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Ensuring Adequate Water Supply to Disadvantaged Urban Communities in Ghana

Kweku Ainuson
Clemson University, kainuson@yahoo.com

ENSURING ADEQUATE WATER SUPPLY TO DISADVANTAGED URBAN COMMUNITIES IN GHANA

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Kweku Gyan Ainuson
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Accepted by:
James B. London, Committee Chair
Michael A. Morris
Robert W. Smith
Caitlin S. Dyckman

ABSTRACT

Ghana like most developing countries struggles to improve access to water and sanitation to its urban population. Presently many areas within the country do not have access to portable water from the national grid. And in areas served by the approved utility company, water service is mostly erratic and increasingly unreliable. Available evidence indicates that only 61% of urban residents have access to improved drinking water. Within the urban centers are disadvantaged communities which tend to have much lower water supply coverage. However, since such disadvantaged communities are regarded as part of the urban center, their unique needs are often hidden in the aggregate statistics of the larger urban areas. Thus, policy interventions aimed at improving water supply in the urban centers often have very limited effect on the disadvantaged communities.

This research theorize that the unique characteristics of disadvantaged communities such as high concentration of low income dwellers, squatter communities and poor infrastructure developments, set them apart from the urban centers in which they exist. This research therefore seeks to answer the question, how do you ensure adequate water supply to disadvantaged urban communities in Ghana.

Using the case study methodology, focus group discussion and household surveys, this research explores the unique characteristics of disadvantaged urban communities and how such characteristics can be channeled into finding the right mix of policy interventions to ensure adequate water supply.

DEDICATION

I dedicate this work to my parents Mr. and Mrs. Ainuson whose encouragement and provisions have seen me through all my education. Also to my daughter Nana Akua Nshirah Ainuson whose arrival gave me a sense of urgency to complete this research.

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Chapter 1

1.1 Problem Statement

Improved water supply has been closely linked to economic wellbeing. (Okun, 1988; Bartram, Lewis, Lenton, and Wright, 2005; Barlow & Clarke, 2002; Shiva, 2005) According to the WHO, adequate water supply and water resource management boosts a country's economic development and contributes immensely to poverty reduction. (WHO, 2005) In this direction, inadequacies in water supply disproportionally affect the health and wellbeing of poor men and women. (Amenga Etego, 2002; Hall et al, 2004) In fact, adequate water supply is a key element in the reduction of poverty in all its dimensions - growth in income, healthy citizenry, attraction of investments, etc.

In spite of the benefits of adequate water supply to economic wellbeing, Ghana like other developing countries struggles to improve access to water and sanitation to its urban citizens. At present, many areas within the country do not have access to portable water from the national grid. And in areas served by the approved utility company, water service is mostly erratic and increasingly unreliable. Available evidence indicates that only 61% of urban residents have access to improved drinking water.

The low water supply coverage is not peculiar to Ghana alone, but forms part of a systemic urban water supply problem in sub Sahara Africa (SSA). According to UK based international charity WaterAid, water supply coverage in Burkina Faso and Uganda is estimated at 61% and 60%, respectively. In Ethiopia, only 22% of the population has

access to portable water while 43% and 48% of the population in Mozambique and Nigeria, respectively, have access to portable water.

The problems that account for urban water supply shortages in sub Saharan Africa are enormous and very complex in nature. These problems range from institutional bottlenecks like water utility management capacity and weak regulatory mechanisms to infrastructure problems like poor urban planning, rapid growth of squatter communities and insufficient financial resources. According to the United Nations, urban population in SSA continues to grow at a fast pace. With an urban population of 13% in 1950, the urban population in SSA has increased to a current figure of 33% annually. (Tabutin & Schoumaker, 2002) The United Nations (UN) estimates that by 2030, one in two Africans will be living in urban areas. In Ghana, the proportion of total population living in urban areas increased from 26% in 1965 to 37% in 1997. It is projected that urban population in Ghana will double in the next 20 years. (World Bank, 2002) The growth in the urban sector outpaces the growth in infrastructure development and therefore limits the ability of government to provide adequate utility services to all urban dwellers. Current estimates indicate that over 28% of the urban dwellers in Ghana live below the poverty line. The urban poor are more likely to congregate along urban fringes and defined areas within the urban centers. These poor neighborhoods within the urban areas are populated by squatters and migrants and also tend to have very poorly developed infrastructure. It is within these poor areas that water supply inadequacies are felt more.

The response of governments to the urban water crisis has been through a multi sectorial approach that strengthens legal and regulatory structures and emphasizes a clear

separation between water policy making, water regulation, tariff reforms and operational functions. (Balance & Tremolet, 2005) The main goal of the water sector reform has been geared towards introducing private sector participation (PSP) into the water supply sector. This idea of PSP is based on a neo-liberal market ideology which advocates that the PSP in the water sector can lead to technical know-how and efficient utility management and bring much needed private capital investment. (Gortner et. al, 1997; Chong & Rama, 2002; Hall, et al. 2004) However, gains from PSP in the water sector have been mixed, and its continued use as a policy tool is very controversial. (UN-HABITAT, 2003; Dore, et. al. 2004, Clarke, et. al. 2004, Anwandter & Ozuna 2002)

Within the disadvantaged urban areas, the gains of PSP have been very minimal as PSP often leads to an increase in tariffs and slow expansion of infrastructure to disadvantaged urban areas. (Amenga Etego, 200; Hall, et al. 2004) These disadvantaged urban communities or peripheral municipalities which tend to have a high concentration of low income dwellers and have very low water coverage in comparison to the rest of the larger urban communities. The water supply differentials between the urban areas and the disadvantaged urban areas are often times hidden within the aggregate statistics for the larger urban area. (UN-HABITAT, 2006) In reality, there are wide gaps in the supply and availability of water between disadvantaged urban communities and the rest of the urban area. To this end, residents in the disadvantaged urban neighborhoods are more likely to be unconnected to the national grid and therefore more likely to resort to the unofficial and informal sector for their water supply. For instance, in the urban centers of Kumasi and Takoradi in Ghana, piped water is available in most parts of the city.

Although water service in these urban areas is erratic and suffers from periodic low pressure, disadvantaged communities in these urban areas have a much worse water supply problem that the urban area as a whole.

This research, therefore, looks at how to ensure adequate water supply to the disadvantaged urban communities in Ghana. In Ghana, Ghana Water Company Limited (GWCL) is charged with the provision of urban water supply while the Community Water and Sanitation Agency (CWSA) is charged with rural water provision. GWCL's mode of water supply is mainly through the construction of network pipes. This involves building water treatment plants to treat water and laying pipes from treatment plants to where it is needed in the urban areas. CWSA's method of supplying water to rural areas includes network pipe systems where appropriate, building boreholes and hand-dug wells. In reality, since most rural areas have poor residents, CSWA mostly facilitates the construction of boreholes and hand-dug wells which are relatively cheap to maintain. Peripheral communities in urban areas have a high concentration of low income dwellers and low infrastructure development. They therefore exhibit rural characteristics as defined by the government of Ghana. Most fringe communities are not yet covered by the network pipe system of GWCL. In some of the fringe communities, construction and settlement patterns are such that it will be cost prohibitive to extend network pipe systems to the area immediately. However, because they are not categorized as rural by definition, they do not qualify for CWSA services. This characteristic leaves peripheral communities in Ghana in between the policies of the GWC and CWSA. Peripheral communities therefore depend on small scale water providers and other unapproved sources for their

water supply. Using a multiple case study approach, this study analyzes the unique problems faced by disadvantaged urban communities and how best such problems can be addressed efficiently.

1.2 Purpose of Study

Ensuring adequate water supply to disadvantaged neighborhoods holds the potential to increase economic wellbeing within the country. According to WHO, for every US$ 1 invested into increasing water supply, an economic benefit ranging from US$ 3 to US$ 34 is gained in the health, agricultural and industrial sector. (WHO, 2003) In addition, access to water has often been regarded as a human right and has been enshrined in some national constitutions. (Shiva, 2002; Barlow and Clarke, 2002; Hall, 2004; United Nations, 2006)

In this study, one objective is to examine the informal and unofficial sector on which many disadvantaged urban neighborhoods have increasingly come to depend on for their water supply. Although the informal sector is not recognized and their role goes unnoticed, they may have the potential to improve access to water supply to disadvantaged neighborhoods if they are given the necessary technical and financial support.

Another objective of this study is to study the institutional and regulatory arrangements in the water sector and how such institutions can be reformed to help disadvantaged neighborhoods satisfy their water supply needs. A sustainable supply of clean and reliable water can only be successful through the right institutional and

regulatory arrangements. Thus, a collaborative effort between the various water supply institutions and regulatory agencies together with the residents in the disadvantaged urban neighborhoods can go a long way to improve water supply.

1.3 Research Organization

This study is organized as follows; Chapter 2 looks at some of the remote and immediate problems confronting urban water systems in sub-Saharan Africa. It also discusses how these problems have affected water supply to disadvantaged urban communities throughout SSA. The chapter then considers the theoretical concepts underlying the use of private sector participation in water supply as the lead policy tool to address water supply shortages in urban centers. Chapter 2 ends with a discussion of how private sector participation in water has affected water supply to disadvantaged urban communities. Chapter 3 discusses urban water supply policy in Ghana. In this chapter, emphasis is placed on the various institutional changes in the water sector in Ghana and how these changes affect disadvantaged urban communities in Ghana.

In chapter 4, the methodology which formed the basis of this research is discussed in detail. This chapter describes why the case study approach was selected as a research design and the methodology used in selecting the three case studies and key informants interviewed for the research. Chapters 5 through 7 describe individually the 3 case studies for this study. After a brief history of the area, the individual chapters outline the distinct water supply issues present at each case study area.

Chapter 8 is a comparison of the three case studies. This chapter looks at the similarities as well as the differences in the water supply issues in the case study areas. It is the differences and similarities in chapter 8 that forms the basis of the conclusions and recommendations in chapter 9.

Chapter 2

Urban Water Supply in Sub Saharan Africa

The United Nations estimates that Sub-Saharan Africa's (SSA) urban population has the world's worst supply of urban water and sanitation. (UN-HABITAT, 2003) [1] In most of the urban areas in SSA, there is little to no provision of water supply. And in urban areas with water supply, there exist wide differentials in the availability and quality of water supply. There are also big differentials in water supply coverage with the size of the urban center. Water supply coverage also tends to be wider in large cities and declines with the size of the city. For instance, in a study conducted in 1997 in Abidjan, Cote d'Ivoire less than half of the city population of 3 million received water from the official distribution system. (Champetier et. al., 2000) In Conakry, Guinea, only about 45% of the urban population is connected to the city's water system. A sizeable number of the 45% that are connected to the city's water system also experience erratic water flow due to old and dilapidated infrastructure. (Champetier et. al., 2000)

In spite of the grim nature of the water supply systems in Africa, SSA is home to some of the largest rivers and sources of freshwater in the world. Thus, the intractable problem of inadequate water supply in urban areas in SSA seems to be due in part to failures in institutional decision making and physical impediments such as improper infrastructure development, low water resources financing and political instability rather than actual hydrological scarcity. (AfDB, 2003)

[1] There are regional differences in the supply of water in SSA. For instance, most countries in North Africa and the Republic of South Africa have relatively very good water and sanitation coverage.

This chapter is divided into six sections. Section one looks at the availability of water resources in the SSA. Section two looks at the economics of water systems with emphasis on how economic theory affects water delivery systems. The third section discusses the state of urban water supply in SSA with emphasis on challenges facing water delivery systems. In section four, the discussion focuses on the impact that inadequate water supply has on SSA. Section five discusses the response of governments to the urban water crisis in SSA. Private sector participation in urban water delivery is the focus of discussion in section six.

2.1 Significant Characteristics of Water Resources in Sub-Sahara Africa

SSA is endowed with many big rivers, large lakes, vast wetlands, and a considerable amount of groundwater reserves. There are seventeen major rivers in Africa with a basin area of more than 100,000 KM^2. Notable rivers are the Nile River with a basin area of 3.4 million KM^2, the Volta River with a basin area of 407,093 KM^2, the Congo-Zaire River basin with a basin area of 3.7 million KM^2 and the Niger River with a basin area of 2.3 million KM^2. (FAO, 1997) There are also about one hundred and sixty lakes which are larger than 27,000 KM^2. FAO estimates that the 9 largest international river basins in SSA alone cover 42% of the landmass. (FAO-AQUASTAT, 2005) The equatorial area and the sub-humid East African Highlands within the Rift Valley have most of these lakes. These massive water basins hold the potential for a variety of water resource development options. Apart from tourism, recreation, fishing and transportation, these river basins also possess a huge potential for energy production through

hydroelectric power. It is estimated that river basins in Africa hold the potential to produce 1.4 million Giga watts hour (GWh) per year. (AfDB, 2003) When developed properly, these numerous rivers and lakes in Africa can serve as a reliable source of water to supply the increasing needs of the urban centers and also for the various agricultural development needs on the continent. Africa has about one third of the world's major international water basins. (Basins greater than 100,000 KM^2) These basins hold the potential for achieving water security in SSA. Although the occurrence of water resources within the sub region are unevenly distributed, institutional mechanisms aimed at promoting bulk water sale and water redistribution can improve the water security of particularly arid regions.

