

Assessing the Challenges of Water Supply in Urban Ghana: The case of North Teshie

HENRY WONDER DOE

hwdoe@yahoo.com

Supervisor:

Associate Professor Jan-Erik Gustafsson

Department of Land and Water Resources Engineering,

Royal Institute of Technology (KTH)

Stockholm, Sweden

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DEDICATION

I dedicate this piece of work to my ever supportive wife (Stella Lily Doe) and especially to my little daughter, Delali Ama Doe (Love Baby), who has been deprived of fatherly love during the period of my stay in Sweden for the EESI Programme at KTH.

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The list is tall and I cannot mention all who were involved in various ways for the completion of this work. I say Thanks to you all- "*Tack sa mycket*", "*Akpe kaka*", and God richly bless you all.

I finally give glory, honour and praise to God Almighty whose love; sustenance, care and protection have made it possible for me to stay in Sweden and to undertake this study.

I am personally responsible for all errors that might be found in this work.

Henry W. Doe.

ABSTRACT

This thesis assessed the challenges facing water supply in North Teshie in Ghana. A survey of 100 households from the study area, coupled with information from officials from the GWCL, GSS, PURC, have revealed that illegal connections and continuous unplanned developments have resulted in scarcity of water in the study area.

The study further indicated that the Government of Ghana, acting on the recommendations of the WB/IMF's SAP policies, has ignored the opposition of the civil society and officially privatized the urban water supply in 2005, with a key objective of getting the low income consumers to have access to constant flow of the water at affordable prices.

Protracted water crisis in the study area was found to have led to very high prices of water from the local vendors; putting more socioeconomic burden on women. Though it was thought that community leaders could offer productive suggestions on how to restore water supply to the area, it was also generally believed that the private sector participation could inject greater efficiency into the water supply system.

Between 1995 and 2005, water supply through the joint efforts of the GWCL and Government has increased from 8 litres per person in 1995 to 27 litres in 2005. The increase is expected to continue beyond the 2005 figure, if GWCL is given the needed technical, financial and logistic support.

On account of the vital role of water to socio-economic life of humans, the author recommended an over all involvement of the private sector; the public sector; women; the local inhabitants and the donor institutions to play their supportive roles in the improvement of the provision of water to the urban dwellers in Ghana.

Key words: Ghana, Water Supply, North Teshie, Ghana Water Company Ltd, Public Utilities Regulatory Commission, Private Sector Participation, Socioeconomic Impact.

LIST OF ABBREVIATIONS

AMA	Accra Metropolitan Area
AVRL	Aqua Vitens Rand Limited
CWIQ	Core Welfare Indicators Questionnaire
CWSA	Community Water and Sanitation Agency
DFID	Department for International Development
ECOWAS	Economic Community of West African States
GDP	Gross Domestic Product per Capita
GPRSP	Poverty Reduction Strategy Papers
GSS	Ghana Statistical Service
GWCL	Ghana Water Company Limited
GWSC	Ghana Water and Sewerage Corporation
IMF	International Monetary Fund
ISODEC	Integrated Social Development Centre
IWA	International Water Association
MDGs	Millennium Development Goals
NCAP of Water	National Coalition Against the Privatization of Water
NGOs	Non Governmental Organizations
PAP	Public Awareness Programmes
PMU	Project Management Unit
PSP	Private Sector Participation
PURC	Public Utilities Regulatory Commission
PWD	Public Works Department
RoG	Republic of Ghana
SAP	Structural Adjustment Programme
SPSS	Statistical Package for the Social scientists
UNEP	United Nations Environment Programme
WB	World Bank
WDM	World Development Movement
WHO	World Health Organisation
WUP	Water Utility Partnership

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CHAPTER ONE: INTRODUCTION

1.0 General Introduction

“All peoples, whatever their stage of development and their social and economic conditions, have the right to have access to drinking water in quantities and of a quality equal to their basic needs”(Mar del Plata Water Conference 1977). Water is the most important of all public services. It is the most essential necessity of life after oxygen. Anything that disturbs the provision and supply of water therefore tends to disturb the very survival of humanity.

Although water covers about 70 percent of the Earth’s surface, only 1 percent of it is available to us as a source of drinking. It is understood that our body is made up of about 70 percent water and that it controls virtually every aspect of our health. The importance of water is not only attached to the drinking but also to cooking, bathing, washing and other activities. Where provisions for water and sanitation are inadequate, the diseases that arise from contaminated food, water and hands are among the world’s leading causes of premature death and serious illness. (<http://www.epa.gov/docs/owmitnet/water-efficiency/pubs/supply.htm>).

The challenges facing many countries in the world today in their struggle for economic and social development is increasingly related to water. One of the international goals set for the year 2015 in the United Nations Millennium Declaration and in the plan of implementation of the world summit on sustainable development is reducing the proportion of people without adequate access to water and basic sanitation by one-half. While access to sufficient and clean drinking water may be taken for granted in the developed world, problems with access are most severe in the developing world, where more than 5 million people perish every year from water-related diseases, and more than 1 billion people suffer without access to water for their basic needs. http://www.geotimes.org/may05/feature_worldwater.html

Africa has the lowest water supply and sanitation coverage of any region in the world. More than 30% of Africans residing in urban areas currently lack access to adequate water services and facilities. In the year 2000, World Health Organisation (WHO) estimated that Africa contains 28% of the world’s population without water access to improved water supplies, and 13% of the world’s population without access to improved sanitation. Only 62% of the people in African countries have access to improved water supplies, and only 60% have access to improved sanitation. (WHO 2000, p 6)

The Water Utility Partnership, an organisation that deals with capacity building of water supply and sanitation utilities in Africa, has noted that: “public water services in many African countries have been assigned to a single water authority and the abilities of governments to deliver water adequately have been negatively affected by a number of factors. Thus urban water systems are characterised by heavy losses both financially and of water itself. Africa is also noted as urbanizing more than any other region in the world. Between 1995 and 2005, the urban population is expected to grow from 300 to 700

million, and by 2020 it is expected that over 50% of the population in African countries will reside in urban areas". (Water Utility Partnership (WUP), Africa, 2003)

According to World Health Organisation (WHO), in order to meet the recently established Millennium Development Goals (MDGs) of halving the unserved population by 2015, urban Africa requires about 6000 to 8000 new connections every day. This will call for strong political commitment backed by resources and action if governments are willing to prevent the widening gap between served and unserved households.

In Ghana rainfall is not scarce and several rivers do not cease to flow, but clean water is denied millions of people. Similar to the urban water sector in many developing countries, there are serious constraints to meeting the challenge to provide adequate water for all urban residents. Water supply shortages and quality deterioration are among the problems which require greater attention and action. Various strategies are always being developed to make water accessible to all inhabitants. However due to insufficient structures coupled with rapid population growth and urbanisation, the gap between demand and supply of water continues to widen.

1.1 Country Background

Ghana is situated between latitude 4,44° S and 11,11° N and longitude 3,11° W and 1,11° E in the western part of Africa. It shares borders on the west with [Côte d'Ivoire](#), in the north with [Burkina Faso](#), on the east with [Togo](#) and bounded on the south by the Atlantic Ocean. It has a total surface area of 238 533 square kilometres and a current estimated (2005) Population of 21 946 000, giving an approximate population density of 75 persons per square kilometers, with Accra as its largest city and administrative capital. The country is home to [Akan](#), [Mossi](#), Ewe, and Ga-Adangme peoples among others and has about 79 different languages. Figure 1.1 is a map of Ghana showing the principal towns.

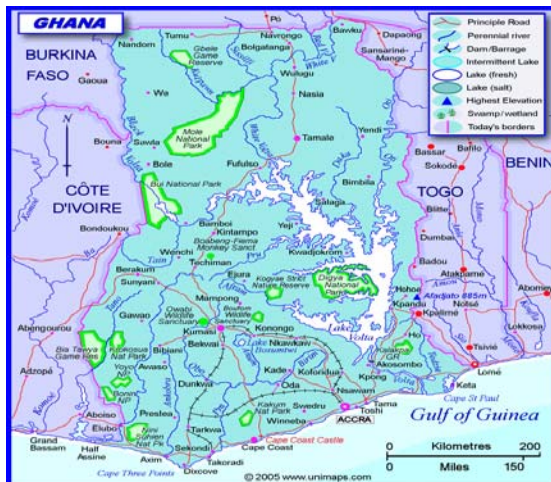


Figure 1.1: Map of Ghana Showing Principal Towns

Source: <http://unimaps.com/ghana/index.html>

Ghana means Warrior King. The name was adopted after the once existed Empire of Ghana (existed C. [750-1036](http://en.wikipedia.org/wiki/Ghana_Empire)) when the then Gold coast attained her independence in 1957 from the British. The country is well endowed with natural resources. The domestic economy continues to revolve around subsistence agriculture, which accounts for 36% of [GDP](#) and employs 60% of the work force, mainly small landholders. The biggest cash crop is cocoa whilst main mineral exports include gold and diamonds. The Gross Domestic Product (GDP) per capita is about US \$ 450 (2005, <http://devdata.worldbank.org>)

Ghana has only two seasons-dry and wet. The climate is tropical, with a long favourable warm weather and with annual rainfall ranging from about 1 100 mm in the northeast to about 2 100 mm in the southwest. The mean annual temperature of the country is about 30 degrees Celsius. <http://www.ghanaweb.com/GhanaHomePage/geography/>

Ghana is a member of the Commonwealth and also of the Economic Community of West African States (ECOWAS). As a republic with a constitutional democracy, the head of state is the president. The country is divided into 10 administrative regions which are subdivided into a total of 138 [districts](#). The official language is English and the currency is the Ghana cedi. Ghana is a lowland country except for a range of hills on its eastern border. Several rivers and streams cross the sandy coastal plain. The Volta River in the east was dammed with the Akosombo Dam, forming one of the largest lakes in the world. Figure 1.2 is a picture of the Akosombo Dam. The hydroelectric scheme at the dam generates a large amount of Ghana's electricity for household consumption and for industries. (<http://en.wikipedia.org/wiki/Ghana>).



Figure 1.2: The Akosombo Dam

Source: http://ca.encarta.msn.com/media_461523869/Akosombo_Dam.html

Ghana's population has been increasing steadily. It was just a little over 2 million in 1921, but increased to 3.1 million in 1931, 4.1 million in 1948, 6.7 million in 1960, 8.6 million in 1970 and 12.2 million in 1984. It was estimated to be 15.0 million in 1990, increased to 18.8 million in the year 2000 and projected to be 22.0 million in 2005. The population of Ghana from 1921 to 2000 is shown in table 1.1 below.

Table 1.1: Ghana's Population from 1921 to 2005

Year	1921	1931	1948	1960	1970	1984	1990	2000	2005
Pop. in Millions	2.3	3.1	4.1	6.7	8.6	12.2	15.0	18.8	*22.0

Source: Ghana Statistical Service, 1921 – 2000 Population Census reports

* Projected figure

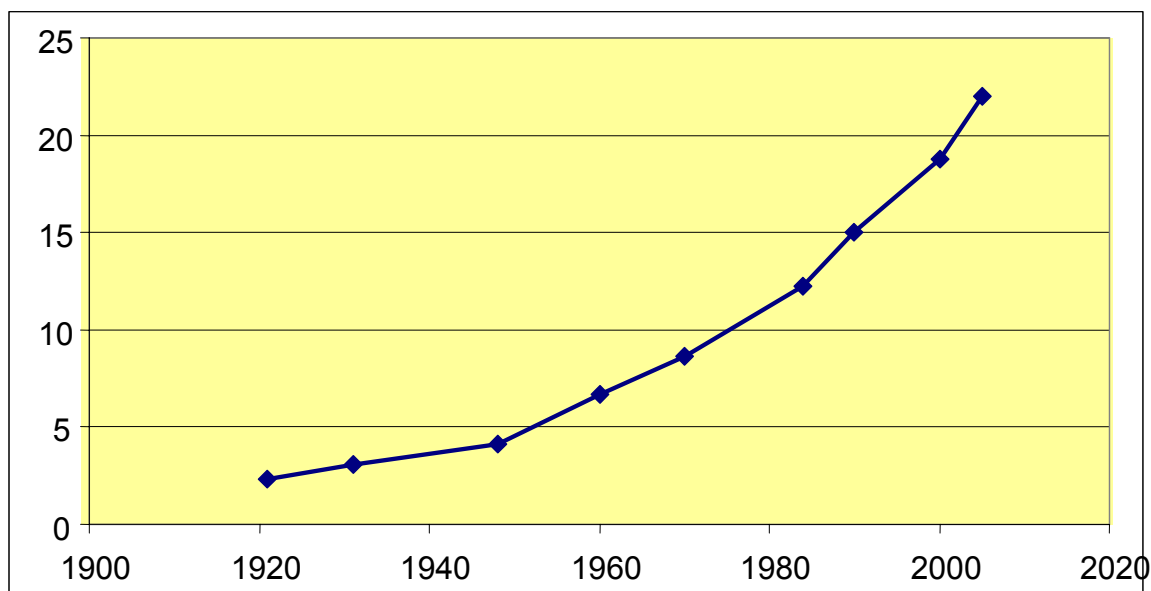


Figure 1.3: Pictorial View of Ghana's Increasing Population Growth

Like many African countries in the region Ghana is rapidly urbanizing. The proportion of the total population living in urban areas rose from 26 percent in 1965 to 35 percent in 1993. In 1997, about 6.7 million people, an estimated 37 percent of the total population, lived in urban areas. It is estimated that some 1.9 million urban residents live below the poverty line. Since 1970, the urban population has consistently grown at a higher rate than the national population. At the current urban growth rate of about 4.2 percent per annum the urban population will double in 17 years. Within the ten regions of the country there are a total of 5 cities and 185 designated urban areas. (An urban area here refers to a locality with a population of 5000 or more.)

([http://wbln0018.worldbank.org/ESSD/NrwTrust.nsf/webpage/attachments/\\$FILE/GHANAUpgradingCARJan02.pdf](http://wbln0018.worldbank.org/ESSD/NrwTrust.nsf/webpage/attachments/$FILE/GHANAUpgradingCARJan02.pdf))

Accra, the capital city, has a population of approximately 2.2 million and accounts for about 25 percent of the urban population. Like all other large African cities, Accra is experiencing rapid growth. Its population increased from 624 000 in 1970 to almost 1.2 million in 1984, to about 1.7 million in 2000 and is estimated to be 2.2 million in 2005.

(GSS, 1970, 1984 and 2000 Census reports). According to GSS 2003 CWIQ reports, more than 80 % of the households in the city have access to improved water (improved water here refers to pipe water in the dwelling, outdoor tap, borehole and protected well). This figure however is considered by some experts to be falling drastically in the low income neighbourhoods in the city.

Accra was founded by the [Ga](#) people in the [1500s](#). The name ‘Accra’ is derived from a local Akan word ‘Nkran’, which refers to the numerous anthills seen in the countryside around Accra. (http://en.wikipedia.org/wiki/Accra#History_of_Accra). It is the most vibrant city, full of diverse economic, social, political, educational and administrative activities as well as home to the largest number of industries in Ghana. There are many buildings of historical merit in Accra. Major places of interest apart from the Christiansburg (Osu) Castle include the Korlebu Hospital, Holy Trinity Cathedral, National Museum, Kwame Nkrumah Mausoleum and the Black star (Independent) Square where ceremonial parades are held. Figure 1.4 shows the Black star (Independent) Square in Accra.



Figure 1.4: The Independence Square of Ghana, in Accra

Source: <http://www.worldisround.com/articles/188967/photo18.html>

General infrastructure, housing and environmental conditions are however not too good. New developments in terms of roads, buildings, businesses and several others are taking place all around Accra. The land is generally being allocated through traditional channels, with many of the developments largely uncontrolled, and with little infrastructure provision, which is causing strain on infrastructure and service delivery agencies. Water supply in the city has long been the responsibility of the Ghana water company Limited (GWCL).

1.2 Teshie Study Area

Teshie began as a fishing settlement along the coast of the Gulf of Guinea, about 14 kilometres to the east of central Accra. It was founded by Ga ethnic group who have been living along the coast since 1500s. The name ‘Teshie’ originated from a Ga phrase which means ‘under the rock’, referring to a period in their history when they had to seek shelter under the rocks along the beach for protection against the enemies. (Traditional Source). Figure 1.5 shows some local fishermen mending their nets around Teshie.



Figure 1.5: Local Fishermen mending their Nets around Teshie

Source: www.resdagboken.se

As in many parts of Africa, both Christians and traditional practices are widespread in all Ga communities. Traditional practices are associated with the ancestors, who are believed to be present in spirit at all times, supervising the activities of the living. Ancestors are believed to reward members of the family who lived good lives but can bring punishment on those who do evil. As practiced among many other tribes in Ghana the system of succession and inheritance of the Ga people is based largely on a patrilineal form, where children born in a marriage belong to the family of their father.

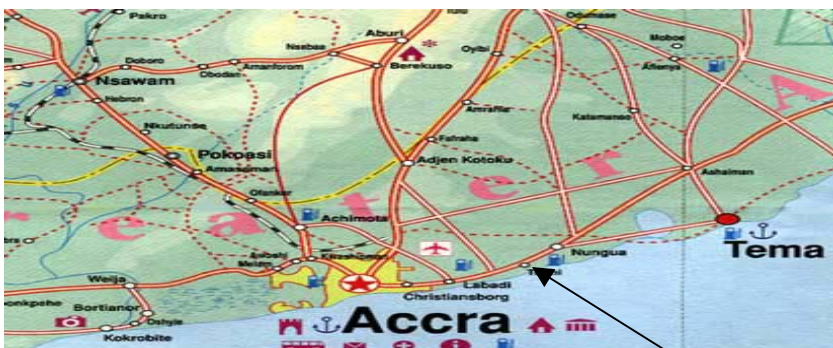


Figure 1.6: Road Network of parts of Accra Showing Teshie

Source: http://www.itmb.com/press_release/press_release_GHANA05.htm (Teshie)

As a result of the country's democratization, development program and urbanization, Teshie is currently well diversified with settlers from other races and tribes, different categories of buildings, centres and economic activities. The area boasts of the National Military Training School and the [Kofi Annan International Peacekeeping Training Centre \(KAIPTC\)](#), Teshie Orphanage, Real Estate development, Hotels, Beach resorts, School and several other places of interest. For entertainment, the best part of the year to be at Teshie will be in August when the people celebrate their annual Homowo (hooting at hunger) Festival, a colourful and fun period when one could almost walk in to any house for food. Figure 1.7 shows a typical street of Teshie and the Homowo street procession.



Figure 1.7: A Typical Street at Teshie and Homowo Street Procession

Source: <http://newint.org/columns/essays/1999/04/01/endpiece/>

Among the craft men, the carpenters in Teshie have won international reputation for their ability to design coffins in several forms to give a befitting burial to the dead. Coffins can be in a form of fish, car, bottle, cigarette, shoe and anything depending on the background of the deceased. Ghana has earned a special recognition for the world's most colorful and imaginative coffins for their dead. Most of these coffin designers are located in Teshie. Figure 1.8 shows young carpenters displaying a fish shaped coffin.



