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**ASSESSING THE PROGRESS TOWARDS IMPROVED WATER
ACCESSIBILITY IN URBAN ACCRA: A CASE STUDY AT DOME**

BY

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**THIS DISSERTATION IS SUBMITTED TO THE UNIVERSITY OF
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DECLARATION

I Justice Kwesi Dadson hereby declare that this study is the outcome of my own research under the supervision of Dr. Fred Mawunyo Dzanku. With the exception of references made to other people's work, which I have duly acknowledged, I am singularly responsible for all views expressed in this research as well as any shortcomings that may be found in this study.

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Sign

Date.....

Dr. Fred Mawunyo Dzanku (Supervisor)

Sign

Date.....

DEDICATION

I dedicate this work to the Almighty God, for His love towards me. I also dedicate this work to my lovely wife, Lady Sylvia Dadson, my daughters, Justine and Lily Love and my son Wesley.

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My deepest appreciation goes to the Almighty God who gave me the opportunity, the strength and ability to complete this programme successfully.

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ABSTRACT

Several reports around the globe point to the fact that access to water has improved in many parts of the world. However, there are still many people who are not able to access improved water. Many people mostly children around the world die from illnesses associated with inadequate and poor water supply. Ghana has the Ghana Water Company Limited (GWCL) and a National Water Policy in place to provide potable water. However, the people in Dome in Accra still have challenges with access to improved water. The study used data from the fifth and sixth rounds of the Ghana Living Standards Survey to assess the extent of improvement in improved water accessibility and the factors that influence access to improved water, and a qualitative study at Dome assessing the current situation in accessing improved water. Age, gender, education and welfare index were found to be significant and positive. Even though there has been some improvement in potable water availability in Dome, access to improved drinking water reduced by one percent over the period between the two rounds of survey. The decline resulted from increase in the population culminating in high demand of water supply services and challenges with logistics, power supply, illegal connections, debt owed GWCL by default customers and pressure on the machines due to population growth. The qualitative study revealed that even though unimproved and relatively expensive, those who provide water through the tanker services were more reliable than the GWCL. The major problem of the residents is that although they pay heavily for pipe borne water (GWCL) services they do not receive the required quality of services. The GWCL should use each decade's population and housing census to help in planning in order to anticipate and meet the demands of the growing population. The GWCL needs to enforce its laws including prosecution on unauthorized tapping of water from its transmission pipes and non-payment of bills to generate the needed resources to acquire and maintain its machine.

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CHAPTER ONE

INTRODUCTION

1.1 Background

Having access to quality water is still a major concern throughout the developing world, especially in Africa. Sources of drinking water are under increasing threats from contamination, with serious consequences for human health and wellbeing. As the quality of water deteriorates, the global gains made in improving access to drinking water is threatened (UNICEF, 2008). Each year, millions of people around the world, most of them being children, die from diseases that are associated with inadequate water supply, poor sanitation and hygiene (UN, 2016). One out of the seventeen Sustainable Development Goals (SDGs) outlined by the United Nations member states is “Ensuring access to water and sanitation for all.” This shows that water is a major concern for people all over the world.

“Adequate access to safe drinking water and hygienic toilets are basic needs required to promote good public health. Polluted water and poor sanitation increase the risk of acquiring various diseases including cholera, typhoid, schistosomiasis and some cancers through exposure to carcinogens” (Tuyet-Hanh et al., 2016, p.2). This means that although the absence of water can cause death among humans, access to polluted and contaminated water can also cause death among humans. So it is important that people have access to not just any water source but an improved water source.

UNICEF and World Health Organization (WHO) in 2015, reported that the Global Millennium Development Goals (MDGs) had a target for drinking water. This target was that by 2015, the proportion of the population without sustainable access to safe drinking water would be halved. This was met in 2010, with 91 percent of the global population using improved drinking water. It was also reported that five developing regions met this

specific target on drinking water, but Central Asia, Northern Africa, Oceania and Sub-Saharan Africa did not. Taken together, Least Developed Countries did not meet the target. The report also said that although we can boast of some improvement in access to improved drinking water, 663 million people around the world still lack improved drinking water (UNICEF and World Health Organization, 2015).

According to Tuyet-Hanh et al. (2016), p.2, “currently still more than 700 million people, mostly the poor and the marginalized in developing countries such as Vietnam, lack access to improved sources of drinking water and 173 million still rely on untreated surface water”.

This situation has also been the plight of most Ghanaians across the country, lacking access to potable water, especially the less privileged in our deprived communities in Ghana. The people only have access to water from the comfort of their homes for few months, when the rains set in (June-October) – an intervention by nature. The rest of the months for the year, travelling into the next year usually leave the people hunting for water from all sources, including polluted water sources. From November to May, every year, it is very common to see people parading all corners with water collection materials, with one locally known as “Kuffour gallons” (Samson, 2016).

1.2 Problem Statement

The Millennium Development Goal target for safe drinking water was halving the proportion of the population without sustainable access to safe drinking water between 1990 and 2015. This was achieved in 2010, five years ahead of schedule. However, a progress report by UNICEF and WHO in 2015 indicated that there is still more work to be done in getting safe water to many people in the world. The report indicated that continued efforts are needed to minimize urban-rural disparities and inequities associated with poverty; to increase coverage in countries in Sub-Saharan Africa (SSA) and Oceania; to promote global

monitoring of drinking water quality; to bring sanitation ‘on track’; and to look beyond the MDG target towards universal coverage. It is still clear that a lot has been achieved. The progress report shows that over 2 billion people gained access to improved water sources between 1990 and 2010 (UNICEF and World Health Organization, 2015).

There are so many challenges faced by African countries in achieving expanded access to clean water. Water scarcity and contamination constitute particular challenges coupled with institutional inadequacies and managerial problems. According to Dovi (2007), inadequate financing and commitment by governments is the single most important factor affecting Africa’s quest for improved access to potable water delivery.

The main sources of water for household use are piped supply, rivers, boreholes, wells, ponds, lakes, harvested rainwater and streams. The Global Water Project (GWP) forecast that six West African countries, including Ghana and Burkina Faso, may experience water scarcity by 2025 mainly due to the expected rate of growth in population (Global Water Partnership, 2000). Meanwhile, the Ghana Statistical Service (GSS), 2012, reports that the current annual population growth rate is 2.5%.

Over the past decade, improving access to potable water in Ghana has remained one of the topmost policy discussions by governments, non-governmental organization and development partners investing in Ghana. Concern for improved access to water by Ghanaians in terms of coverage and frequency of flow amidst excess demand over supply has remained a key challenge in the water sector (Forkuor and Otioku, 2015).

Although Ghana has done considerably well in providing safe water for her population, there is a major concern about the rate of population growth and the water resources available for meeting the needs of the growing population. According to a report in Ghana News by Asare-Donkoh on May 13, 2015, there are millions of households in Greater Accra

Region that live without water. He further pointed out that these households are in areas such as Shai Osudoku area, Teshie-Nungua (including Lashibi and Spintex Road), Adenta-Madina-Frafraha area as well as Dome-Kwabenya-East, West and North Legon.

According to the profile of the Ga East Municipal Assembly (GEMA), which consists of Dome-Kwabenya, potable water supply in the urban/peri-urban areas of the municipality has been one of the major challenges to the Assembly, especially when the Assembly has no direct control over urban water supply. It further stated that areas like Dome, Taifa, Agbogba and Ashongman Musuko have limited or no access to pipe-borne water. Other communities depend on water tanker services and a few hand dug wells. In general, the price of water is fairly high in these urban communities. The situation is not getting any better but becoming more serious due to the increasing population through the influx of skilled and unskilled labour from rural areas in the country. Over the past two decades, the population of the Ga East Municipality has increased tremendously with growth rate exceeding the national average. This has affected the quality and quantity of water resources available to the community (Ghana Statistical Services, 2014).

The News Ghana edition on October 8, 2014 commented that Communities in the Dome-Kwabenya constituency have over the years faced the challenge of getting potable water for domestic use. This is because the quantity of pipe-borne water running through the community is not enough to meet the needs of the people. Those not connected to the community water system have to walk long distances to buy the commodity at high prices. A bucket of water in such communities sells for between Gp70 and Gp80. The situation worsens during the dry season where a bucket of water is sold for GHc1.00.

Given these issues, this study focuses on examining the progress towards the accessibility of improved water facilities in Urban Accra using Dome as a case study.

1.3 Research Questions

In order to address the research issues raised, the study poses the following specific research questions:

1. What are the determinants of access to improved water in urban Accra?
2. What are the factors limiting continuous water supply in Dome over the past ten years?
3. What is the role of the Ghana Water Company Limited in improving access to potable water in Dome?

1.4 Objectives

The main objective of this study is to assess the progress that has been made towards accessing improved water in Ghana. The specific objectives are to:

1. Estimate the determinants of access to improved water in urban Accra.
2. Identify factors limiting continuous water supply in Dome over the past 10 years.
3. Assess the role of the Ghana Water Company Limited in improving access to potable water in Dome.