Compared to other regions of the world, SSA has abundant rainfall. This abundant rainfall pattern has the potential to charge or re-charge available aquifers and thus help provide water security for the region. The annual downpour averages over 600 mm of rainfall and is marked with great variability in time and place. The United Nations estimate temporal variability of rainfall in Africa to be about 40% around the mean. The temporal variability is much higher in temperate zones. Within SSA, the spatial distribution of rainfall is varied from region to region. Table 1 shows the regional distribution of rainfall in SSA. The island countries receive the highest amount of rainfall measuring 1,700 mm per year. Central African countries and countries along the gulf of Guinea also receive considerable amount of rainfall measuring an average of 1,430 mm and 1,407 mm, respectively. The lowest rainfall occurring in SSA occurs around the Sudano - Sahelian region measuring around 335 mm. (United Nations, 2005) The

variability in rainfall can be countered by international water compacts and water sharing agreements between the haves and have-nots.

Another significant aspect of water resources in SSA is the extremely low runoff from rainfall. The low development in SSA means that most of the land surfaces are unpaved and thus have less impervious surfaces. A significant portion of precipitation is absorbed through infiltration and allows water to be stored as groundwater and the groundwater that slowly discharges into streams and rivers through seepage. Table 1 provides a summary of the amount of surface and groundwater flows that are generated from rainfall within the sub region.

From these water bodies in SSA, 9% of water withdrawn is used for community and urban water supply. Industrial use takes 6% of withdrawn water. Agriculture takes the lion's share of 85% of all water withdrawn from water bodies in SSA. (United Nations, 2005) At the continental and sub-regional levels, the water withdrawals are low in relation to both rainfall and internal renewable resources. (See Table 2.1) Exceptions occur in the northern regions of Africa where water withdrawals are 18.6% and 152.6% of rainfall and internal renewable resources, respectively. (United Nations, 2005) It is interesting to note that as of 2005, throughout Africa, the amount of water withdrawn for the three major uses - agriculture, industry and community and urban use account for only 3.8% of internal renewable water resources. Thus, at current withdrawal rates, there is ample water available in SSA to meet the current water demands for agriculture, industry and community and urban uses. (FAO, 1997; United Nations, 2006) According to the UN African Water Vision 2025, if developed and managed properly, water

resources in SSA hold the potential to supply water to 50% of people who do not have access to water by 2015.

Table 2.1: Regional Distribution of Rainfall and Water Withdrawals in Africa

Sub-Region	Area Rainfall			Internal Resources (IRR)		Renewable	Withdrawals for Agriculture, Community Water Supply and Industry			
	1000X kn12	km3/yr	mm/yr	km'/yr	Mm/yr	%of rainfall	km'/yr. rainfall	mm/yr.	% of	%of IRR
Northern	5753	411	71.4	50	8.7	12.2	76.3	13.3	18.6	152.6
Sudano-Sahelian	8591	2878	335.0	170	19.8	5.9	24.1	2.8	0.8	14.1
Gulf of Guinea	2106	2965	1407.9	952	452.0	32.1	6.1	2.9	0.2	0.6
Central	5329	7621	1430.1	1946	365.2	25.5	1.4	0.3	0.02	0.1
Eastern	2916	2364	810.7	259	88.8	11.0	6.5	2.2	0.3	2.5
Islands	591	1005	1700.5	340	575.8	33.8	16.6	28.1	1.7	4.9
Southern	4739	2967	626.1	274	57.8	9.7	18.9	4.0	0.6	6.9
Total	30027	20211	673.1	3991	132.9	19.7	149.9	4.0	0.7	3.8

Source: ECA and FAO, 1995

2.2 Economics of Water Systems

At the 1992 International Conference on Water and the Environment in Dublin, Ireland, one of the principles adopted stated that "water has an economic value in all its competing uses and should be recognized as an economic good". Baumann & Boland, 1998, also wrote that "water is no different from any other economic good. It is no more a necessity than food, clothing, or housing, all of which obey the normal laws of economics". In contrast, Barlow & Clarke (2002) refer to water as a "universal and indivisible" truth that "the Earth's freshwater belongs to the Earth and all species and therefore must not be treated as a private commodity to be bought, sold, and traded for

profit. They point out further that “the global freshwater supply is a shared legacy, a public trust, and a fundamental human right, and therefore, a collective responsibility". Vandana Shiva (2002) writing about cultural differences in the way water is viewed said "a culture that sees water as sacred and treats its provision as a duty for the preservation of life and another that sees water as a commodity, and its ownership and trade as fundamental corporate rights. The culture of commodification is at war with diverse cultures of sharing, or receiving, and giving water as a free gift".

In spite of the mixed views that water is a shared legacy and thus should not be subjected to economic rules in its distribution, there seems to be a convergence in the literature that though water is a necessity for human life, like other such necessities, the principles of economics must be applied to ensure proper management. (Meinzen-Dick & Rosegrant, 2002; Hanemann , 2006; Noll, et. al., 2000; Rogers, et. al., 2002; Briscoe, J. 1996)

Applying economic theory to urban water supply gives rise to a number of important considerations for water policy.

2.2.a The Publicness or Privateness of Water

Economists use the terms public goods and private goods to refer to a precise definition of certain goods and services. (Samuelson, 1954; Buchanan, 1968; Coase, 1974; Ulbrich, 2003) Economists refer to a good or service as a public good if the good or service has the characteristics of non rivalry in consumption and nonexcludability. A good or service is said to be nonrival in consumption if it can be consumed by any number of consumers without affecting the quantity available for consumption by others.

An example suggested by Ulbrich is a beautiful sunset. With a private good, like a shoe, one person's consumption limits the other person from consuming the same shoe. Public goods are non excludable in the sense that it is impossible to keep people, especially non payers from consuming the good or service. National Defense is a typical example, once provided; taxpayers and non taxpayers enjoy it equally. On the other hand, with private goods, if it is so desired, it is possible to exclude others from consuming the good or service.

Within this structure, Hanemann argues that water exhibits both private good and public good characteristics. (Hanemann, 2006) When supplied through pipes to homes or supplied in a factory or a farm, water is a private good. Here, one consumer's use limits the amount of water available for other consumers. Also, non payers can be physically excluded from it use. However when water is left in its natural state, like in a river basin or a stream, it functions as a public good.[2] Hanemann quotes Samuelson as identifying two significant consequences of the public good properties. The first is the issue of free riders on the quantity of public goods to be supplied. Samuelson notes that public goods are mostly supplied collectively through the voting process (or through public taxes). (Samuelson, 1954) Private markets are unlikely to provide public goods because they can not exclude non payers from enjoying the good or service supplied. (Samuelson, 1954; Buchanan, 1968; Coase, 1974)[3] Public goods supplied through the voting process are likely to be undersupplied because free riders have an incentive to understate their true

[2] Technically, a water basin can be a private good if its owners can feasibly fence it and prevent non owners from using it. In practice, since a water basin cannot be fenced, it becomes essentially a public good for as long as it is not substantially depleted in terms of quantity and quality.

[3] It must be noted that the free rider problem can be dealt with if the public good is supplied through taxation and the tax collection system is effective.

interests in the public good. (Groves & Ledyard, 1977; Anderson & Leal, 1989) Second, since public goods can be consumed at the same time by potentially any consumer the valuation is different from the valuation of private goods. With private goods, the value of a unit of good or service consumed will be the value placed on it by the consumer. Thus, in an efficient market, the value of a unit of private good or service will be the value placed on it by the highest user or the user with the best use of the good. On the other hand, the value placed on a unit of public good is the value of all those who use or care for the public good. This phenomenon explains why the non market value placed on environmental preservation can sometimes outweigh the use value associated with diverting water for urban use. (Champ, et al. 1997; Loomis, 1997)

The public good nature of water in its natural state also has an influence on the legal status of water. (Hanemann, 2006) In SSA, under customary law, water is treated as a common property and therefore can not be owned by one person or one family. (Boateng, 1999) It is owned by the whole community and citizens of the community have a usufructuary right to use water. No individual citizens' right to water is greater than the other.

2.2.b The Cost of Urban Water

Delivering water to usage points in urban areas entails considerable cost. The cost of urban water is associated with four major processes. First, it involves the cost of capturing the water resource through diversion, reservoirs or ground wells. Once captured, the second process involves transporting the water to areas of economic need. The water then has to be treated, in the case of urban use, to improve the quality and

reduce contamination. The final process involves delivering the water to consumers through pipes.

The variability in the flow of water in its natural state also affects the cost of water supply to urban areas. Water system delivery becomes relatively simple if water usage is less than the inflow rate throughout the year. In a situation where usage is less than the rate of inflow, the need to store water is almost eliminated when seasonal variability and peak season use is accounted for. The capture process therefore involves diverting water from its source to the transportation system. It must be noted that temporary and seasonal variability in water flow affects the cost of water delivery. Intermittent and seasonal variability can introduce a situation where consumption may exceed inflow levels, though in the long run consumption is less than the rate of inflow. For ground aquifers, this may lead to a drop in the water table thereby increasing pumping costs. For surface water, temporary or seasonal storage facilities increase the overall cost of water delivery.

The infrastructure system needed for urban water systems requires very long term investments in fixed capital assets. (Aldo Baietti and Raymond, P., 2005, Hanemann, 2006) Even though variable costs associated with treatment, storage and transport can be expensive, investments in fixed costs far outstrip costs associated with variable costs. For instance, in the United Kingdom, fixed costs make up 80% of total water supply costs. (Armstrong, Cowan and Vickers, 1994) Investments in the fixed costs of water systems are recouped only in the long run after decades of operation. The rate at which

investments in fixed cost can be recouped depends on the economic viability and the proper management of the water system. (Dinar, 2000)

2.2.c Consumption

Water is an essential commodity for survival, thus, human beings will strive to acquire clean water. This presupposes therefore that at some point, the demand for clean water will be perfectly inelastic. However, in practice, the demand for water exhibits some level of elasticity. Noll et. al. estimates that the elasticity of demand for water in developing countries ranges from -0.25 to -0.75. This is so because, even in the poorest areas in SSA, the demand for water is not only for survival. In addition, it is almost always possible to find other sources of water elsewhere to complement or substitute for clean water from the national grid.[4] Thus pricing can have a varied with considerable effect on consumption patterns and waste. [5] In this case, if the price of water appears inexpensive, then wasting water will be a perfectly rational thing to do. With this, wasting water will only be imprudent if it creates a significant external diseconomy.

Mistakes in the pricing mechanism of urban water can have very significant consequences to water use and the overall sustainability of urban water systems. When prices are too low, there is an incentive for consumers to use more beyond what they actually need. An increase in the quantity demand of water with price staying constant then translates into the need to expand water delivery infrastructure beyond what is efficiently needed. If revenues from the water systems are not adequate to fund the

[4] However these sources may not be approved for consumption and its consumption can affect health and lead to other negative externalities

[5] Waste use emanating from failure to fix leaking pipes or refusing to turn of pipes properly when not in use

system, funding sources must come from general taxes or other sources, and this may be a sign of underpricing or a subsidy. The consequences of underpricing can lead to water system expansions based on faulty economic theory and inefficient distribution systems. (Dinar, 2000) On the other hand, if water revenues cover all expenses and leave surpluses, this may be a sign that water prices are too high. High prices that lead to surpluses may also prop up an inefficient management system.

Low water pricing leads to a number of negative externalities. With low priced water, there is no economic incentive on the part of the consumer to conserve water use. Leaky pipes and other spillage may collect in puddles or slow moving water ways. These puddles of water and standing water can serve as breeding grounds for disease carrying insects like mosquitoes. In this circumstance, there is the further social cost of paying for the effect of the disease carrying insects. The cost can be directly felt through increase in health care cost or indirectly through revenue losses due to increased sick days for employees.

Overpricing water has its own consequence as well. Over pricing water can have the effect of cutting off much needed economic uses. Here, an efficiency improvement in the management system can drastically reduce the cost of water.

Information asymmetry as to the value of water may also affects the price of water. Some consumers may lack the sophistication to comprehend the connection between water quality and health. Others may understand this connection in principle, but because they cannot see the presence of microorganisms and perceive its long term effect on their health, they may refuse to make the link. Thus, if the consumer demand for

quality water is too low due to information asymmetry, consumers may respond to higher prices for piped water by resorting to other low quality sources of water which is cheap. This market failure can be corrected by introducing subsidies to provide some minimum amount of water for human consumption. The minimum amount of clean water guaranteed to low income people and the less informed has been popularly referred to as the lifeline water strategy. (Whittington & Boland, 2003) Since subsidies in the form of the lifeline water strategy may increase water use, lifeline water blocks should be strategically set to what is needed for basic needs.