Figure 1.8: Young Carpenters Carrying a Fish Shaped Coffin

Source: <http://freshpics.blogspot.com/2006/04/coffins-from-ghana.html>

Originally Teshie was not considered part of Accra. However with the upgrading and changes in the administrative policies in Ghana it has now become part of the Accra metropolis. The settlement occupies a very vast land area and is located in the Kpeshie sub district of the Accra Metropolitan Area (AMA). In simple terms, Teshie forms part of Kpeshie sub district and Kpeshie sub district also forms part of the Accra Metropolitan Area (AMA). The entire Teshie community has officially been divided in to 4. These are (1) Teshie Camp (2) South Teshie (3) Teshie- Nungua Estates (4) North Teshie. (See figure 1.9, showing Teshie and the main divisions). This division was based on the main features peculiar to each sub area.

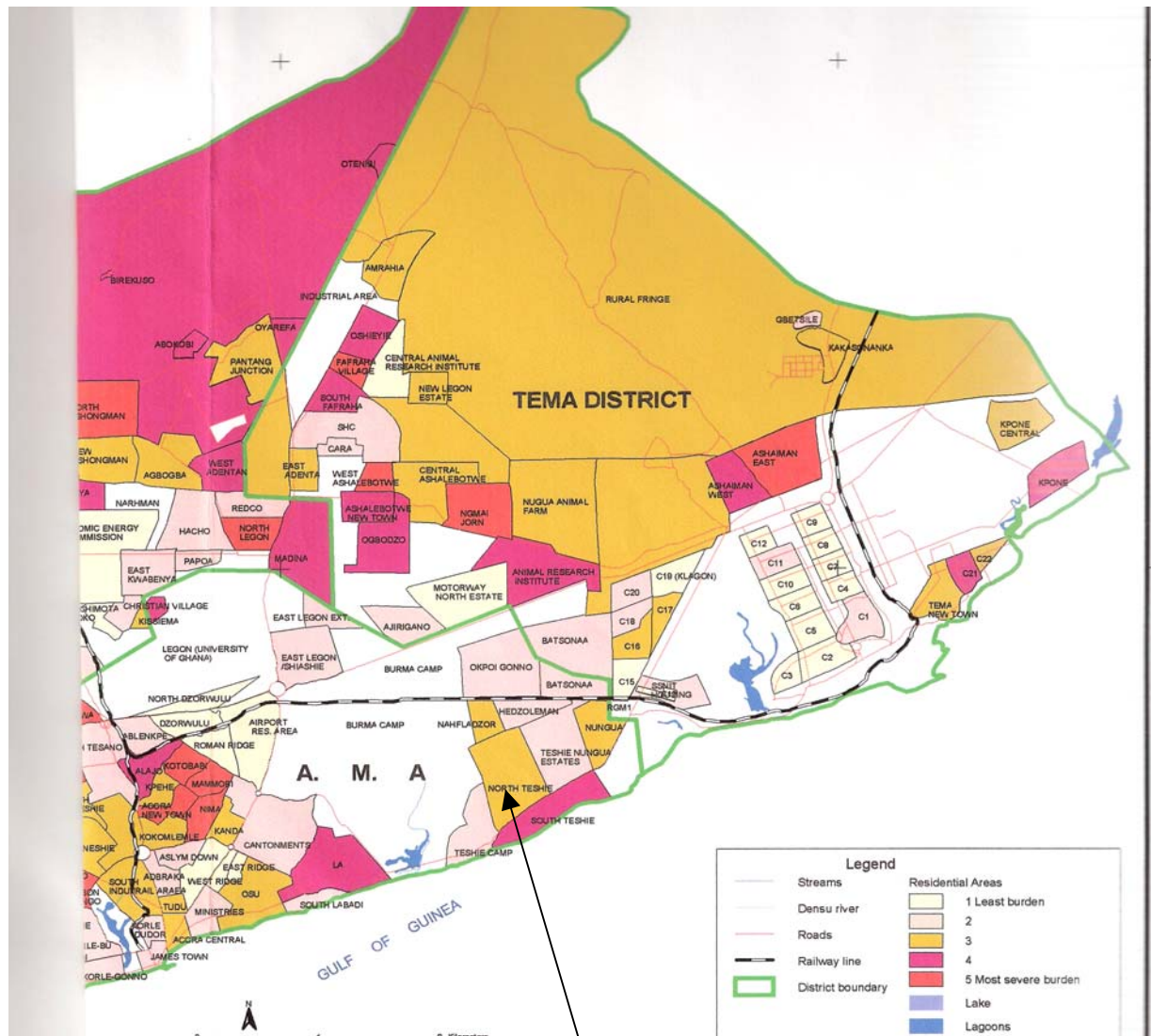


Figure 1.9: Map of Accra showing main Divisions of Teshie and Quintiles of Environmental Burden; Water Supply in Greater Accra Metropolitan Area (GAMA)

Source: Rapid Assessment Survey 2001, (Arrow showing North Teshie)

Whilst Teshie Camp is largely demarcated for military habitation and activities, South Teshie is closest to the sea and mainly inhabited by the people of Ga ethnic group, majority of who are fishermen. Teshie -Nungua Estates seems to be the most planned of all the divisions. As the name implies, it is a comprehensive estate planed area compatible with the standard building codes of Ghana. This sub area has mixed single family detached and attached dwellings with better provision of social amenities. Most elite in the society live here. North Teshie is highly occupied by people from different tribes, nationalities, social status, backgrounds and with different types of buildings, economic activities and lifestyles. This is the most populous of the 4 divisions. It has some features of the other 3 divisions and with continuous haphazard developments taking place. Provision of social amenities has not been well with this sub area.

For the purposes of this study, North Teshie has been selected as the study area. Due to high growth rate, migration and urbanisation, several smaller local areas have developed over the years in North Teshie. Some of these are: Abotsi Hanya, Camp2, Lascala, Aboma, Agbliza, Tsui Bleoo, First Junction, Tebibiano, Century, Kpeegono, Bokweshie, Grada Estate, Anomanto, Ayokowor, Cold store, Etsor, Adjorman, Dares Salaam, Manna, Pink Lady, Market area and several others. These smaller local areas are so much interwoven that it is technically and administratively impossible and politically unwise to separate them. Figure 1.10 shows a picture of a typical area around North Teshie.



Figure 1.10: A Typical area Around North Teshie

Source: www.resdagboken.se

The vantage location of the area coupled with the availability of land has made it possible for industrial and commercial activities to keep springing up every now and then. Some of the significant developments of this area are road constructions, small scale industries, shops, communication centres, and schools, places of worship, entertainment centres, nursing homes, hospitals and still undeveloped areas.



Figure 1.11: A Typical Lorry Station in North Teshie

Source: <http://www.worldisround.com/articles/188967/photo202.html>

The growth rate for population and housing are 4.2 % per annum and 5.7 % per annum respectively. The current estimated figures for population, households and housing stock for the area are 70 257, 15 676 and 6 465 respectively. (Ghana Statistical Service, 2002)

Table 1.2: Population and Housing Profile of North Teshie

Year	Population	Housing	Households
1970	16 154	379	3 604
1984	29 083	1 953	6 489
1990	37 418	2 750	8 349
1995	46 162	3 656	10 300
2000	56 949	4 862	12 707
2005	70 257	6 465	15 676
2010	86 674	8 597	19 340

Source: Ghana Statistical Service, 1921 – 2000 Population Census reports, 2002

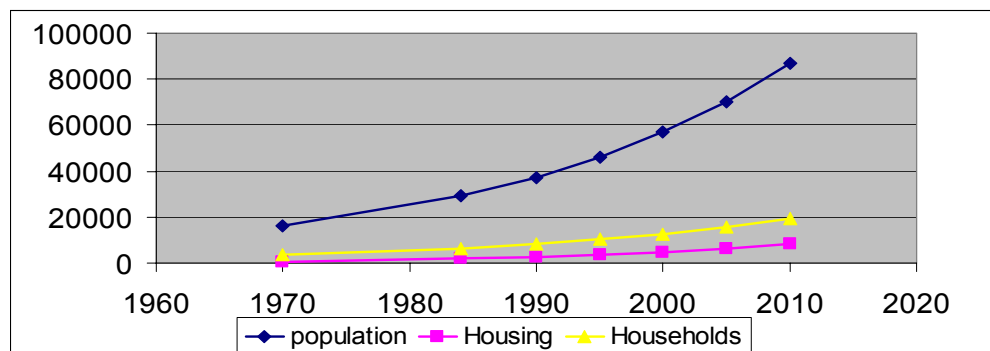


Figure 1.12: Pictorial View of North Teshie's Population and Housing Profile

1.3 Problem Description

In a specially-commissioned survey for United Nations Environment Programme (UNEP) dubbed GEO-2000, 200 leading scientists from 50 countries around the world identified a scarcity of clean water as one of the most pressing problems facing humanity. It was found out that 20% of the world's population lacks access to safe drinking water. <http://www.grida.no/geo2000/pressrel/water.htm>.

In the developing countries in particular, governments face problems of provision of social facilities, especially the supply of sufficient water of good quality at a reasonable price to their citizens. Although the number of people with access to safe water and sanitation grew between 1980 and 1990, population growth erased any substantial gain, especially in urban areas. Between 1990 and 2000, an extra 900 million people were born in places without water and sanitation.

(http://www.itt.com/waterbook/mega_cities.asp)

In Asia, urban water pollution has emerged as one of the critical forms of environmental degradation. According to the report of the Asian Development Bank (ADB), one in three Asians has no access to a safe drinking water source that operates at least part of the day within 200 metres of the home, and the situation is worst in South and South East Asia (ADB 1997) whilst dirty water and poor sanitation also cause more than 500 000 infant deaths a year in the region, as well as a huge burden of illness and disability (WHO 1992). <http://www.unep.org/geo2000/english/0067.htm>

The situation is not different from that in Latin America and the Caribbean. Though the region has 13% of all the world's water supplies, water resources are distributed on a highly inequitable basis. Many people are moving to the cities and the high degree of urban population concentration means rising levels of pressure on the water resources. It is estimated that more than 130 million people do not have safe drinking water in their homes, and only 86 million are connected to adequate sanitation systems. http://library.thinkquest.org/26026/World_Outlook/latin_america_and_the_caribbea5

Perhaps inevitably, the problem is most acute in Africa and West Asia. In Africa, for example, 14 countries already experience water stress or shortage. Another 11 countries may join that list in the next 25 years. The pace of population growth far exceeds the development of water resources and governments in Africa are said to be systematically failing their people when it comes to safe water provision. At present, it is approximated that over 300 million out of over 700 million people in the continent do not have access to safe water. <http://www.accra-mail.com/mailnews.asp?id=15992>.

Most of Africa's populations live in rural areas (62 percent) and yet access is lowest in the rural areas, at about 47 percent for water and 45 percent for sanitation. Low access to a safe water supply and adequate sanitation is the root cause of many diseases that afflict Africa and a contributory factor to the high infant and maternal mortality rates. http://www.afdb.org/portal/page?pageid=313,165531&_dad=portal&_schema=PORTAL

In Ghana the main sources of water for households are piped supply from treated water sources, untreated piped water from ground water sources, rivers, shallow bore holes, wells and ponds, lakes and stream. A study by Rakodi has however estimated that about 28% of the urban poor have no running water in their homes (Rakodi 1996). As clean water is a basic necessity of life, it is thought that government would ensure that every citizen would be guaranteed a certain minimum amount of water at an affordable price.

Ghana's population has multiplied several times since independence when urban pipe-borne systems were constructed. Currently about 44% of the population is urban. About 58% of urban water supply goes to domestic consumption, 24% to commercial/industrial customers and 18% to government and public institutions. Urban water supply coverage keeps decreasing from the 2002 figure of 59% just as the investments needed keep dwindling by the year. (<http://www.ghanaweb.com/GhanaHomePage/features/>)

Whilst reports from the Core Welfare Indicators Questionnaire (CWIQ 2003) of the Ghana Statistical Service (GSS) indicated that 94% of Ghanaians have access to water, other researchers think that almost 50% of the of the citizens lack adequate water supply. Practical experience has revealed a vast backlog in the provision of potable water in the urban and rural areas. The water problem is more evident in the Accra Metropolis for many years now, but in my opinion, has now worsened.

Increasing population growth and urbanization are among the major problems confronting Accra Metropolitan Area (AMA). These have serious economic and environmental impact on the economy of the Metropolis. Over the years and rural-urban migration has increased alarmingly and the current urban growth rate for Accra is about 4.2 percent per annum. Despite efforts of the Ghana government to resolve the perennial water scarcity in many suburb areas of the city of Accra, the problem keeps on unfolding and acute water shortages can still be found in areas such as North Teshie, Nungua, Madina and Adenta among others. It is estimated that one third of the low- income population of Accra lacks access to piped water and purchases water from vendors.

The effects of population pressure at North Teshie are not different from those observed in the entire Accra Metropolis in general. As an urban centre, North Teshie has since long been experiencing increase in population. According to the Ghana Statistical Service, (GSS, 1970, 1984 and 2000 Census reports) in the 1970s the population was around 16 000 people. However in the 1980s the population has grown to around 29 000 and about 46 000 in the middle of the 1990s. In the year 2000, the population shot to 56 949 and is currently home to above 70 000 inhabitants. It is estimated that the population will be close to 87 000 people in 2010.

Number of households and housing stocks are also assuming an increasing trend. From low figures of 3 604 and 379 respectively in 1970, these have increased to 6 489 and 1953 in the 1980s, then up to 10 300 and 3 656 respectively in the middle of 1990s. In year 2000 these figures hit 12 707 and 4 662 and estimated to be 15 676 and 6 465 in 2005. Expectations are that population figures will reach almost 87 000 whilst household numbers get to 19 340 and housing stocks around 8600 by the year 2010. These are

indications of pressure on the provision of water, environment, accommodation, schools, hospitals and other basic amenities, as they cannot meet the needs of the growing population.

At North Teshie, the problem of the water system is beyond description. The suburb area has been without any proper water facility for the past 20 years. Assurances have always been given by the authorities year after year to rectify the situation but no change so far has been realised. It is believed that most of the pipelines serving the township are apparently old and need to be replaced, yet work on these is very slow.



Figure 1.13: A Typical Water Collection Day – Women in Action

Source: <http://web.mit.edu/urbanupgrading/waterandsanitation/action/situation.html>

The suburb area is served by Kpong water works about 60 kilometres to the north, but while the population keeps growing, waterworks has seen no significant expansion since it was built in the early 1960s. Many attempts to reverse the situation have failed to get the taps running. As some residents attribute part of the problem to undue delay in the rehabilitation of the underground reservoir and an overhead tank in the Cold Store area and the activities of water tanker drivers who draw water on the main supply line illegally, experts say it is due to the springing up of large industrial and residential estates and the rapid expansion of the township. Figure 1.14 shows an aerial view of the Kpong Dam site. <http://www.irinnews.org/report.aspx?reportid=48748>



Figure 1.14: An Aerial View of the Kpong Dam Site

Source: http://www.travelpod.com/travel-blog-entries/hooktravellers/ghana_2005/1110897420/babylon.html

Water crisis has affected the entire community. Some petty traders, during an informal chat say they have reduced selling or stopped altogether because of high water prices. Other people also complain that women and school children have to walk for long distances to look for water for their households. They have to fill as many containers as possible in the few hours that taps will flow once in a week and ration it carefully until they can collect it again during the following week.

It is commonplace to see private water vendors using water tankers, both large and small on the streets doing good business. The 2005 official Ghana water rate per bucket (34 cm size, ie 4 gallons or 15 litres) was 84 cedis. (Note: in the US conversion system, 1 gallon = 3.8 litres) Nevertheless in times of severe water shortages residents can pay between 500 cedis to 1,200 cedis (about 6 – 14 cents, based on the exchange rate of 1US Dollar to 8400 cedis) per bucket of water from private suppliers. Queues can be found at many places with people struggling to get their buckets filled with water. This study is therefore carried out to investigate the social and economic problems associated with the scarcity of water in the area.

1.4 Access to Water as Seen by International Organisations

There has been considerable amount of literature documenting issues relating to water resources, management, policies, regulation, supply, pricing and utilization in all fields of life. Several international and national conferences, debates and dialogues are also held on water because of its critical importance to humanity. Stakeholder groupings including government officials, regulators and agencies, public utilities, representatives of poor communities, labour unions, Economists, Environmentalists, Non Governmental Organizations(NGOs), International Financial Institutions, researchers, academicians, students and market women all group together and talk and write about issues of water.

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 integrated approach, close cooperation and partnership between all stake holders”. (IWA. 2004), Research has shown that access to good, reliable and sufficient water supply increases the health status of people. However it is unfortunate that many people in the world today are lacking such quantity and quality of water needed.

Global Water Partnership (2000) has observed that although most countries give first priority to satisfaction of basic human needs for water, one fifth of the world’s population is without access to safe drinking water and the service deficiencies primarily affect the poorest segments of the population in developing countries. It goes on to say that: “water supply and sanitation for both urban and rural areas in these countries represents one of the most serious challenges in the years ahead”. (GWP 2000).

UN-Habitat (2003 p xvii), in its introduction of the book- water and sanitation in the world cities, indicated that many cities face serious water shortages and that millions of urban dwellers have inadequate provision of water, sanitation and drainage, which contributes to very large disease burdens and thousands of premature deaths each year. It

states that: “less than half the population in most urban areas in Africa, Asia and Latin America have piped to their homes and less than one- third have good quality sanitation”. (UN-Habitat 2003)

Water has always been a very important issue on the United Nations (UN) agenda. When defining the Millennium Development Goals (MDGs), water was also taken into account as one of the aspects for ensuring environmental sustainability (Goal 7). The aim of the UN is to reduce by half the proportion of people without sustainable access to safe drinking water by 2015. We are now in 2006, 9 years away from the targeted time, but it is not clear what has significantly been done in the various regions towards the achievement of the goal.

The UN says guaranteeing a proper water supply is vital to eradicating poverty. It says the absolute daily minimum amount of water a person needs is 50 litres (13.2 gallons) which include: 5 litres for drinking, 20 for sanitation and hygiene, 15 for bathing and 10 for preparing food. However because of scarcity, millions of people try to exist on 10 litres (2.6 gallons) a day. They live in Gambia, Haiti, Djibouti, Somalia, Mali, Cambodia, Mozambique, Uganda, Tanzania, Ethiopia, Eritrea, Albania and Bhutan. In 27 more countries people try to manage on a daily average of 30 litres (8 gallons) or less. (<http://www.globalpolicy.org/socecon/develop/africa/2002/0410water.htm>)

The World Health Organization publication in 2000, says 75 % of all diseases in developing countries arose from polluted drinking water. That same year, UNICEF said that: “the consumption of unsafe water contributes to about 2.2 million deaths annually. The UN World Development Report ‘Water for People, Water for Life’ shows that the amount of disease and lost man hours due to unclean water is vastly greater than the cost of improving water systems”. (UNICEF 2000)

<http://www.ghanaweb.com/GhanaHomePage/features/artikel.php?ID=64473>

There is a linkage between rapid population growth and urbanisation on one side and lack of access to water on the other side. This is more pronounced in developing countries. For instance it has been documented by World Bank Regional Reports - Africa Region (2001) that: “rates of urbanisation in Africa are the highest in the world whilst rates of urban economic growth are the lowest. In many African countries therefore, 40 to 70 percent of the urban residents live in low income settlements and mostly lack access to basic water because demand far outstrips supply”. (WBRR 2001)

In terms of management, there is a hot debate going on in Ghana as to whether to privatise water or not. The UN has supported privatization as an effective method of making water accessible to people in poor countries. The reason being that management of the sector is not efficient under the public sector. However civil society and NGOs have been very resistant to the idea. According to Rudolf Amenga Etego, Spokesman for the Ghana Coalition Against the Privatisation of Water, “water is something very close to air and should not be privatised to allow market forces and profit motives to determine who can and who cannot have some to drink”. <http://www.goldmanprize.org/?q=node/67>
The debate has been deliberated extensively and still ongoing.