1.5 Significance of the Study

Amidst the progress that has been made in achieving improved access to water in Ghana, the Ga East Municipal Assembly contends that access to potable water supply in the municipality is a major challenge. This has motivated the study to find out what is actually happening. The Ministry of Water Resources, Works and Housing established a water sector development plan from 2012 to 2025. The aim of the strategy is to provide a framework for achieving the vision of sustainable water and basic sanitation for all by 2025. It is important to ask what the progress has been with respect to access to water in Ga East Municipality,

particularly. The findings of this study would be made available to the Municipal Assembly as well as Ghana Water Company Limited for their study and possible action.

1.6 Organization of Study

The study is organized into five chapters. Chapter one is the introduction which contains the problem and objectives of the study. Chapter two captures the review of relevant and available literature and conceptual framework on the topic under study. Chapter three captures in detail the research methodology. Chapter four looks at the empirical analysis and results. Chapter five summarizes the major findings, draws conclusions and gives recommendation.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter reviews scholarly literature on the importance of water, water sources and its supply in Ghana. It also looks at progress made towards improved access to potable water in Ghana. Nonetheless it draws lessons from the global perspectives on access to improved water sources and compares with Ghana over the past decade. It also looks at institutional roles in providing improved access to potable water in Ghana as well as the socioeconomic factors of households that influence access to improved water.

2.2 Importance of Water

Water, an abundant natural resource, is very important for the sustenance of every human life. Water occupies a central position in the basic needs of humans to the extent that it is next to oxygen in order of importance (Ogunnowo, 2004). Curry (2010), says that “because water is a contributing element to nearly every bodily function, the human body cannot survive for more than a few days without it and that from waste disposal to the healthy functioning of the immune system, the body demands safe freshwater for survival.” p.2. Ogunnowo (2004), says that water means life and prosperity, and it is a key determinant of sustainable development that should be carefully managed to make for suitable and sustainable human health and well-being. Since water means life, any shortage of it may cause death. In the same way if it is not in its required quality it can also be harmful to humans.

According to Sam-Okyere (2010), “the use and importance of water is felt most when our taps stop flowing and our rivers also run dry, we then realize that water is life and that is why sometimes, people struggle to their last breath to get even the worst water from canals

and ponds.” In this case people do not really care the safety of the water, all they want is to survive.

The 1977 Mar Del Plata Action Plan adopted by the UN General Assembly enshrines access to water as an essential human right. This human right relating to water includes having access to drinking water in adequate quality and quantities. The rights of access of everyone to drinking water supply and adequate sanitation services are now enshrined as fundamental human rights. Exclusion of anyone from access to these services due to poverty or place of habitation is a violation of their human rights (Gronwell, 2008, cited in Mahama, 2013).

2.3 Sources of Water in Ghana

Africa is considered globally as a continent endowed with abundant water. Ghana being one of the Sub-Saharan African countries, is well endowed with water resources. Sam-Okyere (2010), in a feature article explains that there are freshwater resources which have been classified into groundwater and surface water in Ghana. He further wrote in the article that “the surface water/river basins have been divided into three systems which were the Volta Basin System, which is made up of the Daka, Oti, Black and White Volta and Lower Volta River, the Southwestern Basin System encompassing the Bia, Tano, Ankobra and Pra rivers, and the Coastal basin system which consist of Tordzie, Densu, Ayensu, Ochi-Nakwa and Ochi-Amisah rivers”. He pointed out that all these water bodies carry a lot of water into the sea annually. Sam-Okyere (2010) said that Lake Bosomtwe situated near Kumasi, formed by meteoritic crater is also a surface water resource.

“Groundwater is found almost everywhere in Ghana, except some part of the Voltain where economic quantities of groundwater is scarce. Groundwater in Ghana is less susceptible to pollution. Groundwater has been a major source of water supply to rural communities, without the reach of treated water supply systems. Groundwater resource is cheap to

subscribe despite the fact that an initial capital investment is required. It can be tapped by both households and individuals at a relatively economic cost” (Sam-Okyere, 2010).

2.4 Water Supply in Ghana

2.4.1. Urban Water Supply

“Ghana Water Company Limited (GWCL) is the Public Utility Company responsible for the supply of potable water for domestic, public, commercial, institutional and industrial use in the urban areas in Ghana, under the supervision of the Ministry of Water Resources, Works and Housing. Presently the Company operates 86 urban water supply systems throughout the country. Average production in urban areas is about 709,090.91m³ per day but present potable water demand is estimated at about 1,131,818.18m³ daily. Urban water supply coverage is therefore about 63 percent. Customer strength stands at 529,709” (GWCL, 2015, p7).

2.4.2 Rural Water Supply

Gyau-Boakye (2001), said that “the surface water sources used by rural communities in Ghana included dug-wells, ponds, dugouts, impoundments from dams, ephemeral streams and rainwater harvesting from roofs whilst the groundwater supplies are obtained from hand-dug wells with or without hand pumps, boreholes fitted with hand pumps, and springs.” However, Gyau-Boakye and Dapaah-Siakwan (1999) also noted that in order to provide improved or potable and safe drinking water for all rural communities in Ghana, the various stakeholders have adopted water supply schemes which are exploited mainly from groundwater sources especially through hand-dug wells and boreholes fitted with pumps.

The Government of Ghana established the Community Water and Sanitation Agency (CWSA) in December 1998, to facilitate the provision of safe water and related sanitation services to rural communities and small towns (CWSA, 1998).

2.5 Access to Improved Water

Following the international drinking water supply and sanitation decade (1981-1990), the international community became aware of the increasing water scarcity and new ways of improving the supply of potable water were conceived. National Governments and donors increasingly recognize the value of equal access to potable water initiatives in ensuring progress towards the then Millennium Development Goals (Belser, 2009).

Nonetheless, global access to potable water is still scarce in many developing countries due to limited resources and population pressure (WHO/UNICEF, 2005). It is estimated that about 1.2 billion people have no access to potable water and five hundred million people are approaching this challenge whereas another 1.7 billion people face economic water shortage (UNDP/FAO, 2007). The implication of this is that it renders most people vulnerable to several socio-economic problems such as easy transmission of water borne diseases, reduction in women's productivity, and children's education, since they spend long hours searching for water which may even be of low quality due to contamination (Gonenc, 2006). Results from the recent Global Water Supply and Sanitation Assessment indicate that, there are 2.2 billion cases of deaths occurring among children under five years of age due to inadequacies in safe drinking water supply (UNICEF/WHO, 2015). The absence of deliberate efforts to improve access to potable water poses serious consequences for household food security, health, and human capital development.

“A household is considered to have access to improved water source if it gets drinking water primarily from a pipe borne water supply system, a public standpipe, borehole and dug well

with pump, a protected spring, a well-developed rain water harvesting system, a reliable water vendor or water tank truck. Sources such as direct from surface waters –i.e. rivers, lakes, ponds, etc. and unprotected wells and springs are regarded as unimproved water sources”. (UNICEF and WHO, 2008)

The dimensions of water poverty are much severe in Sub-Saharan Africa. It is estimated that close to three hundred million people in Africa do not have access to potable and safe drinking water with more than one-third of them living in urban and peri-urban areas. It is anticipated that the region will only reach the SDG sixth target in 2040 (UNICEF and WHO, 2015).

UN-Habitat (2009) suggests that in order to achieve the minimum level of safe and affordable drinking water, some factors need to be considered. These factors include;

1. There must be 20 litres of water a day for each person in each household.
2. Comparing with the income of the household, the cost of the drinking water must not be more than 10 percent of the total household’s income.
3. People must easily access the water. In other words, it must be available without extreme effort which is taken to mean less than one hour per day for collection of water.

2.6 Improved Access to Water in Ghana: Past and Present

Past experience in the water sector has revealed constant struggle for water coupled with high charges by water vendors, mainly tanker service providers in water scarce urban communities (Doe, 2007). The World Bank (2015) development indicator on improved access to water shows that only 77 percent of the Ghanaian population had access to improved water sources while the remaining 23 percent were at greater risk of contracting water related diseases and its attendant ill-health implications. Similar observations were

made by the Ghana Statistical Service in its fifth round Ghana Living Standard Survey Report in 2008. The Ghana Statistical Service (GSS) reports that, between 2005 and 2012 Ghana witnessed about 22 percent increase in access to improved water sources in urban and peri-urban areas. The rural areas, however, recorded a bigger margin of improvement in access to improved water sources from 14 percent in 2005 to 75 percent in 2012 (GSS 2008; 2014). According to the Ghana Water Company Limited (GWCL, 2016), more of these increments resulted from external donor support towards achieving the just ended MDGs while the Government of Ghana has consistently showed little commitment by way of resource allocation to the water sector. Reports by the company further indicate that only about 85 percent of the urban population are currently covered by its operations while 15 percent rely on other sources. Even with the 85 percent who are covered by the company, only 11 percent receive constant flow of potable water due to technical challenges and population increase. This raises water security concerns. This also poses challenges for sanitation management and increases the chance of the spread of communicable and environmentally-induced diseases such as cholera.

According to the GSS (2008), in 2005, households spent an average of 45 minutes in search for water for domestic use. This has implication for household productivity since children and women spend longer time searching and queuing for water at a cost that is higher than the per litre charge by the Ghana Water Company Limited (Doe, 2007). Addo (2003) found that urban residents spent as high as GHc1.00 per four gallons of water obtained from private vendors. This amount was higher than the amount (GHc 0.64) charged by the Ghana Water Company Limited.