One important indicator used for assessing the efficiency of water utilities is the "unaccounted-for water" proportion. (Clarke et. al., 2004; Tremolet & Hunt, 2006; Baietti et. al., 2006; Noll et. al., 2000) Unaccounted-for water predominantly emanates from leaky distribution systems. Illegal water connections resulting in un-metered and unpaid for water also contributes to the proportion of unaccounted-for water. A reduction in the proportion of unaccounted for water will have the effect of reducing the need for expansion, storage, transportation, treatment and distribution capacity of new water utility systems. It must be noted however, that the cost of reduction in the proportion of unaccounted for water will be necessary only if the value of water saved will be more valuable than the cost incurred in reducing unaccounted for water or if consumers over time place a higher value on water.

2.3 State of Urban Water Supply in SSA

In spite of the existence of substantial amount of water resources on the continent of Africa, urban water supply coverage in SSA is not good. (Jaglin, 2002; Estache & Kouassi, 2002) Urban water supply is erratic, inadequate and in some cases non-existent. (Barlow & Clarke, 2002; Marq de Villiers, 1999) The United Nations estimates that water coverage in SSA stands at 57%. (United Nations, 2006) Water coverage in individual countries however varies considerably. In Ethiopia, coverage stands at 22% of the population. Nigeria, Mali and Uganda have water coverage of 48%, 50% and 60% respectively. In relatively prosperous South Africa, water coverage stands at 88% of the population. (www.wateraid.org) de Villiers writes that as many as twenty two African countries do not have the capacity to provide at least half of their population with adequate water supply. (de Villiers, 1999)

Considerable progress in providing safe drinking water and sanitation services was registered in SSA with the dedication of the 1980s the International Drinking Water and Sanitation Decade. About 40 to 52 million more people were provided with access to safe drinking water services in urban areas in SSA within this period. In spite of this progress, SSA still lags behind the rest of the world in achieving the drinking water target of 75% coverage by 2015 set forth in the United Nations Millennium Development Goals. (WHO & UNICEF, 2004; Whittington, 2007)

The inadequate supply of urban water in SSA has far reaching consequences for the development of the entire region. Human capital flight in SSA is in part due to the poor infrastructure development, including adequate water supply. (Mutume, 2003)

Gumisai Mutume argues that inadequate social services like water supply coverage are contributory factors to the outward migration of skilled workers from Africa. (Mutume, 2003) The United Nations Economic Commission for Africa and the International Organization for Migration (IOM) estimated that 27,000 Africans left the continent for industrialized countries between 1960 and 1975. From 1975 to 1984, the figure rose to 40,000. The current projections put human capital flight from Africa at about 20,000 people annually. To make up for the short fall in skilled labor, African governments spend an estimated $4 billion annually to employ about 100,000 non African expatriates. According to the UNDP, Ethiopia which has water supply coverage of 22% of the population lost 75 per cent of its skilled workforce between 1980 and 1991. Currently, there are more Ethiopian medical doctors in Chicago than in Ethiopia. There are only 108 surgeons to serve the over 73 million people. [6] Apart from the effect of the loss of skilled personnel on the local economy, the governments also have to spend huge sums of money to hire foreign expatriates at a rate higher than local talent.

There is no compensation in terms of an inward transfer of skilled personnel to SSA to make up for the loss. The reason for this phenomenon can be explained with the reverse effect of Richard Florida's theory of 'the creative class'. According to Florida, the creative class, which is made up of smart and talented people, is responsible for the economic development of a city. Thus if a city wants to develop, then it must position itself to attract the creative class. Using statistical analysis and indicators such as social

[6] Shore, Bill, Share our Strength, Medical Students Beyond Borders, April 10, 2007. Available at http://www.sharingwitness.org/health_welfare/medical_students_beyond_border/

amenities and social freedoms, Florida explained that cities which have among other things well structured social infrastructure were able to attract more of the creative class. (Florida, 2002) The corollary of Florida's argument appears to be true for SSA. Since SSA lacks adequate infrastructural development including adequate supply of water, it is not positioned strategically to attract professionals and some of the brightest talent around the world. It is not surprising therefore that in 2006, foreign direct investment to SSA accounted for only 1.8% of all global foreign direct investment inflows. (UNCTAD, 2007; Snarr & Snarr, 2008)

Agriculture and industrialization also suffers as a result of the inadequate supply of water in SSA. According to the Food and Agriculture Organization (FAO) food insecurity and insufficiency in SSA is directly related to the water supply. SSA has depended on rain fed agriculture for a considerable period of time. (Schraeder, 2004) Recent changes in climatic conditions that have increased the variability and availability of rainfall has negatively affected agricultural production in SSA. Lack of well developed irrigation structures to augment rain-fed agriculture and also help expand agricultural production has reduced agricultural production in SSA to subsistence level which is plagued with multiple crop failures. (FAO-AQUASTAT, 2005) These issues associated with urban water supply in SSA fall into two broad categories of problems; resources/supply related problems and demand related problems.

2.3.a Resource/Supply Related Problems

The resource related problems involve sustainable water availability. These issues deal with the distribution, occurrence, management and protection of water resources and

the natural systems which the water resources depend on in SSA. The supply side issues form the broader context through which water becomes available to meet the needs in agriculture, industry and domestic water use. The existence or occurrence of water resources in itself does not translate to adequate water supply. It is the institutional arrangements for proper management, protection and agreements of distributional modalities that will ensure adequate water supply for use in SSA.

2.3.a.i Multiple International Water Basins

One of the issues related to the supply side problems of water supply in SSA is how to achieve water cooperation on a continent replete with multiple trans-boundary water basins. Almost every country in SSA including Egypt is a riparian owner to, at least, one international water basin. Africa has over 80 international water basins with many basins having more than 3 riparian countries. The Nile basin which has a basin area of 3.4 million KM^2 has 10 riparian countries. In the case of Guinea, located at the west coast of Africa, 12 different international rivers pass through it territory. The water interdependence problem is exacerbated by the fact that in some downstream countries, high percentages of the flow originate from multiple countries upstream. The water interdependence has been the subject of many international disputes, the most notable one being the increasing tension between Egypt and Sudan over the use of the Nile River. (Swain, 1997) Egypt, a downstream riparian on the Nile River has almost its entire flow emanating from outside its borders. (United Nations, 2005) In Mauritania and Botswana, the total flow originating from other upstream countries is 95% and 94%, respectively.

The Gambia and Sudan have 86% and 77% of flow coming from other upstream countries, respectively.

Table 2.2 summarizes riparian ownership in six major water basins in Africa.

Table 2.2 Major Trans-boundary Water Basins in Africa

Water Basin	No. of Countries	Countries in the Basin	Existence of Basin Organization
Nile	10	Burundi, Egypt, Ethiopia, Kenya, Sudan Rwanda, Tanzania, Uganda, Zaire, Eritrea	Yes
Congo	9	Angola, Burundi, Cameroon, Congo Central African Republic, Rwanda, Zaire, Zambia, Tanzania	NO
Niger	9	Benin, Burkina Faso, Cameroon, Chad, Cote d'Ivoire, Guinea, Mali, Niger, Nigeria	Yes
Zambezi	8	Angola, Botswana, Malawi, Namibia Mozambique, Tanzania, Zambia, Zimbabwe	Yes
Lake Chad	8	Algeria, Cameroon, Chad, Libya, Sudan, Central African Republic, Niger, Nigeria	Yes
Volta	6	Benin, Burkina Faso, Cote d'Ivoire, Mali, Ghana,	NO

Adapted from presentation by David Grey, World Bank

In spite of the interdependent nature of river basins in SSA, there is very little cooperation between riparian countries as to the management of the river basins. The complexity of these trans-boundary river basins exist in a continent which has weak national institutions, weak international laws and a volatile regional cooperation on water issues. (McGowan & Johnson, 1984; Hyden & Bratton, 1992; Schraeder, 2002; Shraeder, 2004) Parochial national interests tend to prevail in most cases over shared basin interests. In 1987, the United Nations Environment Program (UNEP) led an effort to create the Zambezi River Action Plan (ZACPLAN), an environmentally sound

management plan for the Zambezi River basin between the eight basin countries. At the eleventh hour, Malawi and Botswana based on political reasons backed out of the plan putting a nail to the coffin of the plan. After intense negotiations between the basin countries the Zambezi Watercourse Commission was created in 2004 by the basin countries. However, Zambia, an important basin country is yet to sign.

Even though the FAO has called for creation of a basin organization, no agency exists yet for the Volta River Basin. Among the six countries of the basin, only Ghana and Burkina Faso have increased their dialogue for the management of their shared water resources. (http://www.fao.org/nr/water/aquastat/regions/africa/index.stm)

There is ample evidence that water resources management is best done at the basin level. (Doherty et. al. 1992; Lawson, 2006; Falconer et. al. 2007) Thus, the proper management, development and long term sustainability of water sources in SSA is dependent on international cooperation between basin countries. It must be noted however that cooperation does not come easily. In a single country like the United States, many trans-boundary states have not been able to reach agreement on the use of common water basins. (Dellapenna, 2007) The consequences of such disagreements can be very devastating especially among sovereign nations. Unlike the United States, in SSA, there is no central authority with enough power to force feuding parties to agree on the use of common water basins. In fact, international relations are highly competitive and states put a lot of importance on their interests. In the absence of cooperation in SSA, the potential for conflicts between riparian countries has increased in recent times and there is the possibility of escalation of such conflicts. (Swain, 1997) Agreements over the use of the

river basins however hold the key to cooperation between riparian countries to achieve sustainable management practices and realize maximum benefits from the river basins.

The South African Development Community's (SADC) Protocol on Shared Watercourse Systems offers a model for cooperation in the management of shared water resources. The Nile River Basin initiative is also a step in the right direction to achieve cooperation between countries within the Nile River Basin. However, this basin initiative is only a starting point and does not in any way represent a comprehensive agreement as to the use of resources within the basin. For instance the failure of the riparian countries of the Nile River to agree to the specific volumetric water allocation which must be available to Egypt downstream has been a subject of conflict between Egypt and Sudan. The countries sharing the Niger River Basin and the Lake Chad Basin have also entered into joint cooperation to work towards a harmonized environmental policy and the sustainable withdrawals from the respective basins. These examples of cooperation between countries, though limited, is encouraging and holds the key to a full scale agreement as to the use of all basin resources in the future.

2.3.a.ii Disparity and variability in Rainfall

The variability in rainfall is a natural phenomenon that is driven in part by the complex natural planetary forces which is hardly well understood. In recent times, the variability and incidence of rainfall also has been affected by what the scientific community refers to as world climate change. Apart from the direct use of rainfall for agriculture in SSA, rainfall also feeds rivers and recharges groundwater aquifers. The high incidence of disparity and variability of rainfall therefore affects the flow of rivers

and availability of groundwater. The consequences are far reaching for downstream countries as it provides unreliable flow of water. The unreliability of flow adversely affects water planning services for domestic water supply and agricultural production.

As depicted in Table 2.1, there is high regional variability in rainfall in SSA. Great disparities also exist between different regions within individual countries. For instance, South Africa receives only 12% of the SSA's total rainfall. However, the Congo River basin located in the central humid zone which has 10% of the population of Africa receives 35% of runoff in Africa. In addition, in the Gulf of Guinea region located at the west coast of Africa, rainfall is in excess of 1,400 mm. The Kalahari Desert located to the south has annual rainfall of less than 50mm. (United Nations, 2005)

According to the United Nations, Africa has an annual rainfall rate comparable to Europe and North America. However, the higher evaporation of water in Africa leads to a substantially lower net rainfall gain on the continent. The high evaporation and the increasing variability in rainfall affect the availability of water resources for agriculture and domestic use in SSA. Through the Integrated Water Resource Management framework, certain structural steps can be taken to improve the management of runoffs. An important step in this direction is the integrated management of land use patterns, forests and wetlands. (Shaver et. al. 2007) Vegetative cover reduces the amount of runoff and increases percolation of water to charge groundwater aquifers. Forested areas also reduce the amount of evaporation from water bodies. In addition, in domestic and industrial settings, through partnerships with planners and the construction industry, buildings in urban areas can be constructed to harvest water during the raining season.

Such water can augment processing for industries and also outdoor water use for domestic consumers.