McIntosh (2003) found out in his studies that the poor pay many times the amount the rich people pay for water in terms of the unit rate and the total cost because they buy from the water vendors whilst rich people pay less because they have pipe connected directly to their homes. The reality to him is that: "the poor may be willing and can afford to pay the full cost in order to get the regular flow of water". McIntosh again identifies that: "lack of autonomy of water companies is one of the core reasons leading to lack of accountability of management, which is less skilful and unable to perform above standard in rendering of its services to the people".

A review of schemes financed by the World Bank reports that water from the sky is free; but the mounting cost of transporting it long distances to a household tap and preserving its quality is turning it to liquid gold. Water is a commodity like any other, and its price is soaring. Urban consumers in most industrialized countries pay all the recurrent costs for their water supplies and sewerage connections, but in developing countries there is a marked reluctance to come to terms with water costs. In developing countries, however, those provided with services pay far less: only on average 35 percent of the costs. The proportion of investment generated internally by utilities and water boards is also dropping, and their financial situation is therefore consistently worsening. http://www.itt.com/waterbook/mega_cities.asp

Corruption is not left out in the documentation of problems related to water. A number of corruption cases have been cited as obstacles to the development of the water system. In a Stockholm world water week seminar paper prepared by Tropp H. (2005), it has been noted that: "corruption remains one of the least addressed challenges within the water supply system and it is costing the sector millions of dollars every year. While some argue that privatisation is part of the solution to fight corruption, others insist that it will open up new corruption avenues". (Tropp H. 2005),

Ghana is one of the developing countries receiving donor support for its urban water sector from the International Organisations. Noticeable among them are: The World Bank, International Monetary Fund, The UK Department For International Development (DFID), International Development Association and others. However the water debate in Ghana has been very hot with some of the main donors viewing privatisation as the panacea whilst Ghana's Civil Society and some associations think otherwise.

Proponents of privatisation, which include World Bank, DFID and IMF suggest that water privatization will bring about improved efficiency, while also attracting capital to fund investments and expansion of the water system. They also believe expected efficiency gains will result in reduced prices for customers. DFID, which is very supportive of water privatisation in developing countries, assures concerned people that DFID's overall objective in the water sector is to ensure that poor people live a healthier and more productive life by increasing their access to safe drinking water. <http://www.foeghana.org/foeline/17/07.pdf>

DFID argues with the World Development Movement (WDM) and says that Ghana has not privatised water provision. The public owned Ghana Water Company will continue to own and control the country's water infrastructure. It has simply sought private sector involvement in managing urban water supply. It goes on to say that the operational costs of private sector management of urban water in Ghana will be less than \$10 million per year and will be financed by a World Bank grant and that the operator's income is regulated and limited by a performance contract and the operator will have no rights to raise tariffs. <http://www.wdm.org.uk/campaigns>

In response to this statement from the DFID, WDM argues that the push for privatisation has been compounded by World Bank and IMF economic conditions attached to loans and debt relief. Water privatisation in Ghana was a condition of receiving World Bank loans and has since been included in Ghana's Poverty Reduction Strategy Paper (GPRSP), which is needed to access debt relief and other funds. Although PRSPs are supposed to improve the nation's economy, they have been shown to lack civil society consultation and are heavily influenced by the Bank <http://www.wdm.org.uk/campaigns>

In an Integrated Social Development Centre (ISODEC)'s report, The Christian Aid says it is not opposed in principle to every privatisation and acknowledges that business has an important role to play in expanding services in developing countries under certain circumstances. However, given the character of water as a basic need, essential to the right to life, water should not be treated as a common commodity. This implies guaranteeing access and affordability to the poor even at the cost of profit. It added that since water is the most important of all public services, the people who use, desperately need and are often denied water that is clean and safe should be contacted and involve in any plans for restructuring and privatisation services. <http://www.isodec.org.gh>

Rudolf Amenga-Etego the founder of Ghana's National Coalition Against the Privatization of Water, summarizing his position again says "in a country where about 70% of the people have no access to clean water, it would be disastrous for the poor to pay for the full market price of water" (Goldman Environmental Prize, 2004). According to him, some Ghanaians already spend up to 20% of their income on drinking water, and poor urban families sometimes have to choose between water and education. The overwhelming majority of Ghanaians are poor. <http://www.goldmanprize.org/?q=node/67>

He continues to say that: "water privatization is predicated on handing over our assets to a multi-national corporation for profit. So it will automatically price water out of the reach of the poor. It is important to keep water in the public domain with accountable officials, not shareholders". He emphasize that "In a country where 70 percent of the population earns less than one dollar a day, privatizing water will be denying access to the overwhelming majority and perpetuating poverty, disease and squalor."(Goldman Environmental Prize, 2004) <http://www.goldmanprize.org/?q=node/67>



Figure 1.15: Rudolf Amenga Etego Addresses a Crowd

Source: <http://news.bbc.co.uk/1/hi/sci/tech/3625807.stm>

The consultation idea of the Ghana government is in line with what the International Water Association (IWA) has termed as the integrated approach being one of the key principles in its charter. In the Charter of IWA (2004), integrated approach requires close co-operation and partnership between all stakeholders including governments, independent authorities, water suppliers, local public authorities, environmental agencies, land users, contractors, plumbers and consumers themselves.

In spite of these several ambitious programmes, policies, debates, conferences, accumulated knowledge and experience in the water sector, a number of unserved people still remain. All sides consequently admit that something really needs to be done to resolve the situation.

1.5 Objectives of the Study

The overall aim of this study is to create awareness about the challenges facing water service delivery to urban communities in Ghana and to suggest ways to overcome some of the challenges.

The specific objectives are to:

1. identify the major causes of the frequent water shortages at North Teshie
2. look for the socio-economic impacts associated with the water supply shortages.
3. investigate the issues of public and private sector participation in resolving the water supply problem

1.6 Propositions for the Study

Two hypotheses that are to be tested in this study are:

1. The frequent water shortages at North Teshie have not resulted in any negative socio- economic impact
2. The Ghana Water Company Limited has not done enough to resolve the issue of the frequent water shortages.

1.7 Limitation of the Studies and Problems Encountered

Every research has limitations and this particular one is no exception. Firstly, financial difficulties has constrained the researcher to hire a few field assistants to use many interview days and to use a large sample size or the entire population of the chosen area for the study.

There were not enough funds to purchase certain instruments such as digital camera for field pictures and cassette recorder to record speeches from dignitaries who may have less time for interviews, which would have resulted in a vivid and comprehensive outcome. Considering the short time period of one month for the field work, it was not possible to capture everything to show a perfect picture of the situation on the ground. The field assistants however did their best to collect expected information.

Another limitation is the sample size of 100 households taken. Given the current estimate population and household of North Teshie to be 70 257 and 15 676 respectively, the sample size of 100 households for the study has given 0.64% of the household population and seemed too small to provide a sufficient data to make inductive conclusions and generalisations of the issues of water. However it is important to point it out that the study area is an urban area, densely populated and have all features of all types of urban settlements. For this academic research, such a small percentage of the household size used is expected to present a reliable picture of the situation.

Ghana as a developing country has a lot of data problems. For various reasons the national data bank (Ghana Statistical Service) has not gotten any standard and certified detailed baseline data for the various urban communities. The study therefore relied on the broad surface data and estimates, by the use of growth and urbanization rates as well as uncertified records from community leaders. This is likely to introduce a little margin or error in to the results of the study. There has also been no in-depth previous research on water in the community and so it might be very difficult to do a comparative study or to either improve upon or deal with another side of the previous study.

It is very difficult in Ghana to elicit official information from individuals and households and even from government departments and agencies. As a common thing associated with all household surveys in Ghana some people feel uncomfortable to divulge the correct and absolute information to researchers for fear of being taxed or arrested by the police. No matter how open researcher is, some respondents prefer to either hide their identity or not to give out the real information. This might be linked to the literacy level of the population as many people of low education are not well informed and exposed to the full relevance of researches.

The 2000 population and housing census by the Ghana Statistical Service put the national literacy level at 46.9% (2000 figure). After six years (2006) the current literacy level may still be below 50.0 % and the picture in the urban areas may not be too different. People with low education may not understand certain developmental issues very well and may like to give wrong answers to some questions or politely dodge the

questions. This is also likely to introduce some little deviations or bias in to the data. However data cleaning would have to take care of most of them.

Whilst some selected (households) respondents were not at home for the interview, few others were hostile and refused to answer the questions. The other category was those with strong political affiliation. Most of these people think some researches have political backing. To them any research not having the backing of their party is not good. They normally do not want to respond to the questions. These are all common occurrences observed in every field work in Ghana. The field assistants had to replace them with other reserve households. It is however not known if the responses given by the reserve households would be different from would have been given by the replaced households. These types of problems may just marginally affect the result of the study.

The officials of the Ghana Water Company (GWCL) and the Public Utilities Regulatory Commission (PURC) always have heavy schedules. Due to their extra responsibilities or travelling and conferences it is always difficult to get them to fill their questionnaires. This necessitated the use of emails and telephone calls in some cases to complete the data collection.

1.8 Significance of the Study

This study is expected to increase the knowledge and up to date information on urban water supply system and its adverse impacts on the urban poor. It will also serve as a working document to policy makers in the water sector and the Non Governmental Organisations. The study will further serve as benchmark data for any further investigation, as a useful material for academic purposes, and as an added literature to the existing knowledge.

CHAPTER TWO: METHODOLOGY

2.1 Sources of Data Collection

To be able to achieve the stated objectives of this study, a number of relevant research instruments and methods, which included primary and secondary data collection, were employed. These were done through the use of structured questionnaires to households in North Teshie and the officials of the GWCL in addition to field observation, informal interview, telephone interview and email data collection. Secondary information were also collected from the internet, Census and survey reports, Ghana News Agency (GNA) reports, journals as well as other published and unpublished documents.

2.2 The Structured Questionnaires

Two structured questionnaires were prepared for the primary data collection. One for the selected households in the study area and the other for the officials of the GWCL. The questionnaire for the households was divided in to two main sections: These were Sections A and B. Section A had to do with only the background information of the household. Section B was however sub divided into 5 sub sections, which comprised the following headings: Level of scarcity of water, Cost of water, Causes of water problems and impacts, Public participation and Private sector participation. (Refer to appendix 1)

The structure of the questionnaire for the officials of the GWCL was very similar to that of the household. This questionnaire had sections from A to F and had the following titles as the headings to the sections: Cost of water, causes of water problems and impacts, public participation, private sector participation, trend of water supply to the study area and interventions from government and other institutions for possible solution. These two questionnaires were expected to capture part of the primary information needed for the study.

2.3 Selection of the Study Area

The choice of North Teshie as the study area was influenced by the author's own personal experience of protracted water scarcity in the area, as he is a resident in one of the communities. The intention for the selection was buttressed by the many articles, news and phone-in calls by the media to discuss the reality of the water situation on the ground at North Teshie. The issue of water in the area has existed for over 20 years. It has gone up to several levels in government with no solution in site.

According to the current administrative policies and upgrading, (as has been mentioned already in the previous chapter Teshie was officially divided into 4 and have been mapped accordingly. North Teshie was however selected as the area for the study. This is due to the fact that it has all the characteristics of the other 3 divisions and though it houses the new overhead water reservoir built by the GWCL to alleviate the suffering of the inhabitants, the severest of water problems still occurs in the area.

2.4 Data Collection Techniques

The data collection instruments were two types of structured questionnaires administered to the water consumers on one hand and key personnel of stakeholder institutions and companies including the GWCL, on the other hand. The two types of questionnaires contained both close and open ended questions. The close ended questions were meant to capture direct answers from the respondents, whilst the open ended questions were also meant to allow the respondents to express their views as they wish. This was also meant to arrive at relevant information that could not be obtained by the close ended questions. The use of the questionnaires was supplemented by personal in-depth interview, telephone and email interviews.

The entire field data collection covered 100 households of North Teshie. The current estimate household population of North Teshie is about 15 676, meaning that the sample size is about 0.64% of the household population of the area. Even though this sample size is very negligible, the researcher has decided to use it due to the financial constraints and limited time of the study. The services of two field assistants, a male and a female (master and first degree holders respectively) were engaged in the administration of the questionnaires. The field data collection lasted for 10 working days of which quality data was collected for the study. A total of 12 communities were selected for the field work. Between 7 and 12 questionnaires were administered in each community. The list of the 12 communities is as shown in table 2.1 below.

Table 2.1 Communities for Field Data Collection in North Teshie

Serial Number	Smaller Communities in North Teshie	Number of households interviewed	Percentage
1	Manna	9	9.0
2	Tsui Bleoo	10	10.0
3	Tebibiano	10	10.0
4	Lascala	8	8.0
5	Agbliza	8	8.0
6	Adjorman	8	8.0
7	Greda Estate	7	7.0
8	Cold Store	8	8.0
9	Dares Salaam	8	8.0
10	Century	8	8.0
11	Market	8	8.0
12	Abotsi Hanya	8	8.0
	Total	100	100.0

Source: North Teshie Field work: 2006

In each community, a systematic random sampling method was used to select the households. The selection procedure involved a random start of which every 10th household in each of the communities was interviewed. For instance, if the first random

start was 5, then the 15th, the 25th, the 35th, the 45th etc households were interviewed until the selected sample was exhausted. It should be understood that the selection of the sample of men and women did not come in to the issue because the unit of analysis of the study was not individuals, but households. Consequently every normal adult person in any selected household was therefore eligible and was made to answer the questions.

The questionnaire survey was supplemented by in-depth, informal, telephone and email interviews. While key personnel in their offices had more of telephone and email interviews for extra clarification and data update, key informants as well as those who answered the questionnaires in the target population had more detailed in-depth and informal interviews in order to allow them to give additional information and explain certain issues that could not have been done in the questionnaire.

Field observation was carried out to observe what people go through when they clamour for water. This, in addition to the author's own 2 years of personal experience in the area as a resident was expected to be in support of or disagree with what others say, in order to enrich the research qualitatively.

Key personnel of the GWCL and PURC were served with simple structured questionnaires to collect information needed for the study. Purposeful selection technique was used to sample the key personnel from the stakeholder institutions. The selection was based absolutely on who is in a position to provide the needed information. Some of the related information collected from the personnel from the institutions were the level of provision of water to the study area, official cost of water (water rates) to the consumers in urban areas, population and housing growth and rates in the study area and the map of the study area. These data were provided by personnel from the GWCL, PURC, GSS, and Geography Department of the University of Ghana, some of which were recommendations to the researcher. The table below listed some of the key personnel from the various organisations.

Table 2.2: Key Personnel who gave out Information in some Institutions

Institution/Company	Name of Key personnel	Position
GWCL	Michael Agyeman	Chief Manager
GWCL	Emanuel D. Korsah	Industrial Relations Officer
GWCL	Edward Ahaligah	Corp. Planning
PURC	Adjei Boye	Technical Manager
GSS	Gershon Togoh	Head, Census Section

Source: North Teshie Field Work, 2006

Internet search was not left out as part of data collection method. Maps, diagrams, pictures and well documented articles from the internet were downloaded and added to the literature for the study. These documents express views and positions of the various Multinational Institutions, Governmental Organisations, NGOs, and Economics, environmentalists, researchers, politicians and all other stakeholders. Notable among these are conference papers, workshops and articles from the Ghana News Agency,

ISODEC, Cap of Water, Foundations for Grassroots initiatives in Africa, the World Bank, DFID and the rest, which have been collected and duly referenced for the study.

2.5 Tools of Data Analysis

Statistical techniques were used to analyze the data obtained from the field. Some of the computer software applications used for the survey were Statistical Package for the Social scientists (SPSS), MS Excel, MS Power Point and MS Word. The results were presented in both quantitative and qualitative terms. They were in the forms of frequency tables, histograms, bar graphs, pie charts, and time series graph. Inferences and calculations were made from these measures and compared with the existing literature to arrive at the conclusion of the study.

2.6 Organization of the Thesis

The entire thesis was organised as follows:

1. Introduction formed chapter one and comprised of General Introduction, country background, study area, problem statement, literature review, objectives, hypotheses, limitation of the studies and problems encountered as well as significance of the study
2. Methodology constituted chapter two of the thesis. This part included sources of data collection, the structured questionnaires, Selection of the study area, data collection technique, tools of data analysis and organisation of the study.
3. Results from the institutions formed chapter three. This included development of public water supplies on Ghana; organisational set up and activities of the GWCL; Ghana water supply policy; Ghana urban water project; private sector participation in the water sector; management contract of the GWCL; water resources commission and the activities of the PURC in relation to water rate management.
4. Results again form part of chapter four where interview outcomes were presented. These were on the level of scarcity of water, cost of water, causes of water problems and associated impacts, public participation, private participation and interventional measures.
5. Discussion of the Results was the final chapter-five. This was where the findings from all the literature, interviews and secondary data were compared and discussed in addition to the result of the hypotheses. Then conclusion and recommendation were given to conclude the thesis.

CHAPTER THREE: RESULTS FROM INSTITUTIONS

3.1 Development of Public Water Supplies in Ghana

The development of public water supplies in Ghana began in 1920's with a pilot pipe-born system managed by the hydraulic division of Public Works Department (PWD) in Cape Coast. With time, the scope of operation of the hydraulic division was widened making it responsible for the planning, design, construction, operation and maintenance of water supply systems in other parts of the country. In 1948, a rural water development unit was created to take care of the provision and management of rural water supply.

After Ghana's Independence in 1957, a water supply division with headquarters in Kumasi was established under the Ministry of Works and Housing with responsibility for both rural and urban water supplies. Following a severe water shortage in the dry season of 1959, a World Health Organisation (WHO) sponsored study recommended, among other things, the preparation of a twenty-year master plan for water supply and sewerage services in the country. In line with this recommendation, Ghana Water and Sewerage Corporation (GWSC) was duly established in 1965 under an Act of Parliament (act 310) as a legal public utility entity with the following objectives:

- The provision, distribution, conservation and supply of water in Ghana for public, domestic and industrial purposes, and
- The establishment, operation and control of sewerage system for such purposes.

The corporation had the power under the general authority of the Ministry of Works and Housing to plan, construct and operate water supply and sewerage schemes and to collect rates and charges for the water and sewerage services provided. The GWSC as a statutory corporation, remained in operation from 1966 until 1st July, 1999 when it was converted into a Limited Liability Company known as Ghana Water Company Limited (GWCL) under Act 461, as amended under Statutory corporation L1. 1648.

The conversion in to GWCL resulted in the separation of the water supply from the sanitation. It is a part of Ghana's Enhanced Structural Adjustment Policy (1999) in collaboration with the IMF and the World Bank. This unbundling process was done with the objective of increasing the role of private sector participation in especially in urban water supply. The change will enable the water sector to concentrate its activities exclusively on the provision of water for urban areas. It is envisaged that involvement of the Private Sector will help eliminate operating losses, improve maintenance and management of water supply facilities and to generate more revenue that will lead to better quality services and higher operational efficiency.