2.7 Perspectives on Improved Sources of Water

The United Nations Environment Programme (UNEP) considers improved sources of potable water to include water gained from treated and untreated but safe water sources. The treated water source is mainly from pipe supply produced, treated and distributed by state institutions responsible for the management and supply of potable water. The latter category includes water gained from untreated but safe or uncontaminated sources such as protected wells and boreholes, springs and water harnessed from rainfall (UNEP, 2002). Thus, water obtained from unprotected wells and boreholes are considered unsafe for consumption. In a study of safe water treatment and storage in the home by Mintz et al., (2001), it was found that poor storage of improved water implicates its quality, especially if not properly kept from possible contaminants. Even pipe-borne water could be rendered unsafe for consumption if the pipeline breaks and allow surface water to enter it.

In Ghana, seven main sources of drinking water have been documented by the Ghana Statistical Service for both rural and urban households. These include inside pipe supply, water vendors, neighbor/private supply, wells, boreholes, public standpipe and natural sources. Of these, water from private vendors constitute the major source of drinking water as it is used by 28.8 percent of the population. Boreholes, wells and natural sources constitute 42.4 percent. Nonetheless, there are questions as to whether these sources are protected well enough to be considered as improved water sources.

Some have also argued that because supply from the Ghana Water Company has increasingly become unreliable, they prefer other sources (wells, boreholes and natural sources) than inside pipe connections (Rakodi, 2002). In view of these underpinning conceptualizations and realities, much needs to be done in understanding perhaps the relationship between different cultures and preference for sources of water in Ghana and how institutions are responding to the different interconnectivities between standards of

living and demand for improved water. Attending to some of these concerns is why part of this study seeks to find out the role of institutions in improving access to potable water.

2.8 Institutional Response to Improved Sources of Water in Ghana

Historically, state institutional attempt to provide equitable access to improved water dates back to the era after World War I. According to the Ghana Water Company Limited (2016), the Hydraulic Division of the Public Works Department was mandated to produce, distribute and manage the supply of water in the 1920s. The water management sector has since then undergone several institutional reforms.

In 1965, the Ghana Water and Sewerage Corporation was established under an Act of Parliament (Act 310) as a legal public utility entity following recommendations by the World Health Organization in response to the nationwide water crisis. The 1970s and 80s saw a major decline in the production and distribution of water in Ghana. Donor support was therefore sought from variety of sources including the World Bank, Canadian International Development Agency (CIDA), African Development Bank and others to improve access to safe water.

In 1986, Government withdrew its subvention on operation and maintenance works for water production and distribution. This was coupled with increase in user fee charges and subsequent removal of subsidies on water tariffs. The removal of subsidies on water and the increase in user fee led to wide public outcry. These concerns led to the establishment of the Public Utility and Regulations Commission in 1997. The Commission's task was to see to the setting of appropriate and reasonable tariffs by public utility companies and protect the interest of both consumers and public utility providers. A year after, the Community Water and Sanitation Agency was also established to extend the production and distribution of potable water to rural settlements in Ghana.

In 2006, private sector participation in the urban water delivery in Ghana took effect following a five-year signed management contract between Vitens Rand Water Services BV of Netherlands and the Government of Ghana. The contract was to allow Aqua Vitens Rand Limited to manage urban water supply after periods of production and distribution losses by the Ghana Water Company Limited. A review report of the performance of the Aqua Vitens Rand Limited in 2011 showed that the problems in water sector persisted leading to the termination of the contract at the end of the five-year period (GWCL, 2016).

Currently, for a population of over 27 million people, the Ghana Water Company Limited produces 192 million gallons per day while demand is estimated at about 249 million gallons per day. In view of the need to extend water coverage, NGOs including Water Aid, World Vision, Compassion Ghana, UNICEF, USAID, CIDA as well as philanthropist continue to complement Government's effort to expand access to potable water in Ghana.

In 2007, the National Water Policy for Ghana was launched by the Ministry of Water Resources, Works and Housing. The policy was aimed at improving efficiency in water delivery. The policy document was supposed to guide the Water Resources Commission on ways to properly manage water resources in the country. It was also an important step in resolving the precarious water delivery situation in the country. However, it is important to ask how the report has fared in terms of implementation.

2.8.1 Theoretical Underpinnings of Institutional Role for Provision of Water

Theoretically, state institutions responsible for the provision of water operate under the assumption of demand and supply but are expected to be proactive in meeting population targets. Pipe-borne water supply in Ghana, just like other countries, is controlled mainly by the state whose responsibility has been to produce and supply potable water to its citizens

at an affordable price. The inability of such institutions to respond to public demand means ineffectiveness on their part (Rakodi, 2002).

Drawing from the institutional effectiveness of public water supply systems, Addo (2010) argues that the interplay of cultural-cognitive, normative and regulative behaviors of stakeholder institutions in the management of the water sector is based on levels of integrations and participation of such institutions including consumers. Public involvement in the decision-making process by public water institutions has been identified as crucial to meeting demand for water. Bartley (2004) made similar assertion in referring to public institutions responsible for water service delivery as principal agents whose actions and inactions affect the public access to improved water.

Rakodi (2000) argues that the challenge of underperformance of public institutions responsible for supply of potable water is shrouded by the belief that access to water is all about getting the pipe laid to individual household units and communities. Practical experiences in Ghana with reference to parts of the Greater Accra Region including Adenta, Madina, Dome, Taifa, Agbogba and Teshie reveals that laid pipelines in communities and households does not mean flow of water (Rakodi, 2000; Doe, 2007). When the pipes are laid, there is also the need to make sure that water flows through the pipes to individual homes and communities. The struggle for improved access to water continues as the population increases with increasing demand. This raises concerns about the role of the state institutions in providing access to potable water.

2.9 Correlates of Access to Improved Water

The correlates of access to improved water based on previous empirical studies include: occupation and income of household head, distance, location and dwelling type, educational

level of household head, gender and age of household head, household size, marital status of household head, and willingness to pay for quality water.

2.9.1 Occupation and Income

According to Smith and Hanson (2003), household income is one of the main determinants of access to improved water. They further explained that households with lower incomes have limited opportunities to improve their water conditions and that wealth or income and education are expected to have a positive effect on household access to improved water.

Income levels of households are among the factors that determine their access to water and sanitation facilities and services. This is because, those who earn very low incomes are hardly able to afford high connection fees that will bring potable or piped-water into their homes, therefore limiting their access to potable water. While the higher income groups can afford to buy more and are able to afford private alternatives in times of shortages these may be too expensive for the urban poor as they barely are able to meet their basic needs (Mahama, 2013).

Koskei et al. (2013), also indicated that occupation influences the household's income and hence the amount of funds available to spend on water. People may be "water poor" not because there is no safe water in their area, but because they are "income poor."

2.9.2 Distance, Location and Dwelling Type

Howard and Batram (2003), revealed that distance is a very important factor in determining access to potable water. The further away the source of water is to a household, the lesser the amount of water consumed. Bosch et al. (2001) cited in Mahama (2013) explained that though the urban areas generally tend to have better access to water and sanitation facilities and services, urban households in slums or informal areas are more likely to have limited

connectivity. This is because expansion of piped water to poor households especially those in the slums are difficult due to the haphazard nature of their settlements. More often than not, the water and sanitation needs of poor urban communities are hardly incorporated into urban and regional planning. Location is important for access to improved water. Since the urban areas are more developed than the rural areas, it is expected that urban households have better access to improved water than rural households.

Howard and Bartram (2003) also indicated that “average amount of water a household consumes depends on the location of the water source. Those who have water piped into their homes consume average quantities of about 155 litres per person per day. However, those whose water is supplied through a yard decrease consumption to about 50 litres per person per day while those whose water source is outside the home further reduce their daily average consumption level.” This means that the closer the water is to the household, the more water the household consumes.

For the dwelling type, Irianti et al. (2016) indicated that having adequate sanitation facility corresponds to higher likelihood of having access to safe drinking water source. One clear example is that those living in well-structured gated communities or estates have potable water running through the pipes in their homes. Those living in slums may not have access to potable water in their homes. Since the type of dwelling also depends on the wealth of the household, an improved dwelling type is expected to have higher chance of access to improved water than an unimproved dwelling type.

2.9.3 Educational Level

In a study in Kenya by Koskei et al. (2013), it was revealed that the educational level of the household head has significant influence on the type of water source used by household. They further commented that “only 10% of the respondents with tertiary education used

non-improved sources. Most of the households (60%) whose heads had acquired only primary education used unimproved water sources because low educational attainment leads to low incomes and economic status of households is closely linked with the affordability of services such as water.” P 716.

2.9.4 Gender and Age

Koskei et al. (2013), in a study in Bomet Municipality in Kenya found that there is no significant association between gender of household head and access to improved water for domestic use. The same was said for age of household heads. This means that the type of water source used by households was neither influenced by the gender nor age of household heads. However, Adams et al. (2015), in a study in Ghana revealed that households headed by females have a greater chance of having access to improved drinking water compared to male headed households.

2.9.5 Household Size

Irianti et al. (2016), cited in Fotuè and Sikod (2012), found that household size is positively associated with access to improved drinking water source. Adams et al. (2015), also said that larger households tended to have better access to improved water sources compared to smaller households. One could say that since there are more people living in a household with larger size, there is the probability that more people would help to get improved water for everyone in the household.