2.3.a.iii Inadequate Institutional and Regulatory Regimes

An important factor affecting the supply of water in SSA is the existence of an effective institutional arrangement and regulatory regime at the local and international level to preside over water supply. At the international level, the inadequate institutional and regulatory regimes to ensure water management between basin states affect the use of water within river basins. (Pallett, 1997; Starr, 1991) Where institutions exist, inadequate financial support and the lack of real political power to embark on its work have curtailed the effectiveness of such institutions. For instance, the activities of the Nile River Basin Initiative have been limited due to the lack of financial support for the regulatory institution. Although all riparian countries have agreed to jointly fund the activities of the Nile River Basin Initiative, annual contributions have always been delayed and in some cases never sent at all. For instance, Sudan has reneged several times on its promise to contribute to the funding of the organization. (Ashok, 2002)

Industrial pollution also has caused considerable pollution in Swaziland, negatively affecting poor communities who live at the catchment areas of the watersheds. In 1991, the Atomic Energy Corporation in South Africa caused a spillage of 80,000 - 100,000 tones of caustic soda near the Hartbeesport Dam, leading to the massive deaths of fish and other aquatic life. (Ngonidzashe Moyo & Sibekhile Mtetwa, 2007)

These polluted water bodies pose severe health hazards, especially to poor communities located along the water bodies who use untreated water for domestic

activities. Although in most SSA countries, there are environmental laws in place for watersheds, they are hardly enforced. (Hardoy et. al., 2001)

It must be noted that in recent times, many SSA countries have made attempts to adopt policies to create new institutions for environmental protection and also strengthen existing ones. In this direction, there has been an increasing awareness of and political commitment to Integrated Water Resources Management (IWRM). (Lahtela, V. 2001; Stephenson, 2003) The IWRM is an international framework that offers guidelines to water management. The Technical Advisory Committee of the Global Water Partnership defined Integrated Water Resources Management (IWRM) "as a process, which promotes the coordinated development and management of water, land and related resources in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems," and stressed that water should be managed at the basin level through the principles of good governance and public participation. The principles of the IWRM framework have been carefully formulated through a consultative process involving international experts leading to the International Conference on Water and the Environment in Dublin, Ireland in 1992. (Global Water Partnership, 2002) Although countries have committed to the principles of IWRM in water management, its implementation has been very challenging. (Rahaman & Varis 2005) At the Hague Forum and the Bohn Conference, information on privatization and private sector participation in water management was disseminated extensively as

one of the integral parts of IWRM. [7] In SSA, attempts at private sector participation in water have been met with stiff opposition from civil society groups. Institutional and legal problems also have led to early abrogation of public-private attempts at water management. (Hall et. al., 2002; Clark et. al. 2004; Balance & Tremolet, 2005)

2.3.b Demand Side Issues

Demand side issues of water supply in SSA relate to the management of competing demands for available water resources. The demand side issues consider the extent to which such conflicting demands are managed in an equitable and sustainable way. It looks at the issues that confront water policy makers in their quest to satisfy the demands of the urban dwellers.

2.3.b.i Infrastructure Development

Many cities in SSA spend an equivalent of $1 to $2 per person per infrastructure compared to cities such as Vienna, Tokyo and Helsinki which spends $1000 to $2000 per person on infrastructure. In SSA therefore very little capital expenditure is expended for infrastructure development in urban areas. (UNCHS, 1996) A major contributing factor to the inadequate water supply in SSA is the neglect in the maintenance of installed equipment. In Conakry, Guinea for instance the sanitation network which was built in 1954 has ceased to operate because of lack of proper maintenance of the facilities. (Champetier et. al., 2000) Currently, in many SSA countries, a considerable amount of borrowed resources for water supply goes towards rehabilitating installed equipment

[7] Second World Water Forum & Ministerial Conference (The Hague 2000); International Conference on Freshwater – Bonn 2001

instead of expanding services. This practice therefore constrains efforts aimed at expanding services to the poor in urban areas. (WaterAid International)

One of the underlying causes of the lack of adequate infrastructure to support water supply in SSA is political instability and corruption in officialdom. Upon gaining independence from European colonial powers in the 1950s, many SSA countries descended into a spiral of internal power struggles that often led to political and social chaos. (Clapham, 1996; Rothchild, 1997, Young, 1993; Middleton, 1997) The struggle between various ethnic and tribal groups for political control of their respective countries generated political instability in many SSA countries. (Clapham, 1996; Rothchild, 1997; Schraeder, 2004) Numerous coups d'état and political instability in SSA maintained the corrupt rule of dictators for many years in total disregard to established constitutions and in turn slowed down infrastructure development. For the 48 SSA countries granted independence between January 1956 and December 2001, there have been 80 successful coups d'état, 108 failed coup attempts and 139 reported coup plots. (McGowan, 2003) Most of these coups d'état have been orchestrated with the help of other neighboring SSA countries. (Clapham, 1996) For instance, in Burundi from 1993 to 1996 there were six different heads of state. Although beginning from the late 1990s, there has been a considerable reduction in the number of coups d'etat, SSA is still the most conflict prone and politically unstable region in the world. (Deng, Kimaro, Lyons, Rothchild and Zartman, 1995) Transparency International rates SSA as having the highest corruption index in the world. (Transparency International, 2007)

Wars and civil conflicts that resulted from these political instabilities are a primary reason for SSA's lack of adequate water supply systems. This political instability created a sense of insecurity for most of SSA countries consuming political agendas. (Clapham, 1996) There was therefore little time for political leaders to pay any attention to the infrastructural developments of their respective countries. (Clapham, 1996; Schraeder, 2004)) Bureaucrats and civilians were helpless as most of these military leaders and civilian dictators were unaccountable. Existing water infrastructure in particular did not see any meaningful maintenance and there was little or no attempt whatsoever for expansion or development. For instance, Liberia has not had any major refurbishment of it water infrastructure system since its construction. In fact the small incremental gains that were chalked during the 1970s and the 1980s under the then relatively prosperous government of the Tolbert administration have been totally destroyed by the destructive civil wars of the 1990s. In Burundi, the civil wars of the late 1990s have reduced the capacity of the water system from its pre war coverage of 70% to less than 45% coverage. In Ghana, the Akosombo Dam and the Brimbrimso Water System which provide water to urban centers in the south has not seen any major repairs since they were built in the 1960s. (African Development Bank, 2005)

2.3.b.ii. Urban planning – urbanization

Africa experiences the most rapid rate of urbanization in the world – at 5% per annum. (AfDB, 2000) Population in cities such as Abidjan, Dar es Salaam, Dakar, Kampala, Kinshasa, Nairobi, Lagos, and Lusaka grew more than twenty fold between 1950 and 2000. (UN HABITAT, 2003) UN estimates suggest that growth in urban

populations far outstrip rural population growth. They estimate further that 85% of population growth in the world will be in urban areas and almost all this growth will be in Africa, Asia and Latin America. (UN HABITAT, 2003) It must be noted that rapid urban growth is not only peculiar to developing countries; many countries in Western Europe, Japan and USA have also had periods of rapid urbanization. (Preston, 1979) However, there are other peculiar issues in developing countries that make rapid urbanization a difficulty for urban utility provision in SSA. The extent of utility coverage varies from city to city depending on location, natural resource endowment, demographic structure, existing economy and infrastructure development (a factor of past decisions and investments). It must be noted also that there is no clear association between availability of fresh water per person and the quality or extent of water coverage. There are many cities with no piped water provision even though they have abundant fresh water supplies. In addition to the availability of freshwater, the extent of urban water supply depends on the adoption of appropriate policies like the requisite infrastructure development, pricing mechanisms and the long term protection of freshwater sources.

Rapid urbanization has given rise to increased shanty towns, squatter communities and enclaves of populations living in low income neighborhoods. (Rakodi, 1997; de Soto, 2000) For such disadvantaged communities, the basic structures of government agencies with utility responsibilities are at best partially present and at worst nonexistent. The unplanned nature of shanty towns in urban areas leaves little room for infrastructure to be built. Government planning of cities is not able to keep up with the rate of urbanization. Thus, it is common to find unauthorized structures springing up in

public places and areas designated for infrastructure development. Often government agencies are rooted in corruption, have undemocratic structures, favor elites and limit disadvantaged communities from demanding their rights. Where urban structure plans exist, public officials are ill equipped for enforcement.

Table 2.3 Urban Growth in Selected African Cities

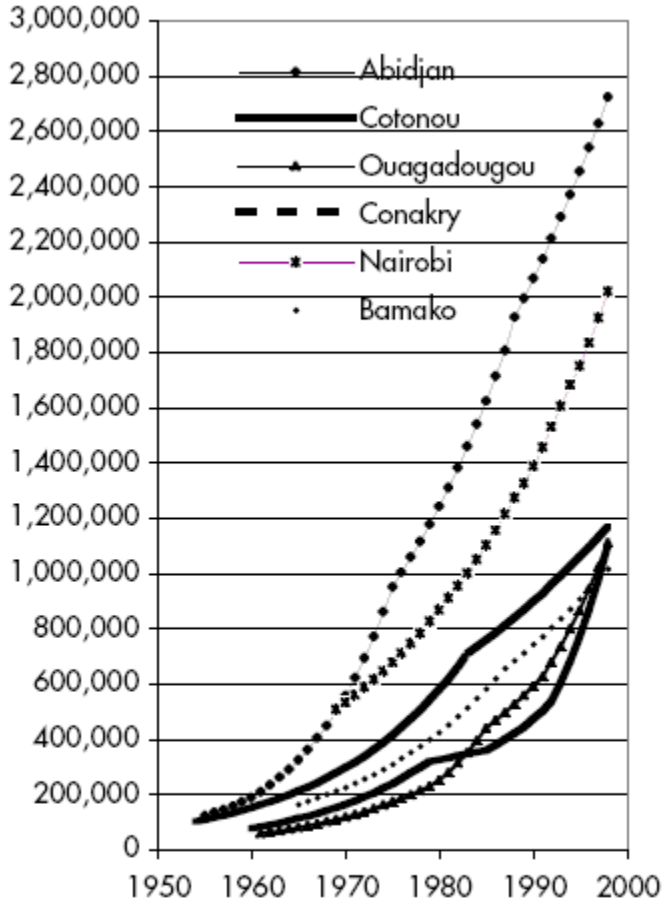


Figure 2.1. Urban growth in six African cities, 1955–2000.

Source: Collignon, 2000

Table 2.4 Poverty, Informal Employment, and Urban Growth Rates in Ten African Cities

Table 2.3. Poverty, informal employment, and urban growth rates in ten African cities.

City	% households below poverty threshhold	Country poverty thresholds (US$/hh/month)	% employment in informal sector	% annual city growth rate
Kampala (Uganda)	77	$144	46	4.76
Conakry (Guinea)	41	n.a.	73	5.80
Abidjan (Côte d'Ivoire)	36	$284	65	5.00
Bamako (Mali)	36	n.a.	36	6.40
Cotonou (Benin)	28	n.a.	77	4.05
Nairobi (Kenya)	27	$32	52	4.70
Nouakchott (Mauritania)	25	$95	41	8.00
Dar es Salaam (Tanzania)	23	n.a.	56	4.30
Dakar (Senegal)	12	$76	47	3.40
Ouagadougou (Burkina Faso)	11	$244	60	9.40
AFRICA	**39**	**$92**	**56**	**5.20**

Source: UNDP, 1999

Some of the variation in poverty rates reflects different methods of calculating the urban poverty threshold and different national strategies for reducing poverty.

7

2.3.b.iii Political Causes

Civil wars and tribal conflicts are a key contributory factor to the increased urbanization in SSA. During wars and conflicts, a considerable proportion of the internally displaced people move to the urban areas, in part, to seek refuge and also to establish new bases for their families to live. For instance, during the 1980s and 1990s civil wars in Angola, Mozambique and Sudan, millions of displaced people fled to urban areas. The same trend occurred earlier in Zimbabwe/Rhodesia during their liberation struggle of the 1970s. (Potts, 1995) Movement patterns and trends make it difficult to accurately determine population counts for planning purposes. For instance, since the

1970s, Angola has not had any full census. (Cain, Daly & Robson, 2002) Yet, since the 1970s, there have been huge population movements in Angola. Rural areas became unsafe during the 1980s conflicts, and this triggered a mass movement to small towns, inland cities and major cities along the coast. (Cain et. al. 2002) Throughout SSA, the number of internally displaced people increased markedly during the 1990s and most of these people ended up living in urban areas. (Castle & Miller, 1993)

2.3.b.iv Squatter and Illegal Settlements

Increased urbanization has accelerated the growth of squatters and illegal settlements in urban centers. It is common to find between a quarter to half of all city dwellers living in informal or illegal settlements. (Hardoy & Satterthwaite, 1989) That is to say there is some illegality with either the land being settled on or the housing development on the land. Squatter and illegal settlements have significant importance for water provision because public and official private water providers may be precluded by law from operating in these areas. In addition, such illegal settlements may lack the preconditions necessary for water service delivery. Plots on which houses are built may not have the proper legal documentation that will allow them to be registered, houses may not have any identifiable or formal addresses, or they may not have the right documents to show plot boundaries and legal ownerships. (de Soto, 2000) Such informal and illegal settlements areas suffer particularly from bad utility services because some countries make ownership or proper documentation a condition for such services. For instance, in Senegal, applicants for social water connections (subsidized water to poor

households) must among other things prove that he or she has proper legal documentation to the residence. (Lauria, Hopkins & Debomy, 2005)

The nonexistence of proper property titles also poses a challenge to situations where the private sector involvement has been sought to increase water services. (Nickson, 2001) The absence of legal title may remove any legal requirement for the private provider to extend services to these illegal settlements. For example, in 1999 in Cartagena, Columbia, the World Bank reported that about one-third of the residents did not have access to running water and sanitation. The concessionaire on the other hand argued that over 90 percent of the residents were served by the water network. The concessionaires arrived at their 90 percent coverage figure without counting the numerous squatters in the city. (Nickson, 2001)

It must be noted that the degree of illegality varies from country to country and within countries, from city to city. Although illegal and informal settlements inhibit supply of improved water services by utility operators, the extent to which the operator can reach the informal settlement varies from city to city. Many water supply agencies may have no difficulty in working in many illegal settlements. For instance, water agencies may routinely support water supply in illegal housing complex where the land is not occupied illegally, but were built without obtaining official permission. In some cities, most of the illegality is due to the fact that no official permission was obtained for building, or buildings were built in violation of the existing zoning regulations. In such instances, utility operators are less apprehensive in providing water services, especially if the settlement has many middle or upper income residents. Also, water companies may

normally provide water services if the residents of the illegal settlement have reached an agreement with the authorities or the water and sanitation agency to regularize their stay over time. The problems of illegal settlements are compounded by the fact that in many cities such settlements spring up with the tolerance and tacit approval of local and national governments. For instance, in 2004, the Accra Metropolitan Assembly evicted a considerable number of illegal traders, among them squatters from public lands as part of a citywide decongestion exercise. But before the exercise would be completed, the government ordered it to stop and the squatters returned to their illegal settlements overnight.

