3%) of the population in the region as skilled agricultural, fisheries, and forestry workers with about 70.7% engaged in a non-agricultural related occupation. This finding confirms the national statistic which puts the service sector as the largest factor in the economy of Ghana. Considering Wa as a Municipality and the majority



of the respondents engaging in non-agricultural activities, it will mean that most of the activities of the respondents are in the Municipality and therefore the respondents have the opportunity to assess the performance of GWCL in the provision of water daily. This also means that their activities do not take them out of the Municipality and will therefore be in a position to answer accurately what they make of the services being rendered to them by GWCL. The capacity of the respondents to also pay for the services of GWCL cannot also be seen to be aligned with the season as most subsistence farmers do.

The study further showed that most people in the Wa township earn more than GHC446.00. This was represented by 38.4% who earn an average monthly income of GHC445 or less whilst 61.6% earn a monthly income of GHC446 or more. This indicates that the majority of the respondents earn above the minimum wage which is GHC388 per month. The relevance of this data is to establish whether the respondents will be able to afford the tariff for the water they consume. With the majority of them above the minimum wage, it is expected that with all things being equal, the majority of the people should be able to pay their water bills. The study will reveal if the income level of the respondents influences their willingness to pay for water bills.

4.2.5 Household size

The study also revealed that 23.5% constitute a '6 or less people are in a household whilst 76.5% constitute '7 or more people in a household. The finding does not support the 2010 housing and population census of the municipality which indicated that the average household size is 5 per household.

The number of people in a household can influence the amount of water used. It can therefore be deduced that respondents who have large households will use a lot of



water and will also find it difficult to control water wastage. The higher the consumptive capacity, the higher the water bill and therefore the higher the payment for the services. The ability of households to pay for their water bills from GWCL however can depend on their economic viability, quality of the services received, and other variables. However, this study revealed that the household size influences the willingness of the people to pay for the water bill.

4.3 The Nature of Water Delivery Systems of GWCL in the Wa Township

This section presents results seeking to meet objective one of the study which is looking out for the nature of water service delivery systems of GWCL in the study area. The section seeks to establish the major sources of water delivery systems in the areas under study as well as the major means by which respondents can access water from GWCL.

4.3.1 Major water delivery systems in the study area

In investigating the major source of water in the area, Figure 4.1 of the study revealed that the major source of water in the Wa township is private home connections followed by Public standpipes and finally the Mobile tanker.

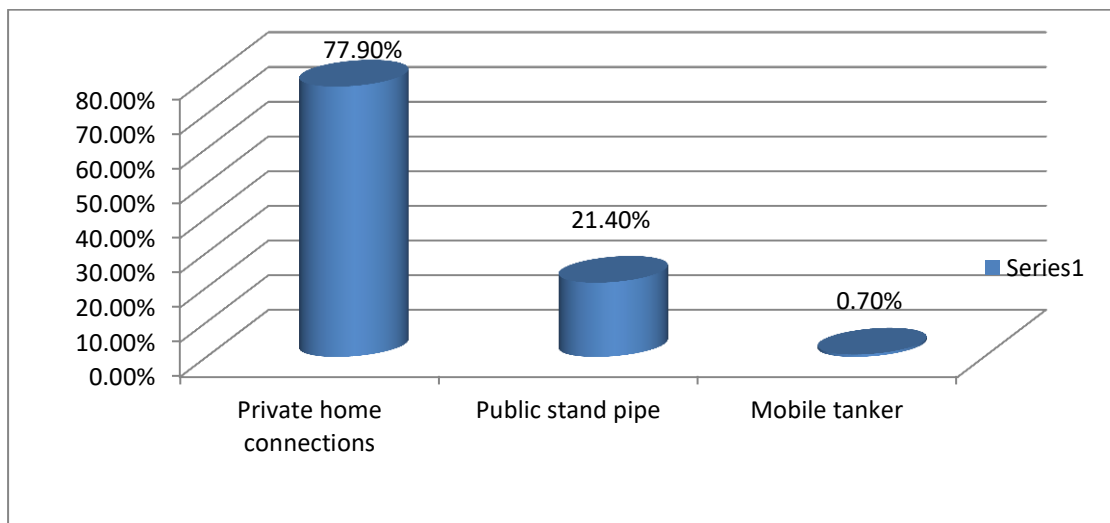


Figure 4.1. Major sources of water in the study area

Field survey, (2020).



These are represented by 79%, 20.3%, and 0.7% respectively. These percentages were however not significantly different from the results of the survey in respect to the major source of water available to respondents (i.e. 77.2%, 22.1%, and 0.7%) for private home connections, Public Standpipes, and Mobile tanker services respectively. This infers that almost all of the GWCL water delivery systems which are in the study areas are also accessible to people within the GWCL coverage area. This means that many people within the coverage area have access to the GWCL mains for the water connection and at places where there is a cluster of people who do not have private home connections, public standpipes are provided for their use. The last of the water provision systems in the area is the mobile tanker which is relied on in times when the pipes are not flowing to parts of the township.

Institutional level interviews indicated that there is supply of water from GWCL to many parts of the township. However, there are differences in terms of access with respect to different locations. It was revealed that there is enough water that can reach everyone in the municipality and even beyond due to the production capacity of the new Jambuse Water Treatment Plant. GWCL also has a mobile tanker that can be booked for water to be supplied anywhere in the township. Where there are problems with the private home connections or the public standpipes in a particular area in the township, the mobile tanker service is another reliable means by which people can have access to water anywhere in the Wa township.

Further institutional inquiries indicated that many people now prefer tapping the GWCL mainline to their homes to have water closer to them. It was reported that there are many instances where households in the same compound are willing to own their water meter indicating people's willingness to manage their water usage. In a discussion with GWCL public standpipe vendors who operate the public standpipes



on behalf of GWCL, it was revealed that the patronage of their services takes a seasonal dimension. In many cases, people fetch water from the public standpipes during the dry season when there is high demand for water to meet household needs. This trend decreases in the rainy season. The issue is that in the rainy season, households supplement the water from the public standpipe with rainwater which they harvest when it rains. It was also ascertained that those who do not go to fetch from the public standpipes at all are those who have domestic pipes in their compounds or have dug boreholes. These people look for alternative water sources when there is a problem with the GWCL system or that the public standpipes too are not working. These category of people depend on the services of public/communal boreholes and/or mechanized boreholes by private operators who sell their water to the public.



Figure 4.2: Private home connection of GWCL water

Source: Field survey, 2020





Figure 4.3: GWCL Public standpipes

Source: Field survey, 2020

As the research is focused on the water service quality delivery in urban areas by GWCL, there was 100% confirmation that the institution that provides the major source of water in the Wa township was the Ghana Water Company Limited. This is also corroborated by Adank and Tuffour (2013) when they held that it is the responsibility of GWCL/GWUC to supply water to its clients through household connections and standpipes.

GWCL, the main supplier of portable water in the Wa township is producing enough water which is capable of supplying the entire township yet difficulties in the extension of the distribution network deny some people in accessing these services in the Wa township. The findings support the work of Jameel (2018) who asserted that in many urban settings, the majority of the dwellers depend on the services of pipelines which are usually supplied and managed by the government through the



establishment of management bodies. Households usually fetch water for their use on daily basis. The reason for this is that many of them do not fetch and store water for future use but rather access water to meet their daily needs. This corroborates the evidence that households spend about 2 hours in a day to collect water on one hand (Niemczynowicz, 1999) whilst on the other hand, the finding differs from the finding of (Niemczynowicz, 1999) who argued that urban dwellers get water service from vendors and water kiosk and the prices are twice the services of pipe supplies. There is a constant supply of water among households that rely on the GWCL main lines. This finding supports the work of Howard (2015) who is of the view that water supply is reliable when there is constant water flow to the users at all times without interruptions.

4.4 Effectiveness of the Roles of Stakeholders in the Service Quality Delivery of GWCL

This section seeks to address objective two of the research. It examined the respondents' knowledge and their expectation of the various stakeholders who are duty-bound to perform their unique roles to ensure water service quality delivery in the Wa township and further interrogated the respondents' assessment of those expected roles as to whether they are observed as being performed by the various stakeholders. The respondents, therefore, had the opportunity to identify one role or more as the expected role or roles of a particular stakeholder and then make an independent assessment as to whether they think those roles are being performed by the respective stakeholders. Where respondents have difficulties in identifying the names of the stakeholders, such stakeholders were referred to and described as government to bring clarity. This stands to reason given that all the agencies referred to are governmental agencies.



4.4.1 Ministry of Sanitation and Water Resources

This is the ministry that directly implements government policy in relation to the water sector. The expected roles of the ministry are presented in Figure 4.3 as follows:

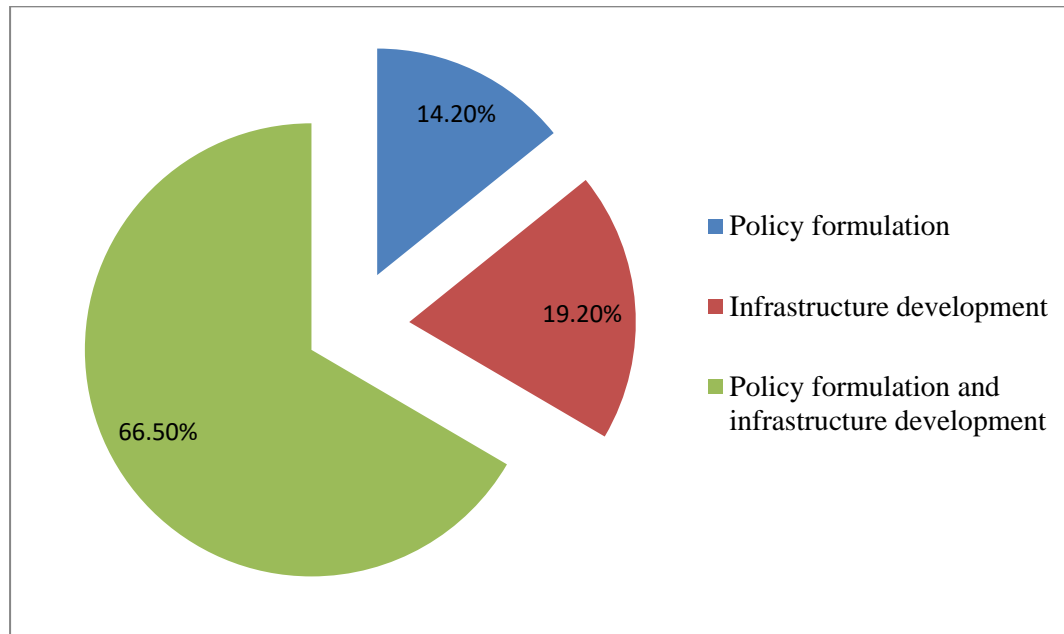


Figure 4.4. Observed roles performed by the ministry of sanitation and water resources

Source: Field survey, (2020).

From Figure 4.3, the majority of the respondents (96.8%) believed that the Ministry was responsible for the formulation of policies to be implemented concerning water supply and the development of infrastructure for the provision of potable water. 2.1% however held the thought that the Ministry was only responsible for policy formulation for the water sector whilst 1.1% believed that the mandate of the Ministry is to ensure infrastructure development. In responding to the observed roles being performed, 66.5% poised that they have observed that the roles of policy formulation and infrastructure development are all being performed. This was followed by 19.2% who said they have observed that the Ministry has only engaged in infrastructure development alone whilst 14.2% said policy formulation is the only role they have



observed that the Ministry is performing all in helping GWCL to deliver quality service to the township.

The expected and observed roles of the Ministry of Sanitation and Water Resources are in line with the conceptual framework of this study which indicates the supportive roles to be played by the Ministry to ensure that GWCL meets its mandate in ensuring service quality delivery in the Wa township. The response suggests that the Ministry has a key role to perform in the provision of potable water through the GWCL for people in the municipality. These ties in with the infrastructure development observation as portrayed by the majority of the respondents who expected the Ministry to not only have those roles but also observe them as performing them. In this case, the respondents acknowledged the construction of the Jambuse Water Treatment Plant as one of the major infrastructural developments in the region and the on-going expansions of the distribution coverage of water in the region which will improve the accessibility and utilization. They added that before the construction of the Jambuse Water Treatment Plant, although GWCL was in the region and providing water, the water was limited to a small coverage area in the town and there were no extensions to new residential areas which were coming up. However, the Jambuse Water Treatment Plant has changed the narrative because there is a consistent flow of water in the township which also ties in very well with the reliability theory. Many peripheral areas which have sprung up have had an extension of the water distribution to those areas. The findings support what a representative at the Ministry of Sanitation and Water Resources office in Wa said:

You are aware this Ministry was carved out of the Ministry of Water Resources, Works, and Housing so although the mandate for the water sector has not changed much, few things are being done anew.



Throughout the country, the Ministry through the sector Minister has been working tirelessly in making sure Ghanaians gets access to potable water and also meet the SDG goal 6. This can be seen with the Ministry activities through the Ghana Water Company Limited in Wa. I mean by the coming on board of the Jambuse Water Treatment Plant, Wa has one of the most modern and reliable sources of water supply for the whole Municipality. Other works are ongoing somewhere but in the case of the Wa Municipal, there is a consistent supply of water because the capacity of the plant is even more than the present demand of the Municipality. We are also expanding the water supply coverage in the town so as you can see, Nakore, Dobile, Bamahu, and Sombo just to mention a few which were previously not having water are all now enjoying the water.

(KII; Official of Ministry of Sanitation and Water Resources, Wa)

Clearly, the importance of the role that the MoSWR plays in the water sector to enhance service quality delivery cannot be over-emphasized. The provision of the Jambuse Water Treatment plant and the expansion of the distribution network promote the reliability of water supply in relation to the service quality model. Dukelow (2013), alluded that, there is the possibility of charges for wasteful use of water but the State will continue to be more vital in the provision of water than the stumbling market environmentalist models. She maintained that as long as people regard water as a public good for which they have to assert their rights, there is a compelling need for the state to make provision in ensuring that there is adequate access to water to meet the needs of the citizenry.



4.4.2 Ghana Water Company Limited

Under this theme, the respondents were given the opportunity to demonstrate their knowledge as to what services they expected from GWCL and make an assessment as to whether those services are being performed. The researcher sought to assess the role of GWCL as a stakeholder in general terms to ascertain how the respondents will assess the work of GWCL with other stakeholders. Table 4.4 presents summarized expected roles of GWCL and presents the findings as follows:

Table 4.2 Observed roles performed by GWCL

Observed roles	Frequency	Percentage
Urban water supply	25	8.9
Customer service management	6	2.1
Urban water supply and maintenance and repairs	27	9.6
Urban water supply and customer service management	26	9.3
Urban water supply and maintenance and repairs and customer service management	187	70.1
Total	281	100

Source: Field Survey, (2020).

The majority of the respondents (70.1) maintained that they observed GWCL to be performing the roles of urban water supply, customer management, and maintenance and repairs followed by 9.6% who observed that urban water supply and maintenance



and repairs are being performed by GWCL. 9.3% said urban water supply and customer management, 8.9% said the only role being performed by GWCL is urban water supply with 2.1% also indicating that it is only customer care management that they think GWCL has been performing.

The field survey revealed that most people in the Wa township are aware of the roles they expect GWCL to perform in meeting their mandate. This was represented in the majority of people expecting the GWCL to be able to supply water to the township and be able to manage the complaints and the needs of the customers they are serving. The customer complaints could include problems with discrepancies with bills, the accuracy of meter reading, application for new service connections, communication with customers on the operations of the company as well as any other issue that comes to the attention of the GWCL officials as customer problems. Again the majority of the people expected GWCL to conduct maintenance and repairs on their equipment and machinery to effectively and efficiently supply water to all the customers.

Interview conducted with officials of GWCL enumerated the responsibilities of the company to include operations and maintenance as well as customer care management as the main work of the company. It was discovered that the operations and maintenance include production and distribution of potable water but during the production process, the plant and equipment being used in the production line are bound to suffer damage and faults which necessitates a very good maintenance schedule as part of the operations. The company has a very organized maintenance team in place that is fully equipped with the requisite maintenance tools to tackle problems that come up during their line of operations. The maintenance team has a maintenance schedule that they follow to conduct routine maintenance but in cases



where unplanned situations come up, they are resolved within the shortest time possible to ensure the populace is not denied water for a long period. This is the way GWCL ensures reliability and responsiveness in their service quality delivery. A respondent has this to say regarding the operations and maintenance work of the company;

Our maintenance team is a whole unit that covers maintenance works from the production site and the distribution system in the town. It is made up of diverse professionals like mechanical, electrical, and civil technicians and engineers as well as pipefitters. They are mostly stationed in our office in Wa here so it is very easy to attend to complaints on equipment and bursts that are reported. Cases that involve the production equipment are also attended to by the team taking into consideration the nature of the problem. They are always on hand to fix whatever problem and I am sure you have been seeing them in town every day attending to maintenance problems.