3.2 Ghana Water Supply Policy

Three directions for water and sanitation management commonly advocated in the international policy arena in the 1990s were: to develop more integrated water resource management at the river basin level and manage demand more effectively (rather than simply withdrawing more and more water to meet the growing demands); to rely more

heavily on private sector enterprises and market mechanisms to provide water and sanitation (rather than depending on public sector) and to devolve responsibilities for water and sanitation management to the lowest appropriate level (rather than keeping all decision making centralised)- (UN Habitat, 2003)

The government of Ghana considers the provision of potable water as a critical element in its policy for sustainable economic development of the country, and is therefore committed to ensuring that all Ghanaians have access to potable water. The policy objectives are to provide affordable, equitable and sustainable access to safe drinking water throughout Ghana through the establishment of efficient and effective institutional arrangements and improvement in management and investment in the sector.

Among the government objectives are also to guarantee the availability of water in sufficient quantities for cultivation of food crops; watering of livestock and sustainable freshwater fisheries to ensure sustainable food security; as well as ensuring the availability of water for hydropower generation; industrial use; water transport; and recreation in the country. Good governance and a stable macro-economic environment are expected to provide the enabling environment for sustainable potable water supply development and management.

In line with national policy objectives, government has undertaken major reconstruction towards liberalization of the provision of potable water. A key objective of the policy is to involve the private sector in the management of water systems and to attract private sector capital inflows for the rapid expansion and rehabilitation of the water sector in order to increase accessibility of all Ghanaians to reliable potable water supply.

Another benefit believed to be derived from the reconstruction is the introduction of efficiency improvement and cost effectiveness in the provision of water through improved sector management and the attraction of private sector entrepreneurial skills and culture. In addition, the reforms seek to minimize the financial burden on government as the sole equity owner and primary provider of needed sector infrastructure improvements and expansions. Furthermore, the reforms are aimed at introducing competition in the operation of urban water supply and services with the ultimate aim of attaining full cost recovery.

3.3 Objectives, Organisational Structure, Vision, Mission, Core activities, and Development Projects of the Ghana Water Company Limited (GWCL)

The conversion of GWSC in to a Liability company in 1999 has brought changes into the objectives as spelt out in the Act of Incorporation. The main objectives of the GWCL are:

- The planning and development of water supply systems in all urban communities in the country
- The provision and maintenance of acceptable levels of service to consumers in respect of quantity and quality of water supplied
- The preparation of long term plans in consultation with the appropriate coordinating authority established by the president

- The conduct of research relative to water and related subjects
- The making of engineering surveys and plans
- The construction and operation of works in the urban areas
- Submission of tariff proposals to the Public Utility Regulatory Commission (PURC) for review and final approval, and
- The conduct of other related or incidental activities.

In terms of organisational structure, GWCL presently operates under the general direction of the ministry of works and housing and is governed by an eight member Board of Directors, which has overall responsibility for the setting of sectorial policies and the control of corporate programmes. The day-to-day affairs of the company are managed by the managing director and his two deputies, General manager (Finance and Administration) and General Manager (Operations). They are assisted by chief managers at the head office and ten chief managers responsible for all the regions in Ghana. The regional chief managers at the head office are individually responsible for running and development, water quality assurance, operations and maintenance, finance, commercial operations, administration, corporate planning, internal audit, legal services, procurement and public relations. The organisational chart of the GWCL is shown in figure 3.1.

In 2006 the GWCL was finally privatised under management contract for the next 5 years (2006– 2011). The new company that has taken over is Aqua Vitens Rand Ltd (AVRL) and the main objectives were to expand a reliable supply of safe water in the urban areas as well as making sure that low income consumers have access to potable water at affordable prices.

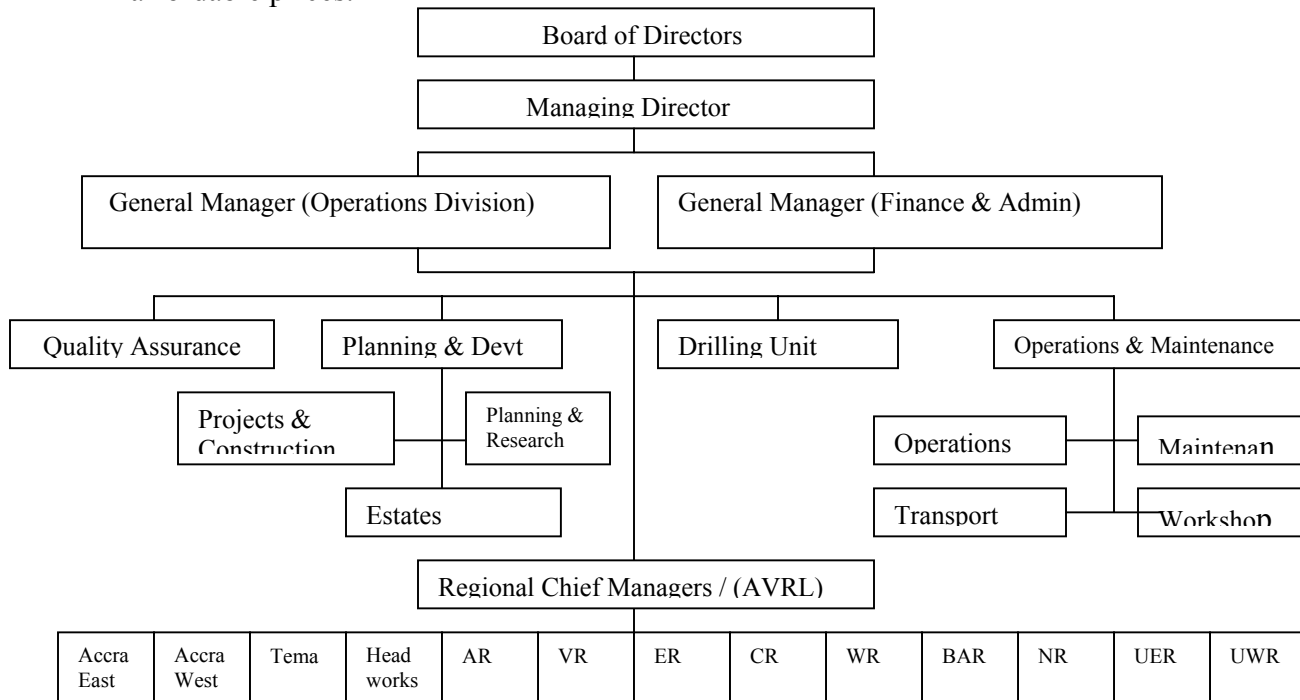


Fig 3.1 Organisational Chart of the GWCL

Source: GWCL (2005)

AVRL Ltd will take care of the GWCL's former regional operation and maintenance duties. Thus the regional staff will be transferred to the AVRL. The vision of the GWCL is to become a reputable utility provider, valued by its customers and playing a key role in the economic development of the nation. The mission is to be committed to abstraction, treatment, transmission, storage and distribution of potable water to urban communities for public, domestic, commercial and industrial purposes and at levels of service appropriate to the needs of each consumer. The core activities of the company include: sustainable operation and maintenance of water systems, extension and improvement to existing systems, construction of new supply systems and the provision of proportional support equipment.

Development projects undertaken by the GWCL may be categorised as: rehabilitation of existing water supply schemes to bring them up to their designed capacities, provision of operational support equipment, limited extensions and improvements of existing schemes and construction of new water schemes. For these projects to materialize, funds are sought from external credit, internal generated funds from the GWCL and the contribution from the Government of Ghana.

The GWCL is currently undertaking a number of rehabilitation works to improve water supply delivery in the country. Notable among the numerous projects are the Weija-Accra interconnection and the Kpong water supply expansion project. The Weija- Accra Interconnection project comprises the laying of a 12 km, 700 diameter pipelines from Weija Treatment plant to the Accra terminal Reservoir.

The project also known as East- West Transfer, will make possible the transfer of excess water at Weija head works to ameliorate the water problems pertaining in certain areas in Eastern parts of Accra. The profile of the Kpong water supply expansion included construction of a new 285 000 cubic metres a day intake, expansion of treatment plant to 250 000 cubic metres daily and construction of new transmission mains through Dodowa, Adenta to the Accra Booster.

3.4 Ghana's Urban Water Project

Currently GWCL has the responsibility for operating 86 urban pipe-born water supply systems serving urban centres (i.e. communities with over 5 000 populations) throughout the country. Total installed capacity of all the systems is about 737 000 cubic metres (m³) per day. Present potable water demand in the urban areas is estimated to be about 939 070 cubic metres (m³) per day whilst supply is about 551 451 m³ per day, resulting in effective urban supply coverage of about 59%. The regional distribution of urban water demand and supply is presented in the table 3.1 below.

Table 3.1 Regional Distribution of Urban Water Demand and Supply in Ghana

Region	Present demand m³/day	% of total demand	Present supply m³/day	% Coverage
Greater Accra	427 758	46	349 135	82
Ashanti	170 484	18	82 110	48
Brong Ahafo	43 260	5	8 225	19
Central	80 040	8	39 490	49
Eastern	66 386	7	13 075	20
Northern	39 878	4	13 090	33
Upper East	11 877	1	4 700	40
Upper West	8 080	1	975	12
Volta	39 452	4	15 395	39
Western	51 855	6	25 256	49
National	939 070	100.0	551 451	59

Source: GWCL

The figures presented in the table 3.1 indicated that Greater Accra Region has the greatest demand (46%) of water in the country. This is followed by Ashanti Region (18%), whilst the least demands of water are from Upper East and Upper west Regions of 1% each. In response to the demand, the GWCL was able to meet 82% of the demand from the Greater Accra Region, 49% each from Western and Central Regions, whilst it was able to meet 48% of the demand from Ashanti Region. The total national unmet need is 41%.

It has been established from a Strategic Investment Programme study (1998) that for GWCL to be able to meet demand in urban water supply by 2020, the company requires an investment about USD 1.6 billion throughout the period. About 75% of such development funding will be from external support agencies while Government of Ghana contributes about 15% and GWCL the remaining 10% using proceeds from water sales. The projected requirement is presented in the table 3.2 below:

Table 3.2: Projected Water Demand and Required Investments (Million Dollars)

Region	Installed Capacity m ³ /day	Projected water demand m ³ /day		Investment	Investment to meet Demand	Total sum
		Year2000	year2020	Year 2005	Year2020	
Ashanti	104 600	116 500	203 000	86	113	199
Brong Ahafo	23 300	44 000	75 800	130	92	222
Central	64 300	65 000	100 900	81	107	188
Eastern	27 100	67 500	111 800	106	103	208
Greater Accra	354 200	482 000	760 000	365	105	470
Northern	35 000	53 500	97 400	68	105	470
Upper East	85 000	14 400	26 200	15	15	40
Upper West	1 600	7 800	14 900	22	40	62
Volta	26 600	34 900	58 480	24	41	65
Western	53 600	43 500	66 700	28	33	61
Total	698 000	929 100	1515 100	924	659	1 692

Source: Strategic Investment Program Study (1998)

The Urban Water Project is part of an overall process to restructure the water sector. Since it began in 1994, the restructuring process has been implemented in three phases. Under phase one, responsibility for the Rural Water Sector was taken from Ghana Water Company and given to the rural areas and small towns to manage, under the supervision of the respective district assemblies.

The Community Water and Sanitation Agency (CWSA) was created in 1999 to facilitate the development, operation and maintenance of these community water supply systems. Under phase two, regulatory institutions were created: One was the Public Utilities Regulatory Commission (PURC), to regulate tariffs, monitor operational performance and protect consumer and service provider interests. Another was the Water Resources Commission to regulate and manage Ghana's water bodies.

In phase three of the Urban Water Project, it is expected that AVRL should improve efficiency in water supply operations; expand the supply of safe water and ensure that poor households have access to potable water at affordable prices. It is also expected to ensure that the water sector as a whole achieves financial stability so that it can depend on itself to negotiate credit to expand and improve the system in future. It has been agreed with the World Bank that as much as \$91.8 million or 74 percent of the \$120 million dollars for the project would be used to rehabilitate and expand the network to make water available to all, especially people in un-served or under-served urban areas. The main target is the poor.

In the long run, therefore, and for everybody's benefit, the Urban Water Project is expected to result in an increased network expansion to supply water to the homes of

more low income customers, thus reducing the need for residents to rely on tanker owners, who currently sell water for between ¢500 and ¢1 200 per bucket, instead of the PURC approved rate of ¢ 84 charged by Ghana Water Company. (\$1 = approx ¢ 9 000). Increased supplies of water and continued good quality water will mean that residents will spend less money on water and less time looking for water. This frees up more of one's household income to pay school fees, house rent and good meals

3.5 The Public Utilities Regulatory Commission (PURC)

The Public Utilities Regulatory Commission (PURC) of Ghana is an independent body set up to regulate and oversee the provision of the highest quality of electricity and water services to consumers. The Commission was established in October 1997 under the Public Utilities Regulatory Commission (PURC) Act, 1997, ACT 538, to regulate and ensure the provision of quality utility services.

The mission of the commission is to be committed to the development and delivery of the highest quality of utility services to all consumers and potential customers, while building a credible regulatory regime that will respond adequately to stakeholders concerns and also ensure fairness, transparency, reliability and equity in the provision of utility services. Its vision is also to become a model institution that ensures the delivery of the highest quality utility services to all consumers at fair prices. The key regulatory tools utilised by the Commission in pursuance of its objectives are: rate setting, regulations, monitoring of public utilities and public awareness programmes (PAP)

Important functions of the Commission include providing guidelines on rates that can be charged by Utility companies; monitoring the performance of the utility service providers with the aim of ensuring that safe, adequate, reliable, and efficient service is delivered to consumers at reasonable cost and on a non-discriminatory basis; communicating every tariff review to the consumers to ensure transparency, advising consumers of their rights and responsibilities, conducting public education to help customers make informed choices; investigating consumer complaints and resolving service related disputes.

As part of PURC's objectives to ensure that consumers are not exploited, and that their rights are adequately and effectively protected, the Commission, in pursuance of Section 3(b) of Act 538, has requested the utilities to post copies of their Schedule of Charges for Services Rendered in front of their offices. This directive has been duly complied with and charges were found posted in most offices of the utilities. The objective was to avoid arbitrariness in pricing, price discrimination and to protect consumers from marketing practices that were unfair or abusive in nature.

To enable the PURC to perform some of its statutory obligations of monitoring utility service standards in Ghana, the Commission has requested each of the utility companies to prepare a comprehensive Customer Charter. The Customer Charters will set out the standards of service that customers should expect from the service providers. They will also spell out the obligations and responsibilities of consumers. Any circumstances that

may result in interruption of utility supply to their customers must be explained to them to avoid negative publicity. (<http://www.purc.com.gh/consumerinfo.htm>)

Since 1998 the commission has been setting the approved rates for utilities in the country. The approved rates for the domestic customers of the GWCL are clearly spelt out and are presented in the table 3.3.

Table 3.3 GWCL's Approved Monthly Water Tariffs (In Cedis per 1000 Litres) for Domestic Users, by the PURC

Date	Quantity of water used (in 1 000 litres)	Approved Rates in cedis per 1 000 litres of water used	Reconnection Fee in cedis
From 01/03/1998	0 - 13	400	
	13 – 45	1000	
	45 +	1 400	
			5 000
From 01/06/1999	0 – 10	500	
	11-40	1 300	
	40+	1 820	
			10 000
From 01/05/2001	0 – 10	990	
	10 +	3 600	
			15 000
From 01/08/2002	0-20	3 000	
	20+	4 500	
			20 000
From 01/03/2003	0 – 20	3 500	
	20 +	4 800	
			25 000
From 2004	0 – 20	4 031	
	20 +	5 528	
			28 794
From 2005	0 – 20	4 031	
	20 +	5 528	
			28 794
From 2006	0 – 20	4 850	
	20 +	6 750	
			28 794

Source: <http://www.purc.com.gh/publications.htm> (retrieved: 19/11/2006)

The table 3.3 shows the trend of administration and approved water rates since 1998. The consumption range of quantity of water per particular rate keeps changing through the years. From the very onset in 1998, three consumption ranges were established, the

first being 0 – 13 thousand litres of water, second being 13 – 45 thousand litres and the last range being 45 thousand plus litres. The ranges changed in the following year. These were 0 – 10, 11 – 40 and 40 thousand plus litres of water.

A consistent consumption range was however realised from 2001 to present. These are only two ranges: 0 – 20 and over 20,000 litres of water. This is due to changes in administration, policy and upgrading. A steady increase is noticed in the approved rates over the years between 1998 and 2006. From the initial rate of 400 cedis for the first consumption range, the rate shot up to 4 850 cedis, resulting in about 12 times of the initial rate within the 8 year period. The rate for the last range also jumped from 1 400 in 1998 to 6 750 in 2006, which is about 5 times of the start rate.

These tariff increases are influenced by the government to ensure the financial viability of the water sector. They are put in place to get sufficient funds to cover operating costs of the private operators. (<http://www.imf.org/external/np/pfp/1999/ghana/>) Reconnection fees maintain a constant increase of 5 000 cedis from 1998 to 2003, but recorded a constant figure from 2004 to present. The difference between the 2005 and 2006 approved water rates are being absorbed by the Ghana Government.

3.6 Private Sector Participation (PSP) in the Water Sector

Proposals to involve the private sector in water supply and sanitation services are often met with resistance as it is feared that the poor will be priced out through higher tariffs and costly connection fees, or overlooked because they live in hard to reach locations. The Water Aid argues that: “the private sector has the capacity and interest to serve the poor and has the skills to innovate in developing suitable options and different levels of service”. (Water Aid 1995). http://www.waterforghana.org/private_sector.asp

At a Key Stakeholders’ meeting held in Accra in 1995 to consider a number of options to restructure the urban water supply sub sector, the government of Ghana originally opted for a Lease contract. A lease contract is a form of private sector participation in the water utility, in which the private operator takes the responsibility for all the operation and maintenance functions (Technical and commercial), but not for any investment. The revenue to the contractor is determined solely by the tariffs he collects. The lease fees are paid to the public sector and the contractor retains the difference.

Since then, the privatization process has passed through various stages, including the establishment of an Advisory Committee (1996); Water Sector Restructuring Secretariat (1997) to oversee the process; the preparation of the Business Framework for the lease (1998); undertaking of various studies to establish reliable and accurate data for the preparation of bidding documents; pre-qualification of potential private operators (1998/2000); donors conference to seek financial support for the sector and bidders conference (2001), where bidders were invited to comment on the bid documents and the lease in the presence of stakeholders.

By 2003, it became obvious that the private investments expected under the lease from

the operators would not be forthcoming. The situation, nonetheless, did not give reason to abandon the PSP program since the objectives set for it were still considered relevant. In the light of this, the Government of Ghana has now opted for a Management Contract.

Management contract is a form of private sector participation in the water utility where the government transfers the responsibility for the operation and maintenance of the water and sewerage network to a private company. The public sector retains the responsibility for investment and expansion. Payment is either fixed or performance related. Management contracts are often used in countries where the private sector considers too risky to invest in. They are sometimes used as entry points for private companies, who wish to test the water supply responsibilities before committing themselves further. This type of contract usually runs for about five years.