2.9.6 Marital Status

According to Irianti et al. (2016), marital status of a household head has great influence on the probability that, the household would have access to improved drinking water source.

Several reasons could be associated with this. One reason is that married couples have a sense of responsibilities for their families.

2.9.7 Willingness to Pay for Quality Water

Duflo et al. (2012), wrote that improving delivery of water, sanitation and health services will require examining the issues that prevent the adoption of new products, technologies, and solutions, and that estimating the fundamental factors that affect demand for these services can inform pricing policy, shed light on the role of credit, information gaps, and other determinants of technology adoption. This simply means that to access quality water, we need to pay for it. Dovi (2007) confirmed this in an article that explained that inability to pay for water will mean fetching unimproved water from rivers and lakes. Therefore, willingness to pay for water will give you access to improved water.

2.10 Conceptual Framework

The conceptual framework for this study is related to the information obtained from the literature reviewed. Some socio-economic indicators influence access to improved water sources and this also affects the living standards of households. Socio-economic characteristics such as educational level of household heads, location, distance, occupation and income of household heads, influence households' access to improved water through use of improved water sources. The access to improved water leads to improve health or reduce the incidence of waterborne diseases. This consequently brings about improved living standards through reduction in poverty and disease burden. The study also looked at the role played by some institutions such as GWCL and CWSA. These institutions provide treated water which is of good quality to households. Thus, contributing to improved living standards.

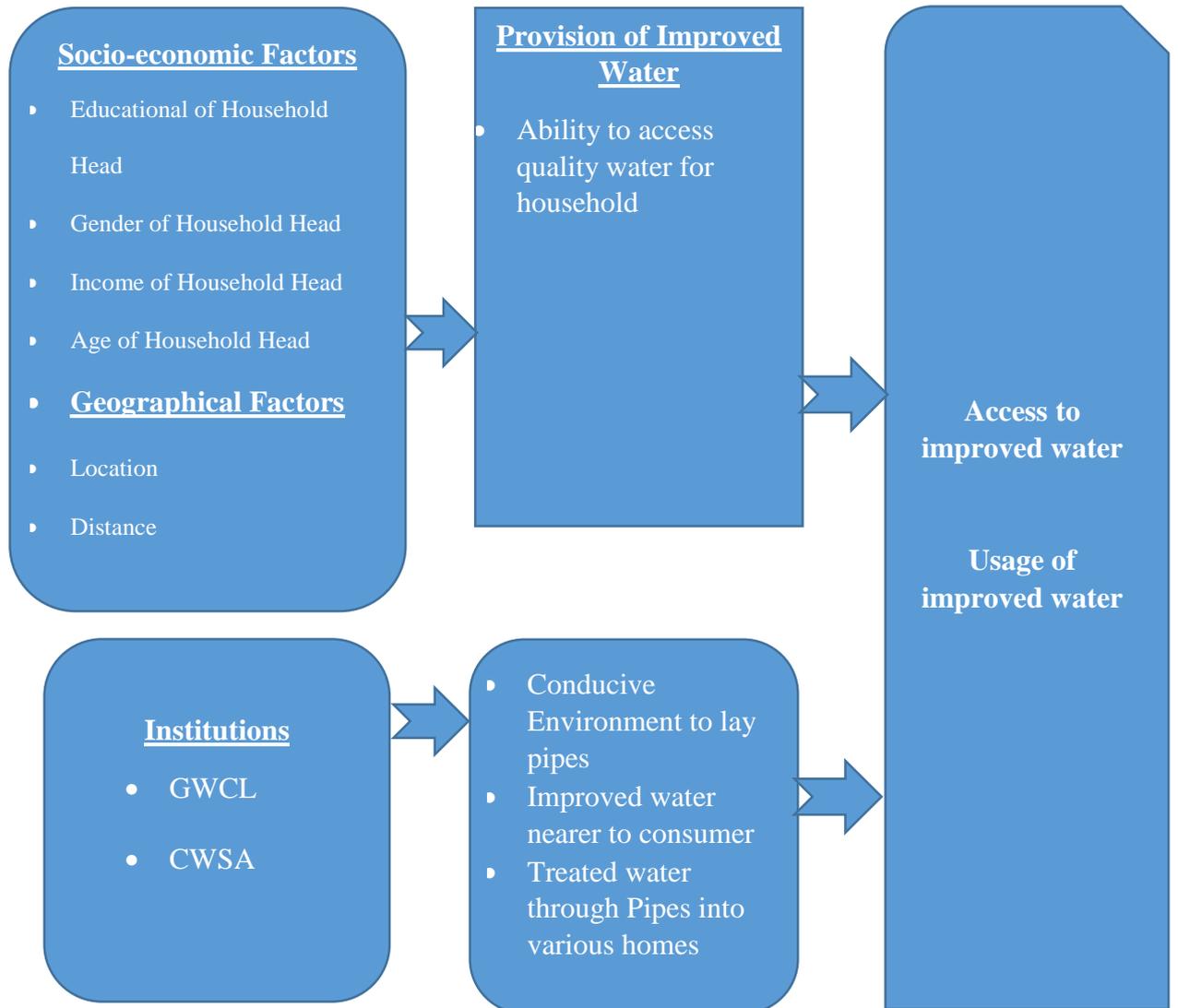


Figure 2.1: Conceptual Framework of Access to Improved Water

Source: Developed by Author in August, 2017

Dome was chosen for this study because according to the 2010 Population and Housing Census for Ga East Municipality, Dome is the most populated settlement in the Municipality. Ghana news 2014, also commented that Communities in the Dome-Kwabinya constituency have over the years faced the challenge of getting potable water for domestic use as the quantity of pipe-borne water running through the area falls short of the needs of the people. The profile of the Ga East Municipal Assembly also commented that potable water supply in the urban/peri-urban areas of the municipality such as Dome has been a major challenge to the Assembly, especially when the Assembly has no direct control over urban water supply.

According to the Ga East District Analytical Report from the 2010 Population and Housing Census, the housing stock of Ga East Municipality is 23,424 representing 4.9 percent of the total number of houses in the Greater Accra Region. Dome has the largest market centre in the Ga East Municipality. It is a fast growing market which provides services to traders in and around the area. The strategic location of the market coupled with good accessibility has facilitated growth leading to congestion and the spilling off onto the nearby roads. The service sector appears to be one of the fastest developing sectors of the local economy. Banking services are provided by the Ghana Commercial Bank, Ecobank Limited, Rural banks and many others. (Ga East Municipal Assembly, 2014)

The main sources of drinking water for households in the municipality is sachet water, followed by pipe-borne water. Households that use bottled water constitute 1.6 percent while those who use protected wells form 1.4 percent. For other domestic purposes, the main source of water in the municipality by households is bore-hole/pump tube well, followed by pipe borne water (Ghana Statistical Service, 2014).

3.3 Research Design and Data Sources

Within the scope of this study, the research employed both quantitative and qualitative methods in its approach. Qualitative data was collected via focused group discussions, key informant interviews and observations. An interview guide was used to aid these interviews. For the quantitative data, the study relied on secondary sources provided by the Ghana Statistical Service (GSS). These are the fifth and sixth rounds of the Ghana Living standards Survey (GLSS) which were conducted in 2005/2006 and 2012/2013 respectively.

3.4 Sampling

3.4.1 Sampling Procedure and Sample Size for the Quantitative Study

The GLSS 5 and 6 are nationally representative household surveys designed to cater for a variety of analyses at various domains of interest. The major focus of the GLSS 5 and 6 surveys are to provide estimates with acceptable precision for a variety of indicators on various aspects of living conditions, including income status, educational level of household head, gender of household head, age of household head, location and distance of house. This data set contains all the variables of interest to this study.

The major domains of interest are:

- Ghana as a whole
- Each of the ten Administrative regions, with a minimum sample size of 400 households
- Urban and Rural localities of Residence (each as a separate domain)
- Each of the three ecological zones, as well as Accra (GAMA)

The GLSS was conducted in all the 10 regions in Ghana. However, for our study, we will be concentrating on the survey conducted in Greater Accra Region, specifically Urban

Accra, which includes major towns in these municipalities. Accra, Adentan, Ga East, Ga Central, Ga South, La Dadekotopon, La Nkwantanang, Ledzokuku-Krowor , all from the Greter Accra Region. From the GLSS 5 report, the total population for Urban Accra was 2,905,726. The number of selected households for the study was 1,260 with 73 Enumeration Areas. From the GLSS 6 report, the total population for Urban Accra was 4,010,054. The selected households for the study was 1, 950 with 130 Enumeration Areas (GSS 2008; 2014).

3.4.2 Sampling Procedure and Sample Size for the Qualitative Study

For the purpose of the qualitative study, Dome was divided into four geographical clusters. The clusters were Pillar two, Ayigbe Town, Dome Afghanistan and Kwabenya. According to the Dome Local Council, these four areas are the most populated areas in the community. Each of these four areas has high economic activities as well as a lot of residential areas. Geographically, these four areas divide Dome into four parts; North, South, East and West. Each cluster had two focused groups, one each for men and women. A purposive sampling was used to select the respondents for the focused group discussions. It was purposive because the participants had to be community members who had lived in the community for more than 10 years because the aim was to assess the state of water accessibility over the past ten years.