(KII; Ag. Regional Production Manager of GWCL, Wa)

The interview at GWCL also revealed that customer care management is a very important part of their operations. It was iterated that the water produced will not be of any benefit if there are no customers to consume it. There is therefore a deliberate continuous effort to improve on the customer service management department. These include the operation of a toll-free number to enable customers to gain easy access to the customer care personnel with their complaints or reports. The company also have their complaints offices furnished to give the customer comfort anytime they visit the offices of the company. This is because of the premium the company places on the



customers who are very important stakeholders. This ensures Empathy and Assurance in the service quality delivery of GWCL. There are customer care officers who read the meters on monthly basis and also deliver accurate bills to the customers. All these measures are put in place so that the customers' complaints will be timely addressed. The respondents added this as part of the answers to the questions posed in the interview;

*We even have an electronic platform where all our customers' details are loaded in a server so at a predetermined time of the month, the monthly water consumption are transmitted electronically to all customers and this is followed with the normal manual distribution of bills which ensures that the customer receives the bill for the month. We have also had a shortcode which is *170# and *701# which can be used by customers to pay their water bills on MTN.*

(KII; Regional Commercial Manager of GWCL, Wa)

4.4.3 Public Utility Regulatory Commission (PURC)

This section seeks to bring to bear the expectations of respondents concerning the roles of PURC and whether the PURC is performing these roles as expected.



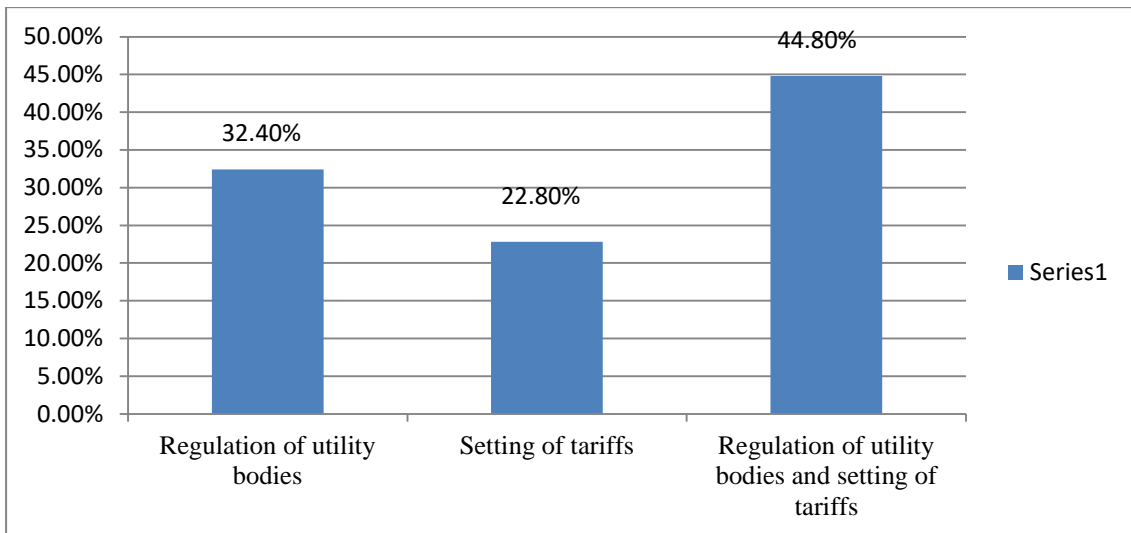


Figure 4.5. Observed roles performed by PURC

Source: Field Survey, (2020)

The study showed that almost 100% of the populace (98.4%) expect the PURC to be responsible for the regulation of utility bodies like the GWCL and VRA and also be in charge of tariff setting in the Region. However, 1.4% disclosed that they think the PURC should be responsible for the setting of tariffs only with 0% giving any indication that they think the PURC should be regulating utility bodies alone. The expected roles as revealed were however different from the findings as to what people observed the PURC to be doing in meeting these expected roles. Although the majority of the respondents still maintained that they have observed the PURC to be performing its roles in relation to regulation of utility bodies and setting of tariffs, this majority constituted only 44.8% of the total respondents as compared to 98.4% who identified these as expected roles. 32.4% responded that the only role they think the PURC is effective in the regulation of the utility bodies but not the other responsibilities whilst 22.8% also disagreed with the views of the previous respondents by indicating that the PURC only performs its role of the setting tariff.



The results of the expected roles of the PURC indicates that the respondents know and expects the PURC to regulate the governmental organizations like the GWCL which is under their jurisdiction and also properly conduct due diligence and show leadership when it comes to the setting of utility tariffs for companies like the GWCL and other companies. However, it can also be deduced that the respondents do not believe that the PURC is living up to all these responsibilities which are likely to affect the service delivery of GWCL. Although the majority still thinks that the Agency is working towards the responsibilities of regulating the utilities and setting tariffs, there was a drastic decline in the percentage compared to those who expected these responsibilities of the PURC. This means that although many people see these as the roles of the PURC they do not think the PURC is living up to the performance of these roles. As many as 32.4% and 22.8% thought that regulation of utility bodies and setting of tariffs respectively are the only roles that the PURC is performing in the region. This is an indication that less than half of the populace see and observe the PURC to be performing its roles wholly. This assessment could stem from the respondent's personal knowledge and engagement with the PURC or for those who see the PURC as a government body, translating their expectation of the government in the area of water service quality delivery by GWCL to the PURC.

According to a desk study, the PURC ACT 538 gives the commission the power and mandate to regulate Public Utilities but when considering Urban Utilities there is the need to qualify it to Public Urban Utilities. A respondent said:

ACT 538 talks about Public Utilities so the PURC is limited as to whom they regulate. Our system is got to do with Public Urban Institutions that government has total control so we regulate VRA, GRIDCO, NEDCO- VRA as well as GWCL and the Independent Power



Producers but even with them what we do is the tariff we give them. Apart from the tariff, we have boundaries, when they are into contracts we don't go there so it is the ACT that establishes the PURC that defines our role.

(KII; Regional Head of the Public Utilities Regulatory Commission, Wa)

Further desk study revealed that the PURC is responsible for regulating water tariffs in the municipality. Anytime the GWCL wants to increase water tariffs, a proposal is sent to the PURC for consideration, and advice is given to the company as to whether it is necessary to do so. In doing this, the commission also takes into consideration the cost of operation and maintenance vis-à-vis the proposed tariff by the GWCL because a tariff regime that does not meet the operational cost of GWCL is likely to affect its service quality delivery. This and many things pave way for appraisal of the new tariffs. The next thing the commission does in tariffs regulations is a public hearing. Public hearing/education is always conducted when there is going to be a new tariff regime. The PURC is enjoined by law to do a public hearing which allows Ghanaians to express their views on any new development of the water utility payment system. So the average Ghanaian get to know that GWCL has proposed to increase tariff, say by 30 or 40% and so they have the chance to agree or disagree with the proposal. This process of a public hearing is what is termed the public hearing index. The GWCL has to include in their proposal the new development that has taken place to warrant the new tariffs. For instance, the level of the new expansion to be done on the water system. Another component that is considered is the debt regime. This comprises all water users who are owing GWCL including individuals and institutions (government and non-governmental). In the analysis of the debt regimes, some debts



are declared bad debts especially governmental institutions that are never ready to pay for user fees as well as non-revenue water. In terms of improvement of the service quality delivery by GWCL, the main issue is the consistency of water flow as well as repairs and maintenance of obsolete distribution systems because some of the water systems tend to produce dirt which affects the water quality when maintenance works are conducted. This threatens the reliability of GWCL in its water service delivery. The commission also expects the GWCL to improve in terms of its customer care management where the billing and metering have to improve to demonstrate assurance and empathy in its service delivery. All these considerations will determine the acceptable level of the tariff being proposed

There are structures in the Agency to oversee all the Public Utilities in and around the Region. The office is an office for overseeing and monitoring all water production and utilization activities. This is made possible through the use of the monitoring of the utility companies, directly and indirectly, receiving complaints from customers and visiting the Utility Company's offices to ensure compliance. Compliant management is one of the most effective supervisory instruments that the PURC uses to stir GWCL to service quality delivery. Issues of water quality complaints received by the PURC are immediately communicated to the GWCL who follows up to make sure the problem is corrected. Also, issues about wrong billing and discrepancies in water tariff payments are all taken up and investigated by the PURC which works with GWCL to remedy the situation. Issues of leakages and water interruptions that come to the attention of the PURC are also followed up to facilitate an immediate resolution by GWCL. The PURC also visits the customer care centres of GWCL to ensure that the facilities which are provided there to be used by the customer whilst they are being served meets acceptable standards and can inure to customer satisfaction.



The PURC is one of the few institutions whose activities with GWCL ensure that all the dimensions of the SERQUAL/RATER model relative to service quality are met. Issues of reliability of water supply, water quality provision, the assurance of guaranteed service, the tangibility of infrastructure and facilities, the empathy of staff in service delivery to clients, and the responsiveness of staff of GWCL to attend to issues that come to their attention are all tackled in the supervisory role of the PURC.

One of the structures available is the Consumer Services Committees which monitor the communities and report back to the offices. They are more or less the groundmen in the communities and take note of all infractions and things that need the attention of the Agency. The Community Monitoring Committees does groundtruthing to ascertain whether what is being reported is really what is on the ground in terms of compliance by the Utility Companies. The PURC is therefore mandated to put GWCL on its toes in ensuring that they do not only meet its mandate to produce and supply water to the people in the Wa township but they meet the expectations of customers with an effective service quality delivery.

4.4.4 Water Resources Commission (WRC)

The Water Resources Commission is another organization that was identified as a stakeholder. An assessment was made by respondents to review their expected and performed responsibilities to aid the researcher ascertain the effectiveness of these responsibilities and how they affect water service quality. The results are presented in figure 4.5 as follows;



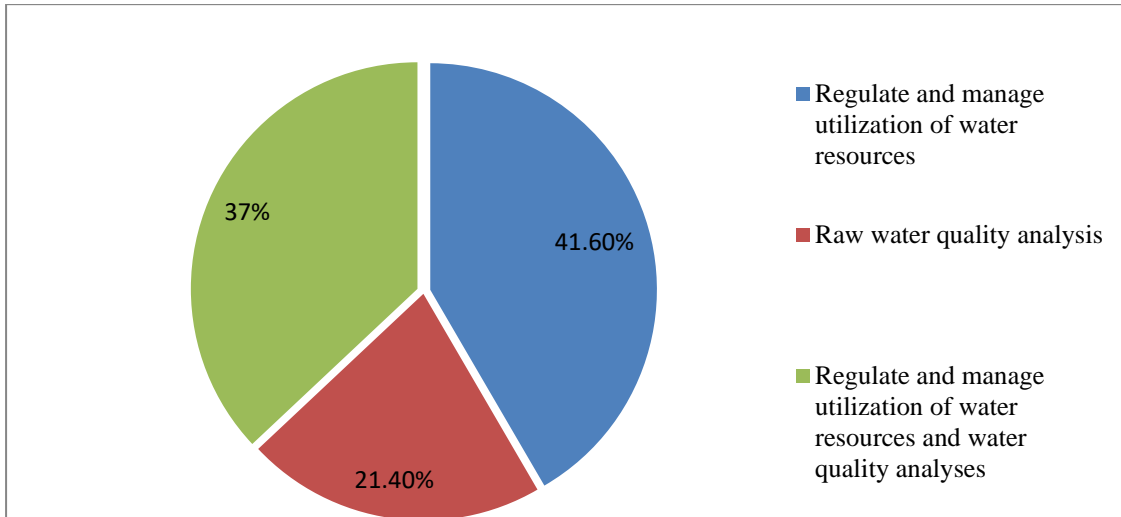


Figure 4.6. Observed performed roles of the Water Resource Commission

Source: Field survey, (2020)

The respondents who expected the WRC to be responsible for both regulation and management of water resources and conduct raw water analysis were 72.6% which indicates a majority. Those who identified the role of regulating and managing utilization of water resources only were 25.6% whilst those who saw the conduct of raw water analysis as the work of the WRC were 1.8%. The inquiry into what the respondents observe as the roles being performed revealed sharp contrast in percentages to what was shown with the expectation assessment. The majority of the respondents said that the WRC only performed roles were regulating and managing the utilization of water bodies which constituted 41.6% of the respondents. This was followed by 37.0% who said they are convinced the WRC attends to both of their responsibilities of regulating and managing the utilization of water bodies and also doing water quality analysis of the water bodies they manage.

The results canvassed from respondents indicated that more than half of the respondents do not think the WRC performs both roles of regulating and managing the utilization of water bodies as well as raw water quality analysis. In fact, the majority (41.6%) of people believe that the WRC has been regulating and managing



the utilization of water resources only without any recognition for water quality analysis. There were also those (21.4%) who also thought that they have only observed the WRC to be performing raw water analysis. This batch of respondents said that the WRC conducts these tests to enable them to determine the usability of the water bodies but they don't think that the WRC regulates the water bodies because people have been using the water bodies anyhow without any measures in place to regulate their activities. They cited the devastating effect of 'galamsey' on our water bodies and how they think it will have cost implications on the operations of GWCL.

On the whole, the roles of regulating and managing the utilization of the water resources as well as the routine conduct of water quality analysis were observed to be performed by the WRC although in the minority. This has a direct correlation to the delivery of quality service by GWCL. The issuance of permits for usage gives the WRC regulation rights to prevent users from engaging in activities that will deteriorate the quality of the water. The performance of this role means that the integrity and quality of the water resources which GWCL depends on for treatment will be protected resulting in a lower cost of treatment and hence lower tariff; a very important attribute of service quality. Also, the data from the water quality analysis acts as predictors which informs the commission on structures and policies which have to be put in place to ensure the sustainability of the water bodies. This will ensure that GWCL has quality water that will be available for consistent supply which will serve customers in both the present and future generations.

An institutional level interview at the Water Resource Commission indicated that the commission grants permission to urban water companies after applications have been submitted and the commission assesses these applications to determine if the required quantity of water needed can be obtained. The applications are processed to determine



if the activities to be engaged in can have any adverse effect on the water bodies in terms of compromising the water quality and whether the quantity to be used can be obtained from the water body. Sometimes even the communities where the water is located and their orientation on the water resource has to be given strong consideration.

Apart from granting permits to institutions like the GWCL, the WRC grants people the freedom to use these water bodies in farming and other activities but where the usage exceeds 5 cubic meters per day, then permit will have to be sought from the Water Resources Commission to grant that right of usage. Also, irrigation projects beyond 1 hecter require a permit from the Water Resources Commission. This is because the use of agrochemicals on the farms can wash into the river and cause algal bloom and other harmful effects which will affect the water quality.

The WRC recognizes and sees GWCL as a major water user. This is because GWCL depends solely on water bodies across the country and perpetually uses them for its operations. Therefore, GWCL has a representative on the Board for Water Policy and GWCL staff is part of many of the committees that work with the Commission because GWCL is seen as a major stakeholder. The GWCL informs and applies to the WRC where they want to use a water body for their operations. The permits granted expires after three months after which they have to be renewed but due to the nature of the operations of GWCL, their permits are in perpetuity and are not subjected to the strict protocols of renewing their permits after the expiration period.

The inquiry also showed that the WRC has different levels of engagements in its bid to regulate and manage the utilization of water resources in the region. The Commission is well integrated and represented in various communities to enable it to



function effectively in the delivery of its mandate. They mostly work with the User Committees in the communities, the District Assembly, and the Sub-Basin Committees to monitor and address problems that come up about the water bodies and activities surrounding them. In response to how they contribute to the delivery of safe water for treatment by GWCL in the region, a respondent had this to say;

Water resources especially the Black Volta River which is been used by the GWCL are well protected. An Integrated Water Resources Management Plan has been drawn to help in the management of water bodies. The plan is yet to be validated for full-scale implementation but parts of the plan are being implemented. The WRC has also put in place an Eco-system restoration program which is located along the rivers at Chakye and Buipe to protect the water bodies using Water User Committees who are supposed to help in managing the water. Also, the Sub Basin committees supervise the Water User Committees. The WRC has direct contact with the Water Basin Authority and coordinates the activities in the Riparian communities. We work with the Mohourm Basin Agency to plan and protect the water upstream to ensure safe water. These same arrangements are existing with the authority in the Cote D'Ivoire for the Chakye River.