Small scale water providers may be reluctant to invest in illegal settlements for fear of future eviction. Residents may also refrain from investing in any permanent water supply structures for fear of future eviction. The problems do not go away even in instances where the government takes steps to regularize the stay of squatters and other illegal settlers. Because the initial settlement was executed without adherence to any rules, it is common to find houses built on any available space in the community. The resultant effect is a settlement with few access roads and few access points for water utilities. Thus, after regularization of such settlements, it becomes next to impossible to lay utility pipes. The haphazard nature of the developments leaves very little room for utility pipes. It is more difficult and expensive to install water systems in settlements that lack clearly demarcated plots, good plot layout and access roads and paths to each house.

In SSA, historical conditions have not been conducive to favor development of effective local authorities. The European colonists paid little attention to developing local

governmental structures. There was therefore very little to build on after the wave of decolonization in the 1950s, 60s and 70s. (Schraeder, 2004; Clapham, 1996) Newly independent SSA countries were confronted with the shock of massive urban changes as restrictions in working and living in urban centers were removed.[8] (Potts, 1995) In most countries, the colonial governments had put in place water infrastructure strategically to benefit their commercial and industrial interests. Local government systems that will allow a functional water system were nonexistent. Thus, at independence, only weak structures existed for urban water and utility planning. At independence, the new national governments failed to put emphasis on strengthening the capacities of local government systems to meet the challenges of urban planning. (Schraeder, 2004) Many national governments rather placed emphasis on consolidating security to perpetuate their rule. (Clapham, 1996) In addition to this, many SSA countries descended into years of conflicts and anarchy not too long after independence. It therefore comes as no surprise that many SSA countries have woefully inadequate urban water supply.

2.3.b.v Capacity of Local Utilities

The ability to supply water to urban areas is affected by the nature and operations of local utility companies. It has increasingly been recognized that one of the problems affecting water provision in urban areas in developing countries is the poor performance of utility companies. (McIntosh & Yniguez, 1997) For many countries in SSA, tariffs charged by the utility agency are not enough to cover the cost of production. Tariff limitations imposed by regulatory agencies limit the ability of utility companies to

[8] Almost all European colonial powers kept down urban population during colonization by imposing apartheid like restrictions on the right of people to live and work in urban areas

accumulate resources for future repairs or extension of services to new settlements. (Balance & Tremolet, 2005) For many local utility agencies financial resources for capital expenditure can be possible only through grant financing.

The incapacity of local utility agencies is partly due to institutional problems. Utility agencies like other bureaucratic agencies in SSA suffer from inefficient administrative practices, insufficient information and communication, inadequate skilled human resources and overstaffed agencies.

The World Health Organization (WHO) reported in 2000 that the use of water meters is very prevalent in urban areas in Africa. About 80 percent of all domestic water users are metered. However, the frequency with which these meters are replaced is very low. On the average, meters are replaced every eight years. (WHO & UNICEF, 2000) Taking into consideration the fact that water meters under-read as they age, it is likely that consumers pay less for water as their meters age. This increases the unaccounted for water rate and further compounds the unsustainability of water utility agencies in Africa.

According to a 2000 assessment report of WHO and UNICEF, meter replacements represent a substantial expenditure for a water supply agency. In many countries, meter replacement may form a high proportion of foreign exchange expenditure in the water supply sector. It comes as no surprise therefore that the average replacement time for water meters is high even though this may lead to broken meters, underbilling and increase in the unaccounted-for water. For instance, the unaccounted-for water rate in Uganda is 37% and as high as 55% in Dar es Salaam in Tanzania. (Balance & Tremolet, 2005)

2.4 Impacts of Inadequate Water Supply

As depicted in the preceding sections, the majority of urban areas in SSA suffer from inadequate supply of portable water. The lack of adequate water supply presents very serious negative consequences for urban settlements in SSA. Negative consequences such as health problems, cost of finding alternative water supply through high monetary cost and time cost in finding alternative water sources ricochets through urban areas in SSA. The inadequacies in water supply disproportionally affect low income households within urban centers. And within the low income households, much of the burden for finding alternative sources of water rests on women and children. Apart from the effects on persons and households, the inadequacy in urban water supply also affects the economic development potential of cities and nations.

2.4.a Health Effects

Urban centers are characteristically a concentration of dense human settlement patterns. Such human concentration centers are also characteristically full of waste from residential settlements and industrial estates. According to WHO, whenever infrastructure and services are inadequate, urban centers become one of the most life threatening human environments in the world. (WHO, 1999) Inadequate water supply gives rise to many diseases and in urban slums, living in close proximity with one another fuels the spread of some of the diseases. At any particular time, almost half of urban dwellers in SSA are suffering from one or more of the major diseases associated with inadequate water supply. (WHO, 1999)

Water related diseases are classified into four main groups in accordance to the way by which such infections are contracted. The four groups are fecal-oral, water-washed, water-based and water-related insect vector. (Cairncross & Feachem, 1993)

Diarrhea is the most common fecal-oral diseases and it accounts for a significant proportion of illness in children and adults. Diarrhea also accounts for a high percentage of water related deaths in infants and children. (Songsore & McGranahan, 1993) The diarrhea causing microorganisms can be water borne and can also be transmitted through fecal-oral routes by which the organisms enter the mouth. (Example, refusing to wash hands properly after using the bathroom) In poor urban areas where the provision of water is inadequate, fecal-oral diseases can pose a serious health challenge to the entire city. (Songsore & McGranahan, 1993) In Nairobi, Kenya for instance, the occurrence of diarrhea in children under three years old living in informal sectors were found to be twice the national average. (UN-HABITAT, 2003) Human congestion and improper human hygiene can fuel the spread of such diseases. It is not uncommon to find three to five persons sharing a room in poor neighborhoods in urban centers in SSA.

Inadequate water supply for washing and bathing is the leading cause of water-washed diseases. Such diseases include various forms of skin and eye infections like scabies and trachoma. In a study of 1103 primary school students in the urban area of Bamako, Mali, the occurrence of scabies among pupils was around 4%. The occurrence of scabies ranged from 1.8% at the schools with the highest socio-economic levels to 5% in schools serving poor neighborhoods. (Landwehr et. al., 1998)

Bilharzia and guinea worm are the two most prevalent water-based diseases. These diseases predominantly affect people living in rural areas because of the fact that infection mostly takes place in people working in irrigated farms and walking in streams and rivers. Increasing number of cases of bilharzias and guinea worm are beginning to show up in urban areas as well. As a result of the increasing tide of rural-urban migration, infected people find themselves in urban centers. In addition, it is not uncommon to find water bodies in urban centers harboring the aquatic snails through which the disease is contracted. Poor neighborhoods in urban centers are the most vulnerable to the incidence of water-based diseases. Low income households are more likely to fetch water from streams and ponds to augment their daily water needs.

Malaria is by far the most serious effect of diseases spread by water related insects in urban centers. Once considered a rural disease, malaria is now one of the leading causes of illness and deaths among urban dwellers. (UN-HABITAT, 2003) In SSA, drinking water storage containers among others have become breeding grounds for the parasite carrying mosquitoes. Inadequacy in urban water supply has forced many urban dwellers to store water in containers in their homes. The Anopheles mosquito which carries the malaria parasite breeds in standing water and therefore finds small water containers and other domestic storage facilities which are not covered properly good breeding grounds. (Cairncross & Feachem, 1993)

Diarrhea and malaria are the two main killers in Luanda. (Cain et. al., 2002) It is interesting to note that opinions differ in regards to the extent to which inadequate water supply contribute to diseases. Data at the city level from Global Urban Indicators indicate

that child mortality rates are highly correlated with the availability of portable water and sanitation than with other variables like household poverty and access to health care. (Shi, A, 2000) In other studies, the link between environmental factors and health are very strong even with constant social and economic variables. (Victoria, et. al., 1988; Woldemicael, 2000) It is however clear that the linkage of water to health and other socioeconomic variables is very complex. This linkage can vary from place to place. In Ghana for instance, the effect of environmental factors on diarrhea prevalence are modest when socioeconomic factors are held constant. This may be due to the fact that provision of water in urban areas is very poor. On the other hand, in Thailand, environmental factors have a strong correlation with the prevalence of diarrhea, but not to mortality. This may be explained by the relatively high access and use of health services. (Timaeus & Lush, 1995) In spite of the place differentials, children have a higher propensity to contract diarrhea, worm infestation, malnutrition and other diseases where there is inadequate supply of water and sanitation and improved conditions lower this risk. (Shi, 2000; Timaeus & Lush, 1995)

2.4.b Costs and Perpetuation of Inequality

The health impacts resulting from inadequate supply of water in urban areas cost a lot of money for the victims to treat. The cost can also result in lost wages and lost time pursuing economic activities. Inadequate water supply also means huge physical efforts on the part of urban dwellers to fetch water and carry water. Residents spend long hours in queues and suffer the inconvenience of carrying water over long distances. There have been reports of children getting killed by cars while crossing the street to fetch water. It is

interesting to note that these impacts are disproportionately felt by poor neighborhoods and disadvantaged urban communities. The UN has noted that the extent to which segments of the urban population feel the effects of such impacts are difficult to estimate. It is often difficult to get accurate data on the demographic structure of urban areas in developing countries. In small urban centers, data on urban demographics are virtually non existent. Available data on quality and extent of service is calculated in averages. Thus, outlier information can significantly skew the accuracy of the data. In Accra, two thirds of the poorest households did not have water supply in their households compared to 12% for the wealthiest households.

Apart from the fact that most poor urban households pay a large proportion of their income on water than non-poor households, they also pay higher prices per liter of water than non-poor households. Studies have found that low income households which rely on vendors in large urban centers spend 5 to 10 percent of their total income on water. In Nouakchott for instance, it is estimated that low income households spend between 14 to 20 percent of their total income on water. (Azandossessi, 2000) In Khartoum, Sudan, as much as 35 percent of household income for poor households went to payment of water from vendors. (Cairncross, 1990) Expenditure for water reduces the amount of money spent on food thereby increasing malnutrition and eventually contributing to increasing levels of child mortality.

Water costs are particularly high for those who depend on some form of vendor services for their water supply. The price of water from vendors can range from 10 to 100 times higher than the unit price of water connections for house connections. It has been

estimated that water vendors serve between 20 to 30 percent of all urban population dwellers in low and middle income countries. (Briscoe, 1986) This number is estimated to have risen considerably in Africa, Asia and Latin American which has seen a population increase of over 700 million since Briscoe's analysis. In a survey of selected Asian cities by the Asian Development Bank, it was found that the unit cost of public taps may also be much higher than the unit cost of house connections.

In many urban areas where dwellers are dependent on vendors for their water supply, 150 liters of water a day will cost more than US$1. (In general each person uses 20-30 liters of water per day.) 150 liters for a household of 5 is generally not sufficient for good hygiene. For purposes of ensuring general hygiene, about 600 liters of water will be required. (UN-HABITAT) The cost of 600 liters will run into several US dollars per day and this would be beyond the means of many poor urban dwellers. This presupposes that the price of water limits the ability of many urban dwellers from getting access safe and adequate supply of water. Although generally very expensive, vendor services are very important to the survival of many urban dwellers. In addition, most water vendors in urban areas operate in a competitive market and the price of vendor supplied water is an indication of the operating cost of vendors.