The Ghanaian reconstruction process has been enriched by empirical studies by various organizations, governmental and NGOs. The studies undertaken included survey of ability and willingness to pay especially for the low-income segments; assessment of current and future water demand and cost implications; development of cost - recovery tariff for sustainability of the system and the development of effective tariff structure to ensure cost recovery and provision of lifeline for low-income segments. Subsequently the recommendations in the ISODEC report of the studies embraced the private sector providing for both local and external contractors to carry out physical workshops, operating the systems in future, mobilizing funds to improve water supply and maintaining the services in future. http://www.waterforghana.org/private_sector.asp

To ensure that the benefits from the envisaged expansion and rehabilitation are sustainable, the Government has decided in 2006 to enter into the management contract to operate and manage the Urban Water Systems This is not considered as privatization by the Government, because 'Privatization' means a total sellout of a state enterprise. Government's intention is to enter into a partnership with the Private Sector operator to inject efficiency in the operations of the water sector.

With a private sector partner, GWCL should become a more efficient utility. The Private Operator will assist Ghana Water Company to improve the generation of revenue by reducing the water losses in the distribution lines. When this is supplemented by investments from donor sources and grants, the gap between demand and supply will be considerably closed.

According to Water for Ghana, the government is only permitting the private sector to operate the water system owned by the people of Ghana and that five years of partnership with the AVRIL will enable GWCL to be run without losses and be more customer-friendly. Through partnership with the AVRIL, it is expected that Non-revenue water, that is, treated water lost through illegal connections and wastage from old pipes will be reduced.

A reduction of non-revenue water by even 5% of the current over 456 million litres (120 million gallons) of water a day means that several million litres or gallons of additional

water a day will be released to serve hitherto un-served and under-served areas. It will also mean an improvement in the revenues of Ghana Water Company without having to increase tariffs. Tariff determination will still be the exclusive responsibility of the regulator, PURC. Increases in tariff will mainly be to address increases in cost due to inflation, such as increases in the price of electricity for pumping water, or imported chemicals for treating water. (http://www.waterforghana.org/water_policy.asp)

3.7 The Management Contract for Ghana Urban Water

As mentioned in section 3.3, the management contract for Ghana urban water was signed between Ghana water company limited (of Ghana) on one side and Vitens Rand water services BV (of The Netherlands) and Aqua Vitra Limited (in Ghana), having a joint name as ‘Aqua Vitens Rand Ltd (AVRL)’ on the other side in October 2006. This Management Contract is expected to remain in full force and effect during a period of five (5) years: between October 2006 and September 2011.

(<http://siteresources.worldbank.org/INFOSHOP1/Resources/managementcontract.pdf>)

The main objectives for the urban water utility sector in Ghana are:

- to expand the reliable supply of safe water in the urban areas;
- to ensure that low income consumers have access to potable water at affordable prices;
- to ensure sustainability of the sector through cost recovery;
- to ensure an adequate and steady flow of investment funds, with an emphasis on low cost and concession financing;
- and to support the introduction of the private sector into management.

<http://siteresources.worldbank.org/INFOSHOP1/Resources/managementcontract.pdf>

The system expansion and Rehabilitation component is designed to support: increasing the amount of treated water for sale; extending service to low income areas; rehabilitating existing network to reduce non-revenue water; and dam safety upgrades, procurement and installation of meters, provision of engineering services, vehicles and equipment for grantor’s regional and district offices.

Financing for the over all AVRL Project would be provided by the World Bank (one hundred three million (103 000 000) United States Dollars), Nordic Development Fund (five million (5 000 000) United States Dollars) and the Republic of Ghana (RoG) (twelve million (12 000 000) United States Dollars). The total amount of such financing amounts to one hundred and twenty million (120 000 000) United States Dollars (the "Project Funds"). An amount of two hundred and fifty thousand (250 000) United States Dollars was to be deposited once by the operator for the entire Management Contract Period into the Revenue Collection Account for use as working capital of the Operator. (Commission Act, 1997 Act 538)

It was agreed that neither AVRL nor its sub-contractors nor the AVRL Staff shall engage during the term of this Management Contract, either directly or indirectly in any business or professional activities in Ghana which would conflict with the activities assigned to

them under this Management Contract. The operator was given the authority to be in charge of the care and control of the revenue collection account. It shall be operated exclusively by the operator pursuant to the terms of this Management Contract and that subject to the appropriate exemption under Applicable Law, the operator, its sub-contractors and their foreign personnel shall be exempted from paying taxes. (http://www.waterforghana.org/documents/management_contract.doc).

In October 2006, Mr. Emmanuel Korsah, in an interview had the following to say about the management contract:

“The specific purpose company Aqua Vitens Rand Ltd (AVRL) has now been established with a 50-50 per cent ownership of the two foreign companies. The new company will take care of the GWCL’s former regional operation and maintenance duties according to the management contract. Thus the regional staff will be transferred to the AVRL. After the retrenchment process, 4 700 of GWCL’s former staff will be reduced to 1 524. After the five year management contract it might be that the management contract will be transformed into an affermage or lease contract. But nobody knows if the AVRL will be interested in such a solution.

Investment is still a government task, thus this is the responsibility of the GWCL’s head office. Currently there are 82 staff at Head Office (before then the number was 240). The redundant staffs have been transferred to the regions. Some other 2 700 have been transferred to the AVRL. A consultant has been appointed to review the staff administration situation at the Head Office. Probably the consultant will propose a further retrenchment to some 60 people employed.

A GWCL committee has been set up to look at the consultant’s report. The Board of the GWCL will however take the ultimate decision. AVRL will continue to do what GWCL did before, so what was the point with the management contract? he asked. AVRL collects the tariff, and the GWCL is supposed to monitor its behaviour according to the performance criteria in the contract.

There are ten urban regions in the whole of Ghana, but Accra is divided in 4 subareas; West, East, Tema and Production Headwork. In addition there is a well drilling unit in Kumasi and workshop in Tema. These units are supposed to be autonomous, but are still funded by the GWCL. The GWCL covers about 250 district capitals and big towns, but other towns are under the Community Water and Sanitation Agency (CWSA) regime. Public Utilities Regulatory Commission (PURC) fixes the official tariff rates whilst the most important task for the GWCL is Monitoring.

A Project Management Unit (PMU) was set up by the World Bank (WB) and the Ministry of Works and Housing to oversee the on-going privatisation process. Its function “has not been very clear”. It reports to the WB, the management director of GWCL and the Ministry. Based on requests, staffs from GWCL were transferred to the PMU, and they were paid better than others” (October 31, 2006).

CHAPTER FOUR: RESULTS FROM NORTH TESHIE STUDY AREA

4.1 Levels of Scarcity of Water

The availability of water in the study area depends upon the regularity and the adequacy of supply. The survey results show that 78% of the households in the area are connected to the water supply system. 22% do not have pipes connected to their homes. This is shown in figure 4.1 below. The figure (78%) was however lower as compared to those of the district (AMA) figures reported by the 2000 population & housing census (90.7%) and 2003 CWIQ district report (97.5%) as well as 94% for national 2003 CWIQ report.

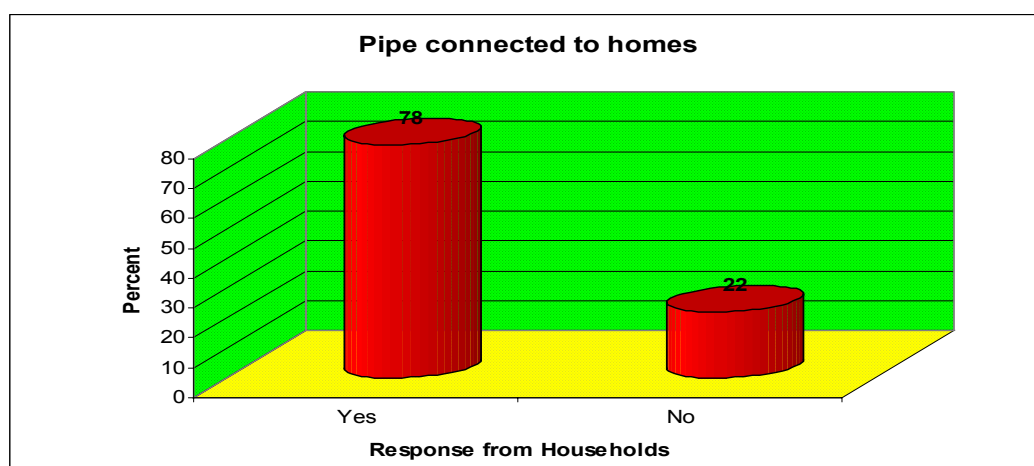


Figure 4.1: Pipes Connected to Homes

Source: North Teshie Field Survey 2006

Frequency of flow of water has been a major concern for the inhabitants of North Teshie. The results indicated that for most of the households, water flows mainly on 1 day or maximum of 2 days in a week. As indicated in the figure 4.2, 93 % of those interviewed mentioned 1 to 2 days as the main days that water flows from the taps.

North Teshie has two different water systems: the old and the new. The two systems are opened alternatively in the week. The old system is usually opened to the households on Saturday or Sunday, whilst the new system is opened on Tuesdays or Wednesdays. Unfortunately, for any of those 2 days, taps may flow for some few hours and stop, leaving people in frustration. Households therefore have to use those 2 particular days in the week to fetch water, which they store for use for the whole week.

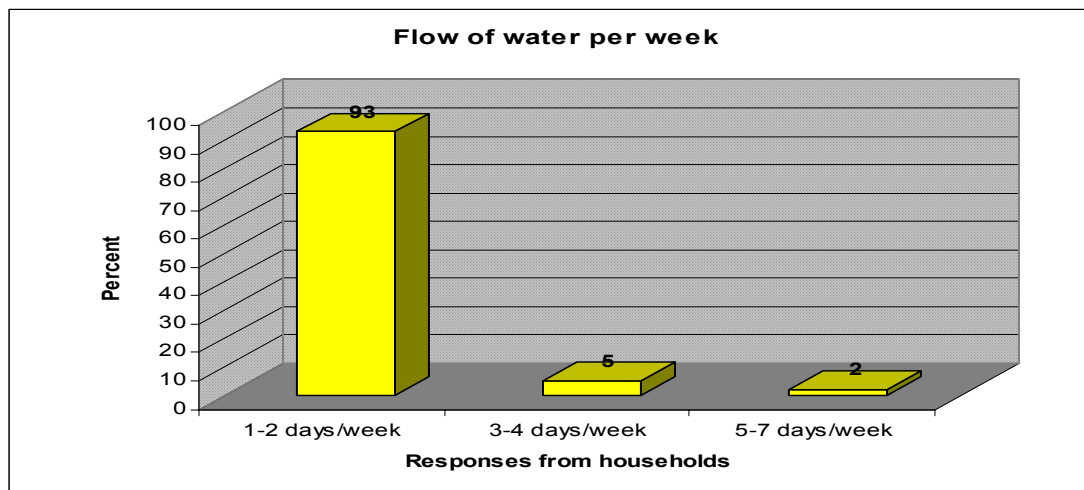


Figure 4.2: Flow of Water per Week
Source: North Teshie Field Survey 2006

One tiresome thing about the search for water in the area is that the particular hour of the start of flow of the water taps is not known during the days that water runs. Yet the assurance is that it will certainly flow on any hour of the designated days that water runs during the week. For this reason, people queue with their containers for water from any tap nearest to them, then get back to their dwellings to wait whilst doing other things. Immediately the water starts to flow, children who are still waiting near the taps shout in the local language "*nsuo na baooo!!!!*" which means "the water has arrived!!!!". Then people run from all directions to stand by their containers already in the queue to wait for their turn to fetch.



Figure 4.3: A Picture Showing People Waiting for their turns to fetch Water
Source: <http://www.irinnews.org/report.aspx?reportid=48748>

If the water flows deep in the night or at dawn when people are sleeping, then one has to be awakened by the noise of buckets and people who have started fetching the water

already, and rush towards that direction to fetch. Experience has shown that the water usually arrives in the night.

When they were asked of the average distances travelled to fetch water, 29% said they travelled for a maximum of 50 metres, 28 % travelled between 50 to 100 metres whilst 23% travelled between 100 to 200 metres before fetching water for their households. 14 % never travelled any distance for water because they have reservoir in form of poly tanks or concrete tanks which are used to store water for long periods of time, at least more than one week.

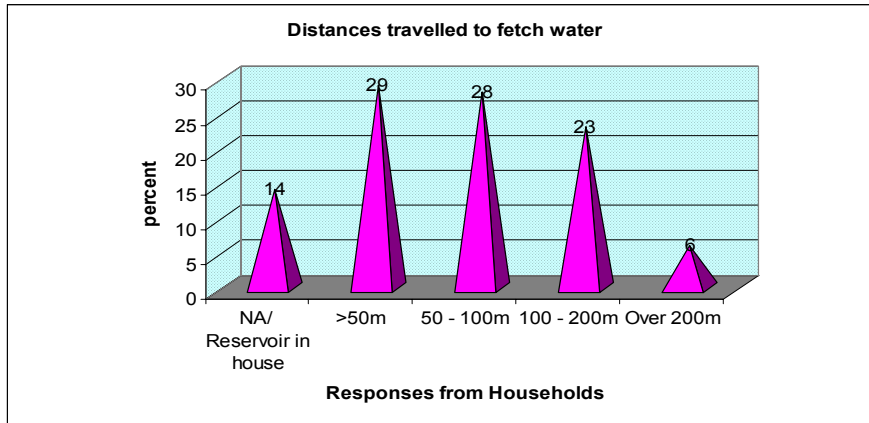


Figure 4.4: Distances Travelled to Fetch Water

Source: North Teshie Field Survey 2006

Sometimes the flow of water for the 2 days in a week is so scarce that households who are connected to the system but do not have reservoirs, do not get enough and have to join the others to look for water elsewhere. Figure 4.4 has also revealed that 94 % (14% +29%+ 28% +23%) of the respondents get access to their water within 200 metres radius. A normal walking up to 200 metres is not beyond 30 minutes. It is therefore acceptable to say that 94% of the households are within 30 minutes of the source of their water. In an urban setting this is however not impressive because water is expected to be in people's homes or very close to their homes.

In table 4.1, it appears 28% of the households interviewed use more than 9 buckets (34cm size), (36 gallons or 137 litres) of water per day for their drinking, bathing, washing and other things. 21% use 6 buckets (24 gallons or 91 litres) per day, 18 % use 8 buckets (32 gallons or 122 litres) per day whilst 12% say they use 5 buckets (20 gallons or 76 litres) per day. This distribution may be based on the household size and what water is used for in the household. In the survey of 100 households, 28% of the households have a size of 5; 21% have size 6 and 19 % of them have size 4. This means the majority of the households interviewed (68%) have household sizes falling between 4 and 6, giving an average of 5 members in a household, which is normal in urban Ghana.

Table 4.1: Number of Buckets of Water Needed for a Household per Day

Number of buckets (34cm) needed	Equivalent in gallons	Equivalent in litres	% of household
1	4	15	1
2	8	30	1
3	12	46	4
4	16	61	6
5	20	76	12
6	24	91	21
7	28	106	9
8	32	122	18
9+	36+	137+	28
Total			100

Source: North Teshie Field Survey 2006

The households were asked about the sufficiency of the water they use per day and the responses were recorded in a pie chart in Figure 4.5. 65% of them reported a positive response whilst 35 % reported in the negative.

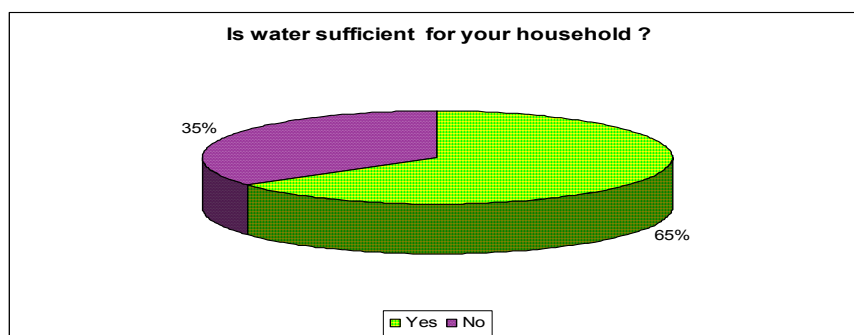


Figure 4.5: Sufficiency of Water for Households

Source: North Teshie Field Survey 2006

4.2 Cost of Water

4.2.1 Households Connected to the Pipe Network

The households are billed according the litres of water used per month. The issue of water tariffs is however a controversial one in the study area. Whilst some people believe that they are being cheated by the utility company, others are enjoying under-billing. It was very difficult to get the correct bills from the households. This is because some may have illegal connections; others may be under billed whilst the rest said their bills were either irregular or the last bill was so many months ago. They were able to mention their bills as recorded in table 4.2 below.

**Table 4.2: Water Bill per Month
(for those who have pipes monitored by meter in their homes)**

Amount for water bill in Cedis	% of households
Not connected to pipe	22
20 000 – 49 000	9
50 000 – 99 000	49
100 000 – 149 000	10
150 000 – 199 000	8
200 000 – 249 000	2
Total	100

Source: North Teshie Field Survey 2006

Majority of the households (49%) have their monthly water bills in the 50 000 – 99 000 cedis category. 10 % of the households also pay between 100 000 – 149 000 cedis; 9% pay between 20 000 – 49 000 cedis and 8% pay between 150 000 – 199 000 cedis as their monthly water bills.

4.2.2 Households Not Connected to the Pipe Network

As already shown in figure 4.1, the homes of 22% of the households are not connected to pipe and so do not pay monthly water bills. Most of these households use the 34cm size bucket as a measure to buy their water.

The GWCL, through the PURC has established that the official tariff for a bucket of water (34cm size, also equivalent to 15 litres or 4 gallons) is 84 cedis. This rate according to the officials of the GWCL is not sufficient to recover costs such as operation, maintenance, energy and replacement activities of the water system, hence the inability of the company to improve upon its services.

The amount that households pay for a bucket of water varies from place to place and from week to week depending on the level of scarcity of water in the week and the demand for water by the people from a particular owner of a reservoir or a big tanker or a small truck. The prices for a bucket of water were reported during the survey. In the figure 4.6 below, the highest percentage (31%) of the respondents paid 500 cedis for a bucket of water, 13% paid 400 cedis whilst 11% and another 11 % paid 700 and 800 cedis respectively, with some 5% reported paying 900. Some of the respondents explained that cost of water could be sometimes up to 1 000 cedis per bucket and even beyond. ‘Water shortage retards progress in many ways’, they lamented.