(KII; Regional Head of the Water Resources Commission, Wa)

This shows that the Black Volta River is well managed and safe for the treatment and supply of potable water in the municipality. As part of the roles to ensure water quality safety and availability by safeguarding activities of the water bodies, the commission continuously evaluates the quality of the water through a regular analysis



scheme. They are also able to trace the happenings or activities around the water bodies that are impacting negatively on its quality. It was revealed that the commission collects samples of which twenty-six (26) parameters are analyzed every six months as a way of monitoring the water quality. This is a very important feature in helping GWCL in meeting its service quality mandate. A respondent summarized it this way;

As we speak, the Black Volta is the best in quality compared to Oti and White Volta rivers and is only second to the Lower Volta river in the whole country. The Black Volta has a water quality index of 66 making it very conducive for water treatment and supply.

(KII; Regional Head of the Water Resources Commission)

4.4.5 Environmental Protection Agency (EPA)

This part of the presentation deals with the assessment of the effectiveness of the roles of the Environmental Protection Agency as part of addressing objective two and the part of the conceptual framework that deals with the roles of stakeholders of this study. Table 4.5 shows how respondents identified and assessed the work of EPA which were given as; regulation of water bodies against pollution and environmental pollution control.



Table 4.3: Observed roles performed by Environmental Protection Agency

Observed roles	Frequency	Percentage
Regulate water bodies against pollution	61	21.7
Environmental pollution control	134	47.7
Regulate water bodies against pollution and environmental pollution control	86	30.6
Total	281	100

Source: Field survey, (2020).

78.6% of the respondents identified and said they expect the Environmental Protection Agency to be responsible for the regulation of water bodies against pollution and 21.4% said they only expected environmental pollution control as the role of the EPA. Responding to how the respondents think the expected roles are being performed, the majority of the respondents for this study (47.7%) said environmental pollution control is the only role they have observed the EPA to be performing. However, 30.6% also observed the roles of regulation of water bodies against pollution and environmental pollution control as being performed whilst 21.7% maintains that the only observed role of the EPA which is being performed is the regulation of water bodies against pollution.

There was a clear indication from the outcome of this study that although most people (78.6%) expect the EPA to be responsible for both regulating water bodies against pollution and environmental pollution control, only 30.6% said the EPA is performing these roles. The shortfall in the percentage who observed the roles as performed can be attributed to the fact that many see the EPA to be responsible only for the issues



which concern the environment and do not consider water pollution as one of the areas within the mandate of the EPA. This is manifested in the percentage of respondents (47.7%) who said the EPA is only responsible for environmental pollution control. There is however a substantial minority (21.7%) who recognize that the EPA actually regulates the pollution of water bodies. The understanding of this group stems from the point that the EPA as a governmental agency and in some cases being described as the government to people who are not familiar with the EPA as an organization puts the EPA in the same category as the government and therefore sees them to be performing this role. These roles being performed benefit the GWCL due to the impacts it has on water pollution control. When the water is less polluted, GWCL spends less on the usage of water treatment chemicals to make the water wholesome for drinking which is reflected in the tariff for customers to pay. Also, GWCL is able to produce water that is of good quality and safe for drinking. This is because GWCL will have an easy task to treat the water to make it wholesome because of the activities of EPA to curb the pollution of the environment.

An interview conducted at the EPA demonstrated the relevance of the agency and how their activities affect the water bodies which GWCL relies on for production. It was revealed that the Environmental Protection Agency (EPA) performs water-related functions such as ensuring environmental safety of water sources. This is very paramount in the sense that the ability of both water service providers and users to enjoy the best water supply depends on how safe the water source environment looks. Government water establishments like GWCL, private and corporate organizations under the water production and supply chain need a safe water source to enable them to deliver the best of services to their clients. The EPA is generally responsible for the safety of the environment and so has to take steps to prevent anything that will cause



harm to the environment and by extension to the water bodies. It, therefore, has to assess all activities of individuals or organizations to ascertain whether those activities pose any threat to environmental safety. Therefore, any activity that will result in the discharge of waste into any water body including the Black Volta River has to be prevented by the agency. This is why a permit is given out before any activity is carried out. This is achieved through the undertaking of Environmental Impact Assessment

The EPA again based on the recommendation from the environmental assessment process, grants permit to developers of water supply infrastructures like the GWCL to enable them to develop better systems that will serve water to users to meet their satisfaction. A respondent described how the EPA relates to the GWCL saying;

We are aware the GWCL always makes applications to the EPA at places where they wish to establish a water treatment plant but these applications are normally sent to the Head Office where the process starts. The Environmental Impact Assessment for the Jambusi Water Treatment Plant started in the year 2013 but we do not have a copy of the permit available for reference. GWCL is however required to do a quality assessment and submit the report to the Head Office. If any permit was issued it should be expired now. Although the EPA creates awareness in ensuring freshwater quality monitoring, it is not the mandate of the EPA to monitor the potable water quality from GWCL. The laboratory in our office has not been fully stocked and so we are unable to perform a lot of laboratory analysis. What we normally do is environmental pollution control and also prescribe standards for operations to the Ghana Standards Board for publishing.



(KII; Official of the Environmental Protection Agency, Wa)

All firms and companies including GWCL that are delivering water services to the public are keenly monitored by the EPA. This is done through intermittent testing of the quality of water given to the public however in the case of the Upper West Regional Office of the EPA, the laboratory is not functional. A situation that is detrimental to its role to help GWCL deliver service quality to the populace.

4.5 Assessment of Service Quality Delivery by GWCL

This section addresses objective three of the study. It seeks to elucidate from respondents their assessment of GWCL's water service delivery which can lead to the conclusion as to whether they meet service quality standards in the Wa township. The section is divided into seven themes which include water quality, reliability, assurance, tangibility, empathy, responsiveness, and expansion. The researcher adapted SERQUAL/RATER model but expanded it by making water quality stand on its own and adding expansion to bring out their relevance in water service delivery for this study. The various themes are assessed using defined water service quality parameters to which the respondents are made to give their experience in water service delivery of GWCL.

4.5.1 Water quality

Parameters used in assessing water quality included colour, taste, and odour because these can easily be examined by the respondents. The majority of the respondents (91.1%) said the colour of water supplied to them was good whilst 8.9% of the said the water colour was bad. Also, 95.4% of the respondents said the water supplied tasted good whilst 4.6% thought that the water taste was bad. The number of



respondents who said the odour of water was good represented 96.4% and the number who thought of it to be bad was 3.6%. This is presented in table 4.7.

Table 4. 4: Water quality: Observation of quality of water supplied by GWCL

Water quality parameters observed		Bad	Good	Total
Colour of water supplied	<i>f</i>	25	256	281
	%	8.9	91.1	100
Taste of water supplied	<i>f</i>	13	268	281
	%	4.6	95.4	100
The odour of water supplied	<i>f</i>	10	271	281
	%	3.6	96.4	100

Source: Field survey, (2020).

There is an overall high rating of the quality of the water supplied to the Wa township according to the response from the respondents, (i.e. 91.1%, 95.4%, and 96.4% for colour, taste, and odour respectively). The respondents indicated by their response that the water supplied was without materials that impact negatively on the colour of water which is supposed to be colourless. The taste and odour which are also supposed to be tasteless and odourless respectively were found to be wholly acceptable. A small percentage of 8.9%, 4.6%, and 3.6% said the colour, taste, and odour respectively was bad because during the period they have occasionally received water which by their assessment was not acceptable for consumption.

The interview conducted at the GWCL indicated that the company has a water quality assurance department that is responsible for the quality of water consumed by its users. They have two laboratories to help them perform this job. They have a controlled laboratory at Jambuse Water Treatment facility which is responsible for treating the raw water by determining the optimum dosage of chemicals to use in



treating the water to meet the WHO standards at water treatment facility. It was also revealed that the control laboratory performs hourly analyses to monitor the quality of water being produced and sent for distribution. It was also added that there is another laboratory in the Regional office which is responsible for checking the water quality in the distribution network in the township. The whole water distribution network area is divided into zones that guide the water quality technicians to take samples and analyse to ensure that the right standards are maintained in all the distribution systems. The laboratory also periodically picks samples from the Jambuse Water Treatment Plant and brings them to the regional laboratory for analyses as a way of overseeing the water quality performance of the treatment facility. In response to cases where water users have reported bad water quality, it was answered that where the company receives reports of bad water quality, the department immediately visits the complaints areas and had mostly found that the issues were more of negligence on the part of the customers. These included dirty storage tanks, broken pipes in pools of water, and some cases water received after maintenance work by officials of the company. Where the fault is from the company, remedial measures are taken to immediately solve the problem. An official had this to say about the water quality of GWCL;

I will rate our water quality to be very high because when you look at the WHO standards and even the standards set by the Ghana Standards Board we are always having a very high indication of good water quality. If there is to be any report, it is mostly got to do with the customers' ways of managing the water they receive.

(KII; Regional Water Quality Assurance Manager of GWCL, Wa)



It was indicated that there is complete confidence in the quality of water in the township because there are independent regulatory bodies like the PURC and the Ghana Standards Board who monitors the water quality and regulate the activities of the company so the company is bound to meet the water quality standards which have been given or face sanctions. Also internally, the company has a water quality department that monitors the water right from the source where the water is abstracted, then through the production process and in the distribution system where it gets to consumers. It was emphasized that all this is done to ensure that the quality of water during treatment is maintained throughout the system until it gets to the consumers to ensure public safety. There was an indication that the company does not publish the water quality analyses results but it has its reporting format where they send reports weekly and monthly to the authorities for analysis and further action. This was corroborated by the respondent when he said;

In terms of the product quality, the benchmark is the one given to us by the WHO and the Ghana Standards Authority and so far we have followed them and met the requirements. There is no discourse about the quality of the water we are producing.

(KII; Regional Water Quality Assurance Manager of GWCL, Wa).

4.5.2 Reliability

Reliability is the consistent flow of water in its right quantity as propounded by the reliability theory. For this study, reliability is assessed using the review of parameters which includes the consistency of water flow, the tap yield, and also the functionality of the system. This is presented in table 4.8 below:



Table 4.5: Reliability: Observation of service delivery by GWCL based on reliability

Flow consistency	Frequency	Percentage
Less than 3 times a week	15	5.3
More than 3 times a week	83	29.5
Throughout the week	183	65.1
Total	281	100
Tap yield		
Does not meet the expectation	20	7.1
Meets expectation	281	92.9
Total	281	100
Functionality of system		
Broken down	6	2.1
Sometimes breakdown	142	50.5
Functions well	133	47.3
Total	281	100

Source: Field survey, (2020).

The study showed that in terms of consistency of flow, 65.1% of the respondents said that their taps flow throughout the week. This was followed by 29.5% of the respondents who indicated that their taps flow more than three (3) times a week and



5.3% of the respondents reported that their taps flow less than three (3) times a week. This indicates that the water flows at most times.

Also, the majority of the respondents indicated that the tap yield is adequate with 92.9% revealing that the tap yield meets expectation whilst 7.1% thinks that the tap yield does not meet the expectation. This shows that the quantity of water supplied by GWCL in the Wa township is adequate to meet the needs of the majority of the customers. In addition, in assessing the functionality of the system, 50.5% of the respondents said that the system sometimes breakdown although 47.3% indicated that the system functions well without any problem. In all, 2.1% of the respondents said that the system is totally broken down and so does not satisfy the water needs of the Wa township.

In the institutional study, it was revealed that the GWCL until the inception of the Jambuse Water Treatment Plant was challenged in the supply of the required quantity of water to users in the municipality because the company was depending on mechanized boreholes. This led to a situation where the water supplied could not meet the demand by users and created a shortfall in water supply in the municipality. This situation too makes it impossible to undertake an expansion in the distribution network to new users due to the shortfall in the production capacity. In an interview with officials of GWCL, it was indicated that the region was having less than 1000 meter cube of production capacity per month which resulted in production shortfalls in the township but since the commencement of operations at the Jambuse Water Treatment Plant, the production levels have risen from about 1600m³/day in 2017 when the facility started operation to more than 4000m³/day in the year 2020 but this production is only 25% of the production capacity of the plant. There are water reservoirs at three different locations in the town which are constantly filled with



water from the treatment plant to ensure water availability at all times to all parts of the town where the distribution network can be found. Due to the elevation of these reservoirs, there is adequate pressure in the distribution system which ensures that the tap yield is adequate. The interview also showed that the system generally functions well. Where there are problems which can lead to a total shutdown at the production facility or lead to the isolation of parts of the distribution network, the maintenance team are always ready to resolve the problem. A respondent said;

" We do our best to work with minimum interruptions but it is very important to also conduct routine maintenance on plant and equipment and also resolve faults that might come up to ensure the smooth running of operations. We only have to ensure that whatever the fault might be, we resolve it within the shortest time possible so that we can continue supplying water to our customers."

(KII; Ag. Regional Production Manager of GWCL, Wa).

The inquiry also showed that there are places that have been locked down due to indebtedness or because such facilities are no more in use as in the case of the standpipes.

4.5.3 Assurance

Assurance as an attribute of water service quality deals with the confidence that the staff of GWCL will carry out their work with the skill and professionalism that it requires to attend to issues brought to the attention of the service provider to meet the satisfaction of the customers. Figure 4.6 presents the parameters used in assessing assurance which included disconnection without damage to pipes, disconnection of only customers who are indebted to GWCL, and prompt repairs of burst pipes.



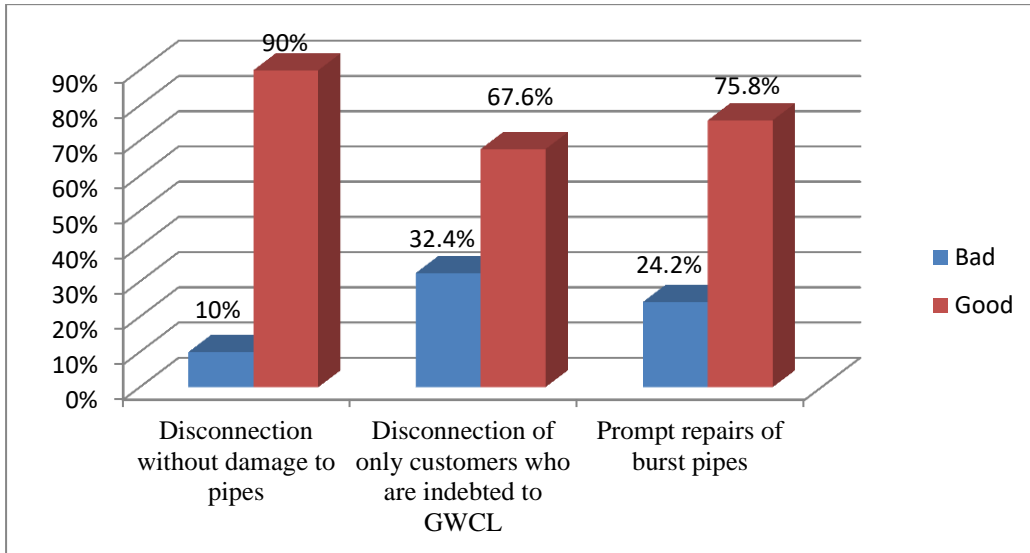


Figure 4.7. Assurance: Assessment of service delivery by GWCL on Assurance

Source: Field survey, (2020).

The study showed that 90% of respondents evaluated the job of GWCL with regards to disconnection without damage to pipes to be good whilst 10% said it was bad. In cases where only people who are indebted to GWCL are disconnected, 67.6% said the GWCL is doing well but 32.4% said the GWCL sometimes disconnects people who are not indebted to them. 75.8% of the respondents are also of the opinion that the company pays attention and promptly repairs burst pipes when they get the report.