2.4.c Travel Time and Associated Costs

In poor urban communities where there is no piped water into households, a member of the household has to spend time to get water. Compared to households with piped water where virtually no travel time is spent on water, unconnected households spend an average of an hour every day to get water. (UN-HABITAT, 2003) A

considerable amount of time is spent is long queues for water in the morning and in the evening. Since low income people spend long hours at work, this time spent getting water diminishes their economic earning potential. Staying in queues for a long time at stand pipes which have erratic water flow is a source of tension and they often degenerate into conflicts. In a study of households in 16 sites in 9 urban areas in Kenya, Uganda and Tanzania in 1997, it was found that households with no piped water spent an average of 92 minutes every day collecting water. (Thompson et. al., 2000) This translates into an average of over 500 man hours spent each year on water. Compared to the 1960s when average water collection time was 28 minutes, 92 minutes represent more that a threefold increase in collection time.

The person or persons responsible for fetching water will have to wake up very early in the morning to ensure there is enough water in the household for morning chores. Women and children are normally designated with the responsibility of collecting water. It must be noted that in some disadvantaged urban communities where the majority of the people are made up of rural migrants, it is not uncommon to find men in queues for water. This is explained by the fact that some men leave their families in the rural areas while they migrate into the cities in search of jobs to provide for their families in the villages. Irrespective of who the responsibility falls on to fetch water, water is very heavy to carry. The longer the distance traveled with water, the more the physical strain on the person carrying the water. Thus, the amount of water used will depend to a large extent on the distance that one has to carry the water from. A household that maintains consumption rate of only 150 liters a day (ie equivalent of 4 buckets) will mean carrying

150 kilograms of water from the fetching point every day. It is therefore not surprising that those who have the responsibility for carrying water develop severe back problems. The strain of carrying water for long distance coupled with the chance of road accidents put children at high risk.

2.5 Government Response to Urban Water Crisis in SSA

It is reasonable to assume that no responsible government will be happy about the effects that inadequate water supply has on its citizens. In SSA, various efforts have been attempted to ease the effect of inadequate water supply while at the same time planning to increase water supply. Policy options and institutional arrangements available to the government to respond to the water crisis are affected by some distinguishing features from other utilities and infrastructure that set it apart. (Noll et. al., 2000; Hanemann, 1998) Noll et. al. (2000) point out that these distinguishing features of water influence the choice of reforms applied to the water sector. There is substantial local variation in the cost, availability and quality of water. This variability in locality affects the choice of appropriate water market structures, the right regulatory institution and pricing mechanisms. Also, there is limited possibility of incorporating competition in water supply. (Clarke et. al. 2004) In aspects of water supply where competition is feasible, it is often times viewed negatively as socially undesirable. (Noll et. al. 2000, Shiva, 2005) Another distinguishing feature of water is the enormous capital assets that make up the bulk of water supply infrastructure. Frequently, such assets have a very long life span. Hanemann estimates that the infrastructure associated with a pipe network can have an

economic life span of 50 – 100 or more years. This is far longer that capital investments in other comparable public utility infrastructure. Where the private sector is involved in infrastructure development, there have to be measures to allow the private operator to recoup the sunken cost. Any agreement to supply water that involves substantial infrastructure construction therefore has to be for a long term. Governments in developing economies face an uphill task of convincing private companies that their fragile economies will be sustainable over an extended period of time to allow sunken capital cost to be eventually recovered. (Privatization is therefore mainly management and leasehold with little expansion of service.) A final distinguishing feature of water is that health and environmental externalities associated with its coverage are very difficult to internalize or to regulate efficiently.

Response to water adequacy problems in SSA has been mainly on the demand side. Water policy in SSA over the last twenty years has chiefly been geared towards increasing and developing new water systems to cater for the growing water demand. In this direction, water policy has focused on building more dams and water ways and also looking for new water bodies to harness new water supply. Considering that a high percentage of people in SSA do not have adequate supply of water, building new dams and harnessing new water resources sounds like a step in the right direction. However, the population of SSA is increasing faster than current water supply systems are expanding. According to Getches, the "mistaken approaches to water policy are characterized by a perpetual insistence on addressing all water problems with a quest to provide more water". (Getches, 2004)

The underlying assumption of the supply side policy is that water supply can expand indefinitely as the demand for water grows. This assumption poses a lot of problems as it gives the wrong incentives to the consumers. In addition, water supply is finite and erratic in flow. Available evidence indicates that supply throughout the world is fast dwindling while demand is growing (Rosegrant, 1997; Stiassny, 1996; Postel, 2000). In SSA, increasing desertification in the Sahara and Kalahari regions is threatening water bodies. Also, deforestation and pollution are threatening water bodies in West and Central Africa's highly forested areas. The Nile, Niger, Victoria and Zambezi rivers have for the last twenty years been declining in flow and water level.

Governments' response to urban water crisis has mainly been through an overall sector reform through the adoption of legal and regulatory structures that establishes a clear separation between water policy making, water regulation, tariff reforms and operations functions. (Balance & Tremolet, 2005) This sector reform has been chiefly geared towards the introduction of private sector participation (PSP) into the water supply sector. Private sector participation in water supply in SSA tends to range from the most limited, like service or management contract where the operator only contracts to manage the water utility usually with no agreement for major expansion to the more extensive like concession or long term leaseholds or affermage where the operator takes charge of the whole urban water system and usually includes an agreement for major network expansion.

2.5.a Selected Private Sector Participation in SSA

Burkina Faso

Urban water in Burkina Faso is supplied by the National Water and Sanitation Authority (ONEA). ONEA is a limited liability company which is charged with the responsibility of producing and distributing water to a total of 41 urban centers in Burkina Faso. Although ONEA is perceived as innovative and relatively efficient, water service coverage under ONEA has remained low. Only 20% of residents in the area served by ONEA have access to domestic water services. ONEA however has a policy of developing standpipes across its coverage area to serve the urban poor and unconnected areas to make up for the low network connection. With the standpipe water policy, ONEA is able to reach an additional 50% of the population in its service area. It must be noted though that service is unevenly distributed through out the coverage area. As such, there is a high incidence of water resale activities especially for unconnected residents who live further away from the standpipes. ONEA's commercial and financial performance has contributed to weakening of its operations. ONEA however has a relatively strong technical performance reflected through its rather low unaccounted-for-water rate of just 15%.

PSP in Burkina Faso was pushed by donors who provided funding for the Ziga Dam, a major investment project termed the Ouagadougou Drinking Water Project to increase the supply of water to the capital Ouagadougou and surrounding areas. As a condition for their involvement, the donor agencies placed emphasis on efficiency and financial reforms of ONEA. ONEA was thus to enter into a management service

agreement with an international water supply company and a financial management agreement with a reputable financial firm to see to the financial integrity of ONEA. In 2001, an international water supply company (Veolia) and an International auditing firm (Mazars & Guerard) formed a joint venture and signed a five year service contract to manage the affairs of ONEA.

Mali

Mali has a dual water supply system in its urban areas. Traditionally, a national operator, Energie du Mali (EDM) has been responsible for providing water supply services to 16 major urban areas. As of 2000, the 16 urban areas made up almost 20% of the urban population in Mali and EDM's coverage was estimated at 60% within this segment of the urban population. More than a third of EDM's services is through the provision of public standpipes.

Apart from the 16 urban centers covered by EDM, an additional 49 urban centers and municipalities are charged with the provision of water supply. These municipalities are however required by law to delegate their water provision authority to a private operator or a user association.

Years of low investment left EDM under-resourced, inefficient and in need of serious reform to survive. To salvage EDM, a management contract was entered into with a consortium of the international firm SHEC in 1995. The management contract was however prematurely abrogated at the instance of both parties due to conflicts in performance improvement target rates. In 2000, SAUR International with 60% ownership in EDM signed a 20 year concession contract to operate water and electricity. The

concession contract was mainly to expand services and to improve the financial and technical performance of EDM. (Hall et. al., 2002)

The concession contract puts EDM in charge of operations and investments in the service area. A directorate within the Ministry of Mines, Energy and Water monitors the contract while a regulatory agency established in 2000 is charged with regulating the water and electricity sector. This concession contract was riddled with conflict right from the start with both parties accusing each other of sabotage. The Malian authorities started to criticize the performance of the concessionaires and the criticisms increased when the concessionaires failed to raise the long term finance needed to fund its investment obligations under the contract. A series of cuts in tariffs also compounded the ability of the concessionaires to raise the needed investment capital. Investments in the service area slowed down considerably and this increased the accusations of unsatisfactory performance. A World Bank brokered peace between the two parties still did not end the animosity between the parties. Balance & Tremolet, (2005) argue that the genesis of the bad relationship between the parties to the concession contract stems from a weak contract design.

Tanzania

In 1997, the government of Tanzania adopted a new legal framework which broke up the National Urban Water Authority (NUWA) into separate legal entities with different water coverage areas. For the 20 regional centers in Tanzania, the government established 20 separate Urban Water Supply and Sewerage Authorities (UWSAs) to provide water and sanitation to these areas. In total, the UWSAs are in charge of

providing water to about 3 million people which makes up 38% of urban population in Tanzania. District Urban Water and Sewerage Authorities (DUWSAs) were established to provide water and sanitation to small towns. In the capital city of Dar es Salaam, water and sanitation services have been managed independently from the rest of the country since the 1980s. Tanzania in 2001 established the Dar es Salaam Water and Sewerage Authority (DAWASA) to provide water and sanitation services to the over 3 million residents (38% of urban population) in the capital.

In 2003, a ten year lease contract was signed between DAWASA and a private consortium, City Water Services. Under the lease contract, City Water had responsibility for billing, tariff collection and operation and maintenance of water systems. In May 2005, the ten year lease contract was abrogated due to complaints by the government that City Water was performing poorly. A new company, Dar es Salaam Water and Sanitation Corporation (DAWASCO) was established by the government to take over the services provided by City Water Services.

The governments' response to the urban water crisis can be summarized as follows;

1. To defer to the private sector and market forces to provide urban water instead of relying heavily on public production.
2. To push the responsibility for urban water production to individual urban units instead of keeping all decision making centralized.
3. To encourage the complementary role of water vendors and the activities of non governmental organizations that focus on water supply.

The influence of these policy options on actual water supply policy has been mixed. The policy options used varies from country to country depending on the actual conditions present at the local level. In spite of this, prevalence of private sector participation in water supply in SSA has been on the increase. (Clarke et. al., 2004; Bakker, K., 2003) Private sector participation in water supply has at the same time been hotly debated as to its effect on urban water supply.

2.6 Private Sector Participation in Water

The idea of private sector involvement in the operation of water utilities is based on a neo-liberal market ideology. This neo-liberal market ideology advocates that private sector participation in water and sanitation can bring technical know-how and efficiency improvements and, in developing countries, private capital. (Gortner et. al, 1997; and Chong & Rama, 2002)

Privatization or private sector participation in water utility was introduced into sub Saharan Africa in the beginning of the 1990s. (Hall, et al. 2004) Since then, a number of African countries have undertaken water sector reforms to incorporate the private sector in their water utility delivery and management. (Hall, et al. 2004; Bakker, 2003) Other countries are in the process of reforming their water sector for introducing the private sector participation in their water utility systems.

The gains from private sector participation in water supply have been mixed and very controversial as well. (UN-HABITAT, 2003) The controversy stems from the fact that there has been mixed reaction as to the benefits of private sector participation in

water utility. (Dore, et. al. 2004, Clarke, et. al. 2004, Anwandter and Ozuna 2002) A number of scholars have argued convincingly that private sector participation in water utility management does not increase efficiency in water supply significantly. (Vickers and Yarrow 1991; Hall, et al., 2004, Estache and Rossi 2002; Smith, 2003) Yet, other authors have also argued in favor of the efficiency and utility gained in private sector participation and have therefore advocated for market based reforms as the lead strategy for water sector reform. (Rogers, P. et al. 2002; Boardman and Vining, 1989; Tynan, 2000). The lead organization in favor of market based reforms in the water sector in developing countries has been the World Bank.

In Africa, the controversy is compounded because of the distinct problem of poor infrastructure, poverty and low income among other factors. In spite of local and international protest against privatizing water supply in Africa, it seems to be the lead reform tool in Africa today. (Clark et al, 2004; Bayliss, 2004)

Up until the mid 1980s, utility services were monopolies owned and managed by the public sector in almost every country. By the late 1980s, scholars had began to question the rational and effectiveness for the public sector to manage these utilities. These were mainly due to technological changes and better understanding of the cost of monopolies. (Clarke et al, 2004) Starting from central Europe, a sweeping reform of the way and manner water utilities were managed took place. Britain under Margaret Thatcher was credited as undertaking the most far reaching privatization of water utilities in the world during the 1980s. (Dore, et. al., 2004) The privatization of water utilities has spread throughout the western part of Europe and to the Americas. Currently, the

Environmental Protection Agency of the United States estimates that about 15% of the population of the United States receives their water services directly from the private sector. (USEPA, www.epa.gov)

In SSA, coupled with management problems, population growth had outstripped the capacity of water systems to provide adequately for the population. (UN-HABITAT, 2006; Bayliss, 2004) In spite of the fact that the 1990s was declared the water decade, the progress within Africa has not been encouraging. (Whittington, 2006) These facts bolstered the argument of the advocates of market based reforms and thus gave them the ammunition to push more forcefully for sector reform, particularly privatization and competition within the water sector.