Each focused group was made up of 10 individuals (men and women separately) from different households. A total of 80 households participated in the focused group discussions. Each group was made up of people living in a compound house, rented house, rented apartment, own house, a commercial area as well as a residential area. It also included people who were employed as well as unemployed. The age range of participants spanned

from 19 years to 82 years. The issues discussed in the focused group included (but not limited to) water delivery, tariffs, reliability and challenges in water supply.

In-depth interviews were also held with the District Manager of the Ghana Water Company Limited, Accra North, Legon and the Head of Environmental Department of the Ga East Municipality and two Environmental officers from the Assembly. This was to find out their role in facilitating access to improved water for the people of Dome.

3.5 Main Variables of Interest

The main dependent variable of interest to this study is “access to improved water”. This is a binary variable that takes on the value 1 if a household’s main source of drinking water and water for other domestic uses falls within the WHO/UNICEF (2005), category of improved water, and 0 if otherwise (i.e. the water is unimproved). The sources of water considered as improved included:

- Piped water into dwelling
- Piped water to yard/plot
- Public tap or standpipe
- Tube well or borehole
- Protected dug well
- Protected spring
- Rainwater collected or harvested from surfaces and stored for consumption

The sources of water considered as unimproved are:

- Unprotected spring
- Unprotected dug well
- Sachet water

- Water sold by transporting water into a community using donkey carts, motorized
- vehicles and other means
- Bottled water

3.6 Data Analysis

The qualitative data was analyzed by comparing the responses and grouping common themes as well as separating divergent views. In-depth interviews held with the Ghana Water Company Limited were also analyzed. The quantitative data is first presented using descriptive statistics. Further, multivariate logistic regression is used to examine the determinants of access to improved water over the two surveys.

As discussed in Chapter 2, several factors determine a household's access to improved water. In order to analyze the determinants of access to improved water, a logistic regression model was employed. A household's access to improved water is assumed to depend on some socio-economic characteristics of the household head. These socio-economic characteristics include education, gender, age, location, income status, household size, dwelling type, marital status, distance from water source and willingness to pay for improved water.

The probability of a household having access to improved water is related to their socio-economic characteristics and other factors defined below. However, what is observed is that the household either has access to improved water or not. The probit model is used in this study to examine the determinants of access to improved water. The probit model can be derived from an underlying latent variable model where y^* is the latent variable determined by

$$y^* = \beta_0 + \beta_1 Edu + \beta_2 Gen + \beta_3 Age + \beta_4 Loc + \beta_5 Inc + \beta_6 Mar + \beta_7 Hsize + \beta_8 Dwl + \beta_9 Dist + \beta_{10} Wtp + e, \quad y = 1[y^* > 0]$$

This observation is represented by a dummy variable (y) which has a value of 1 if the household has access to improved water and zero (0) if the household does not have access to improved water.

$\beta_1, \beta_2 \dots \beta_u$, are the coefficient of the parametres of the socio-economic characteristics;

Edu is Education of household head

Gen is Gender of household head

Age is Age of household head

Loc is Location of household

Inc is Income status of household head

Mar is Marital status of household head

Hsize is Household size

Dwl is Dwelling type

Dist is Distance from water source

Wtp is Willingness to pay for improved water

e is the error term.

Two models were run using the specified binomial probit model; one for access to improved drinking water and the other for access to improved water for other domestic uses.

CHAPTER FOUR

RESULTS AND DISCUSSIONS

4.1 Introduction

This chapter presents and discusses the results of the study. The chapter consists of four sections that are structured based on the specific objectives. The first section discusses the summary statistics of relevant variables derived from the 5th and 6th rounds of the GLSS data. The second section presents the determinants of access to improved water over the two rounds of survey data. The third section presents the current assessment of access to improved water services using the qualitative data obtained from focus group discussions at Dome. The fourth section discusses the role of the Ghana Water Company Limited in providing improved water to the population at Dome.

4.2 Summary of Household Characteristics

Table 4.1 presents the descriptive statistics for the variables of interest for the GLSS 5 (2005/06) and GLSS 6 (2012/13) datasets. The mean age of household heads for both rounds of the survey is 42 years. Household size is important in understanding demand for water services. Again, across the two survey rounds, mean household size is 3 persons.

The proportion of female-headed households was around 30 percent for the two rounds. The proportion of household heads who have had formal education was also around 30 percent in both surveys.

The mean distance to drinking water source reduced drastically from 260 metres in 2005/06 to 12 metres in 2012/13. With respect to other water sources, it also reduced from 574 metres in 2005/06 to 32 metres in 2012/13.

The results also show that between 2005/06 and 2012/13 the proportion of households with access to improved drinking water decreased from about 90 percent to 85 percent. The data also shows that the proportion of households that paid for water in 2005/06 also decreased from 37 percent to 30 percent.

Table 4.1: Descriptive statistics of respondents' background information

Variables	2005/06			2012/13		
	Mean	Min.	Max.	Mean	Min.	Max.
Age of household head (<i>in years</i>)	42.74	18	90	42.36	16	99
Distance to drinking water source (<i>meters</i>)	260.48	0		12.89	0	400
Distance to other water source (<i>meters</i>)	574.41	0		32.54	0	400
Household size	3.2	1	29	3.3	1	15
	Percentage			Percentage		
3 Categories of dwelling (total = 1)	-			-		
<i>Bungalow/Flat/Semi-detached houses</i>	25.98			27.79		
<i>Rooms (include compound houses)</i>	67.55			67.28		
<i>Huts and others</i>	6.47			4.92		
Total	100.00			100.00		
Proportion of female-headed households	29.17			30.34		
Proportion of married respondents	46.81			49.68		
Proportion with improved water access	90.60			85.12		
Proportion of households that pay water	36.70			30.40		
Proportion of heads with formal education	90.46			89.29		

Source: Secondary Data from Ghana Statistical Service (2008 and 2014)

4.3 Level of Improved Access to Water in Ghana over the Past Decade

A description of the state of access to improved water over the past decade is presented in Table 4.2. The percentage of households with access to piped water inside their homes actually decreased from about 48 percent in 2005/6 to 21 percent in 2012/13. Meanwhile a

different occurrence was found with piped water outside the home within the same period. It increased from 36 percent in 2005/6 to 47 percent in 2012/13. An improvement was the percentage of households that use public standpipes. It increased from 4 percent in 2005/6 to 7 percent in 2012/13. These may have resulted from the efficient operations of the Ghana Water Company Limited within the period. On the other hand, sachet/bottled water use increased dramatically from about 8 percent to 41 percent between 2005/6 to 2012/13.

Table 4.2: Sources of drinking water for households between 2005/6 and 2012/13

Drinking water for household	2005/6		2012/13	
	Frequency	Percentage	Frequency	Percentage
Indoor/Inside pipe*	538	47.70	370	21.43
Pipe borne outside dwelling/private*	409	36.25	817	47.31
Tanker and vendor services*	96	8.51	214	12.39
Public standpipe*	45	3.99	126	7.30
Sachet/bottled water	8	0.71	41	2.37
Borehole*	2	0.18	83	4.81
Protected well*	19	1.68	32	1.85
Unprotected well	2	0.18	16	0.93
River and stream	9	0.80	8	0.46
Rain water*	-	-	3	0.17
Dugout/pond/lake/dam	-	-	8	0.46
Other	-	-	9	0.52
Total	1,128	100%	1,727	100%

*Improved water sources

Source: Secondary Data from Ghana Statistical Service (2008 and 2014)

4.4 Determinants of Access to Improved Drinking Water

The results of the binomial probit regression estimates of the determinants of access to improved drinking water is presented in Tables 4.3. The age of household heads was found to be significant and positive at 1 percent. This means that a one year increase in the age of

the household head will increase the probability of access to improved drinking water by 2 percent points in 2005/6 in the Greater Accra Region. This also means that older household heads are more likely to access improved drinking water than the younger household heads. This finding contradicts the work of Koskei et al, (2013) who found no significant association between age of household heads and access to improved water.

Table 4.3: Determinants of access to improved drinking water in Urban Accra

VARIABLES	2005/06			2012/13		
	Coef.	Std. Err.	AME	Coef.	Std. Err.	AME
Age of household head	0.005*	0.001	0.002	0.013	0.005	0.001
Female headed household	0.176*	0.031	0.013	0.112*	0.021	0.013
Household head is married	-0.05	0.026	-0.020	0.041	0.070	0.010
Household size	-0.00	0.030	-0.001	-0.011	0.001	-0.023
Head's education (ref. is None):						
Primary	0.096	0.071	0.029	0.131**	0.029	0.005
Junior High School	0.216*	0.029	0.016	0.417**	0.017	0.018
Secondary	0.256*	0.062	0.005	0.140*	0.080	0.007
Tertiary	0.182***	0.112	0.001	0.023*	0.291	0.002
Welfare index (ref. if lowest quintile)						
Second quintile	0.050**	0.073	0.024	0.038	0.073	0.015
Third quintile	0.112	0.005	0.019	0.019**	0.090	0.010
Forth quintile	0.124*	0.201	0.043	0.127**	0.041	0.020
Highest quintile	0.118*	0.322	0.071	0.102*	0.172	0.031
Housing (ref. is bungalows & flats)						
Compound house	0.018	0.122	-0.01	0.319*	0.071	0.042
Huts/others	-0.42**	0.178	-0.13	-0.016	0.083	-0.010
Pays for drinking water	1.732*	0.185	0.272	1.197*	0.102	0.172
Intercept	0.028	0.238		0.008	0.153	
Observations	1,128			1,727		
F(25, 536)	3.141			5.17		
Prob > F	0.000			0.000		

*P<0.01; **p<0.05; ***P<0.10

AME – Average Marginal Effect

Source: Secondary Data from Ghana Statistical Service (2008 and 2014)

In both survey rounds, female-headed households was found to be significant and positive. Thus, in 2005/6 holding all other things constant, a household headed by a female has a probability of increasing the access to improved drinking water by 1.3 percent points. Thus, every unit of female-headed household increases the probability of accessing improved drinking water by coefficient proportion of 17.6 percent. It is also observed in 2012/13 that female headed households have 1.3 percent probability of accessing improved drinking

water. This was significant at 1 percent. This finding does not agree with the works of Koskei et al, (2013) who found gender of household heads not to be significant with access to improved water. Comparatively, the marginal effect of gender on access to improved drinking water in urban Accra in both rounds of the survey are significantly not different from each other.