The study showed that the overall performance of GWCL with regards to assurance is very good. It demonstrated that GWCL staff are well skilled in the execution of their job when it comes to repairs of burst pipes due to the overwhelming majority of respondents (90%) who said the staff can disconnect without damage to pipes. There is a strong sense of professionalism by staff whom the majority of the respondents say disconnect only those who are indebted to the company however 32.4% still thinks that some people get disconnected even though they were not indebted to the GWCL. It might be as a result of inaccuracies in the billing system of the company and cases where a group of people share the same meter and have to put their money together



and pay as a unit. In such cases, although some people might have finished paying their bills, others might cause a delay which might result in the disconnection of their water supply.

Institutional level interviews during this study showed that there is a team of pipefitters who are responsible for repairing bursts that occur in the distribution system. The company has about three highly skilled staff that operates within designated zones to address issues that are reported in their designated zones. The teams are equipped with the right tools to be able to execute their work effectively and efficiently. This has resulted in the effective repairs of burst pipes as well as disconnection and doing other maintenance works without damage to pipes. It was also revealed that there is normally a team that goes around with the customer care officers to disconnect indebted customers. If a customer is indebted, he/she is first notified to get the debt settled to avoid disconnection. Sometimes this notification comes in the form of radio announcements, the use of public announcements with vans, or personal notification by the customer care officers. This allows the customers to settle their bills or make a complaint where inaccuracies are discovered on the bill delivered.

4.5.4 Tangibility

Tangibility in water service quality refers to the general outlook of the company in terms of infrastructure and personnel as well as pressure at which water is delivered to customers in the township. Water pressure ensures that the distributed water gets to its targeted recipients in the right quantities. To ensure quality service the researcher enquired from the respondents whether they receive water at constant pressure always and whether those in high buildings receive water with adequate pressure. The findings are presented in figure 4.7.



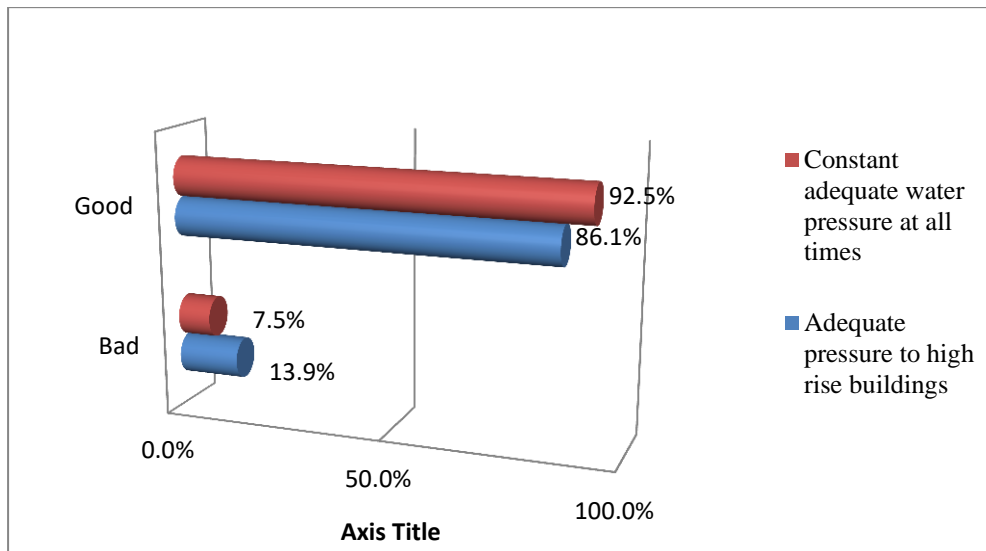


Figure 4.8. Tangibility: Assessment of service delivery by GWCL on Tangibility

Source: Field survey, (2020).

86.1% of the respondents who live in high rise buildings or know people who live in high rise buildings in the Wa township said that the water pressure to high rise buildings is adequate but 13.9% responded that the pressure is bad and cannot sometimes rise to the height of the buildings. The majority of the respondents (92.5%) also said that they get constant adequate pressure at all times which helps them to get water wherever they find themselves and also in adequate quantities. However, 7.5% of the respondents said the water pressure is bad and tends to affect the quantity of water they get within a particular period.

The adequacy of pressure in the distribution network as manifested in the results of this study (92.5%) promotes the distribution of water in required quantities to every part of the distribution network. People are assured water to meet their specific needs. The results also indicate that there are places where the water pressure is not good and therefore affects the water usage of such customers. These might be places that have multiple connections on service lines or at places where the topography makes it difficult for them to get adequate pressure.



Institutional level interviews indicated that there is generally very good pressure in the distribution system due to the elevation of the reservoirs and the topography of their location in the township. The point was made that the water is distributed to the Wa township by gravity after the elevated reservoirs have been filled by the Inter Mediate Pumping Station at Dorimon. The gravity flow ensures that there are no fluctuations in the distribution network and consistent pressure is maintained at all areas of the network. However, when the water level in the reservoirs runs low, the pressure in the distribution system also reduces, and the extreme ends of the network experience low-pressure levels which affect the amount of water that can be accessed at these areas. This leads to periodic complaints of low pressures at certain parts of the network but this is only temporary because water in the reservoirs get replenished to restore any pressure deficiencies in the distribution network.

4.5.5 Empathy

For this study, empathy concerning water service quality is defined as the sensitivity of the service provider to the plight of customers. It is assessed using parameters such as affordability of water tariffs, response to complaints on water tariff irregularities, exhibiting courtesy in carrying out duties, giving notice before disconnection, and response to complaints on technical breakdowns.

As many as 92.2% of the respondents said the water bill that they are being given on monthly basis is affordable and can pay for it, 7.8% regarded the monthly water tariff to be too high and therefore will not be able to afford it given the present economic situations.



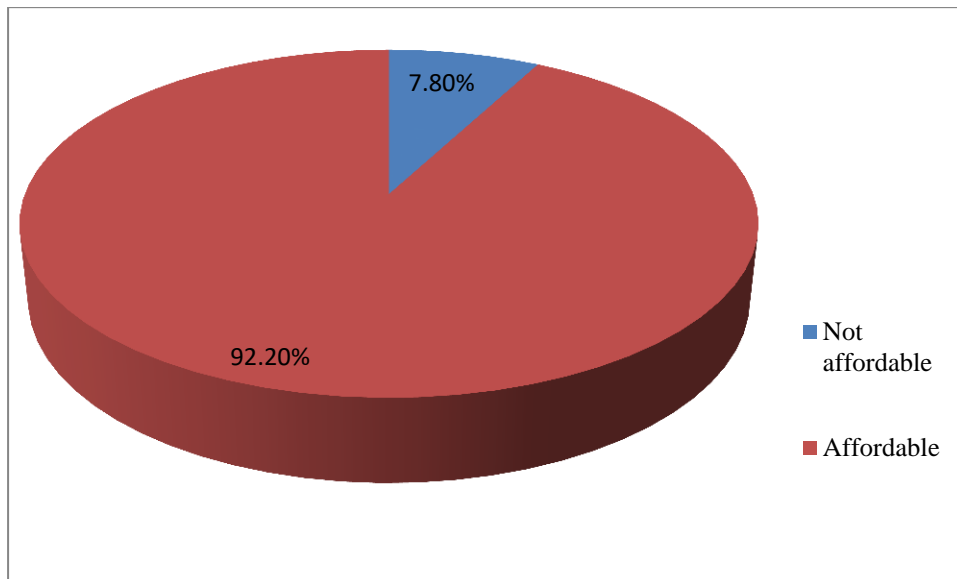


Figure 4.9. Empathy: Assessment of tariff affordability

Field survey, (2020).

The results show that an overwhelming majority (92.2%) in the Wa township can afford to pay their water bill on monthly basis. This is partly because the economic setting of the urban community where most of the respondents for this study reside has a source of livelihood. The few (7.8%) who said the tariff is too high and will not be able to afford might be facing economic difficulty due to their source of income or might be dissatisfied with one or more services of GWCL and therefore unwilling to pay for the tariff. Table 4.9 gives further details on empathy with regards to the other parameters under study.



Table 4. 6. Empathy: Observation on customer service management by GWCL

Observation		Bad	Good	Total
Response to complaints on tariff irregularities	<i>f</i>	45	236	281
	%	16	84	100
Exhibiting courtesy in carrying out duties	<i>f</i>	74	207	281
	%	26.3	73.7	100
Giving notice before disconnection	<i>f</i>	129	152	281
	%	45.9	54.1	100
Response to complaints on technical breakdowns	<i>f</i>	53	228	281
	%	18.9	81.1	100

Source: Field survey, (2020).

The majority of the respondents constituting 84% found the response to complaints on tariff irregularities to be good whilst 16% said the response to complaints that were made on tariff irregularities was bad. 73.7% of the respondents found the GWCL staff to be courteous in carrying out their duties but 26.3 said the staff did not exhibit courtesy in the line of their duties. When asked if they were given notice before disconnection, 54.1% said they have had disconnection notice from the GWCL before disconnection whilst 45.9% said they have not received disconnection notice before. Many people report breakdowns in terms of pipe bursts and other technical problems



to which the GWCL has to respond. 81.1% said the response of GWCL was good and 18.9% said the response was bad.

Water tariff is a very important factor in the production, distribution, and consumption of water. The customers' ability to afford and pay for the water tariff will determine the ability of the service provider to continue producing and distributing and will determine the efficiency and the effectiveness of the service being provided. The study which showed that the majority of the respondents in the municipality find the tariff affordable is refreshing to GWCL. Given the percentage who finds the water tariff not to be affordable, GWCL can have a working agreement to have them pay at certain terms.

The study also showed that the service delivery by GWCL in responding to their complaints on tariff irregularities which sometimes brings serious discomfort to customers was good (84%). This means that customers can have whatever issue they have with their bills resolved by the GWCL once it is reported. The exhibition of courtesy by GWCL staff in the line of their duties (73.7) was also found to be good which will promote a good working relationship between GWCL and its customers. Although the majority of the respondents (54.1%) again said the GWCL gives notice before disconnection, almost half of the respondents also thought that the GWCL does not give notice or they as individuals have not received notice from the GWCL for disconnection before. This could be because this batch of respondents have not had cause to be disconnected before so could not be served notice. It could also be because they were not available or the customer service agent failed to give notice before the disconnection was done. The results of the study also showed that GWCL was doing well with their response to complaints that are received on technical breakdowns as demonstrated by 81.1% of the respondents.



An institutional level interview revealed that customers do not pay for the full cost of treating water. Although the GWCL sends a proposal for the increment of tariffs, the PURC which represents the government reviews proposals and takes inputs from the general public through their public hearing process to know what the public thinks about the increment and what they think is the right price to pay. The PURC also takes inputs from Organized labour who represents the workers in the country as well as the CSO's to make inputs as stakeholders before a tariff increment is agreed upon. It was also revealed that the customer is at the center of the business transaction of the GWCL so a premium is placed on customer complaints and efforts are made to attend to issues raised by the customer to address them in the shortest time possible. A respondent had this to say;

Complaints can be made to our complaints office in person where a customer comes to our office to make complaints at the customer care office or through phone call through our toll-free number or the shortcodes to our offices. Another way is for the customer to write to our office but this is rarely used by customers in making a complaint to our offices. The complaint policy we have that directs us on how we manage the customer complaints is the customer charter.

The customer charter is well implemented in our daily operations because our work is mostly customer-centered. Anything we do in terms of operations and maintenance ends with how we manage our customers to win their loyalty. Sometimes it is not easy because things don't go the way you



want or the customer might not be properly informed on some issues but we do well to address them and make things happen.

(KII; Regional Commercial Manager of GWCL, Wa)

4.5.6 Responsiveness

The findings on responsiveness are presented in table 4.10. Responsiveness is defined in this context to be the attention and diligence that GWCL puts into the service delivery in ensuring water service quality. The main parameters used in assessing responsiveness include accuracy in meter reading, regularity in meter reading and bill delivery, and reflection of payments made to GWCL on water usage.

Table 4.7 Responsiveness: Observation of the level of responsiveness exhibited by GWCL

Observation		Bad	Good	Total
Accuracy in meter reading	<i>f</i>	46	235	281
	%	16.4	83.6	100
Regularity in the meter reading and bill delivery	<i>f</i>	20	261	281
	%	7.1	92.1	100
Reflection of payments made to GWCL on water usage	<i>f</i>	66	215	281
	%	23.5	76.5	100

Source: Field survey, (2020).

83.6% of the respondents said the accuracy of meter reading is good and 16.4% said the accuracy in the meter readings they have received is bad. A good majority



(92.1%) were also of the view that the regularity in the meter reading and bill delivery is good but 7.1% thought that it is bad whilst 76.5% of the respondents say that the reflection of payments made to GWCL on water usage is good and 23.5% says that the reflection of payments on bills is bad.

The study disclosed that many people (83.6%) agreed that there is accuracy in meter readings which shows that there will be little discrepancies when it comes to the payment of the water tariffs. This could be because the staff of the GWCL visits and takes the meter reading for the processing of the bill. Hence it represents the real consumption of the customer. Most of the respondents (92.1%) also have their meters being read and bills delivered on regular basis. Where the meter reading and the bill delivery are regular, the customer can monitor his/her consumption levels and also be able to discover irregularities on the bill. 7.1% of the respondents however might not have received their bills and were not having their meters read regularly. Again, the majority of the people (76.5%) said they had their payments made to GWCL reflecting on their bills which shows a level of diligence portrayed by the staff of GWCL.

The interview conducted at the institution showed that there are dedicated numbers of customers who are supposed to be served by customer care officers. This was given as one officer to 800 customers. Per this ratio, the staff should be able to visit the customer at least once a month to deliver the bill for the previous month and take the meter reading of the present consumption. The company also has an electronic platform that ensures that the bills are delivered to the customers by text before a follow-up is made with a hard copy of the bill. The consistent visitation ensures that the customer is always abreast with his/her indebtedness. The use of digital platforms and a consistent visit by the officers also ensure that where there are problems



regarding the reflection of payments on the bill, this is solved in the shortest possible time. A respondent explained this when he said;

We have automated our system of operation which promotes the absence of minor errors in our billing system. This is called the cloud-based billing system. We have also introduced an electronic billing system where bills are generated automatically and sent to users via emails and text messages. All these are geared towards eliminating various challenges in the distribution and receiving of water bills from the company. This is done along with manual sharing of the bills to the users. We do the distribution of bills in a way that at least the main user or a household member will receive it for onward submission to the one in charge.

(KII; Regional Commercial Manager of GWCL, Wa)

4.5.7 Expansion

This part of the study takes a look at the expansion works as part of the delivery of service quality by GWCL to the Wa township and how the Jambuse Water Treatment Plant has influenced these expansions if any. The respondents were asked if they have witnessed the extension of the distribution network in their area and whether the number of private home connections and public standpipes is increasing in their area. The findings are presented in figure 4.9.



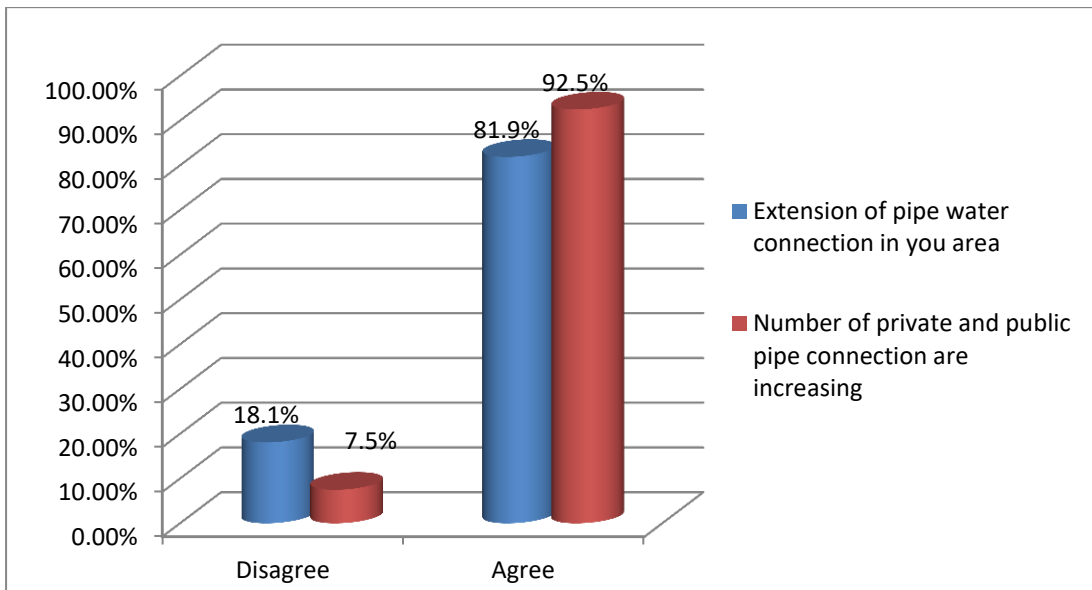


Figure 4.10. Expansion of water delivery services by GWCL in Wa township Field survey, (2020).