Privatization and competition have remained controversial due to a lack of agreement about how best to organize the sector. It has also raised concerns about equitable distribution of water and appropriate water tariffs. Because of this, reform in the water sector has proceeded slowly and when reforms are introduced, private sector involvement has usually been limited. The relatively slow involvement of the private sector is due to the impracticability and the expensive nature of having to transfer water over a long distance to the consumer. Also, most of the cost of water supply is tied at the distribution sector which makes it difficult for multiply providers to get on board. (Tynan, 2000) Thus the private operator will virtually have to operate as a monopoly. The monopoly status of the private production has in itself proved to be very troubling as it will be easy to justify competition when there is more than one operator. Besides these

issues, governments face legal constraints in selling off a water system because of its sensitivity and importance to human survival and needs. (Zerah, 2001)

In spite of these difficulties, reform in the water sector is still predominant throughout the world. Starting from the 1980s, many countries, predominantly the developed world began experimenting with private sector participation in the delivery of water as a way of increasing coverage, efficiency and water quality. (Megginson, 2000) In SSA, there were over 50 water projects involving private sector participation in the 1990s. (rru.worldbank.org, 2007)

Although there is little rigorous statistical study in the literature about the effect of privatization on water supply and efficiency, the reaction to privatization is clear. Scholars and stakeholders have expressed mixed reaction as to the effectiveness of privatization in promoting increased coverage and efficiency in the literature. (Holland, 2005; Clarke et al, 2004; Yarrow and Vickers, 1991)

Existing studies in the literature have been mainly on case studies of specific projects. Case studies normally make a comparison between water utility performance before and after privatization in a single country or town. The advantage of this method is that it allows the researcher to consider a broad range of peculiar issues in a country and the particular design of private participation and then describe how transactional characteristics will affect the outcome or output of such private involvement. This approach however has some shortcomings. Chief among them is sample selection bias. Case study selection is not done in a random manner. The researcher mainly selects a project to study without giving any scientific basis for doing so. Thus, choosing an outlier

project to study which is extremely successful or precariously bad example will give a slanted view of private participation. It is therefore difficult for such result to have universal application. Also, in cases of failure, it will be difficult to ascertain with certainty why the project failed, and lessons learnt from one project might not necessarily be applicable to others. (Yin, 1989)

A few have however based their study on a multi utility statistical analysis or an econometric model. The results from such study also tend to be weak. This is due to the limited availability of data generally when dealing with research in the developing world. (Clark et al, 2004) Thus, statistical studies looking at the effect of privatization on the delivery of water tend to be based on small samples. Despite the above problems, some scholars have either argued in favor of privatization while others have argued against privatization.

2.6.a. Arguments for PSP

It also has been argued that water is a scarce commodity and when the public sector provides scarce goods (many times subsidized), the good tends to be overused. Consumers do not have the market incentive to use only what they need. They consume beyond the point where the value consumed becomes less than the cost of production. (Hanemann, 1998) In a competitive market, the private producer produces at the point where marginal revenue equals marginal cost. Thus, economic theory suggests that given a free and competitive market, goods should be priced at the marginal cost.

In the developing world, the World Bank had championed the course of privatization, advocating for opening up water systems for private participation to ensure

efficiency and increased coverage. (World Bank, 1993) The Organization for Cooperation and Economic Development (OECD) also has given full backing to this privatization drive and in a report in 2002 stated, based on case studies in Eastern Europe and Central Asia that private participation in water utility increases capital investments and thereby increase water supply. (OECD, 2002) In a subsequent study, McIntosh used household data to analyze the effect of privatization on water utility supply in Asia. McIntosh arrived at the conclusion that privatization increased urban water supply significantly.

Brocklehurst and Janssens, conducted a case study of water systems in Senegal in 2004 to ascertain the effect of private sector participation in the delivery of water. They also arrived at the same conclusion that private participation has increased water supply in Senegal.

2.6.b. Arguments Against PSP

There seem to be a controversy as to the economic categorization of water. On the one hand, some economists refer to water as an economic good subjected to the law of demand and supply and will therefore be supplied efficiently by the market. (Hanemann, 2006) On the other hand, some scholars categorize water as a quasi public good which should be provided or supplied by public institutions. The scholars who argue against water privatization belong to the school of thought that characterizes water as a public good. (Shiva, 2005 & Barlow, 2001) Urban water systems are seen as quasi public goods that provide important public benefit such as protection from infectious diseases and floods. Innocent community dwellers tend to suffer the externality of diseases from

improper disposal of waste by others. Thus, it is uneconomical to exclude people from drainage systems because of their inability to pay for the service. Such externality can be eliminated if water systems are managed within the public sector. Apart from using appropriate regulatory regimes, the public sector has the legitimacy to impose compulsory fees in the form of taxes on all citizens for the provision of water supply. It must be noted that in low income countries it is possible for private investments to be insufficient to finance the adequate provision. This is especially true when people do not comprehend the private health benefit of network utilities.

Total costs are lower in the water sector when a single enterprise provides water through the water network. Multiple networks competing for the same consumers will result in higher infrastructure costs than a single network. Thus, water utilities enjoy huge economies of scale and any additional provider diminishes the economies of scale in production. Water utilities are therefore termed as natural monopolies. Unlike firms in a perfectly competitive market, monopolists have an incentive to under-produce and over-price thereby realizing abnormal profits. Economic theory advocates that in general terms, natural monopolies require public supervision and regulation to prevent over-pricing. Thus, it has been argued that because of the natural monopoly status of water utilities, it should be provided through the public sector to prevent under-production and over-pricing. In SSA where most of the private water companies have annual sales more than double the GDP of some countries, opponents of privatization have argued that such private companies will be too powerful for any government regulation to work in the private sector.

In addition, environmentalists are quick to point out that harvesting water from natural water sources often imposes other environmental costs which is more than what a private operator will incur. The extent of damages to the ecosystem and wildlife habitat from harvesting water from natural water systems may become apparent in the future at which time the private operator may have finished its contract.

Fundamental to the argument against water privatization in sub Saharan African has been the issue of affordability. (Hall et. al. 2004; Bayliss, 2002) Existing case studies on water privatization throughout the world overwhelmingly support the view that water tariffs increase significantly in the wake of privatization. (Bayliss, 2002; Hall, 2004) In addition, scholars have argued that the "willingness to pay" research (Whittington, et al, 1989; Whittington, et al, 1992) on which pricing theories are based appears to be faulty. Merrett argues that there should be a distinction between willingness to pay and ability to pay. (Merrett, 2002) In addition to questioning the statistical validity of the research, (especially those undertaken by Dale Whittington and associates between 1986 and 1994) Merrett also argues that willingness to pay does not mean ability to pay. Thus, communities like Onitsha and Nsuka in Nigeria, Lugazi in Uganda and Kumasi in Ghana cannot in actuality pay for the commercial rate of water services in the advent of privatization. To this, Balance & Tremolet, (2005) have argued that progressive tariff increase to cost recovery levels should be adopted since it is less socially disruptive. They argue further that this progressive approach has been utilized successfully in some countries. When Senegal agreed to private sector participation in its water sector, the parties agreed to a progressive tariff increase of 3% annually until tariffs reach full cost.

This gradual increase in tariffs was well received by water customers in Senegal. (Balance & Tremolet, 2005)

Clark et al (2004) used household level data to look at the effect of privatization and how it affects water and sewage coverage over time. Their study, which is done across cities in Latin America, compared privatized cities to controlled cities which never privatized. They then studied the effect of private participation on water coverage, productivity, prices and water quality. They found that while connections seem to have generally increased in the wake of the privatization, the increase appears to have been the same also in the controlled cities that retained public ownership. Thus, there was no evidence that privatization increased water supply significantly. (Clark et al, 2004)

In a study done in 2002, Hall et al conducted a case study of 21 water utilities in 19 Sub Saharan African countries. They found that privatization did not significantly increase water supply in the utilities under study. Rather, it brought untold hardship to the communities in these countries in the form of unaffordably high water tariffs, corruption and in some cases public health disasters. They advocated for communal ownership of water instead.

Based on an empirical study of some public utilities in some parts of the developed world, Vickers and Yarrow lashed out against privatization. They concluded that there was no clear evidence that private participation increased efficiency over public ownership. In fact, they argued that privatization will only be beneficial if it can promote some form of competition. Private participation in water being mostly monopolistic in nature, governments should be careful when inviting private participation. Due to the

sensitive nature of the water sector, governments can not commit effectively to negative market incentives and punish economic failure. Water and sanitation issues are so essential that the central government will invariably be left with no choice but to bail out local failures. Vickers and Yarrow therefore warn that governments should be slow in their privatization bid.

Laila Smith (2004) believes in the application of management principles of the private sector to water delivery services. She differs on who should apply these management principles, arguing that the superiority of the private sector is in their management skills. However, the public sector has a mandate to the public that the private sector does not share. Using case studies in two utilities in South Africa, she argues that to increase water delivery services, the public sector should retain ownership but employ private sector management principles. This she terms 'corporatization' of the water systems within the public domain. (Smith, 2003)

Studying 50 water utilities in 19 countries in Asia, Estache and Rossi (2002) explored the effect of ownership on utility performance. Twenty two of the 50 companies had some form of privatization, while the other 28 did not have any private participation. Estache and Rossi did not find any evidence that ownership per se significantly affected the performance of the utility companies.

As noted earlier, there seems to be no clear trend in the literature as to the effect of privatization on the performance of the various water utility companies within sub-Saharan Africa. Evidence from the developed world also shows that there is a split in scholarly studies as to the effect of privatization on utility performance. (Anwandter and

Ozuma, 2002) In addition, many of the big water supply companies operating in SSA have shown very little interest in expanding water services to communities with low income residents who have less capability to pay for the water services.

In a nutshell, private sector participation in urban water supply is not likely to be the panacea for all the ills in urban water supply in SSA. There exist a lot of obstacles to improving urban water supply that has nothing to do with the role of private sector utilities. The absence of adequate regulatory institutions which affect government supply of urban water can also affect the private sector. Institutional corruption which permeates the very fabric of some SSA countries can affect the operations of the private sector as it affects the public sector. Political instability will affect utility provision no matter the kind of institutions that control water utilities. In addition, the pro-poor measures that confront public run utilities can also confront the private sector.

2.6.c. The Urban Poor in SSA and PSP

Although PSP has been the policy of choice in SSA, results from PSP have been mixed. Poor contract design, inadequate finance to back projects and weak regulatory regimes have contributed to the mixed performance of PSPs in water supply in SSA. (Plummer, 2003) In the case of Burkina Faso's three year service contract and Mali's twenty year concession contract, Balance & Tremolet, (2005) report that the performance of the private operator was affected by weak incentive mechanisms from the government. In the case of Mali, weak regulatory regime and political considerations gave way to tariff reductions in 2003 and 2004. The weak regulatory regime and tariff reduction

significantly affected the performance of the private operator to extend services to unconnected neighborhoods in Bamako and its surrounding areas.

Governments in SSA have often times used water pricing mechanisms as an important policy tool to help the urban poor acquire adequate water supply. (Balance & Tremolet, 2005) This is mainly done through incorporating a lifeline tariff pricing into an increasing block rate tariff structure. The first block of water in an increasing block rate water tariff is typically referred to as a social block and its aim is to provide cheap water for minimum usage. The social block or lifeline water is thus priced cheaply so that the poor can be able to afford it. Whittington points out that this policy will only achieve it aim of providing water cheaply to poor households if each family has its own water meter. (Whittington, 1992) Poor neighborhoods in SSA have a very high population density with multiple families living in one "Compound House" and sharing one water meter. When extended families of 30 to 40 people share a building or a compound, the concept of household as defined for water billing purposes become ineffective. Using household level data in Kumasi, Ghana, Whittington showed that poor residents in compound housings are charged higher than what a non poor resident will be charged for the same level of water consumption. Because multiple families share one house and thus one water meter, though each family's water usage may be within the social block, the aggregate water usage far exceeds the social block. As characteristic with the increasing block rate water tariff, the price for water compounds with increase in the blocks of water consumed.

In addition, any benefits accruing from social pricing can be enjoyed by poor urban neighborhoods if they are connected to the national grid. With increasing numbers of neighborhoods falling outside the coverage of the national grid, the policy of social blocks does not extend to them at all. Balance & Tremolet, (2005) have pointed out that poor PSP contract design, lack of finances and inadequate urban renewal among other things have prevented the timely expansion of national water grids to uncovered urban neighborhoods. In addition, the urban poor characteristically have low income and therefore are likely to consume water within the social block. To maximize profits, private operators will rather emphasize expansion into areas where consumption will exceed the social block.