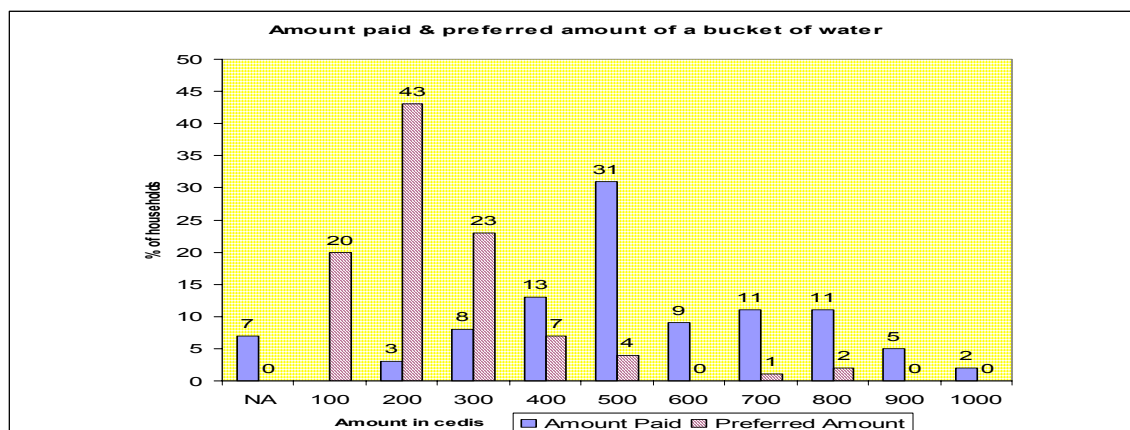


Figure 4.6: Amount Paid for a Bucket (15 litres) of Water and a Preferred Amount of a Bucket of Water

Source: North Teshie Field Survey 2006

When they were asked of the preferred cost of a bucket of water for an average urban dweller, a large majority (43%) of the respondents were in favour of 200 cedis. This is however distantly followed by 23% who supported 300 cedis and another 20% who stood for 100 cedis per bucket. It is important to note that the 200 cedis mentioned by the majority of the respondents was precisely the same amount preferred by the officials of the GWCL.

The estimated business profit margins of water vendors are calculated in table 4.3. Judging from the table, if the official price of a bucket of water is 84 cedis, then a vendor who sells his/her bucket of water for 500 cedis is likely to make a business profit of 416 cedis (495% of the cost price) on each bucket of water. (ignoring all hidden costs of the vendor)

Table 4.3: Analysis of Likely Business Profit of Water Vendors per Bucket.

Business Profit analysis of water vendors			
Cost price per bucket of water (15 litres)	Selling price	Likely Business Profit	% of likely business profit
84	200	116	138
84	300	216	257
84	400	316	376
84	500	416	495
84	600	516	614
84	700	616	733
84	800	716	852
84	900	816	971
84	1 000	916	1 090

If the selling price bucket of water should reduce to the popular request of 200 cedis, then the likely business profit level of most of the vendors will reduce to 116 cedis (138% of the cost price. (ignoring all hidden costs of the vendor). This situation is however currently difficult to attain since demand for water is always greater than supply and determines the market price of a bucket of water from the vendors.

Vendors using small trucks of about 1 520 litres (or about 400 gallons) deliver water services to the homes of households having bigger containers or small poly tanks for their consumption for some period of time. This is to reduce the pressure and frustration of going out for long distances, sometimes during odd hours like 11.00 pm or 4.00 am to look for water. Most of the small poly tanks observed in the homes are of 1 520 litre (400 gallon) capacity. This is exactly the same capacity as the containers of the vendors' small trucks that deliver water to the homes. This means that poly tank owners will like to store several buckets of water, in their homes to avoid a 'bad day' when water does not flow.

The survey results have shown in figure 4.7 that 44% of the households paid between 50 000 cedis to 99 000 cedis per small truck of water. Unfortunately, not everybody can afford to possess big containers to store their water. 46% did not buy from the water vendors. They either do not have the big containers or cannot afford the price or think it is more expensive than buying with the buckets. 5% of households paid between 100 000 to 149 000 cedis, 2 % for 200,000 to 249,000 and another 2% paid 250 000 to 299 000 cedis for same service provided by vendors.

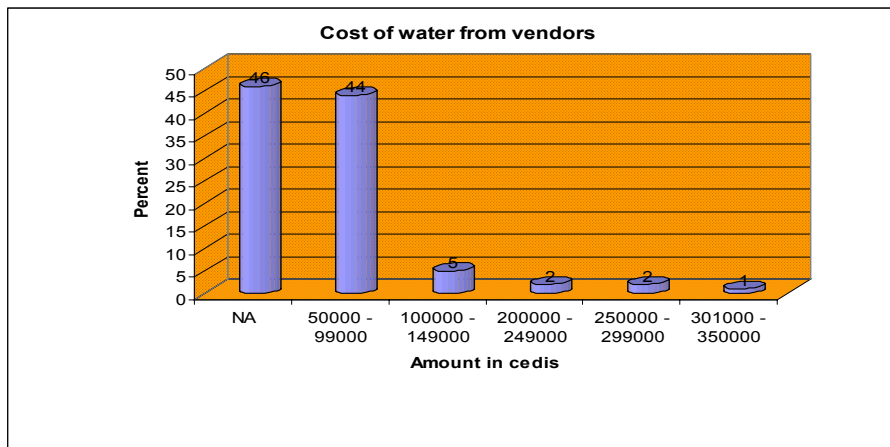


Figure 4.7: Cost of Water from Vendors Using Small Trucks

Source: North Teshie Field Survey 2006

Many households believe that the price of water per trip from the vendors with small trucks is not affordable. During the period of the survey, as much as 78% of the households agreed, as in figure 4.8, that water per trip was expensive. 6% said it was affordable whilst 16 % did not know whether it was affordable or expensive.

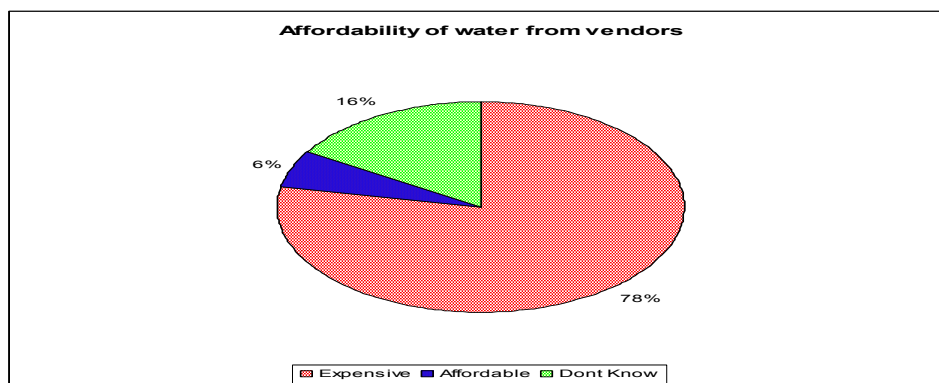


Figure 4.8: Affordability of Water from Vendors with Small Trucks

Source: North Teshie Field Survey 2006

Using the equivalence of 15 litres (4 gallons) to 1 bucket, it is realised that the cost of water from vendors with small trucks was not different from those selling with buckets. The bulk of the surveyed population bought water from vendors with small trucks (ie 1 520 litres or about 400 gallons and also equivalent to 100 buckets of water) for 50 000 to 99 000 cedis. This boils down to each bucket of water being bought for at least 500 and at most 1 000 cedis as seen in the case of those who buy with buckets. The main difference was the times saved by owners of poly tanks and bigger containers.

4.3 Causes of Water Problems and Impacts

Both category of respondents (Household water consumers and GWCL officials) absolutely agreed that there were problems associated with water supply system in the study area. From figure 4.9, it appears 95 % of the households indicated problems with the water supply system in their areas. 4% of them said there were no problems but 1 % could not decide.

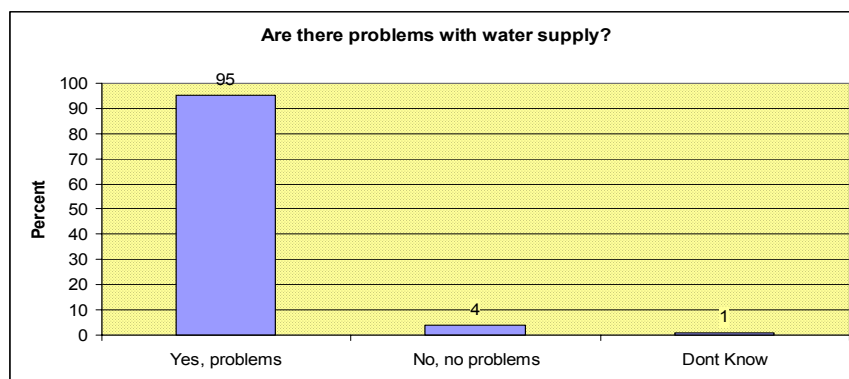


Figure 4.9: Are there Problems with Water Supply?

Source: North Teshie Field Survey 2006

Causes of water supply problems in the study area are many. The itemised list in table 4.4 was presented to the households to indicate their rankings. The respondents were asked to rank the causes of the problems in terms of major cause, minor cause, not a cause or do

not know (cannot tell). 81 % of the respondents were of the view that one of the major causes of the water scarcity in the area was due to the fast expansion of the township, which the few old existing pipelines cannot support. 73 % of them were suggested the cause was from the frequent broken down pipe lines of the GWCL. 53 % argued out that the continuous unplanned developments of the various springing communities might be one of the main causes, whilst 43% has the belief that part of the main cause might be due to the lack of technical expertise from the GWCL to handle the pumps.

Apart from the major causes, 37% were of the opinion that illegal connections might be a minor cause of water problems and 30% also held the same view in terms of the land owners' refusal to allow pipe lines to pass through their lands. In another ranking, 47 % said they did not know if the allegation of 'the arrangement between tanker owners and the officials of the GWCL to limit the supply of water, to put money in to the pockets of the tanker owners' could be a cause to water problems, whilst 37% rejected the assertion that electricity power outage could be a cause to water shortage problems.

When the officials of the GWCL were interviewed on the issue, the four major causes of water supply problems in the area were mentioned as illegal connections; the lack of financial support from the company to carry out maintenance and expansion work on their system; fast expansion of the township and the springing up of industries in the area that use a lot of water. They believed the possible minor causes might be; frequent broken down of the pipelines and electricity outage problems. According to them, lack of expertise from the company to handle the pumps and the refusal of the land owners to allow pipe lines to pass through their lands could not be causes of the water problems.

Table 4.4: Possible Causes of Water Problems

Possible Causes of water problems	Major cause (%)	Minor cause (%)	Not a cause (%)	Don't Know (%)	Total (%)
(1) Illegal connections	23	37	11	29	100
(2) GWCL lack technical expertise to handle the pumps	43	27	6	24	100
(3) Tanker owners arranged with the GWCL to limit water supply	23	17	13	47	100
(4) Frequent broken down of pipe lines	73	12	8	7	100
(5) Few pipe lines cannot support fast expansion of township	81	9	3	7	100
(6) Land owners do not want new pipe lines to pass their lands	22	30	25	23	100
(7) Unplanned township/community	53	25	15	7	100
(8) Electricity power outage problems	19	30	37	14	100

Source: North Teshie Field Survey 2006

The respondents were presented with the possible impacts of the water problems for ranking as listed in table 4.5. In this regard, a large percentage (86%) of the households

interviewed said the water shortage in the area retards progress in all domestic and commercial activities in many ways. 'Nobody has his peace and comfort in terms of this water problems, we are tired of the situation', one man reiterated. The officials of the GWCL confirmed the irregular pipe flow and the slowing down of domestic and commercial activities as the overall main impact of the water shortage situation in the study area.

In other rankings, 70% of the respondents noted high water prices from water vendors as a severe impact, 61% also had the same view for children risking their lives when walking across streets to search for water, whilst 38% agreed that children usually being either late to or absent from school was also a severe impact. 57% of the households also revealed another severe impact as work load of women in the households becoming extra heavy. They believed this is so because women are already overburden with a lot of domestic unpaid activities, and that the water problem have aggravated their situation as they have to use extra time and energy to make sure water is available in the home for the spouse and the children.

As 55% of the households thought of the risk in drinking of untreated water from open wells or surface waters in some cases as a severe impact, 49% were also of the same view that too much time is being wasted in search of water. The main risk of the use of untreated water might be the incidence of some water related diseases in the area. 42% of the respondents considered long queues in fetching water, resulting in quarrels as a minor impact whilst 38% of them also judged prices of food items being increased due to shortage of water as just a minor impact.

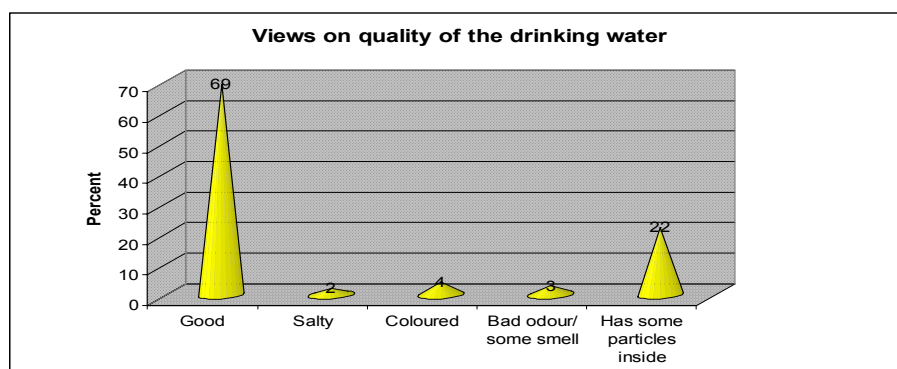
However according to the judgement of the GWCL officials, certain assertion like high water prices from vendors; too much time is wasted in search of water; children usually are either late or absent from school and risking their lives when crossing the roads to fetch water are all minor problems in the water problem deliberation. They also did not agree to the statements that long queues in fetching water; increase of prices of food items and risk in drinking untreated water were impacts of the water problem. They advised that it could be helpful if many households start acquiring larger storage facilities in order not to be taken unawares if the problem persists for some days.

Consumers were also asked of their opinion on the quality of the drinking water. The result was displayed in the figure 4.10. Over all, 69% judged the quality of the water as being good, 22% reported of the water having some particles inside; 4% were of the view that the water was coloured whilst some 3 % said the drinking water had some bad odour or smell. One person complained that "when pipe water is stored in underground tanks for a long time, it smells and sometimes full of larvae if the tanks are not washed for a long period of time". He said this could bring about diseases.

Table 4.5: Possible Impacts of Water Problems in percentages (%)

Possible impacts of water problems	Severe impact	Minor impact	Not an impact	Don't Know	Total
(1) Slow down of domestic & commercial activities	86	13	1	0	100
(2) High water prices from local water vendors	70	16	0	14	100
(3) Too much time is wasted in search of water	49	3	9	7	100
(4) Long queues in fetching water, resulting in quarrels	30	42	18	10	100
(5) Children usually are either late to or absent from school	38	31	20	11	100
(6) Children risk their lives crossing roads in search of water	61	16	17	6	100
(7) Prices of food items increase due to shortage of water	19	38	26	17	100
(8) Risk in drinking of untreated water from open wells or surface waters	55	29	11	5	100
(9) Work load of women in the households becomes very heavy	57	29	11	5	100

Source: North Teshie Field Survey 2006

**Figure 4.10: Views on the Quality of Drinking Water**

Source: North Teshie Field Survey 2006

4.4 Public Participation

Increasing public participation in decision-making is becoming an important component of the democratization processes and the strengthening of civil society. Public participation does not only imply voting but also an open dialogue in which citizens/residents have a voice in the decisions that affect them. The process provides participants

with the information they need to participate in a meaningful way and how their input affected the decision. Even though authorities may not be legally required to solicit public participation, it is often in their best interest to do so.

The issue of public participation was looked at during the study. The respondents were asked whether they were aware if the GWCL has ever involved the chiefs and elders or the residents association in discussing the water supply and delivery problems. The result is shown in figure 4.11. Majority of them (62%) indicated not having any knowledge of any such meeting. 32 % said there have been no involvement of the community at any level, but 6% of them were very certain some kind in involvement of the community leaders in the water problems.

When they were asked to mention the number of meeting during the last 2 years, 94% of the respondents gave their explanation that since they were not aware of any such involvement, it would not be in their capacity to tell of the number of such meetings. Out of the 6 % which were sure of any involvement of the community, 3% of them mentioned 2 meetings and another 3% stated 3 meetings. The involvement of the community was however confirmed by the officials of the GWCL and added that several (more than 9) meetings have been held with the leaders of the area in a bid to find solution to the protracted water crisis in the area.

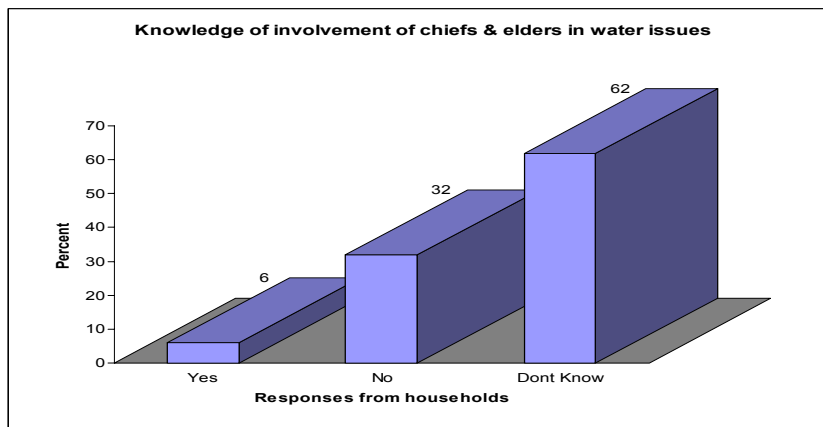


Figure 4.11: Knowledge of Involvement of Chiefs and Elders in Water Issues

Source: North Teshie Field Survey 2006

Broadly speaking, both officials of the GWCL and the surveyed households of the study area accepted the fact that involving the community would be one of the helpful steps in solving the water problem in the area. In figure 4.12, almost 2 out of every 3 households interviewed (62%) believed the community leaders were capable of offering some assistance that could result in relieving of the water crisis. 28 % of the respondents could not say whether involving the community leaders could resolve the problem but one out of every ten (10%) respondents thought community leaders could not be of any help.

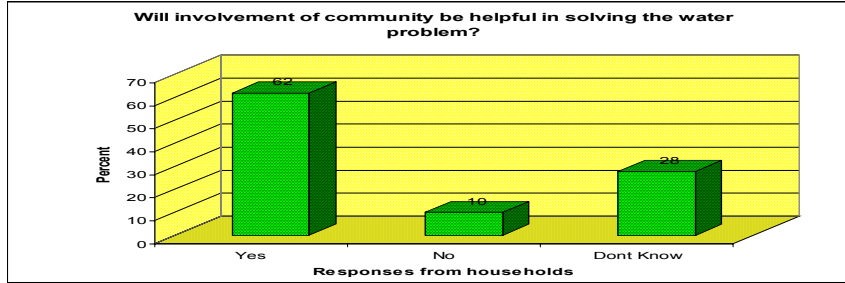


Figure 4.12 Will Involvement of Community be Helpful in Solving the Water Problem? Source: North Teshie Field Survey 2006

4.5 Private Sector Participation (PSP) in Urban Water Supply

More and more governments are currently turning to the private sector for help in developing and delivering water services. Although bitter experiences were recorded in some countries that have entered into the arrangement of private sector participation, it is believed that, if well designed, these arrangements can bring big improvements in the quality, availability, and cost-effectiveness of the water services. When the respondents were asked about their opinion on the water supply being handled by a private company, they were found almost divided in to 2 equal groups.