A majority of 81.9% and 92.5% agreed that they have seen an extension of the distribution network and an appreciable increase in the number of private home connections as well as public standpipes connections respectively. 18.1% of the respondents however said they have not seen the extension of any distribution network for pipe connections in their area and 7.5% disagreed that the number of private home connections and public standpipes is increasing.

The study reveals that there has been an increment in the scope of the distribution network in the Wa township (92.5% of respondents) whilst the number of private connections and public standpipes has also increased in the town. First of all, the GWCL can only undertake an expansion in their distribution system because they have enough water to distribute to prospective customers who will get hooked up to it. The study also shows that more people are getting private home connections because they have access to the GWCL distribution network which can give them fresh potable water for their usage.



At the institutional level, it was revealed that the Jambuse Water Treatment Plant which commenced operations in 2017 with a capacity of 15,000m³ daily started operation at about only 15% of its production capacity although it came with an 18km expansion of the distribution network in Wa. The study further revealed that between 2019 and 2020 the company has added 20km to its distribution coverage which has increased the daily production of Jambuse Water Treatment Plant from 15% to about 25% of its capacity.

This is an indication that the Jambuse Water Treatment Plant has led to the widening of the distribution lines which has increased water accessibility and utilization. The extensive coverage and access to water in the municipality are not more than four years now. The commissioning of the major water supply source being the Jambuse Water Treatment facility was held on 2nd October 2017. It was ascertained that despite the recent increment in accessibility, some sections of the town are still depending on boreholes for their domestic needs. A respondent lamented on the extent of the problem when he said;

I think one thing that requires improvement is to increase our distribution coverage in the municipality which we are currently doing. We have so much water which we can serve to consumers on regular basis but our distribution coverage is limited because we were previously running on boreholes. For the most part, we are doing well with our product quality and management of our customer complaints but we can always improve and we are doing everything possible to get better and better.

(KII; Ag. Regional Production Manager of GWCL, Wa)



The study revealed that the majority of urban water users depend on domestic water connections to meet their water needs. This is a result of not only the expansion and growth of urban households in recent times but also the establishment of new water supply facilities. This leads to the expansion of the water distribution networks into many residential areas to bring water closer to many households and increase accessibility. There are trained and equipped staffs to attend to the needs of clients. This is similar to the work of Bhatt and Bhanawat (2016) who believe that service quality is assured on the grounds of having experts in the field of service. Many of the households have not been connected to the GWCL main line for more than two years (48 – months). Most of the users are using the metered system of which the water bills are given to them monthly. In the water supply management process, there is the provision of communication channels to make it easier for customers to reach the service providers. This supports the work of Kumar and Managi (2010) and Essaw (2014), who emphasizes that one key component of the service provider and receiver relationship is good communication between them and the feedback that exists. The study found that the urban water users receive good water service quality from the Ghana Water Company Limited through a regulatory framework. This is in line with the work of Adank and Tuffour (2013), who are of belief that the utility management model in Ghana takes the form of proper institutional regulatory mechanisms in handling their complaints and meeting good standards in service delivery, especially in the urban water supply system.

There is reliable water supply to customers, water quality in terms of colour and appearance meets the required standards, and there are no constraints in water use and supply in the municipality and without associated taste and odour problems. This is similar to the work of Waris et al. (2018) that believes that service quality is



supported by reliability and comfort of operation to the customers. And it is also similar to the work of George and Kumar (2013) who said service quality is assured when the service-providing companies can carry out the promises given to their clients. Bukari (2017) however believes that the inability of customers to pay the required tariffs is a threat to the reliability of water supply and can also lead to disconnections of such customers. It was also revealed that there is billing accuracy according to urban water users. Staff are having the required knowledge and expertise in dealing with customers' complaints and are courteous enough to handle issues in the delivery of water services and receiving complaints from customers. Customers lodge complaints personally to the complaints desk or customer care attendants of the company and in some cases through phone calls. Those using phone calls are usually lodging complaints regarding water leakages or bursts of pipelines within their neighborhoods. This finding is in line with the work of (O'Neill & Palmer, 2004) who said service quality is better achieved if there are better sources of complaints delivery from the receivers of the services to the service producers. However, the findings disagree with the assertion that service providers make information accessible to their entire client as there was no clear-cut mode of information sharing from the GWCL to their customers.

The finding is in line with the work of Tozlu et al (2016) who asserted that service providers can render good service quality standards through the routine maintenance works they undertake. There is an overall, good impression of the work of GWCL in terms of urban water supply and distribution. These results are in line with the idea of the proponent of the service quality model, Parasuraman (1988) who postulated that for customers to appreciate the service of providers there should be some sort of empathy (thus helpfulness and courtesy by the staff of service providers). It also



supports Parasuraman (1988) on the grounds of the tangibility of the product which has to do with less pressure, colour, and taste of the water. In this case, the water delivered and used by customers is colourless, tasteless, odourless, and with adequate pressure to reach users. Parasuraman (1988) again argued that products service quality is achieved when there is an assurance which means that the service provider is having the required knowledge and expertise in services delivery (Khodayari & Khodayari, 2011). In this study, it was ascertained that workers of the GWCL are having the needed knowledge and expertise to handle water supply and management of customer complaints in terms of responsiveness to customers. This is in line with the argument of George and Kumar (2013) that customers' satisfaction goes in line with service providers' willingness to offer assistance to clients when the need arises. Parasuraman's (1988) argument is also in line with the findings which revealed that there is water service reliability, thus continuous and timely supply of water to end-users.

4.6 Effects of Service Quality Delivery of GWCL on Customer Satisfaction and Willingness to Pay for Water

This section answers objective four of this study and hinges on the last part of the conceptual framework. In this section, the researcher assesses the various attributes defined for water service quality in the literature review and conceptual framework using various descriptive parameters to ascertain the level of satisfaction of respondents regarding the service delivery of GWCL in relation to those parameters. These attributes include water quality, reliability, assurance, tangibility, empathy, responsiveness, and expansion.

The section also examines the willingness of the respondents to pay for water tariffs at the present rates and the water service quality delivery by GWCL. It also examined



how their income levels and their household sizes affect their willingness to pay for the water tariff.

4.6.1 Satisfaction with water quality

Table 4.11 presents the parameters which are used to assess the level of satisfaction of respondents with regards to water quality including colour, taste, and odour.

Table 4.8: Satisfaction with water quality

Observation		Dissatisfied	Satisfied	Total
Water colour	<i>f</i>	21	261	281
	%	7.5	92.5	100
Water taste	<i>f</i>	15	266	281
	%	5.3	94.7	100
Water odour	<i>f</i>	12	269	281
	%	4.3	95.7	100

Source: Field survey, (2020).

Of the 281 respondents, 92.5% expressed satisfaction with the colour of water supplied to them whilst 7.5% said they were dissatisfied. Also, 94.7% of the respondents were satisfied with the taste of the water whilst 5.3% were not satisfied with the taste. 95.7% also said they were satisfied with the taste of the water which they found to be very good whilst 4.3% disagreed saying they were dissatisfied with the taste of the water. The findings suggests that the customers expectation of what the quality of water should be in terms of colour, taste and odour where met. These are attributes that does not need any professionalism to interpret and therefore served as the right parameters to assess the satisfaction of the respondents.



The GWCL during an institutional level investigation indicated that the quality of water supplied in the Wa township is one of the very best in the country. The rigorous testing regime and the expertise of the water quality assurance officers in the region ensure a cautious effort to treat the water to meet the standards set by the WHO and the Ghana Standards Authority. Of the many parameters, water quality has a very high level of satisfaction which was on average over 90 percent as was supported by Morgan, (1999) and Uchida, (1995) who said water quality is one of the main factors that affect users' perceptions of water of the coastline environment.

4.6.2 Satisfaction with Reliability

Reliability as defined in the earlier discussion is assessed by looking at parameters such as flow rate, tap yield, and functionality of the system. This is presented in table 4.12 as follows:

Table 4.9: Satisfaction with reliability of service

Observation		Dissatisfied	Satisfied	Total
Satisfaction with reliability of flow	<i>f</i>	19	262	281
	%	6.8	93.2	100
Satisfaction with tap yield	<i>f</i>	20	261	281
	%	7.1	92.9	100
Satisfaction with the functionality of the system	<i>f</i>	21	260	281
	%	7.5	92.5	100

Source: Field survey, (2020).



93.2% of the respondents expressed satisfaction with the consistency of the water supply in the township with 6.8% of the people not satisfied with the rate of flow. As many as 92.9% of the respondents were also satisfied with the tap yield whilst 7.1% of the respondents were dissatisfied. Again, 92.5% of the respondents assessing the functionality of the system said they were satisfied with how effective the water supply system is functioning, and 7.5% of the respondents were dissatisfied with the functionality of the system.

The revelation from the study demonstrates an overwhelming satisfaction with the consistent flow of water in the Wa township, the tap yield which refers to the amount of water flow from the tap within a period, and the functionality of the system (93.2%, 92.9%, and 92.5% respectively). This means that the water supply system is robust and does not break down frequently which will lead to interruption in the water supply hence the consistent flow of water and reliable water supply in the township. There is also sufficient tap yield because there is adequate pressure in the supply system which meets the needs of the consumers. A customer who can be assured of a consistent water supply with little or no interruption can be described as a satisfied customer as demonstrated by the findings of this study.

This was corroborated by the GWCL when they asserted that the production capacity of the Jambuse Water Treatment Plant exceeds the demands of the existing distribution system so they can supply water to the township without any interruption if there are no issues of electricity power interruption or faults on the plants and equipment. It was also added that most of the distribution network is fairly new including the equipment so there is hardly a major breakdown other than the usual routine maintenance to keep the machines running effectively. Urban water users' acceptance of water reliability to be a motivational factor in their decision to show



that they are satisfied with the water service delivery is a reflection of the work of Uri-Shamir and Howard (2015) and Waris et al (2018), who said continuous flow of water without interruption is a true definition of service quality in water supply and management system. This also agrees with the argument by Bei et al (2019), who is of the belief that the urban water supply and management are affected by water shortages at production points and further confirms the positive impact of the Jambuse Water Treatment Plant on water supply in the Wa township.

4.6.3 Satisfaction with Assurance

Assurance as an attribute presented in figure 4.10 is reviewed to ascertain the level of satisfaction of respondents by assessing parameters which are disconnection without damage to pipes, disconnection of only customers who are indebted to GWCL, and the prompt repairs of burst pipes.

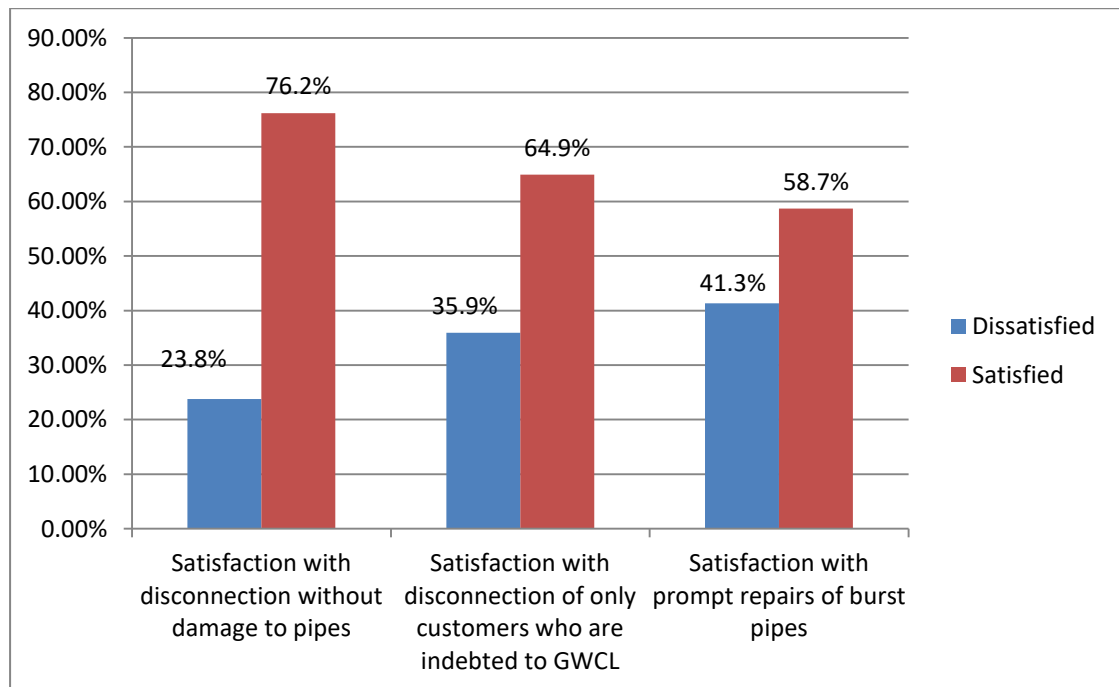


Figure 4.11. Satisfaction with assurance

Source: Field survey, (2020).



76.2% of the 281 respondents showed satisfaction with the disconnection without damage to pipes with the remaining 23.8% expressing dissatisfaction. Another majority of 64.9% of the respondents said they were satisfied that the GWCL disconnected only people who were indebted to them and 35.9% said they were not satisfied because the GWCL sometimes disconnects people who do not owe them. A relative majority of 58.3% and a minority of 41.3% expressed satisfaction and dissatisfaction for the promptness of the repairs of burst pipes respectively.

From the results of the study as presented above, there are above average satisfaction (76.3%, 64.9%, and 58.7%) levels expressed in the assessment of the parameters by the respondents. The satisfaction stems from the fact that the respondents observe the staff of GWCL to do good work anytime they are on a disconnection exercise or repairing burst pipes in the township. The exercise of due diligence also led to the satisfaction of many people who said the GWCL disconnection exercise mostly affects people who owe the company. However, there is a substantial majority that also thinks the GWCL has to do more diligence in their disconnection exercises because there have been instances where they have disconnected people who do not owe the company. The same can be said with issues of repairing burst pipes and disconnection without damage to pipes because on some occasions the work has not been done to perfection.

The institutional level interview accepts the fact that there have been lapses sometimes in the repairs of burst pipes due to the timeliness of attending to it although the company ensures that any report received is treated as a priority. This is geared towards maintaining customer satisfaction and loyalty. This is especially so because when a customer is disconnected for the wrong reasons it creates discontent and dissatisfaction for the customers and loss of confidence in the service providers. The



idea is therefore to ensure that any work which has to be done is done with the professionalism and diligence it deserves. Tutu (2016) however argued that the lack of routine maintenance of plants and installations of GWCL causes frequent breakdowns of these assets which affect the consistent supply of water across the Country leading to a sense of discontentment amongst water users.

4.6.4 Tangibility

Table 4.13 presents the assessment of tangibility for satisfaction levels of customers which were done using parameters like adequate pressure to high rise building and adequate constant pressure at all times.

Table 4.10: Satisfaction with Tangibility

Observation		Dissatisfied	Satisfied	Total
Satisfaction with adequate pressure to high rise buildings	<i>f</i>	58	223	281
	<i>%</i>	20.6	79.4	100
Satisfaction with constant water pressure at all times	<i>f</i>	24	257	281
	<i>%</i>	8.5	91.5	100

Source: Field survey, (2020).

The pressure to high-rise buildings was adjudged to be adequate and satisfactory by 79.4% of the respondents whilst 20.6% were dissatisfied with the pressure of the water that reaches high-rise buildings. A far more majority of 91.5% were very satisfied with the adequacy of the pressure in the distribution system at all times but 8.5% of them were dissatisfied with the pressure that gets to their taps from the distribution system.



The results of the survey indicate that majority of the respondents (79.4% and 91.5%) are both satisfied with the adequacy of the pressure to high rise buildings and the constant water pressure in the distribution network. The constant pressure to the majority of the respondents is because there is enough water to supply to the distribution system from the elevated tanks which mostly have enough water in them for distribution.