In 2012/13, primary education achievement of household heads was significant and positive at 5 percent. This indicates that there is a relationship between basic level of education of household heads and improved water accessibility in the Greater Accra Region. The primary educational achievement of household heads increases the household's access to improved drinking water by the margin of 5 percent. However, in 2005/06 the effect was not significant. Furthermore, the data shows that junior high, secondary and tertiary educational achievements by household heads were significant at both rounds of survey at the 1 percent, 5 percent and 10 percent significant levels. This means that household heads that are educated tend to have access to improved water. This finding is concurrent with the works of Koskei et al (2013) that education of household heads influence access to improved drinking water by households. They argued that educational achievements of household heads help them acquire good paying jobs, hence culminating in better salaries and wages and thus have the capacity to acquire improved water.

The four levels of the welfare index of household heads were found to be significant and positive at the 1 percent and 5 percent of the alpha values in both rounds of survey respectively. This means that, in a linear term, the better the welfare index of the household head the higher the probability of accessing improved drinking water. The welfare index measures the economic prowess of the household head and to this effect grants them the ability to easily have access to improved drinking water through purchasing. This finding is concurrent with the works of Smith and Hanson (2003) and Koskei et al, (2013) who found

income to be significant, which in this study, is the measure of welfare index. They both argue on the premise that households with higher incomes stand to have better chances in accessing improved drinking water than low or poor income households.

On the type of housing, compound house was found to be significant and positive at 1 percent level. This means that households residing in compound houses have a 4.2 percent chance of accessing improved drinking water in the 2012/13 survey. However, this was not significant in the 2005/6 round of survey. The huts/other housing types was found to be significant at level 5 percent in the 2005/6 round of survey but was negative. This means that the probability of people living in households made of huts/other housing not having access to improved drinking water is 1.3 percent points in the Greater Accra Region.

Household paying for improved drinking water was found to be significant and positive in both rounds of survey at 1 percent. This means that if a household pays for improved drinking water, the access to improved drinking water increases by 27 percent and 17 percent in 2005/06 and 2012/13 respectively. Thus, their willingness to pay for improved drinking water increases their margin of accessibility more than those who are not willing to pay. This also confirms what Dovi (2007) and Duflo et al, (2012) said on willingness to pay for water; that willingness to pay for water will give you access to improved water.

However, the household size and the marital status did not influence access to improved drinking water. Both characteristics of the households were not significant in both rounds of the surveys. This actually contradicts what Irianti et al, (2016) found on marital status and household size and also contradicts what Adjei et al, (2015) also found on household size. Both studies noted that larger households tend to have better access to improved water sources than smaller households.

4.5. Determinants of access to improved water for other domestic uses

The results of the logistic regression estimates of the determinants of access to improved water for other domestic uses is presented in Table 4.4. The analysis shows that age was found to be significant and positive at 5 percent in 2005/6 survey. This indicates that households with older heads have 2.1 percent probability of accessing improved water for domestic use. However, age was not significant in 2012/13 round of survey.

Table 4.4: Determinants of access to improved water for other domestic uses in Urban Accra

VARIABLES	2005/06			2012/13		
	Coef.	Std. Err.	AME	Coef.	Std. Err.	AME
Age of household head	0.013**	0.010	0.021	0.020	0.007	0.011
Female headed household	0.120*	0.023	0.020	0.170*	0.040	0.002
Household head is married	-0.113**	0.090	-0.017	0.039	0.001	0.090
Household size	-0.013	0.010	-0.000	-0.041*	0.020	-0.010
Head's education (ref. is None):						
Primary	0.010**	0.042	0.010	0.000***	0.047	0.003
Junior High School	0.072*	0.014	0.003	0.140**	0.011	0.031
Secondary	0.203**	0.073	0.040	0.200*	0.005	0.006
Tertiary	0.315**	0.013	0.035	0.503*	0.029	0.081
Welfare index (ref. if lowest quintile)						
Second quintile	0.003	0.01	0.001	0.102	0.030	0.013
Third quintile	0.010**	0.100	0.031	0.307***	0.072	0.010
Forth quintile	0.178	0.102	0.011	0.059***	0.011	0.007
Highest quintile	0.261	0.101	0.013	0.30**0	0.110	0.023
Housing (ref. is bungalows & flats)						
Compound house	-0.130	0.110	-0.020	0.302*	0.051	0.015
Huts/others	-0.300	0.020	-0.011	-0.001	0.027	-0.034
Pays for drinking water	1.105	0.020	0.110	0.317	0.100	0.021
Intercept	0.052	0.132		0.032	0.102	
Observations	8,687			1,727		
F(25, 536)	9.75			11.13		
Prob > F	0.000			0.000		

*P<0.01; **p<0.05; ***P<0.10

AME – Average Marginal Effect

Source: Secondary Data from Ghana Statistical Service (2008 and 2014)

The correlate gender was significant and positive at 1 percent in both rounds of survey. For every female headed household, the probability of accessing improved water for domestic use is 20 percent and 2 percent for 2005/6 and 2012/13 survey years respectively. This could

be as a result of the pro-activeness of women in household domestic activities that includes demanding improved water for domestic use. The result does not agree with Koskei et al, (2013) who found gender not to have a relationship with access to improved water.

Marital status of household heads was found to be significant but negative at 10 percent level of significance. This means that for every household headed by a married person, the chances to access improved drinking water for domestic use is decreased by 1.7 percent in 2005/6 survey year. At 1 percent level of significance, household size was significant but with a negative probability value in 2012/13. This contradicts the work of Irianti et al (2016) indicating that the larger the household size, the better the chance of accessing improved water. This suggests that for every additional person in the household, the chances to access improved water for domestic use decreases by 1 percent.

Education was found to be significant and positive in both rounds of survey. This finding is similar to the results on determinants of access to improved drinking water in Table 4.3 Household heads with any level of education stands the chance of accessing improved water for domestic use than their counterpart who have no education. This result is concurrent with Koskei et al, (2013) that education of household heads positively influences access to improved water.

The welfare or income of household heads was expected to be significant and positive. The welfare was divided into four level index. Household heads found in the second quintiles for both years were found to be significant in both years at 5 percent and 10 percent for 2005/6 and 2012/13 years respectively. For 2005/6, every unit increase in welfare index in the third quintile, the access to improved water for domestic use increases by 1.3 percent while in 2012/13 it improves by 1 percent. Furthermore, at the same 10 percent confidence level in 2012/13, a unit increase in the welfare index in the fourth quintile increases

household head's access to improved water for domestic use by 7 percent. It was also observed that, the highest quintile welfare index was found to be significant in 2012/13 at 5 percent confidence interval. The margin of increase to access to improved water for domestic use for this category of household heads was found to be 2.3 percent explicitly more than the above levels discussed. This expounds that the better the income of a household as a measure of welfare, the higher its access to improved water for domestic use. This affirms the work of Smith and Hanson (2003). For the type of housing as one of the correlates discussed, the study found household heads living in compound houses to influence access to improved water for domestic use. This is significant and positive at 1 percent. This explains that every unit of household head living in a compound house stands the chance to increase its access to improved water for domestic use by 1.5 percent points.

4.6 Current Level of Access to Improved Water Facilities for Households in Dome

One of the objectives of this study is to identify factors that limit continuous water supply in Dome over the past 10 years using primary data obtained from focus group discussions.

At the discussion in Kwabenya, respondents indicated that over the past 10 years, access to water had been exceedingly difficult. Household members had to walk long distances (between 30 to 45 minutes) to get access to water. The following is the narrative of one of the male participants in Kwabenya:

'Dome was one of the suburbs in the Greater Accra Region that has suffered from poor access to improved water. In the past five years for instance, we could stay more than two days without bathing properly. If you like go into each house and ask they will tell you the same thing' (24th May, 2016).

According to them, the situation has however improved because they do not walk over long distances in search of water anymore. Most of them indicated that currently they rely on

tanker services for access to water for domestic use. Their fear however remained that they know little about the sources of the water they buy from the water tanker suppliers. However, they said those who provide water through the tanker services were more reliable than the Ghana Water Company Limited. Others also said, currently sachet water producers are many in the area and hence did not struggle much to access water, especially for drinking purposes.