As displayed by figure 4.13, an interesting result was obtained from the question of involvement of the private sector in the handling of the urban water. Almost half, (47%) of the sampled population responded in the private affirmative. The same proportion also answered in the negative. Only 6 % reported that they could not say anything about the decision. According to the GWCL authorities, urban water supply from an alternative provider is welcome; hence it would be in the right direction if a private company could be involved in the supply, operation and maintenance of the urban water system.

It is understood that private sector skills and technical know-how could serve as complement to improve the efficiency of the service delivery, and help in gaining access to finance for new investments. PSP on its own is not a complete panacea for problems in the water supply system. It may require the involvement and determined efforts of the government; the private sector participants and the local residents as well.

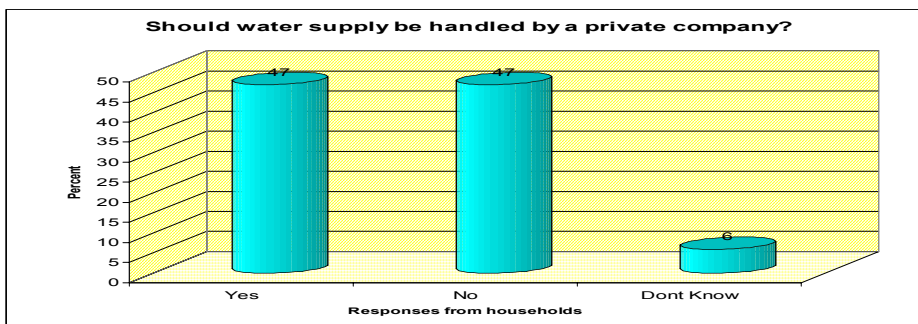


Figure 4.13: Should Water Supply be Handled by a Private Company? Source: North Teshie Field Survey 2006

Whilst some of the respondents commented that water supply and delivery should be handled by a private company because a private company can give a better offer at the same cost, some were of the view that government should be responsible for water issues and must control the pricing.

Having a better knowledge of the cause of problems in the water system, GWCL officials trusted that involving a private partner in the urban water sector could bring many benefits. There could be positive change in work attitude and zero tolerance to waste. The co operation might bring about transfer of technology that may possibly result in the enhancement of productivity and culminate with increased investor confidence.

It is sometimes envisaged that if water tariffs were adjusted a little higher, the proceeds could be used to improve the services for the consumers. Against this background, the respondents were asked if they were willing to pay higher water bills for better water services. The result as portrayed in figure 4.14 suggested that majority of the people were not in favour of higher water tariffs. A comparative assessment of the two issues-water supply to be handled by a private company versus willingness to pay higher water bills for better services- has revealed that the mass of the respondents (whether in favour of the private sector involvement or against it) have rejected any proposal of increasing water bills. Whilst 76% said no to the suggestion, only 15% were willing to pay any upward adjustment of the bills but 9% were indifferent.

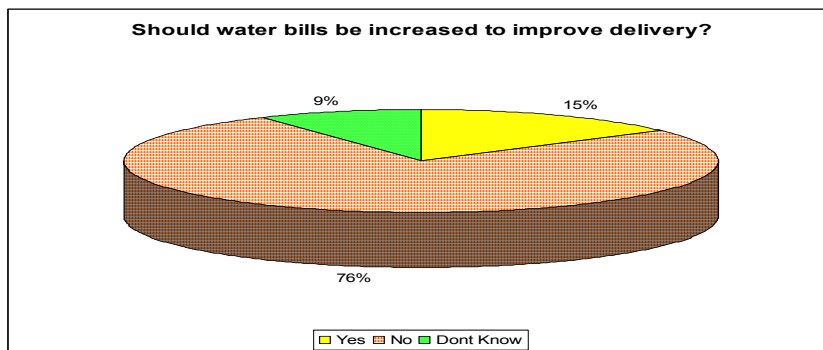


Figure 4.14: Willingness to Pay Higher Water Bills for Better Services

Source: North Teshie Field Survey 2006

Many respondents made comments that upward adjustment of the water tariff was not in their interest, but other areas could be checked to save the situation. One man said that “the management of the GWCL should rise up and be efficient. If all bills are collected from the customers, they can repair all the broken down pipes and expand their maintenance work”. Another commented that “the GWCL should have effective monitoring team to help minimise illegal connections and waste through leakages. Water flows in my area on Saturdays and Sundays only. The officers from the GWCL should be available at random on such days so that water retailers will stop intentional obstruction of flow of water”.

Other people's suggestions were that the enforcement of laws for the payment of the water bills should be followed to the letter, in order to get enough revenue to sustain regular supply of water. Also the staff of GWCL who might be connecting people illegally should be sanctioned to put a stop to it, so that GWCL can make more money to connect all areas to have their pipes flowing every day. People should learn how to share. They should not use water pumping machines to draw water to their homes for sale.

4.6 Interventional Measures

4.6.1 Interactions between Officials and Residents

The GWCL made it clear that the main challenges facing the company in the delivery of its services are linked to the lack of funds for expansion and rehabilitation works and the ever expanding new settlements with their increasing population in the study areas. Other problem areas mentioned were in relation to illegal connections; unwillingness of the consumers to pay their bills; logistic problems such as lack of vehicles and the low quality level of the billing system. According to the government's own figures, 50 percent of Ghana Water Company's daily production of 456 million litres (120 million gallons) is being lost through leakages, illegal connections and unpaid bills.

Since 1989, when the water crisis in North Teshie and its environments in particular, was seen to be worsening, the government in collaboration with the water company attempted to reverse the situation, by including a \$140m project among others, to improve the system. The project described below has been implemented but unfortunately the taps run only for a few hours for one or two days a week. This has necessitated some homes in the area to have water tanks to store water. <http://news.bbc.co.uk/2/low/africa/3145001.stm>

In 2001, during the tenure of office of Mr Eddy Akita, the then Member of Parliament for the area various efforts were made to solve the North Teshie water problem. He was reported as having held regular meetings with the leadership of the residents, officials of the GWCL, and the Ministry of Works and Housing after which they collectively realised that the problem would take some time to be resolved. It was also on record that, Madam Theresa Tagoe the Deputy Minister of Works and Housing at that time, held series of meetings with the residents and communicated emergency measures being taken to address the water problem. She again said long term plans were in the pipeline to extend water supply from the Weija treatment plant to the problem area. <http://www.ghanaweb.com/GhanaHomePage/NewsArchive/artikel.php?ID=32992>

In December 2002, when no sigh of relief was coming, members of the residents association organised a press conference and appealed to the Ministry of Works and Housing and the GWCL to restore regular water supply to North Teshie, which they stressed has been without the facility for the past 20 years. This appeal was also taken in good faith with a promise to act with all seriousness.

In January 2003, the member of parliament (MP) for the area Mr G. Ako Nai and other officials held another meeting with the members of the residents association and they

were given the assurance that the problem will be rectified. The officials said the move formed part of the government's effort to resolve the perennial water problem in many parts of Accra. Assurances were given that the project would take three years to complete and would enhance the water supply situation considerably.

In June 2003 a six-member committee appointed to investigate the perennial water shortage at North Teshie has called on the authorities to complete the ongoing rehabilitation work on the underground reservoir and overhead tank at the Cold Store area, as a matter of urgency, to alleviate the suffering of the people. This was after some members of the North Teshie Concerned Citizens Association took to the streets in Accra, to protest at the failure of the GWCL to restore and maintain regular supply of water to area. They had also vowed to stop any political party, which attempts to campaign in the area and threatened not to vote in the 2004 general election. <http://www.mclglobal.com/History/Jun2003/02f2003/02f3r.html>

In June 2004, when the Minister of Works and Housing, went to inspect work on the ongoing Project of the GWCL at North Teshie, he ordered the immediate transfer of an engineer at the North Teshie Water Project Site, to the head office of the GWCL for unsatisfactory work and replaced him with a more efficient person. The Project was scheduled for completion and inauguration in the first week of July 2004, but the Minister was told that only 80 per cent of work had been completed at the time of his tour. <http://www.ghanaweb.com/GhanaHomePage/NewsArchive/artikel.php?ID=60241>

The Project was being undertaken at a cost of about 3.40 billion cedis to improve the water supply system in North Teshie. It involved the building of a booster station to pump water into an overhead tank and the construction of an underground tank for storage of the water. The minister said North Teshie like all other communities in the country deserved to have good drinking water, adding that the President (Mr. John Agyekum Kufuor) had tasked him to make sure that the project came to its logical conclusion. Despite all these efforts the problem still persists. It is however difficult to understand if the Government is just paying lip service to the people or the exact problem area could not be identified and solved.

In 2006 Government again said it was adopting both short and long-term strategies to enable it deal more effectively with the water situation and also improve the lives of the people. Drilling of bore holes was included this time in some parts of Accra. Among the long term plans mentioned was the expansion of the Kpong water distribution centre, which is expected to begin in 2007 to produce additional 152 million litres (40 million gallons) of water a day to meet part of the country's growing demand for water. http://www.peacefmonline.com/index.php?option=com_content&task=view&id=4098&Itemid=32

4.6.2 Trend Analysis of Water Supply to North Teshie Community

Table 4.6: Number of households connected to pipe in the North Teshie community

Year	1995	2000	2005
Total households	10 300	12 707	15 676
Number of Households connected	3 000	3 700	4 000
% of households connected	29%	29%	26%
% increase in connection	-	23%	8%
% increase in connection for total 10 year period	-	-	33%

Source: GWCL

The quantitative outcome of the interventional measures is recorded in table 4.6 above. The outcome revealed the number of households connected to pipe in the North Teshie community within a ten year period (1995-2005). The trend %s indicate a constant and followed by a decline in percentage of the number of households connected to pipe during the ten year period. 29 % of the households were connected to pipe borne water in 1995. The same percentage of households was connected in the year 2000, but a decline in percentage (26) was realised between 2000 and 2005.

Using 1995 as a base year, there has been some fluctuation in the percentage of pipe connection to the households. There was 23% increase in pipe connection between 1995 and the year 2000. It again decreased to 8% between the year 2000 and 2005. There was however an increment of 33% in the over all pipe connection to the households in the ten year period. There can be a change of trend in the future pipe connection to the community depending on the resource and potential change of the GWCL.

Comparing table 4.6 to figure 4.1, it is realized that the variation between the percentages of households connected to the water supply system in North Teshie as at 2005 was too wide. The field survey results in figure 4.1 indicated that 78% of the households in the area were connected but the table 4.6 from GWCL indicated 33% in the same year. It is believed that data error might have occurred either at source or during the transfer of the information, which could result in obtaining the 33%. Results from other official surveys have demonstrated that the percentage of household connection in the area could not have been less than 70%. Some of these are: 90.7% district (AMA) household connection figure reported by the 2000 population & housing census, 97.5% CWIQ district report in 2003 as well as 94% for national 2003 CWIQ report.

4.6.3 Volume of Water(litres) per Household and per Head per Day

The figures provided for the volume of water supplied for the ten year period (1995-2005) can be used to derive the volume of water available for each household and for each person per day. In 1995 the volume of water available per household in the North Teshie community was about 37 litres (9.7 gallons per household per day). After 5 years (2000), the volume of water provided per household almost doubled to 74.47 litres (19.6 gallons) per household per day. In the year 2005 (ten years later), the volume of water provided to each household per day increased to 121.20 litres (32 gallons).

Table 4.7: Volume of Water per Household and per Head per Day Supplied to the North Teshie community

Year	1995	2000	2005
Total Population	46 162	56 949	70 257
Household Population	10 300	12 707	15 676
Volume of water provided in litres	378 540	946 350	1 900 000
Volume of water provided in litres per head	8.20	16.61	27.04
Volume of water provided in litres per household	36.75	74.47	121.20

Source: GWCL

Increases were also observed with regards to the volume of water available per person per day in the study area during the same ten year period. In 1995, the volume of water that each person could use per day was about 8.20 litres (2 gallons). In the year 2000, the rate almost doubled to 16.61 litres (4.4 gallons) per person per day. Later in 2005, the quantity of water supplied by the GWCL to each person in the North Teshie township per day was 27.04 litres (7 gallons). This is about 3 times of the initial rate recorded within the ten year period, and GWCL could be adjudged to be making serious but gradual efforts to improve the provision of water supply to the area.

Despite the fact that the overall observation gives a picture of a steady rise in provision of water to the study area, the figures of water provided in litres per head fall below the UN recommended 50 litres per day as the absolute daily minimum amount of water a person needs. UN research in 2002 has indicated that because of scarcity, millions of people try to exist on 10 litres (2.6 gallons) a day. These people are said to live in Gambia, Haiti, Djibouti, Somalia, Mali, Cambodia, Mozambique, Uganda, Tanzania, Ethiopia, Eritrea, Albania and Bhutan. The fact that Ghana's name is not found in the list implies that its people exist on more than 10 litres of water per day at the time of the research. This has been confirmed by this North Teshie study.

These indicate some modest improvement in the provision of water by the GWCL to the study area. It can therefore be predicted that if the GWCL is well resourced and better managed, there can be a steady improvement of provision of water to the study area until it comes out of the scarcity category.

CHAPTER FIVE: DISCUSSION

5.1 Findings

This discussion part of the thesis is based on the findings that resulted from the study, of which views sampled and information gathered from interested parties in the North Teshie water problem have been categorised and analysed. These key findings will among others revolve mainly around the stated objectives and the propositions of the study. They are made clear under the subheadings below.

5.1.1. Restructuring of Water Supply in Ghana

The study has found out that public water supplies in Ghana started in the 1920's and was well established later in 1965 as the Ghana Water and Sewerage Cooperation (GWSC). In 1999 the corporation was converted in to Ghana Water Company Limited (GWCL). The conversion in to GWCL resulted in the separation of the water supply from the sanitation. as part of Ghana's Enhanced Structural Adjustment Policy (SAP) in collaboration with the IMF and the World Bank. This was to involve private sector participation in urban water supply for better quality services and higher operational efficiency.

In line with the aims of the Enhanced SAP, the Public Utilities Regulatory Commission (PURC) was set up in 1997 by the Government as an independent body to among other functions provide guidelines on rates that can be charged by utility companies. Consequently the approved monthly water tariffs for domestic users set by the PURC jumped from the initial rate of 400 cedis for the first consumption range (0-13 000 litres) in 1998 to 4,850 cedis for the same first consumption range in 2006, whilst the rates for the last consumption range during the same period were 1 400 cedis and 6 750 cedis.

The upward review of the tariffs for the first water consumption range up to 2006 is observed to be about 12 times the initial rate from 1998 (within the 8 year period), whilst that for the last consumption range is noticed to be about 5 times from the start rate. These tariff increases are seen to be too high for the period but they are actually influenced by the government to ensure the financial viability and to get sufficient funds to cover costs of the private companies that will be operating in the water sector.

5.1.2 Major Causes of Water Crisis Identified in North Teshie

Provision of water in urban areas especially in the developing world faces serious problems. The North Teshie has been recognized as one of the urban areas having severe water crisis. Even though results signified that as much as 78 percent of the households in the area were connected to the water supply system, frequent interruptions were taking place in the supply system. The major causes of such water crisis have been identified. This is done to address the first specific objective of the study.

All the parties involved in the study admitted that there has been a protracted water crisis in the North Teshie community. The major causes of water crisis reported by the residents in the study area include fast expansion of the township, which the few old

existing pipelines cannot support; frequent broken down pipe lines of the GWCL; continuous unplanned developments of the various springing communities and illegal connections. The officials of the GWCL confirmed all these and added other causes as lack of financial support from the company to improve and expand their work as well as electricity outage problems.

It is believed that the rate of growth of population and urbanisation in the area far outstrip government planning and funding available to the GWCL to carry out its expansion work and might be the key sources of the causes of water crisis.

5.1.3 Socio Economic Impacts Associated with Water Crisis in North Teshie

The second specific objective was to look for the socio economic impacts associated with water supply shortages in the North Teshie. In this regard, the main impact admitted by all parties linked to the study was the general retardation of progress in all domestic and commercial activities in many ways.

As has already been stated, majority of the households were connected to the water supply system but unfortunately the flow of water was seen to be only 1 to 2 days per week. This situation has compelled many people to either construct concrete tanks, buy large poly-tanks or several smaller container containers (gallons) to store their water for use for the week or even more. Though this is an urban area, men, women and children have to walk up to a radius of about 200 metres (within a range of 30 minutes), whether during the day, night or at dawn to get water for their households. Children particularly were observed to be spending more time in searching for water and usually being either late to or absent from school.

The price of water is extremely important, not only for those providing the water service, but also for all the people depending on the services. Most of the households who are connected to the water supply system had their monthly water bills between 50 000 and 99 000 cedis and were satisfied with it. However almost everybody resorts to the purchase of water from the vendors because of the irregular flow of the taps.

High water prices from water vendors were also seen as severe impact. While most of the households paid 500 cedis for a bucket of water (34cm size, also equivalent to 15 litres or 4 gallons), others who buy from the small truck vendors paid between 50 000 cedis to 99 000 cedis per trip, which lasts for a week or 2 depending on the household size. Since the PURC's official tariff for a bucket of water is 84 cedis, the water vendors were believed to be making too much business profit. The cost of water in the area was therefore considered as very expensive, hence 200 cedis was preferred by almost every household and supported by the officials of the GWCL to be the price per bucket of water from the vendors.

Another phenomenon viewed as a severe impact is drinking of untreated water from open wells or surface waters. This happens when some poor households think the water from the open wells is free and therefore can save the money used to buy expensive water from

the vendors for another thing. The main risk of the use of untreated water might be the incidence of some water related diseases such as cholera in the area.

Further impact is seen in the area of gender. Power at the household level is concentrated in the hands of men in most developing societies and women are the primary collectors of water. With increasing tariffs and the inability of the flow of pipes, there is bound to be increased pressure on women, who are already overburdened with a lot of domestic unpaid activities. They may take long distances and spend a lot more time, energy and money to make sure water is available in the home for the spouse and the children. The methods of carrying water may also lead to physical injury.

Following from the above findings on the socio economic impacts, the first propositions of the study can be tested. During the study, the mainstream of the respondents in North Teshie and the officials of the GWCL have acknowledged the aforementioned as adverse socio economic impacts associated with the shortage of water supply in the area. The first proposition can therefore be rejected, and it will now be clear to assert that the water crisis in North Teshie has resulted in negative socio economic impacts.

5.1.4 Public Participation

The best measure of an enterprise's success is the satisfaction of its customers. In the investigation of the public participation, households interviewed agreed that involving the community would be one of the helpful steps in solving the water problem in the area. Almost 2 out of every 3 households interviewed believed the community leaders were capable of offering some assistance that could result in the panacea of the water crisis in the area.

Public participation improves relationship between people and governments, increases transparency and builds public support for a vision and goals of a project. It provides the public with information so they can understand the process and the values of the project and can participate effectively. It also gives opportunities for the public to share their views because they are the people who are going to be affected by those decisions.

Public participation is one sure way that sustainable water provision can be achieved. The involvement of all stakeholders, focusing on the interactions between the local residents (the public) and authorities in a democratic context, make the people more responsive, committed and willing to pay for the cost of the project because they will then know the full benefit of it. This actually did happen when officials from Government and GWCL used this approach in the later years (2001 to 2005) to have fruitful discussions with members of the residents association in the study area.

It is important to deepen community participation in the provision of water, because their contribution brings a wealth of knowledge about the local environment that can never be provided by an outsider.