Interview with the GWCL confirmed that the pumping station at the Jambuse Water Treatment Plant works on a shift system to ensure that any time the water level in the tanks runs low which can affect the pressure in the distribution system, they are called upon to fill the tanks to maintain the consistent pressure and flow of water within the Wa township. They said a good pressure ensures water supply in their right quantities to all targeted customers which will inure to a greater satisfaction amongst customers. Despite these efforts, the company concedes that there are times when some areas experience low pressures because of their location or the mode of connection but efforts are in place to rectify those problems in the distribution system. Prasad (2007), disagreed with finding in his work when he argued that most developing countries are suffering due to a lack of potable water. Those countries in the developing world who manage to have access to water supply still suffer issues such as low coverage, no or low pressure, poor quality of water, and pipe leakages among others.

4.6.5 Satisfaction on Empathy

Tariff affordability, response to complaints on tariff irregularities, response to complaints on technical breakdowns, and exhibiting courtesy in carrying out duties are the parameters for assessing the level of satisfaction for empathy in this part of the study. The results are presented in Table 4.14 below.



Table 4.11: Satisfaction with Empathy

Observation		Dissatisfied	Satisfied	Total
Satisfaction with tariff affordability	<i>f</i>	23	258	281
	<i>%</i>	8.2	91.8	100
Satisfaction with response to complaints on tariff irregularities	<i>f</i>	55	226	281
	<i>%</i>	19.6	80.4	100
Satisfaction with response to complaints on technical breakdowns	<i>f</i>	52	229	281
	<i>%</i>	18.5	81.5	100
Satisfaction with exhibiting courtesy in carrying out duties	<i>f</i>	72	209	281
	<i>%</i>	25.6	74.4	100
Satisfaction with giving notice before disconnection	<i>f</i>	122	159	289
	<i>%</i>	43.4	56.6	100

Source: Field survey, (2020).

Results showed that 91.8% of the people interviewed were satisfied with the amount of money they are paying for water whilst 8.2% were not satisfied with the amount they were paying. Another 80.4% demonstrated satisfaction with the response by GWCL staff to the complaints made to them on tariff irregularities but 19.6% said the response to the staff of GWCL was inappropriate so they were dissatisfied. 81.5% also showed satisfaction to the level of response to complaints to GWCL staff on technical breakdowns in their installations whilst 18.5% were not satisfied with the



response of GWCL to the problems on technical breakdowns that were reported to them.

Most of the respondents (74.4%) were also satisfied that the personnel for GWCL showed courtesy in dealing with them in the line of their duties but 25.6% showed that they were not satisfied with the show of courtesy by the GWCL staff which can be attributed to some misunderstanding that might have come up during engagements with the staff of GWCL. Only 56.6% said they were satisfied with how GWCL gave notification before they undertook disconnection exercises in the Wa township with almost half of the respondents (43.4%) expressing their dissatisfaction with how and whether at all notices are given by GWCL before they undertake disconnection exercise.

The results of the survey as presented in the table show the expression of general satisfaction with all the parameters used in assessing empathy (91.8%, 80.4%, 81.5%, 74.4%, and 56.6%). The results indicate that people are satisfied with the tariff charged by GWCL for the service they render to the populace and also demonstrate that people can afford the tariff charged against their monthly consumption. The study also showed that the GWCL is proactive to complaints received in relation to tariff irregularities and technical breakdowns. It means that the GWCL react within an acceptable time to get the issues resolved and provided a listening ear to the issues raised by the customers. Furthermore, it can be deduced from the results of the survey that an above-average majority are content with how GWCL informs their customers before engaging in a disconnection exercise, this is however refuted by almost half of the respondents who hold that the GWCL does not give any notification or where a notification has been given they did not receive it so are not satisfied.



The institutional level interview showed that due to the processes involved with the PURC which is geared towards the provision of value for money service, the tariff for water is always economical. It was also revealed that there is a constant appraisal of the performance of the customer care officers to promote good rapport between themselves and the customers they serve. The officers are always available to take complaints and triangulate with field officers to get them solved within the shortest time possible. The finding bears similarity in the argument by Essaw (2014) who said the achievement of service quality cannot be decoupled from the form of communication that exists between the customers and services provider which demonstrates the appreciation of the corporate entities towards its customers.

4.6.6 Satisfaction with Responsiveness

The parameters which were used to analyze the level of satisfaction with responsiveness included accuracy in meter reading, regularity in the meter reading and bill delivery, and reflection of payments on the water bill, and the results are presented below in table 4.15.

Table 4.12: Satisfaction with Responsiveness

Observation		Dissatisfied	Satisfied	Total
Satisfaction with accuracy in meter reading	<i>F</i>	53	228	281
	%	18.9	81.1	100
Satisfaction with regularity in the meter reading and bill delivery	<i>F</i>	26	255	281
	%	9.3	90.7	100
Satisfaction with the reflection of payments made to GWCL on water usage	<i>F</i>	80	201	281
	%	28.5	71.5	100

Source: Field survey, (2020).



A majority of 81.1% demonstrated satisfaction with accuracy in meter reading and 18.9% said they were not satisfied because there have been inaccuracies in the meter readings. Another majority of 90.7% also said they were satisfied with the regularity in the monthly meter reading and bill delivery but another minority of 9.3% disagreed and said they were dissatisfied with that because the meter reading and the bill delivery are inconsistent. 71.5% also expressed satisfaction with how payments made to GWCL on water usage reflect on their bills without any complaint whilst 28.5% were not satisfied with the way the payments had reflected after it had been made.

The findings reflect a general satisfaction and indicate that most of the respondents (81.1%) have no complaints when it comes to the accuracy in their meter reading or the regularity in the meter reading and the consistency in the bill delivery. It demonstrates that the GWCL exercises due diligence in taking the meter reading which the people find satisfactory. This ties in well with the satisfaction level (90.7%) of respondents who said they were very satisfied with the regularity in the meter reading and bill delivery. This satisfaction is due to the consistency at which customers receive their bills after their meters have been read. Apart from this, the respondents (71.5%) also said payments they made for their consumption of water were also reflected as expected on their bills. This promotes satisfaction as customers have confidence in the workings of the GWCL.

The GWCL in an interview reiterated that, apart from ensuring that customers get a constant flow of water, the next most important thing is gaining the customers' trust and assurance that there will be an accurate charge on their consumption and payments made will be a true reflection of the customers' payments. The company is continuously making efforts to reduce errors in this regard hence the introduction of the digital platforms and the exercise of due diligence by the officers. This finding is



in line with the work of Kumi (2003) who argued that water service satisfaction goes beyond the mere presence and availability of water to users but also includes the service providers and customer's interaction and understanding. The finding also has similarity in the argument by Essaw (2014) who said the achievement of service quality is directly linked to the nature of communication that exists between the customers and services provider which is a motivational factor in appreciating services by corporate entities.

4.6.7 Satisfaction with Expansion

The researcher used parameters like the observation of the extension of GWCL distribution network to areas of the respondents and also whether the respondents have observed an increase in the number of private home connections and public standpipes in their areas to solicit the satisfaction level of customers. This is presented in table 4.16 below:

Table 4.13: Satisfaction with Expansion of service

Observation		Dissatisfied	Satisfied	Total
Satisfaction with the extension of the distribution network for pipe water connection observed	<i>F</i>	37	244	281
	<i>%</i>	13.2	86.8	100
Satisfaction with an increasing number of private and public pipe water connections observed	<i>F</i>	19	262	281
	<i>%</i>	6.8	93.2	100

Source: Field survey, (2020).



From Table 4.16, 86.8% of the respondents expressed satisfaction that they have observed an extension in the distribution network of GWCL in their area and other areas passing through town but 13.2% disagreed and expressed dissatisfaction at the expansion of the pipe network in their area. 93.2% also said they are satisfied with the level of increment in the private home connection and public standpipes in their area. 6.8% did not observe any increment in the number of private home connections and public standpipes so were not satisfied.

Once more there is general satisfaction by respondents with the expansion of the distribution network of GWCL (86.8%) and the increasing number of private home connections and public standpipes. This demonstrates the physical presence of the GWCL staff to expand their distribution network to areas that did not have access to their water and therefore giving people the chance to get connected to their homes. It also allowed GWCL to erect public standpipes in areas that needed them. The consistency with the supply also acts as an enticement for people to connect to GWCL distribution lines instead of relying on boreholes which can run low resulting in lesser yield during the dry season.

Averagely, urban water users are those who predominantly receive service delivery by GWCL and are in the position to determine if the service rendered to them is satisfactory for which they are willing to make some commitment. Deichmann and Lall, (2003) said that several underlining factors influence satisfaction which can be connected to the characteristics of the delivered service. The satisfaction with the expansion of systems corroborates the work of Evans and Linsay (2002) when they held that without first increasing satisfied customers, a business will not build reliable customers; this occurs when services and goods reach or surpass consumer standards.



Staff were also having the required knowledge and expertise in dealing with customers' complaints and were courteous enough to handle issues in the delivery of water services and receiving complaints from customers which led to a considerable satisfaction level amongst the customers. There is an overall, good impression and satisfaction of the work of GWCL in terms of urban water supply and distribution.

4.6.8 Willingness to pay for water (WTP)

This part of the analysis responds to the second part of objective four and seeks to establish the willingness of the respondents to pay for water tariffs considering their satisfaction level with the water service quality of GWCL with other variables like the income level and the household size of the respondents.

Figure 4.11 below presents the amount that people are willing to pay for the water they consume. The results show that the majority of the respondents (58.7%) are willing to pay GHc17.00 or less per 8000ltrs of water whilst 41.3% said they are willing to GHC18.00 or more per every 8100ltrs and above for water used.

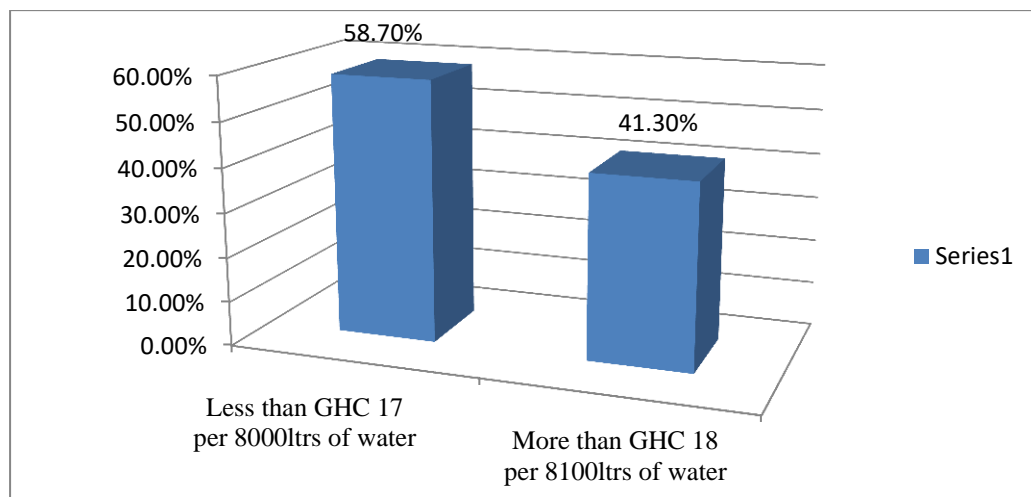


Figure 4.12. Willingness to pay for tariff

Source: Field survey, (2020)



The results show that there is an almost equal willingness to pay less than GH¢17.00 per 8000ltrs of water or more than GH¢18 per 8100ltrs of water as tariffs every month. Given that the first 5000liters of water falls within the lifeline category so does not attract any payments, the GH¢17.00 covers the next 3000ltrs (any additional 1000ltrs costs GH¢5.62 which are rounded up to the whole number for the next 3000ltrs) of consumption. The willingness of almost half of the respondents to pay GH¢18.00 or more based on their level of consumption which will be above 8100ltrs of water shows that they are assured and have confidence in the reliable supply of the water in the right quantity and quality to meet their daily needs. The performance of the GWCL and the trust they have built in their customers in providing quality customer service also promotes loyalty and the willingness of the customers to pay for the service they receive. However, the perception of considering water as a public good and the right for everyone leads to a sharp majority of the respondents holding the thought that they will prefer paying GH¢17 or less for 8000ltrs of water consumed irrespective of the quality of the service rendered to them and the reliability of supply. This situation is made worse when the present economic situation is given a consideration vis-à-vis the amounts of money people are willing to pay for utility services.

Table 4.17 as presented below shows the response of the respondents in the assessment of willingness to pay based on variables like the tariff amount involved, the water service quality, the household income level as well as household size.



Table 4.14: Functions of willingness to pay

Observation		No	Yes	Total
Willing to pay the monthly tariff given the amount involved	<i>f</i>	83	198	281
	<i>%</i>	29.5	70.5	100
Tariff amount influence your willingness to pay for the water	<i>f</i>	30	251	281
	<i>%</i>	10.7	89.3	100
Generally satisfied with the level of water services	<i>f</i>	41	240	281
	<i>%</i>	14.6	85.4	100
Satisfaction with water service quality influence your willingness to pay for water	<i>f</i>	10	271	281
	<i>%</i>	3.6	96.4	100
Household income level influence your willingness to pay for water	<i>f</i>	58	223	281
	<i>%</i>	20.6	79.4	100
Household size influence your willingness to pay for water	<i>f</i>	94	187	281
	<i>%</i>	33.5	66.5	100

Source: Field survey, (2020).

70.5% of the respondents said they were willing to pay for the monthly tariff given the amount involved whilst 29.5% were not willing to pay the amount involved on monthly basis. Another 89.3% said the tariff amount involved influences their willingness to pay for water whilst 10.7% answered in the negative. A majority of 85.4% were satisfied with the water service delivery corroborated by another 96.4% who held that the satisfaction with the water service quality influences their willingness to pay for the tariff and amount given to them as the water bill. However, 14.6% were not satisfied with service delivery leading to 3.6% saying their dissatisfaction with the water service quality does not affect their willingness to pay for the water. Household income level (79.4%) and household size (66.5%) were found to be some of the factors that influence the willingness of the customers to pay for water. 20.6 % however said their income level does not affect their willingness to pay and 33.5% also said their household size will not be able to influence their willingness to pay for the water.



The majority of the people interviewed showed their willingness to pay for the prevailing water tariff given the amount involved which demonstrates a high level of confidence in the service quality delivery of GWCL as being commensurate with the amount being paid as the tariff. However, respondents are still cautious of the amount being charged as the monthly tariff leading to a majority saying their willingness to pay for water is affected by the amount involved. This is in line with the work of Zhang and Wu (2011) who posited that the economy or expenditure is a factor which affects the willing to pay. This suggests that given the economic situation, people might not be willing to pay if the amount crosses a certain threshold which they estimate to be too high. From the results as presented, there is satisfaction with the water service quality of GWCL which respondents said influences their willingness to pay for the water tariff being presented to them. Here the quality of the service delivery influences the willingness to pay for the service if the expectation of the customer is met as demonstrated by Zhang and Wu (2012) who held that product quality is a strong predictor of willingness to pay. Another variable that was found to influence the willingness to pay for the tariff as presented in the above table was household income level. This means that the amount of money people receive affects their affordability and their willingness to pay for the service given to them as posited by Zhang and Wu (2012). It also means that people who do not have a well-paid source of livelihood might find it difficult to pay even if they are willing to pay. The household size which demonstrates the number of people who are feeding from the same pot also affects their willingness to pay for the money. This can be so because the larger the household the more water they will need to use. There is also difficulty in controlling wastage of water when the household size is large which can lead to higher tariff charges at the end of the month. Depending on the household size, the



number of tariff charges might be affordable or not and where the tariff is deemed to be too high it might affect the willingness to pay for the water. This again falls within the argument of economy and expenditure of customers' as posited by Zhang and Wu (2012). The findings however failed to confirm the argument of Rao (2020) and Homburg et. al. (2005) who posited that seasonality and brand image are factors that influences willingness to pay

4.6.9 Binary Logistic Regression

Table 4.15: Binary Logistic Test Results on Willingness to Pay for Water Supplied by GWCL

Observation	No	Yes	Total	Sig.	Wald	Df
Willing to pay the monthly tariff given the amount involved	83	198	281	.269	1.221	1
	29.5	70.5	100			
Satisfaction with water service quality influence your willingness to pay for water	10	271	281	.531	.393	1
	3.6	96.4	100			
Household income level influence your willingness to pay for water	58	223	281	.570	.323	1
	20.6	79.4	100			
Household size influence your willingness to pay for water	94	187	281	.825	.467	1
	33.5	66.5	100			

Source: Field survey, (2020)

Interpretation of the binary logit results to address the hypotheses

1. H_0 : Water tariff amount per month has no significant relationship with willingness to pay for water.

The null hypothesis 1 cannot be rejected, because the significance value of 0.269 is greater than the cutoff point of 0.05. In other words, no relationship exists. But a



Wald value of 1.221 is greater than zero (0), suggesting that water tariff amount is a contributory factor to the willingness to pay for water.