At Ayigbe Town, similar concerns were raised in the focused groups. According to them, water supply in the 1980s and 90s was very good and reliable because the population was not huge and the Ghana Water Company Limited could produce and distribute enough water. They also indicated that streams and rivers were available and were not polluted and hence were wholesome for domestic consumption. According to them, the challenge of access to improved water began in the year 2000. One female focus group participant said:

“The water stopped flowing through the pipes in the year 2000. People started depending on tanker services at a fee while others carried buckets to fetch water from the tankers at a distance. It was after 2008 that water started flowing again at some places in Dome but was not reliable. Could you believe that this problem has since persisted until last year before the taps started flowing again?”(24th May, 2016).

Further discussion revealed that a bucket of water equivalent to 14 litres of water from private water vendors was being sold for GHc 1.20. According to some of the respondents, they had to spend between GHc 36.00 and GHc 50.00 every month on water from vendors including public standpipes, tanker services and sachet water.

It was also revealed that the current situation with regards to household access to improved water sources still remains a challenge although some improvements have been made,

especially in relation to recent expansion of pipelines and the fact that water flows once per week.

Below are some of the comments from both male and female participants in Dome Pillar Two and Dome Afghanistan:

In the male group at Dome Pillar Two:

“Currently more people have pipe connections in their homes. Not everyone could afford this since huge sums of money had to be paid to get the connection in their homes. Though payments differ from house to house, an average of GHC 1,500 could be paid in order to have access to pipe-borne water. This is very expensive. This is however compounded by the infrequent flow of water even though pipe connections have been made in some homes.”(24th May, 2016)

In the female group at Dome Afghanistan, a female household head said that:

“Even though pipes have been connected to many homes, water still does not flow regularly and most old pipe lines have also been broken by heavy trucks therefore rendering most households incapable of accessing pipe-borne water. Because the pipes are not reliable, many homes have also decided to construct their own borehole to provide them with reliable supply of water for their domestic use”. (24th May, 2016).

In households where respondents purchase water from borehole vendors, they spend about GHC 3.00 every day.

Table 4.5 summarizes the views of male and female discussants during the focus group interviews with regards to current access to improved water in Dome. Both male and female respondents shared similar views with regards to the irregular flow of pipe-borne water in their homes and their reliance on sachet water for drinking purposes.

The female discussants however said they were unable to manage their homes properly as a result of the current rationing of the water by the Ghana Water Company Limited (GWCL). Some of the male discussants also said they have stopped relying on pipe-borne water from GWCL and now preferred the water tanker service which they use for flushing toilet, washing of clothes, cooking and bathing while the sachet water is used for drinking.

It was also surprising to find that men could not specify the exact amount they paid for access to improved water every month although they were heads of their households. The women on the other hand said they spend between GHC 80.00 and GHC 200.00 monthly on water bills. This may have resulted because the women were the ones who manage water in the household and used water most in the households and therefore could tell the exact amount they spend accessing water for domestic use.

Table 4.5: Opinions of Focus Group Discussants on Current Water Situation in Dome

Theme	Male Discussants	Female Discussants
Cost of Water	High water tariffs	Household water expenditure is too high
	Water bill vary from month to month	Monthly water bill is between GHs 80 and 200
Frequency of flow	Irregular flow of water	Irregular flow of pipe borne water
Sources of water	We rely on boreholes and water tanker services	Distance to improved water source has reduced
	We have stopped relying on GWCL pipe water	
Sources of water for drinking	We buy bags of sachet water everyday	
	We drink sachet water everyday	We drink sachet water everyday
Uses of Water	We use the pipe water to cook and bath	We use the pipe water to cook, bath and wash
		Difficulty in managing the home without water
		Inability to wash clothes regularly

4.7 Institutional Role to Providing Access to Improved Water

This section presents results of the key informant interviews. There was an interview with two Environmental Health officers in the Ga East Municipal Assembly. The two officers confirmed that the Municipal assembly is not responsible for providing water to the people. The officers said that in the small towns however, the Municipal Assembly is responsible for water supply. They said that the Assembly is currently managing two small towns' piped schemes through Water and Sanitation Development Boards (WSDD). These are Abokobi-Oyarifa-Teiman-Sesemi scheme, and Pantang Area Pipe scheme. It was noted that the Ghana Water Company Limited is responsible for providing water for the people of Dome. The Municipal Assembly therefore plays no role in providing water for the people of Dome. In responding to a separate interview, an official of the Ghana Water Company Limited shared views on the institutional arrangement of Ghana Water Company Limited to improving household access to water services in Dome and in Ghana as a whole. The official stated that for the past 10 years, water has been flowing in the Dome community but was heavily rationed. He added that;

“The heavy rationing came about because there was pressure on the existing machines to produce water for the whole population. The original plan was to ensure water was distributed to all parts of the Greater Accra Region. This deliberate action led to heavy rationing of the water which sometimes caused delay in flow for more than a month” (23rd June, 2016).

According to him, as the population increased in the community it became difficult to serve every household with pipe-borne water hence, there was the need to ration the flow of pipe-borne water. He however said, in January 2015, the water pumping machines were repaired and the capacity increased to serve the whole community. He reiterated that their biggest challenge to ensuring improved access to water has been lack of funding for expansion works and also for the production cost. He indicated that Government has not been

forthcoming with fulfilling financial promises to the Ghana Water Company Limited hence, the delay in expanding access to community/public stand pipes and other forms of public access including household request for pipe-borne water connections.

Table 4.6 shows the current billing rate obtained from the Ghana Water Company Limited. It indicates that billing rates for water from the Ghana Water Company Limited vary with regards to the type of consumption group. In all, the key informant said the water obtained by households fell under the domestic billing category which attracts the lowest billing of GHC 2.98 for every first 5000 litres of water consumed. The purpose of this billing was for the company to make improved water easily accessible to households. He said although the billing for pipe-borne water consumed by households was subsidized, some customers try to escape billing by engaging in illegal connections. According to him, the illegal connection of water by households in parts of Accra has compounded the company’s effort to generate revenue to expand access to improved water to other sections and households in the national capital.

Table 4.6: Current billing rate for pipe-borne water by the GWCL

Type of service	Quantity (litres)	Amount charged (GHc)
Domestic consumption	0-5000	2.98
Domestic	Above 5000	5.07 for every 1000 litres
Commercial use	Every 1000 litres	8.36
Industrial	1000 litres	10.07
For government departments	1000 litres	6.51

Source: Field interview with an Official of GWCL, 2016

Specifically, the Official stated the roles of the Ghana Water Company Limited to include; *“The planning and development of water supply systems in the urban communities in the country. The company is also mandated to plan, research and engineer new solutions towards improving access to water in Ghana”*. (23rd June, 2016)

According to him, responsibility of production, distribution and management of urban water supply has been one of the core mandates of the company.

He reiterated that lack of logistics, depreciation of the Ghana cedi, interruption of power supply and illegal connections and debt owed them by defaulting customers in the past decades remained the key challenges hindering effort by the company to providing access to improved pipe-borne water in Ghana.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Introduction

The main objective of the study was to assess the progress that has been made towards access to improved water in Urban Accra. Specifically, it examined the determinants of access to improved water over the past 10 years in Urban Accra. It also identified the factors limiting the continuous supply of water in Dome over the past 10 years. Finally, the study also looked at the role of the Ghana Water Company Limited in improving access to potable water in Dome. Data from the Fifth and Sixth Rounds of the Ghana Living Standards Survey were analyzed. Focused group discussions were held with residents of Dome to ascertain the current state of improved water accessibility in Dome. Interviews were also held with the District Manager at the Ghana Water Company, Accra North, to find out their role in the management and sustainability of improved water to the population.

5.2 Summary of Findings

Descriptively, the mean age of the household heads was found to be the same in both rounds of survey. The mean age was 42 years and this suggests that majority of the household heads interviewed were within the economically active age. The household size was also found to be an average of 3 persons for both rounds of surveys in the Greater Accra Region. Interestingly, the proportion of female-headed households sampled for the study increased by 1 percent, 29 percent in 2005/6 to 30 percent in 2012/13. Furthermore, less than half of the household heads are married in both round of surveys. The study also found that majority of the household heads have achieved some educational level indicating high literacy among the household heads. This was reported as 90 percent and 89 percent educational attainment in 2005/6 and 2012/13 rounds of survey respectively.

With regards to the type of dwelling, a little over 67 percent of the households live in compound house rooms in both rounds of survey. The proximity to the nearest source of improved drinking water was found to reduce from 260 metres in 2005/6 round of survey to almost 13 metres in 2012/13. The proportion of households reported to be paying for improved drinking water reduced from 36.7 percent to 30.4 percent in 2005/6 and 2012/13 respectively.

The analysis of the factors influencing the accessibility of improved drinking water and domestic usage was key in this study. The factors which were age, gender (female-headed household), education and welfare index were found to be significant and positive at different significance levels (1 percent, 5 percent and 10 percent). With a unit increase of these factors, there is an increment in the probability of accessing improved drinking water and water for domestic use in Urban Accra. Dwelling type (compound room) was found to be significant and negative for access to improved drinking water but positive for domestic use. However, household size and marital status were expected to influence access to improve drinking water but were not significant. They were however significant but negative in accessing improved water for domestic use in the Greater Accra Region.