5.1.5 Private Sector Participation (PSP)

The issue of water privatization seems to generate heated arguments in Ghana. When the private sector involvement was investigated, Government appeared to be in favour, proportion of civil society and individuals happened to be against, but another proportion still supported it. Proponents of the privatisation widely believed that the private sector will be a strong leverage to bring about effective management and improved efficiency, while also attracting capital to fund investments for improvement and expansion in the water delivery system. The opponents however have a different opinion- that water delivery will then become an economic good, tariffs will be increased and the poor (the majority in Ghana) cannot have access to it.

This North Teshie study has found an interesting result. Half of the total respondents were in favour of the privatisation whilst the other half were against it. Those who were in favour argued that they were paying high tariffs for poor quality of service in return and that private sector is believed to give a better offer at the same cost. In addition, skills and technical know-how from the private partner could serve as complement to improve the efficiency of the service delivery. Some also hinted that discrimination sometimes occurs in the water allocation as some few rich people in certain areas are believed to be constantly supplied with water while the poor areas are left un-served unless there is media attention.

It was generally agreed that there should be no increase in tariffs until there was an improvement in the service quality. Respondents had the opinion that payment of water bills should be followed strictly, in order to get enough revenue for maintenance work and expansion of the supply services.

5.1.6 Efforts by GWCL and Government to Resolve the North Teshie Water Crisis

The last proposition was to test whether or not the GWCL has done anything to resolve the issue of the frequent water shortages in the North Teshie community. This was dealt with by the trend analysis and the volume of water of water supplied to the study area per head per day. Using 1995 as a base year, a trend analysis of the data available has revealed an over all 33 percent increment in the number of households that were connected to the water supply system by the GWCL from 1995 to 2005.

In 1995 the volume of water supplied to the North Teshie community per household per day was about 37 litres (9.7 gallons). After 5 years (2000), the volume doubled to about 74 litres (19.5 gallons) per household per day. In the year 2005 (ten years later), the volume of water provided increased again to and 121.20 litres (32 gallons) per household per day. Though not very significant, they were still profound improvements that the GWCL could be proud of.

Regarding the volume of water supplied to the North Teshie community per person per day, it was found out that about 8.20 litres (2 gallons) per person per day was supplied in 1995; 16.61 litres (4.4 gallons) per person per day was supplied in 2000; and about 27 litres (7 gallons) per person per day was supplied in 2005. On the whole the observation

gave a picture of a stable rise in provision of water to the study area within the 10 year period. Although the figures fall below the UN recommended 50 litres per person per day as the absolute daily minimum amount of water a person needs, the gradual rise in the water provision per person per day is an indication that if the GWCL has effective management coupled with funds and efficiency in delivery, the water crisis of North Teshie can soon become a thing of the past.

Finally the above scrutiny has shown that the GWCL has made some appreciable efforts in resolving the North Teshie water crisis, only that the efforts were not able to match the standard set by the UN. Over all it could however be appropriate reject the second proposition and declare that the GWCL has in reality been doing something to improve the water supply situation in the North Teshie.

5.2 Conclusions

Broadly speaking, one can argue that the continuous rapid haphazard nature of development projects in the study area combined with the lack of support for the GWCL have combined to explain the water crisis and its associated negative impacts in the North Teshie residential communities.

This survey has yielded some useful information, which is expected to help improve water supply delivery in the study area. Consumers' perception on the level of scarcity of water; impacts of the water supply problem; cost of the water, public participation and others will all help the officials to address these urgent issues faced by their valued customers. As the gap between demand and supply is rapidly increasing from day to day, the GWCL will be unable to meet the rapidly increasing water supply needs of the study area unless investments are put in place to augment the water supply system.

The debate of water privatization has been very extensive. Some civil societies and NGOs objected to water privatization in Ghana, saying it would become economic good and be out of reach of the pockets of the poor because access to water will be determined by the market. Government however went ahead to privatize with a key objective that poor people would rather have constant access to water at affordable price.

I do not oppose in principle the private sector participation in the water business because its promotion is caused by lack of funds from government for proper maintenance and expansion; inefficient management and lack of incentives for improving the water supply system. If water should be privatised then it should be supported by the local institutions and the consumers should be consulted and involved in the plans for the reconstruction or else it will be unsuccessful.

It is not known if the Ghana Government is aware of the privatisation experience in some countries. Shiva (2001) noted that in the 1990s the rates in France were increased by 150% but water quality deteriorated. In England, the rates were increased by 450% but a number of customers have been disconnected from the water service. In Philippines very high fees were charged that have not been matched by quality improvement. In

Argentina, the rates were doubled but clean water was not provided. The company was forced to pull out because people refused to pay their bills.

Will the water privatization bring favourable results in water supply system in urban Ghana? Let somebody take up a future research into this. Will the privatization speed up the process for the achievement of the MDGs for water coverage in Ghana within the stipulated time frame? We wait to see.

Finally, many researches have shown that human survival is dependent on water. This necessity of life has been ranked by experts as second only to oxygen. This implies, that independently of the water management form chosen, clean water should be able to reach every person irrespective of their location and social status.

5.3 Recommendations

Evidence from the study shows that service providers have much to accomplish, and so more action must continue in order to meet the water demand needs of the consuming population. The following suggestions may be useful in achieving more efficient provision of water supply in North Teshie and in the Accra metropolis as well as in the entire country.

1. Private Sector Participation: Now that the private sector is substantially involved in the urban Ghana water provision, a different set of rules should be developed for operating the water supply system. An independent body should be set up to monitor the activities of the private partners to make sure they are committed to the affordability, sustainability, and improve performance of the water service provision as outlined in their objectives.
2. Civil Society involvement: Civil society involving representation from NGOs, academics, professionals, media, urban poor, schools and both those served and unserved with piped water should be involved in the water issues in Ghana. The groups should be able to provide suggestions as to project priorities and plans of the private partners. Management of water supply should be seen as a multi-faceted enterprise and should involve a number of stakeholders to promote constant inter-action between private sector, donors, the government and NGOs to review progress.
3. Water for the poor: The urban poor are contributing significantly to economy of the nation. Determined efforts must therefore be made to provide them with water at the affordable price as promised by the private sector participants. Increasing the supply of water to the poor is essential if there is to be an improvement in the standard of living of Ghanaians. Even as there is the need to recover cost or profit in water provision, policies and strategies should be developed to ensure adequate protection for vulnerable people for such a basic commodity like clean water. Legislation should be put in place to provide certain basic amount of water to the poor at an affordable rate or that the poor areas get a certain amount of water for free.

4. **Tariff Regulation:** The government should make sure that PURC increases water tariffs up to a reasonable level, where enough funds can be generated for cost recovery but not too much beyond the pockets of the ordinary citizens.
5. **Improvement of monitoring and collection of Bills:** All stakeholders must support effective monitoring and the collection of correct bills from customers. Maintenance and expansion can take place if effective monitoring team is formed to help minimise illegal connections and collection of all bills.
6. **Water Vendors:** A task force should be put in place to educate the local water vendors against selling their water at exploitative prices to their neighbours. Indisputably, this domestic reselling of water helps the communities in times of water crisis. But a new strict resale price range should be arrived at by the Government, the private partner and the PURC so that any vendor whose resale rate is above that price should be taken to task.
7. **Adopting Zonal Approach for Overall Service Improvement:** Zonal approach can be successfully adopted for overall improvement of water supply in the urban areas. In zonal approach a relatively small area is hydraulically designated to form a “Water District” where adequate water supply of acceptable quality can be ensured for 100% of the population for 24 hours.
8. **Local Initiatives:** At the community level, there should be targeted ways of involve the local people in water supply provision. Community or user groups should be formed in connection with the supply of water. The local community should be involved in planning and be partially responsible for management, operation and maintenance of the facilities. It is also often necessary to make agreements between them and the service provider to improve service provision and sustainability.
9. **Involvement of Women:** Women as the primary collectors of water should be given special roles in the management of water facilities in their localities. Community participation through the bottom-up approach should be encouraged and existing women’s groups like religious, trade and professional associations should be involved to enable them to discuss how to use water with care.
10. **Support from Donors:** Finally, donor nations and institutions should continue to support the developing countries like Ghana, with funds, expertise, and other logistics to help meet the water supply needs of the populace. The donor community must encourage country-led solutions to the problems of the urban water sector, instead of insisting on models developed from theoretical frameworks that may have no relevance to a developing world situation.
11. **Future Researches:** Since the private partner is permitted to work for 5 years, I strongly suggest future researches in to their activities after the five years of service. This will help to know whether their involvement has made water consumers better off or

worse off, and a clear choice can then be made by the people for improved living conditions.

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APPENDICES**Appendix 1:**

Master programme in Environmental Engineering & Sustainable Infrastructure (EESI). Royal Institute of Technology (KTH), Stockholm, Sweden.

Master Thesis Topic: Assessing the challenges of water supply in urban Ghana: The case of North Teshie.

All information provided will be treated as strictly confidential and for academic purpose only.

Household Questionnaire (Questionnaire for Water Consumers).

Respondent Number:

Section A:

Q1. Sex: (1) Male (2) Female

Q2. Age : (1) 15 – 19 (2) 20 – 29 (3) 30 – 39 (4) 40– 49 (5) 50 – 59 (6) 60+

Q3. Marital Status: (1) Married (2) Single (3) Divorced/Separated (4) widowed

Q4. What is your household size? (How many are you in your household?):

(1)1 (2) 2 (3) 3 (4) 4 (5) 5 (6) 6 (7) 7 (8) 8 (9) 9 +

Q5. What is your highest level of education?: (1) No education (2) Primary

(3) J.S.S / Middle (4) Sec/S.S.S/Tech/Vocational (5) Post Secondary (Tr. Trg/Nursing/Agric) (6) Tertiary (Poly/Univ)

Q6. What do you do for a living? (Occupation).....

Q7. Which part of North Teshie do you stay? (Your area of residence in North Teshie):

Section B:

Q8. Do you have pipe connected to your home? (1) Yes (2) No

Q9. If yes, how many days does your tap flow in a week? (1) 1-2 (2) 3-4 (3) 5-7

Q10. If not, how far (in metres or kilometres) does it take you to walk to where you draw / fetch water? (1) < 50 m (2) 50 - 100 m (3) 100 -200 m (4) over 200m

Q11. On the average how many buckets (34 cm size/ 4 gallons) of water do you need for your household per day? (1)1 (2) 2 (3) 3 (4) 4 (5) 5 (6) 6 (7) 7 (8) 8 (9) 9 +

Q12. Is the water you fetch sufficient to meet your household requirements?

(1) Yes (2) No

Q13. If you have pipe connected to your home, how much do you pay (on the average) as water bill per month? ¢.....

Q14. If you buy water outside your house, how much do you pay (on the average) for one bucket (34cm size/4 gallons) of water? (1) ₵200 (2) ₵300 (3) ₵400 (4) ₵ 500

(5) ₵ 600 (6) ₵ 700 (7) ₵800 (8) ₵900 (9) other

Q15. How much do you think an average urban dweller in Accra should pay for one bucket (34cm size/4 gallons) of water? (1)₵100 (2) ₵200 (3) ₵300 (4) ₵400

(5) ₵ 500 (6) ₵ 600 (7) ₵700 (8) ₵800 (9) other

Q16. If you buy water from water vendors on smaller trucks (400-500 gallons), how much do you pay per trip? ₵.....

Q17. Do you think water price per trip is expensive or affordable to you? (1) expensive (2) affordable (3) Don't Know

Q18. Do you think there are problems with water supply and delivery in your area?

(1) Yes, problems (2) No, no problems (3) Don't Know

Q19. What will you say about the following issues of water supply in your area?

Tick (✓) as appropriate in the columns under: *Severe problem*, *Minor problem*, *Not a problem* and *Don't know*, in the table below.

Water Issue	<i>Severe problem</i>	<i>Minor problem</i>	<i>Not a problem</i>	<i>Don't Know</i>
(1) Slowing down of domestic & commercial activities				
(2) High water prices from water vendors				
(3) Too much time is wasted in search of water				
(4) Long queues in fetching water, resulting in quarrels				
(5) Children usually are either late to or absent from school				
(6) Children risk their lives crossing roads in search of water				
(7) Prices of food items increase due to shortage of water				
(8) Risk in drinking of untreated water from open wells or surface waters				
(9) Work load of women in the households becomes very heavy				
(10) Other (specify)				

Q20. What will you say about the quality of the water that you drink? (1) Good (2) Salty (3) Coloured (4) bad odour (5) Has some particles inside (6) other (specify)

Q21. What do you think are the possible causes of the water problems in your area?
Tick (✓) as appropriate in the columns under: *Major cause*, *Minor cause*, *Not a cause* and *Don't know* in the table below.

Causes of water problems	<i>Major cause</i>	<i>Minor cause</i>	<i>Not a cause</i>	<i>Don't Know</i>
(1) Illegal connections				
(2) GWCL lack technical expertise to handle the pumps				
(3) Tanker owners arranged with the GWCL to limit water supply				
(4) Frequent broken down of pipe lines				
(5) Few pipe lines cannot support fast expansion of township				
(6) Land owners do not want new pipe lines to pass their lands				
(7) Unplanned township/community				
(8) Electricity power outage problems				
(9) Other (Specify)				

Q22. Do you know if the GWCL has ever involved chiefs & elders or the residents association in your area in discussing water supply and delivery issues?

(1) Yes (2) No (3) Don't Know

Q23. If yes, how many meetings have been held since the last 2 years? (1)1 (2) 2 (3) 3

(4) 4 (5) 5 (6) 6 (7) 7 (8) 8 (9) 9 +

Q24. Do you think involving the Chiefs & Elders or the residents association by the GWCL will be helpful in solving some of your water supply problems?

(1) Yes (2) No (3) Don't Know

Q25. Do you think water bills should be increased in order to improve water supply and delivery services? (1) Yes (2) No (3) Don't Know

Q26. Do you accept that water supply and delivery should be handled by a private (Rand company) company? (1) Yes (2) No (3) Don't Know

Q27. What do you think can be done to improve water supply and delivery services in Your area ?

Q28. Which type of toilet do you use in your house? (1) Water closet
(2) Pit latrine (3) bucket (4) No toilet facility

THANK YOU FOR YOUR ASSISTANCE AND VALUABLE TIME.

Appendix 2:

Master programme in Environmental Engineering & Sustainable Infrastructure (EESI). Royal Institute of Technology (KTH), Stockholm, Sweden.

Master Thesis Topic: Assessing the challenges of water supply in urban Ghana: The case of North Teshie.

All information provided will be treated as strictly confidential and for academic purpose only.

Questionnaire for Water suppliers (GWCL)

Name of Responding Officers (1).....

(2).....

(3).....

Positions in company (1).....

(2).....

(3).....

Section A:

Q1. What is the current official tariff/price per bucket (four gallons) of water supply services in the urban of Accra? ¢.....

Q2. Is the current tariff/price sufficient to recover costs such as operation , maintenance energy and replacement costs? (1) Yes (2) No

Q3. Does the level of tariff / price discourage or encourage the GWCL in its efforts to improve services to the urban poor?

(1) Discourages (2) Encourages (3) Don't Know

Q4. How much do you think an average urban dweller in Accra should pay for one Bucket ? (34cm size/4 gallons) of water? (1)¢100 (2) ¢200 (3) ¢300 (4) ¢400 (5) ¢ 500 (6) ¢ 600 (7) ¢700 (8) ¢800 (9) other

Section B:

Q5. Can you say that there are problems with water supply and delivery services to the North Teshie suburb area? (1) Yes, there are problems (2) No, no problems

Q6. What will you say about the following issues of water supply and delivery in the North Teshie suburb area? Tick (√) as appropriate in the columns under: *Severe problem*, *Minor problem*, *Not a problem* and *Don't know* in the table below.

Water Issue	<i>Severe problem</i>	<i>Minor problem</i>	<i>Not a problem</i>	<i>Don't Know</i>
(1) Slowing down of domestic & commercial activities				
(2) High water prices from water vendors				
(3) Too much time is wasted in search of water				
(4) Long queues in fetching water, resulting in quarrels				
(5) Children usually are either late to or absent from school				
(6) Children risk their lives crossing roads in search of water				
(7) Prices of food items increase due to shortage of water				
(8) Risk in drinking of untreated water from open wells or				
(9) Other (specify)				

Q7. What do you think are the possible causes of the water problems in the North Teshie suburb area? Tick (✓) as appropriate in the columns under: *Major cause*, *Minor cause*, *Not a cause* and *Don't know* in the table below.

Causes of water problems	<i>Major cause</i>	<i>Minor cause</i>	<i>Not a cause</i>	<i>Don't Know</i>
(1) Illegal connections				
(2) GWCL lack technical expertise to handle the pumps				
(3) GWCL lack financial support for maintenance works				
(4) Springing up of industries that use a lot of water				
(5) Few pipe lines cannot support fast expansion of township				
(6) Land owners do not want new pipe lines to pass their lands				
(7) Unplanned community, People built on pipe lines				
(8) Electricity power outage problems				
(9) Frequent broken down of pipe lines				
(10) Other (Specify)				

Section C:

Q8. Has GWCL ever involved chiefs & elders/ residents/ residents association in North Teshie area in discussing water supply and delivery issues? (1) Yes (2) No (3) Don't Know

Q9. If yes, how many meetings have been held since the last 2 years? (1)1 (2) 2 (3) 3
(4) 4 (5) 5 (6) 6 (7) 7 (8) 8 (9) 9 +

Q10. Do you think involving the Chiefs & Elders/public/ residents by the GWCL will be helpful in solving some of your water supply problems?

(1) Yes (2) No (3) Don't Know

Q11. Do you think water bills should be increased in order to improve water supply and delivery services? (1) Yes (2) No (3) Don't Know

Section D:

Q12. Are there other alternative service providers involved in the provision of water to the North Teshie area (1) Yes (2) No (State the names if there is/are any)

Q13. Do you need water supply provision from any alternative providers to supplement your efforts? (1) Yes (2) No

Q14. Do you think water supply, operation and maintenance should be handled by a Private (Rand company) company? (1) Yes (2) No (3) Don't Know

Q15. What do you think are the benefits of water privatization, if any?.....

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Section E:

Q16. Which treatment plant supplies water to the North Teshie community? (1) Kpong (2) Weia (3) both (4) other (specify)

Q17. How many gallons of water do you currently pump to the North Teshie community daily?.....

Q18. Given the current population, what do you think is the ideal number of gallons of water to be pumped to the North Teshie community on daily basis?.....

Q19. Could you kindly state the number of consumers in the North Teshie community who have pipes in their homes according to the table below:

Year	Number of Households connected
1985	
1990	
1995	
2000	
2005	

Q. 20. What problems do you face with tariff collection? (Please List them)

.....
.....
.....

Section F:

Q21. Does GWCL receive financial support from the Ghana govt? (1) Yes (2) No

Q22. Does GWCL receive financial support from any other organisation?

(1) Yes (2) No

Q23. State if any.....

.....
.....

Q24. What should the Public Utility Regulatory Commission (PURC) do to help the GWCL to overcome its problems or improve its services?

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.....
.....

Q25. What are the key challenges facing the water supply system in urban Accra?

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Q26. What do you think can be done to overcome water supply problems or to improve water supply services in the urban areas of Accra?

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THANK YOU FOR YOUR ASSISTANCE AND YOUR VALUABLE TIME