2. H_0 : Water service quality has no significant relationship with willingness to pay for water.

The null hypothesis 2 cannot be rejected, because the significance value of 0.531 is greater than the cutoff point of 0.05. In other words, no relationship exists. But a Wald value of 0.393 is greater than zero (0), suggesting that water service quality is a contributory factor to willingness to pay for water.

3. H_0 : Household income size has no significant relationship with willingness to pay for improved water service quality

The null hypothesis 3 cannot be rejected, because the significance value of 0.570 is greater than the cutoff point of 0.05. In other words, no relationship exists. But a Wald value of 0.323 is greater than zero (0), suggesting that household income size is a contributory factor to willingness to pay for water.

4. H_0 : Household size has no significant relationship with willingness to pay for improved water service quality

The null hypothesis 4 cannot be rejected, because the significance value of 0.825 is greater than the cutoff point of 0.05. In other words, no relationship exists. But a Wald value of 0.467 is greater than zero (0), suggesting that household size is a contributory factor to willingness to pay for water.

Generally, the binary logistic regression test results show that water tariff amounts, water service quality, income, and household size have no significant relationships with willingness to pay. However, the Wald coefficients are all greater than 1,



suggesting that all the variables contribute to willingness to pay, despite being statistically insignificant in the relationship (see Pallant, 2005).

In terms of policy implications, the significant value for the relationship between water tariff amount and willingness to pay is relatively closer to the acceptable cutoff point of 0.05. It also has the largest Wald value of 1.221. This implies that any policy to improve willingness to pay for water services of Ghana Water Company Ltd. in Wa township should focus on a good tariff policy, especially affordability.

4.7 Summary

This chapter presented and analyzed results from the study which covered the demographic characteristics of respondents, the nature of the water delivery systems in the Wa township, identification and effectiveness of the roles of stakeholders by respondents, and the assessment of the water delivery service of GWCL. The chapter also included the presentation and analysis of customer satisfaction concerning water service quality delivery by GWCL and the willingness of the customers to pay for the service delivered.



CHAPTER FIVE

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

5.1 Introduction

This section of the research presents a summary of the key research findings. It further also showcases the conclusions and recommendations made based on the findings as presented in the previous chapter.

5.2 Summary of Key Findings

The main focus of this study was to determine the effects of service quality of GWCL on customer satisfaction and willingness to pay in the Wa township. To effectively answer this, the researcher specifically investigated the nature of the water service delivery of GWCL; assessed the effectiveness of the roles of stakeholders in the service quality delivery by GWCL; examine the effectiveness of the service delivery of GWCL in the Wa township; ascertain the effect of service quality of GWCL on customer satisfaction and willingness to pay for water. The major findings are discussed as follows;

The nature of water delivery systems of GWCL in the Wa Township

The results of the first objective revealed that the main water service delivery systems by GWCL which are accessible for utilization in the Wa township are private home connections, followed by public standpipes that are normally operated by vendors on behalf of the GWCL and then mobile tanker services. The study also showed that there has been a tremendous increment in the number of private home connections and public standpipes since the Jambuse Water Treatment facility commenced operation.



The effectiveness of the roles of stakeholders in the service quality delivery by GWCL.

In addressing objective two of the study, it was revealed that the Ministry of Sanitation and Water Resources has been effective in formulating policy to guide the water service delivery and has also promoted infrastructure development like the Jambuse Water Treatment facility and the expansion of the distribution network in the township. The Ghana Water Company Limited has been performing well in the area of supplying water to the urban community, the maintenance and repairs of faulty plants and equipment as well as effective customer service management. There was an outcome of an effective regulation of utility bodies like the GWCL to abide by its mandate of providing water for the populace and the setting of tariffs by the PURC which is also supported by the effective role being played by the Water Resource Commission in the regulation and management of the utilization of water resources and water quality analysis of the freshwater resources available in the Upper West Region. It was also established that given the roles of the Environmental Protection Agency, they were most effective at environmental protection control. All these stakeholders perform their roles in ensuring that GWCL meets its goal of good water service quality delivery in the Wa township.

Examine the service quality delivery of GWCL in the Wa township

In examining the service quality delivery by GWCL in the Wa township, the research showed that the quality of water supplied by GWCL was shown by the taste (tasteless), colour (Colourless), and Odour (Odourless) of the water was very good. The reliability of the water supply was also good because water mostly flows throughout the week and so meets the expectation and needs of the customers. This is because the current demand on the distribution system in Wa is below the capacity of



the Jambuse Water Treatment Plant. It was also found that the whole production and distribution system functions well with minimum breakdowns. The study also showed that GWCL does well when it comes to disconnection without damage to pipes, prompt repairs of burst pipes, and the disconnection of only customers who are indebted to GWCL. There was constant adequate pressure in the supply of water to customers at most times whilst those living at high rise buildings also had good pressure of the water being supplied to them. There was an overwhelming majority who found the water tariff to be affordable whilst the GWCL showed good customer management in their response to complaints on tariff irregularities and the exhibition of courtesy in carrying out their duties. The company also had a positive approval for the way they responded to complaints on technical breakdowns. The study also showed a good performance by the GWCL in providing accurate meter readings and demonstrating regularity in the meter reading and bill delivery and going further to ensure that there is a reflection of payments made to GWCL for water consumed. Also, the GWCL performed well in the area of expanding the distribution network in the township which has led to an increase in the private homes connections and the public standpipes.

Ascertain the effects of service quality delivery of GWCL on customer satisfaction and willingness to pay for the water.

To also answer the first part of objective four of this study, the service delivery of GWCL as presented above led to a general expression of satisfaction of the water quality, reliability, assurance, tangibility, empathy, responsiveness, and expansion as defined by the SERQUAL/RATER model and the literature in this study.

Focusing on the second part of objective four, the study showed that a weak majority of people who responded to this research are willing to pay GH17.00 or less for every



8000ltrs or below for water they use. Also, more people are willing to pay the monthly tariff given the amount involved in relation to their water usage and even a higher majority was influenced by the amount of the tariff involved in their willingness to pay for water. The research also revealed that satisfaction with the water service quality is one of the factors that influence people's willingness to pay for water as do household income. Another factor that was found in the study to influence willingness to pay for water was household size.

5.3 Conclusions

Objective one of this study was achieved by investigating the water delivery systems available for customers in the Wa township. The study concludes that the water delivery systems used by GWCL to supply water to customers in the Wa township include private home connections which are followed by the public standpipes and then the mobile tankers. The study conformed to the reliability theory which was demonstrated by the robustness of the water delivery systems in the form of private home connections, public standpipes, and water tankers and their ability to work with minimum failures. The study was also in line with the Utility Management Model as can be found in the conceptual framework of this study. This model looked at water as an economic good delivered through private home connections, public standpipes, and mobile tankers.

Objective two of the study was achieved with the assessment of effectiveness of the roles of the stakeholders which will lead to service quality delivery of GWCL as demonstrated in the conceptual framework. The results agree with the stakeholder theory which emphasizes the importance of stakeholders and the roles they have to play for the successful performance of an organization. In this case, the findings of this study have shown how the contributions of the identified stakeholders in



performing their various roles have helped GWCL to meet its service quality delivery. It is also in line with the conceptual framework of this study which shows that if the stakeholders perform their assigned roles, it will lead to service quality delivery. It concludes that for GWCL to provide water service quality in the Wa township, the Ministry of Sanitation and Water Resources effectively performs its role of policy formulation and infrastructure development which manifested in the building of the Jambuse Water Treatment Plant and the expansion of the distribution network in the township. The study also concludes that the GWCL performs its role of urban water supply, maintenance, and repairs of the faults on plants and equipment and customer service management to ensure service quality. The study concludes that the PURC performs its oversight duties like the regulation of utility bodies like the GWCL and the setting of tariffs to ensure service quality. The study concludes that the Water Resource Commission also performs the roles of regulation and management of the utilization of water resources and conducts water quality analysis of these water bodies to ensure service quality delivery of GWCL. The Environmental Protection Agency as part of its responsibilities also performs its role of environmental pollution control to ensure water service quality delivery of GWCL in the Wa township.

Objective three (3) was addressed by examining the dimensions in the SERQUAL/RATER model which were functions of service quality to examine the service delivery of GWCL which will eventually lead to customer satisfaction in accordance with the conceptual framework. The results support the reliability theory which calls for consistency in water supply in the right quantities and quality as well good customer management regime. The study also indicates that the GWCL in ensuring water service quality supplied water that met the prescribed quality standards by the WHO and Ghana Standards Board from the Jambuse Water Treatment Plant to



the Wa township. The study also concludes that GWCL demonstrated the reliability of service by meeting the water service quality requirement of a consistent flow of good quality water and adequate tap yield to the township because the Jambuse Water Treatment Plant was effective and has a production capacity that exceeds the existing distribution network. The study concludes that there was Assurance in service quality by GWCL because disconnection was mostly done without damage to pipes with prompt repairs of burst pipes at most of the times that such reports were received. Steps were also taken to disconnect only customers who were indebted to GWCL. The study also concludes that there was Tangibility to ensure service quality by GWCL which was demonstrated by the adequacy of pressure levels in the distribution network to all customers. The study showed that GWCL met the Empathy parameter of service quality because the water supplied was affordable. The staff of GWCL also responded to complaints on tariff irregularities, technical breakdowns, gave notice to customers before disconnection, and exhibited courtesy in carrying out their duties. The study also concluded that the parameter of Responsiveness for service quality by GWCL was adequately met by GWCL through their accuracy in meter reading, the regularity in meter reading and bill delivery as well as the reflection of payments made to GWCL on water usage. The study also concludes that since the commencement of operations at the Jambuse Water Treatment Plant, the GWCL has made considerable expansion of their distribution network in the Wa township which has led to an increment in the number of private home connections and public standpipes.

Objective four of the study was accomplished as customers had the chance to express their satisfaction levels on various parameters addressing the various dimensions of the SEQUAL/RATER model in line with the conceptual framework. The dimensions



were expanded to represent the various service delivery aspects of GWCL which was examined in objective 3. In line with this, the study concludes that the water service quality by GWCL led to the satisfaction of customers with the water quality. The study also concludes that there was satisfaction with reliability. The study also concludes that there was satisfaction with Assurance. The study also concludes that there was satisfaction with the Tangibility of service quality. The study further concludes that there is satisfaction concerning Empathy of service quality because of the positive responses to affordability. The study again showed satisfaction with the way GWCL has expanded its distribution system and the increment in the number of private home connections and public standpipes. Conversely, the conclusion of this study is in line with the conceptual framework which shows that if the service quality meets expectations, it will lead to customer satisfaction and willingness to pay for the services rendered.

Regarding the willingness of customers to pay for water supply services, the binary logistic regression test results show that water tariff amounts, water service quality, income, and household size have no significant relationships with willingness to pay.

In terms of policy implications, the significant value for the relationship between water tariff amount and willingness to pay is relatively closer to the acceptable cutoff point of 0.05. It also has the largest Wald value of 1.221. This implies that any policy to improve willingness to pay for water service quality of Ghana Water Company Ltd. in Wa township should focus on a good tariff policy, especially affordability.

5.4 Recommendations

The study has revealed the water supply situation in the Wa township by telling the stories of both suppliers and consumers of water as well as other relevant stakeholders. Steps need to be taken to address problems identified to enhance the



operations of GWCL. The following recommendations sought to address the problems identified in the study.

The PURC, WRC, and the EPA should engage in publicity programs at radio stations and other available means to educate the public on their roles and what they have been doing in the Upper West region. This will lead to a majority of the public knowing them by their institutional names and getting abreast with what they are doing in the municipality.

GWCL should put a rapid response team in place to facilitate the prompt repairs of reported leakages in the Wa township. This will ensure that the delay in repairs reported by a large minority of people in the Wa township is addressed.

GWCL should also ensure adequate dissemination of information using radio stations and information vans to announce water supply interruptions and serve notices to customers on impending disconnection exercises. This will help customers to store water to cover periods of interruptions and also take steps to settle unpaid bills to prevent disconnections.

GWCL in collaboration with the MoSWR should undertake expansion of the distribution network to other parts of the municipality that have not been covered.

This will ensure that there is sufficient water to most parts of the municipality and further ensure that the Jambuse Water Treatment Plant which is operating at about 30% of its capacity is put into good use.



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APPENDICES

Appendix I: Household questionnaire

**UNIVERSITY FOR DEVELOPMENT STUDIES
DEPARTMENT OF ENVIRONMENT AND RESOURCE STUDIES
WA CAMPUS**

**WATER SERVICE QUALITY & CUSTOMER SATISFACTION
QUESTIONNAIRE**

Good morning/afternoon/evening Sir,

I am called Raymond Mensah, a student of University for Development Studies who is offering my Masters program in Environment and Resource Management. As part of my study I am conducting a survey regarding water service quality and customer satisfaction of Ghana Water Company Limited (GWCL) customers in your area. The information collected would be used to identify your priorities and concern in order to advise ways that the service quality of water supply could be improved in future. All the detailed information provided will be treated privately. The survey will take about 15 minutes to complete. I would appreciate your participation and hope that you will be willing to help me with this study. Thank you.

SECTION A: SOCIO ECONOMIC BACKGROUND OF RESPONDENTS:

1. Which of the following age group do you belong?

18-59yrs 60+yrs

2. Sex

Male Female



3. Educational background?

Literate Illiterate

4. Employment status?

Employed Unemployed

5. Occupation ?

Farmer Non-farmer

6. What is the monthly family income?

445 or less GHC 446 or more

7. Marital status?

Married Not married

8. What is your household size?

6 or less 7 or more

9. Type of Dwelling:

Block of Flats Semi & Detached Bungalow Semi & Detached Duplex

Mansionnette

10. Classification of Area:

Low Density Medium Density High Density Area

11. What is your status in this building?

Head of family Occupant



**SECTION B: THE NATURE OF WATER DELIVERY SYSTEMS IN THE WA
TOWNSHIP**

12. What is the major source of water in your area?

Private pipe Public Stand pipe 3. Boreholes 4. Mobile Tanker 5.
Yard well

13. Which of the major source of water is available to you?

Private pipe Public stand pipe Boreholes Mobile Tanker Yard
well

14. Which institution is responsible for your main source of water?

G.W.C.L CWSA NGO Water Vendor

15. Which of the following does your major source of water depend on?

Surface water Ground water Rain water

16. Does the major source of water involve application for connection? Yes

No

17. Has your Household ever applied for water connection? Yes No

18. If yes, which institution? G.W.C.L CWSA NGO Self

Vendor

19. Does your water supply system involve a treatment facility? Yes No

20. If yes, which institution is responsible for your water? GWCL CWSA

NGO Self Vendor



SECTION C: ASSESSMENT OF THE EXPECTED ROLES OF SAKEHOLDERS

No.	Stakeholders	Expected Roles
21.	Ministry of sanitation and water resources <input type="checkbox"/>	Policy formulation <input type="checkbox"/> Infrastructure development <input type="checkbox"/>
22.	Ghana Water Company Limited <input type="checkbox"/>	Urban Water supply <input type="checkbox"/> Maintenance and repairs <input type="checkbox"/> Customer service management <input type="checkbox"/>
23.	Public Utility Regulatory Commission <input type="checkbox"/>	Regulation of utility bodies <input type="checkbox"/> Setting of tariffs <input type="checkbox"/>
24.	Water Resource Commission <input type="checkbox"/>	Regulate and manage utilization of water resources <input type="checkbox"/> Water quality analyses <input type="checkbox"/>
25.	Environmental Protection Agency <input type="checkbox"/>	Regulate water bodies against pollution <input type="checkbox"/> Environmental pollution control <input type="checkbox"/>



SECTION D: ASSESSMENT OF THE OBSERVED ROLES OF SAKEHOLDERS

No.	Stakeholders	Observed Roles
26.	Ministry of sanitation and water resources	Policy formulation <input type="checkbox"/> Infrastructure development <input type="checkbox"/>
27.	Ghana Water Company Limited	Urban Water supply <input type="checkbox"/> Maintenance and repairs <input type="checkbox"/> Customer service management <input type="checkbox"/>
28.	Public Utility Regulatory Commission	Regulation of utility bodies <input type="checkbox"/> Setting of tariffs <input type="checkbox"/>
29.	Water Resource Commission	Regulate and manage utilization of water resources <input type="checkbox"/> Water quality analyses <input type="checkbox"/>
30.	Environmental Protection Agency	Regulate water bodies against pollution <input type="checkbox"/> Environmental pollution control <input type="checkbox"/>