The qualitative study conducted at Dome revealed that although most people in the area are connected to pipe borne water, the flow of the water is not reliable. This was also confirmed by the manager at the Accra North Ghana Water Company Limited. It was explained that due to high increase in population, there is so much demand for water and that is putting a lot of pressure on the machines, resulting in a short life span of the machines. The major problem of the residents are that although they pay heavily for such services they do not receive the required quality of services. Some residents also do not have access to pipe-borne water. No pipes have been laid to their homes or neighborhoods. They depend totally on other sources such as tanker trucks which are considered as unimproved water sources.

These tankers apart from being unimproved are also relatively expensive. This means that the poor are not able to afford the water from the tankers, therefore they do not have access even to unimproved water. Meanwhile, Mar del Plata Water Conference (1977) cited in Doe (2007) states that “All people, 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” p1.

5.3 Conclusions

There has been a general improvement of access to quality water for both drinking and other domestic use in the Greater Accra Region, Dome to be specific. Majority of the populace have access to improved drinking water even though it reduced by one percent over the period of six years (between 2005/06 and 2012/13 rounds of survey). The decline was as a result of increase in the population culminating in high demand of water supply services. The demand side exceeding the supply sides creates a deficit in the number of household accessing improved drinking water. Following this, the proximity to accessing improved drinking water has declined over the period of time. This suggests more people now have access to improved drinking water directly in their households without travelling long distances to get water.

The educational attainment of most of the household heads has greatly influenced their access to improved drinking water and water for domestic usage. Education has given the household heads the opportunity to get jobs that helps them to earn good income so access quality water. The welfare index of households as a measure of their economic wellbeing is paramount in influencing the choice of accessing improved drinking water and water for domestic use by households. The income level of the household heads guarantees them high purchasing power, hence the ability to pay for the supply of water services irrespective of

the cost. Gender also plays a significant role in accessing both improved drinking water and water for domestic use, as female-headed households are more likely to access improved drinking water and water for domestic use. Older household heads have access to improved drinking water and water for domestic purposes. The import of this conclusion could be as a result of their economic activities and responsibilities they may be exercising in their homes.

“The human right to water and to sanitation constitutes the right of every individual, without discrimination, to sufficient, safe, acceptable, accessible and affordable water and sanitation for personal use.” (UNICEF, 2014, p1). This statement clearly shows that every human being must have access to water that is safe, sufficient, accessible and affordable. Although access to water has improved in Ghana, can we say that the water is safe, sufficient, acceptable, accessible and affordable? Most of the people living in Dome cannot afford the construction of the borehole in their homes. Sachet and bottled water are also relatively expensive for the poor, yet piped water is unreliable. The study showed that the ability of a person to pay for water indicates the person’s potential access to improved water. Water is not easily accessible to households in Dome as they have to walk long distances to access water when the pipe-borne water in their homes are not flowing.

5.4 Recommendation

Due to the high cost involved in accessing improved drinking water, Government should subsidize the connection and service fee so that poor households can afford improved water supply. Government should also ensure the efficient supply of water to encourage prompt payment for water because the records show that many do not pay for improved water due to the poor service provision.

It is the responsibility of every government to provide water as a basic need for her population. It is as a result of this responsibility that the Government of Ghana established the Ghana Water Company Limited as a public utility responsible for the supply of potable water in urban areas in Ghana, under the supervision of the Ministry of Water Resources, Works and Housing. The study has revealed some challenges faced by GWCL. These challenges include logistics, interruption of power supply, illegal connections, debt owed them by defaulting customers and pressure on the machines due to population growth. To improve access to potable water, these challenges need to be addressed.

There is the need to resolve the problem of interruption in water flows. Measures should be taken to procure quality materials that will not break down or leak as a result of pressure from the water pumps. Acheampong (2011) suggests that corruption in the award of contracts and procurement of materials, lack of fiscal discipline and proper management in the water supply sector, lack of maintenance culture in our system, water wastage from leaking pipes, unauthorized tapping of water from transmission pipes in certain neighborhoods and poor bill paying culture all contribute to the inefficiency and ineffectiveness of the company, thus resulting in poor services. In order to improve water delivery services, the company must have a good maintenance culture, where all the machines are properly serviced in a timely manner. Unauthorized water tappers should be prosecuted. There should be regular auditing to help address all these weaknesses. There should be a system in place that leads to the procurement of quality materials as well.

The Ghana Water Company Limited should make use of each decade's population and housing census to help in planning in order to anticipate and meet the demands of the growing population. If this is done there will not be excessive pressure on the machines and equipment being used to convey water to the people. This will help in improving access of potable water for the people of Dome.

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APPENDICES

Appendix 1: Focused Group Discussion Guide

FOCUSED GROUP DISCUSSION GUIDE FOR THE DOME COMMUNITY

1. How was access to water in this community 10 years ago?
2. What would you say are the main changes in terms of access to water now compared with 5 years ago?
3. What are the sources of water for this community?
4. How reliable is this source of water all year round?
5. What are the uses you put water to?
6. How far is this source of water from your dwelling?
7. How regular is your source of water supply?
8. How much water does your household use in a day?
Number of bucket
9. How much do you spend on water in a month?
10. What is the average monthly cost of accessing water for your activities?
11. What challenges do you face with regards to access to water?
12. In what ways do you think water delivery or access can be improved?
13. For the past ten years (since 2006), have more people moved to your community, or have there been more people that moved away?
More arrivals
More departures
About the same
No arrivals and No departures
14. Do any households in this community have pipe-borne water/bore hole?
Yes, pipe borne
Yes, bore hole

15. Do most households have pipe-borne water, or only a few?

Most households

Only a few.....`

16. What has been the role of Ghana Water Company Limited in providing potable water to you?

17. Any other comment

Appendix 2: Interview Guide

INTERVIEW GUIDE FOR KEY INFORMANTS

- *District Manager of the Ghana Water Company Limited*
- *Environmental Health Officers at the Ga East Municipal Assembly*

1. What are the main sources of water available to the community?
2. Which of these sources is recommended for human use?
3. Is this source available for the community all year round?
4. What is the role of your institution in the whole community water delivery, access and management?
5. How much does it cost your institution to make water available for a household/community?
How much do you charge for the use of water per household?
6. What challenges are faced by your institution to ensure potable water for all in the community?
7. What do you propose in solving this challenge?
8. Any other comments?

Appendix 3: Participants background information from the different communities

Male Groups

Pillar Two			Ayigbe Town			Dome Afghanistan			Kwabenya		
Age	Employment status	Dwelling Type	Age	Employment status	Dwelling Type	Age	Employment status	Dwelling Type	Age	Employment status	Dwelling Type
25	Mason	Compound House	71	Not employed	Compound House	27	Teacher	Bungalow	20	Student	Compound House
38	Driver	Compound House	60	Trader	Compound House	37	Trader	Bungalow	77	Pensioner	Rented Apartment
37	Driver	Compound House	60	Driver	Compound House	80	Pensioner	Compound House	35	Trader	Compound House
67	Trader	Bungalow	43	Accountant	Rented Apartment	21	Student	Compound House	36	Mechanic	Rented Apartment
50	Trader	Compound House	42	Office clerk	Compound House	22	Driver	Compound House	40	Office clerk	Compound House
32	Teacher	Rented Apartment	19	Student	Residential area	45	Trader	Rented Apartment	44	Engineer	Rented Apartment
30	Accountant	Rented Apartment	20	Electrician	Rented Apartment	32	Office clerk	Compound House	60	Trader	Compound House
38	Teacher	Compound House	35	Driver	Compound House	31	Office clerk	Residential area	23	Not employed	Compound House
29	Carpenter	Compound House	33	Trader	Rented Apartment	50	Accountant	Compound House	45	Driver	Compound House
32	Mechanic	Compound House	33	Engineer	Bungalow	33	Mason	Compound House	40	Office clerk	Bungalow

Female Groups

Pillar Two			Ayigbe Town			Dome Afghanistan			Kwabenya		
Age	Employment status	Dwelling Type	Age	Employment status	Dwelling Type	Age	Employment status	Dwelling Type	Age	Employment status	Dwelling Type
33	Seamstresses	Rented Apartment	39	caterer	Compound House	26	Teacher	Compound House	22	Student	Rented Apartment
82	Not employed	Compound House	30	Hairdresser	Compound House	41	Trader	Rented Apartment	78	Not employed	Compound House
66	Trader	Compound House	55	Trader	Rented Apartment	36	Shop attendant	Bungalow	47	Trader	Compound House
50	Trader	Rented Apartment	53	Trader	Compound House	56	Trader	Bungalow	63	caterer	Bungalow
21	student	Compound House	24	Not employed	Compound House	60	Not employed	Compound House	59	Trader	Rented Apartment
23	Teacher	Rented Apartment	53	Office clerk	Rented Apartment	66	Caterer	Rented Apartment	75	Not employed	Compound House
27	Teacher	Compound House	44	Hairdresser	Compound House	57	Caterer	Rented Apartment	70	Caterer	Rented Apartment
40	Trader	Rented Apartment	45	Beautician	Rented Apartment	52	Trader	Rented Apartment	54	Trader	Compound House
77	Not employed	Compound House	51	Trader	Compound House	50	Seamstress	Compound House	38	Office clerk	Rented Apartment
72	Caterer	Compound House	48	Caterer	Rented Apartment	42	Seamstress	Rented Apartment	55	Trader	Rented Apartment