SECTION E: ASSESSMENT OF SERVICE DELIVERY BY G.W.C.L IN ENSURING SERVICE QUALITY

Water Quality: State your observation on quality of water supplied by GWCL under the following

31. Water Colour - Good Bad

32. Water Taste – Good Bad

33. Water odour - Good Bad

Reliability: Specify your observation of the reliability of service provided by GWCL based on the following:

34. Reliability of flow: Less than 3 times a week More than 3 times a week
Throughout the week

35. Tap water yield : Meets expectation Does not meet expectation

36. Functionality of tap system : Functions well Sometimes breakdown
Broken down

Empathy: What is your observation of the level of empathy exhibited by GWCL in the delivery of water services under the following:

37. Affordability of tariffs: Affordable Not affordable

38. Response to complaints on tariff irregularities: Good Bad

39. Response to complaints on technical breakdowns: Good Bad



40. Exhibiting courtesy in carrying out duties: Good Bad

41. Giving notice before disconnection: Good Bad

Responsiveness: What is your observation on the level of responsiveness exhibited by GWCL

42. Accuracy in meter reading: Good Bad

43. Regularity in meter reading and bill delivery: Good Bad

44. Reflection of payments made to GWCL on water usage: Good Bad

Tangibles: What is your observation on the level of tangibility exhibited by GWCL

45. Adequate pressure to high rise buildings: Good Bad

46. Constant pressure at all times: Good Bad

Assurance: What is your observation on the level of assurance exhibited by GWCL

47. Disconnection without damage to pipes: Good Bad

48. Disconnection of only customers who are indebted to GWCL: Good Bad

49. Prompt repairs of burst pipes: Good Bad

Expansion: What is your observation on the level of expansion carried out by GWCL

50. Extension of pipe water connection are observed in your area: Yes No

51. The number of private and public pipe connections are increasing: Agree
Disagree



SECTION F: CUSTOMER SATISFACTION

INDICATE YOUR LEVEL OF SATISFACTION WITH THE FOLLOWING

Water Quality

- 52 Water Colour Satisfied Dissatisfied
- 53 Water taste Satisfied Dissatisfied
- 54 Water Odour Satisfied Dissatisfied

Reliability

- 55 Reliability of flow Satisfied Dissatisfied
- 56 Tap yield Satisfied Dissatisfied
- 57 Functionality of system Satisfied Dissatisfied

Empathy

- 58 Affordability of tariffs Satisfied Dissatisfied
- 59 Response to complaints on tariff irregularities Satisfied Dissatisfied
- 60 Response to complaints on technical breakdowns Satisfied Dissatisfied
- 61 Exhibiting courtesy in carrying out duties Satisfied Dissatisfied
- 62 Giving notice before disconnection Satisfied Dissatisfied



Responsiveness

- 63 Accuracy in meter reading Satisfied Dissatisfied
- 64 Regularity in meter reading and bill delivery Satisfied Dissatisfied
- 65 Reflection of payments made to GWCL on water usage Satisfied Dissatisfied

Tangibles

- 66 Adequate pressure to high rise buildings Satisfied Dissatisfied
- 67 Constant pressure at all times Satisfied Dissatisfied

Assurance

- 68 Disconnection without damage to pipes Satisfied Dissatisfied
- 69 Disconnection of only customers who are indebted to GWCL Satisfied Dissatisfied
- 70 Prompt repairs of burst pipes Satisfied Dissatisfied

Expansion

- 71 Extension of pipe water connection are observed in your area Satisfied Dissatisfied
- 72 The number of private and public pipe connections are increasing Satisfied Dissatisfied



WILLINGNESS TO PAY FOR WATER

73. How much does your household spend on water tariff per month?
GHC.....

74. What is your observation of the amount paid as monthly water tariff by your household?

Low High

75. Are you willing to pay the monthly tariff given the amount involved? Yes
No

76. Does the tariff amount influence your willingness to pay for the water? Yes
No

77. Generally are you satisfied with the level of water services ? Yes No

78. Does the level of your satisfaction with the water service quality influence your willingness to pay for water? Yes No

79. Does your household income level influence your willingness to pay for water?
Yes No

80. Does your household size influence your willingness to pay for water? Yes
No



Appendix II: Interview guide for officials of GWCL

UNIVERSITY FOR DEVELOPMENT STUDIES

DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCE

MANAGEMENT

Interview guide for Officials of **Ghana Water Company Limited** on effectiveness of roles in ensuring water service quality in the Wa township

To the prospective respondent:

Good morning/afternoon/evening Sir,

I am called Raymond Mensah, a student of University for Development Studies who is offering my Masters program in Environment and Resource Management. As part of my study I am conducting a survey regarding water service quality and customer satisfaction of Ghana Water Company Limited (GWCL). The information collected would be used to identify your priorities and concern in order to advise ways that the service quality of water supply could be improved in future. All the detailed information provided will be treated privately. The survey will take about 15 minutes to complete. I would appreciate your participation and hope that you will be willing to help me with this study. Thank you.

i. Date of interview:

ii. Region:

iii. District:

iv. Community:

v. Organisation

Telephone number of interviewee



S/N	PRODUCTION CAPACITY
1	Number of water schemes
2	Number of surface water schemes
3	Number of underground water schemes
4	Total number of functional scheme
5	Total install capacity
6	Total volume of water produced

Section A: Nature of water service delivery in the Wa township

1. What are the water supply systems in place to help customers receive water in the Wa township?
2. What informs the erection of a public stand pipe in a particular area?
3. Which is the most preferred choice of water supply system to customers and why

Section B : Effectiveness of stakeholders in ensuring water service quality

1. Which major stakeholders does the company work with in its bid to ensure water service quality?
2. What roles does these stakeholders perform in relation to their collaboration with GWCL?



3. How does the roles of these stakeholders affect the work of GWCL?
4. What Challenges do you normally encounter in working with these stakeholders?
5. How effective are these identified roles of the various stakeholders in assisting GWCL to achieve water service quality?

Section C: Effective of GWCL in water service delivery in ensuring customer satisfaction

1. What will you say about the quality of water produced by GWCL?
 - a. Do you sometimes have complaints on water quality and how do you solve it?
 - b. Which water parameter do you normally test for the water quality assurance?
2. How reliable is the consistency of flow to customers, the water yield and how frequent do you have breakdowns? How is all these influenced by the Jambuse water treatment plant?
3. How is the maintenance regime of the company in repairing burst pipes and maintaining a functional system?
 - a. How are issues of customers indebtedness addressed?
 - b. What are the mechanisms in place to promptly respond to customer complaints?
 - c. How do your customers make complaint to GWCL? What sort of complaint policy do you have?
4. How is the pressure of the water being supplied and how is that influenced by the Jambuse water treatment plant?



5. How affordable is the water being supplied and how does the company respond to complaints on tariff, technical breakdowns, disconnections and issues of courtesy by GWCL staff?
6. How effective is GWCL in accuracy in meter reading, regularity in meter reading and bill delivery as well as reflection of payments made for water usage?
7. How has the Jambuse Water Treatment Plant influenced the expansion and extension of GWCL water services in the Wa township? How can this be evidenced in the Wa township?
8. What are the priorities that require improvement in terms of product and service quality?

Section D: Customer Satisfaction and willingness to pay

1. How does GWCL receive feedback on customer satisfaction?
2. Would you say the customers of GWCL are satisfied with the services of GWCL and why?
3. Will you say the tariff and services of GWCL influences customers willingness to pay for water supplied to them?



Appendix III: Interview guide for officials of MoSWR

UNIVERSITY FOR DEVELOPMENT STUDIES

DEPARTMENT OF ENVIRONMENT AND RESOURCE MANAGEMENT

Questionnaire for **Ministry of Sanitation and Water Resources** on roles of stakeholders in water service quality in Wa Municipality

To the prospective respondent:

Good morning/afternoon/evening Sir,

I am called Raymond Mensah, a student of University for Development Studies who is offering my Masters program in Environment and Resource Management. As part of my study I am conducting a survey regarding water service quality and customer satisfaction of Ghana Water Company Limited (GWCL) customer. The information collected would be used to identify your priorities and concern in order to advise ways that the service quality of water supply could be improved in future. All the detailed information provided will be treated privately. The survey will take about 15 minutes to complete. I would appreciate your participation and hope that you will be willing to help me with this study. Thank you.

- i. Date of interview:
- ii. Region:
- iii. District:
- iv. Community:
- v. Settlement type.....



vi. Organization

vii. Telephone number of interviewee

S/N	Question		Any Comment
1	What are the roles of the Ministry in the provision of potable water in the country and Wa township in particular?		
2	How does the ministry ensure efficiency in water production by GWCL?		
3	What are the structures in place for the ministry to effectively execute its oversight responsibilities over GWCL?		



4	On a scale of 1-10 how would you grade the quality of service of GWCL?		
5	What would you have GWCL do to improve on their service quality.		
6	Would you say the ministry has succeeded in its oversight responsibilities? How would you grade yourself on a scale of 1-10		
7	What are the main roles being played by the Ministry in the quest to ensure water service quality in the Wa township		



Appendix IV: Interview guide for officials of PURC

UNIVERSITY FOR DEVELOPMENT STUDIES

DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCE

MANAGEMENT

Questionnaire for Officials of **Public Utilities Regulatory Commission** on effectiveness of roles in ensuring water service quality in the Wa municipality

To the prospective respondent:

Good morning/afternoon/evening Sir,

I am called Raymond Mensah, a student of University for Development Studies who is offering my Masters program in Environment and Resource Management. As part of my study I am conducting a survey regarding water service quality and customer satisfaction of Ghana Water Company Limited (GWCL) customers. The information collected would be used to identify your priorities and concern in order to advise ways that the service quality of water supply could be improved in future. All the detailed information provided will be treated privately. The survey will take about 15 minutes to complete. I would appreciate your participation and hope that you will be willing to help me with this study. Thank you.

- i. Date of interview:
- ii. Region:
- iii. District:
- iv. Community:
- v. Organisation
- Telephone number of interviewee



SECTION A: Effectiveness of roles of the PURC in water service quality in the Wa township

S/N	Questions	Options (Please tick appropriate option)			Any Comments
1.	The PURC controls public urban water tariffs by formula	Agree	Disagree	Undecided	
2.	The PURC standardizes tariffs for urban utilities only	Agree	Disagree	Undecided	
3.	The PURC involved other stakeholders to determine final approved tariffs	Agree	Disagree	Undecided	
4.	The PURC regulates tariffs for urban utilities only	Agree	Disagree	Undecided	
5.	PURC monitors water utilities to ensure compliance to non-urban water tariff regulatory provisions	Agree	Disagree	Undecided	



7.	What are the structures in place for the PURC to effectively execute its oversight responsibilities over GWCL?				
8.	How would you grade the quality of service of GWCL in line with the expectations of the PURC?				
9.	What would you have GWCL do to improve on their service quality?				
	How effective is the PURC in regulating services of the GWCL?				
10.	Water consumers are stakeholders in water tariff determination	Agree	Disagree	Undecided	
11.	Consumer Protection Agency is a stakeholder in water tariff determination	Agree	Disagree	Undecided	



12.	The interest of the PURC is to ensure fairness in water tariff imposition	Agree	Disagree	Undecided	
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Appendix V: Interview guide for officials of WRC

UNIVERSITY FOR DEVELOPMENT STUDIES

FACULTY FOR INTEGRATED DEVELOPMENT STUDIES

Questionnaire for Officials of **Water Resources Commission** on Assessment of water service quality in the Wa municipality.

To the prospective respondent:

Good morning/afternoon/evening Sir,

I am called Raymond Mensah, a student of University for Development Studies who is offering my Masters program in Environment and Resource Management. As part of my study I am conducting a survey regarding water service quality and customer satisfaction of Ghana Water Company Limited (GWCL). The information collected would be used to identify your priorities and concern in order to advise ways that the service quality of water supply could be improved in future. All the detailed information provided will be treated privately. The survey will take about 15 minutes to complete. I would appreciate your participation and hope that you will be willing to help me with this study. Thank you.

- i. Date of interview:
- ii. Region:
- iii. District:
- iv. Town:
- v. Organisation
- vi. Telephone number of interviewee



S/N	QUESTION		
1	How are freshwater sources in rural and peri-urban communities acquired and used by urban water companies?		
2	What are the causes of conflict between the water resource owning communities and the water companies?		
3	What is the existing relationship between the commission and GWCL in water resource management		
4	Would you say the water resources especially the black volta river which is used by GWCL for water is well protected? If No, why?		



5	Has there been observation over the past two years about any pollution activities on the black Volta River?		
6	Would you say the Black Volta River is being managed well and is safe for treatment and supply to the municipality? Why		
7	What roles does your institution play in the water resource communities to ensure fresh good water quality?		
8	How do your roles ensure water service quality in the provision of water in the Wa municipality?		



10	What are the major fresh water bodies available for abstraction under your jurisdiction?		
11	Are there any challenges in ensuring fresh water quality by the commission?		
12	Any recommendation for improving the roles of your commission for promoting fresh water resource quality?		



Appendix VI: Interview guide for officials of EPA

UNIVERSITY FOR DEVELOPMENT STUDIES

DEPARTMENT OF ENVIRONMENT AND RESOURCE MANAGEMENT

Questionnaire for **Environmental Protection Agency** on roles of stakeholders in water service quality in Wa Municipality

To the prospective respondent:

Good morning/afternoon/evening Sir,

I am called Raymond Mensah, a student of University for Development Studies who is offering my Masters program in Environment and Resource Management. As part of my study I am conducting a survey regarding water service quality and customer satisfaction of Ghana Water Company Limited (GWCL). The information collected would be used to identify your priorities and concern in order to advise ways that the service quality of water supply could be improved in future. All the detailed information provided will be treated privately. The survey will take about 15 minutes to complete. I would appreciate your participation and hope that you will be willing to help me with this study. Thank you.

- i. Date of interview:
- ii. Region:
- iii. District:
- iv. Community:
- vi. Organisation
- vii. Telephone number of interviewee



S/N					
1	The EPA is responsible for the prevention of discharge of waste materials into the Black Volta river by yourself or with other organizations	Agree	Disagree	Comment	
2	How does the EPA ensure that Communities and business follows the prescribed standards and guide line relating to water pollution?				
3	Has the EPA granted permits to GWCL to use the Black Volta river in relation to water production?				
4	How effective is the collaboration between the EPA and GWCL				



	in ensuring fresh water quality?		
5	Has the EPA made observations of non-compliance from community and other entities in relation to fresh water resource use regulation?		



Appendix VII: Focus Group Discussion Guide

UNIVERSITY FOR DEVELOPMENT STUDIES

DEPARTMENT OF ENVIRONMENT AND RESOURCE STUDIES

Semi-structured Focus Group Discussion Guide

To the prospective respondent:

Good morning/afternoon/evening Sir,

I am called Raymond Mensah, a student of University for Development Studies who is offering my Masters program in Environment and Resource Management. As part of my study I am conducting a survey regarding water service quality and customer satisfaction of Ghana Water Company Limited. The information collected would be used to identify your priorities and concern in order to advise ways that the service quality of water supply could be improved in future. All the detailed information provided will be treated privately. The survey will take about 15 minutes to complete. I would appreciate your participation and hope that you will be willing to help me with this study. Thank you.

- i. Date of interview:
- ii. Region:
- iii. District:
- iv. Community:
- vi. Organisation
- vii. Telephone number of interviewee



1. How long have you worked with GWCL?
2. What is the name of your vendor post?
3. What are your roles?
4. How many ppl rely on your service in a day?
5. How regular is the flow?
6. How adequate is the pressure of the flow of water?
7. Do you receive any water quality complaints and how do you deal with it?
8. What is your view on the price of water?
9. How do you carry out routine maintenance and maintenance as a result of faults that comes up?
10. Any complaints from customers?
11. How do you handle complaints?
12. Given choice do you think people will choose GWCL water over others?
13. Do you have any concerns about how GWCL supply water and handle customers?
14. What do you think GWCL should do for you to make your work more effective?