In cases where the national grid is available, some national governments have embarked on subsidized domestic water connections. In Uganda, a connection fund which is made up of 10% of revenues from water tariffs is channeled to subsidizing all new water connections. Tanzania offers a free first time water connection through the first time domestic connection fund provided the household has three water points. In Senegal, a social connection fund offers subsidies for first time water connection for consumers. However, to qualify for the subsidy, the consumer must prove legal title to the land or house. (Lauria, Hopkins & Debomy, 2005) This condition puts the subsidy beyond the reach of many poor residents because most of them live in shanty towns and have no way of proving title to their living quarters. In spite of this, social connections have averaged over 16,000 annually.

In countries like Zambia, Kenya, Mali and Burkina Faso, standing pipes are provided at vantage points for use by residents who are not connected to the national grid. For instance in Burkina Faso, 50% of the population served by ONEA receives their water supply through standpipes. In Mali, 40% of the population served by EDM receives their water through standpipes. (Balance & Tremolet, 2005) A flat rate is charged for water consumed through standpipes. However, standpipes are inadequately distributed throughout the entire urban area. A lot of people are left miles away from the nearest standpipe.

Thus, in neighborhoods served by the national grid, living arrangements put water prices beyond the reach of the poor. Neighborhoods not served by the national grid may also find themselves very far from the nearest standpipe which makes obtaining water costly and highly inconvenient.

2.6.d. Where Do the Urban Poor Get their Water?

Access to water supply in the urban poor neighborhoods is through a myriad of service delivery mechanisms. The nature of the service available to poor neighborhoods to a large extent varies from city to city and from country to country. Services available to the urban poor are also dependent on the extent of network pipe connection in the city. Poor neighborhoods in cities with extensive network connections like Cote d'Ivoire are more likely to get water easily than poor neighborhoods in cities with very limited urban network pipe connection like Ethiopia.

Plummer, (2005) points out that most urban poor households consume between 5 and 30 liters of water daily. Water consumed is paid for on a daily basis. Poor households

may not have a steady income to be able to afford monthly water payments. Paying on a daily basis ensures that water consumed reflects daily available funds. Plummer argues further that the water consumed by poor urban neighborhoods come from different sources. Water may be obtained from hand dug wells, boreholes, private outlets or government provided stand pipes. The majority of poor neighborhoods however purchase their water through intermediaries including landlords, private outlets and vendors.

In SSA, the small scale water supplier has become a very important water source for the urban poor. The small scale providers have stepped in to fill the water service gap left by the citywide water utilities companies. Small scale water providers have existed in the informal sector of most SSA countries for a long time and their importance has grown as the number of urban dwellers without access to portable water from the national grid has grown. (Collignon, 2000) A significant proportion of the un-served and underserved urban dwellers by official water systems rely heavily on the services of the small scale water providers to make up for the shortfall in their water needs. (UN-HABITAT, 2003)

As an institution in the informal sector, small scale water providers do not have a uniform standard of operation. Their operation depends on the choice of the operator and the needs of the consumers in the locality served. In a study of small scale water providers in cities in ten African countries, their operations included;

- "hand-pushed carts" that carry 100-200 litres of water;
- horse- or donkey-pulled carts with up to 500 litres (especially in cities of the Sahel, where draught animals are raised in abundance)

- water truckers who serve larger customers – for instance, filling water tanks in large houses or offices; and
- various types of water re-sellers operating from fixed points of sale, including standpipe vendors and, in some cities mini-piped networks." (UN-HABITAT, 2003)

It is clear that PSP has been the policy tool of choice for majority of SSA countries that have embarked on water sector reforms. The extent of PSP involvement varies from country to country and is dependent to a large extent on the local conditions and also the interest of the donor community. The effect of water policy on the supply of water to the urban poor hinges on the combination of the extent of PSP involvement and the institutional arrangement within each country. Thus, with a strong institutional arrangement, local regulatory institutions can ensure that the service provided by the private provider meets the requisite regulatory standards and the private providers' overall performance is in consonance to the letter of the PSP agreement.

Chapter 3

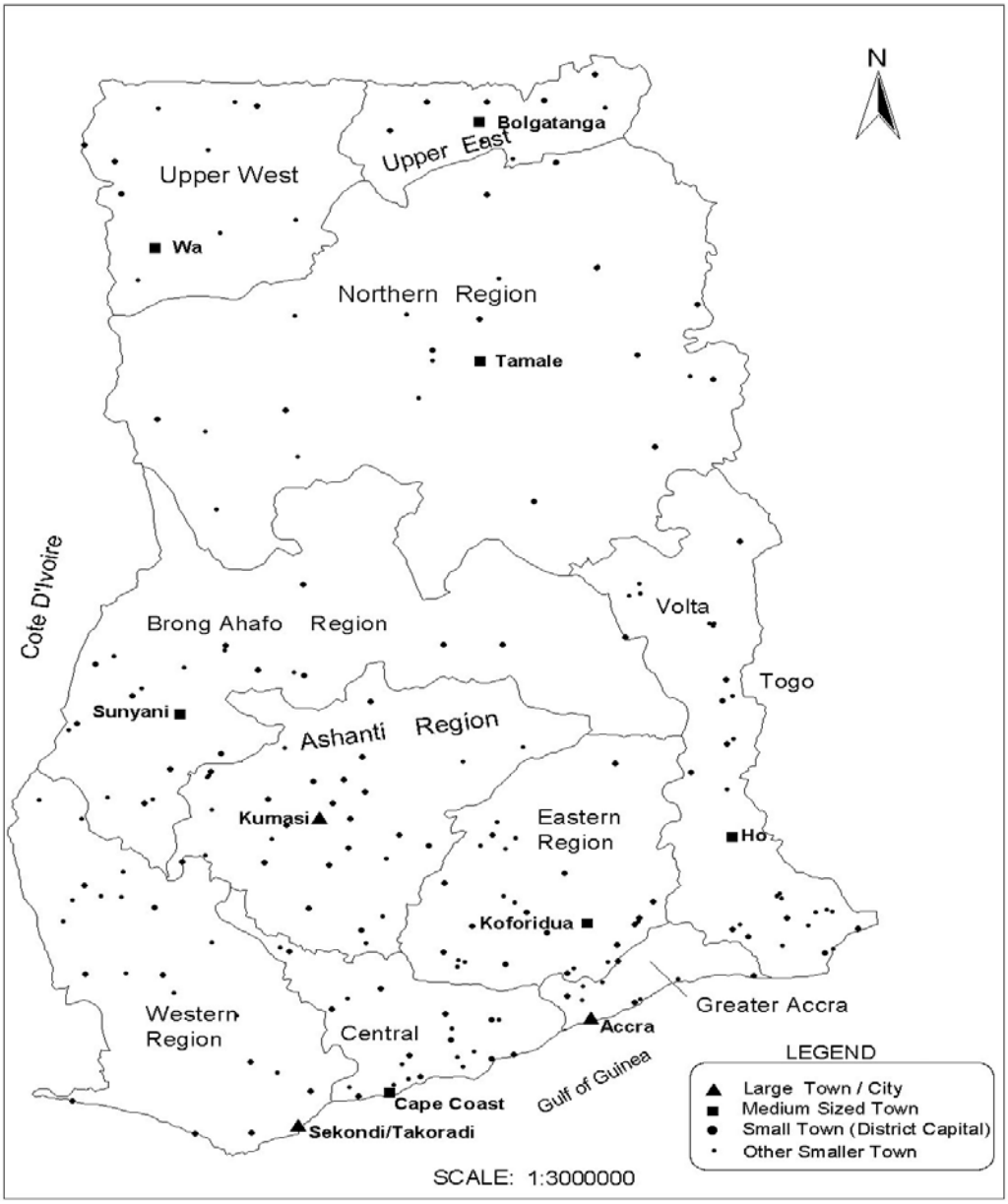
Urban Water Supply Policy in Ghana

3.1 Introduction

Under the Ghana Poverty Reduction Strategy I and II (GPRSI and GPRSII -2003 and 2006), adequate water supply is featured as one of the priorities to reduce the incidence of poverty in Ghana. The GPRS sets out strategies to "to reduce human deprivation, promote human rights and achieve sustainable growth." In spite of the emphasis on increasing access to water as part of poverty reduction, urban water supply is still under 65% coverage.

Ghana has a land area of 239,460 sq km, slightly smaller in size to the state of Oregon. The total population of Ghana at 2008 is estimated at 23.3 million. Fifty-eight percent of the people live in rural areas whiles 42% live in the urban centers. Urban population growth is estimated at 3.5% per annum while rural population growth is estimated at 1.5%. (WaterAid Ghana, 2007)

Figure 3.1: Map of Ghana Showing Distribution of Urban Centers



Ghana is drained by three main river systems. The largest river system, the Volta River system is made up of Rivers Oti and Daka, the White and Black Volta Rivers and the Prru, Sene and Afram Rivers. The Volta River system covers 70% of the land area in Ghana. (FAO, 2005) The southwestern river system which is made up of rivers Bia, Tano, Ankobra and Pra covers 22% of the land area of Ghana. Another 8% of the country is covered by the coastal river system which comprises the rivers Ochi-Nakwa, Ochi Amissah, Ayensu, Densu and the Tordzie. Completed in the 1960s, the Akosombo Dam impounds the Volta River to form the Volta Lake. The Volta Lake with a surface area of 8,502 km2 and a maximum dept of 91m is the world's largest artificial lake.

Three separate aquifers make up the bulk of groundwater in Ghana. The first aquifer which is close to coastal Ghana is unconfined with depth of between 2 and 4m and contains meteoric water. The second aquifer occurs in the Red Continental Deposits of sand clay and gravel. It is either semi-confined or confined with depths measuring up to 120m. Groundwater in this aquifer is fresh and exists in artesian conditions. The third aquifer alone has an average yield of 184 m3/hr.

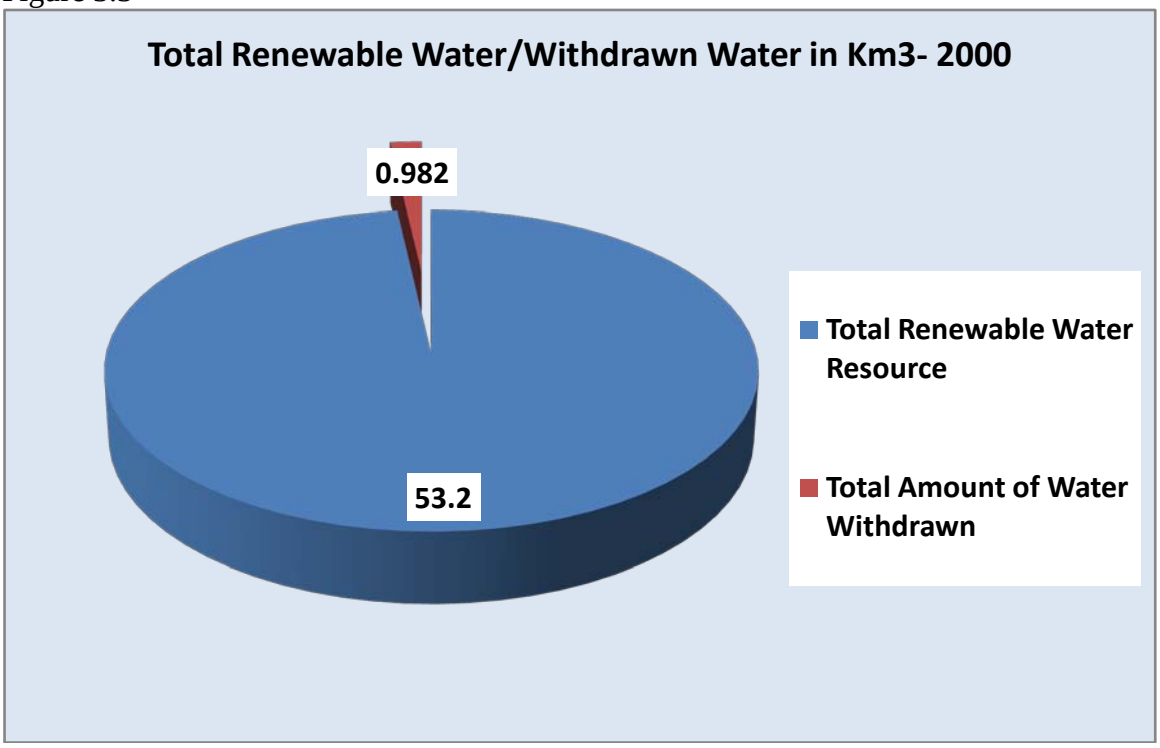
The total renewable water resource in Ghana is estimated to be 53.2 km^3/yr out of which 30.3 km^3/yr is produced internally. In 2000, only 0.982 km^3 of water was withdrawn for use. 0.652 km^3 representing 66% was withdrawn for irrigation, 0.095 km^3 representing 10% was withdrawn for industry and 0.235 km^3 representing 24% was withdrawn for domestic use. (FAO Country Stat, 2005)

Source: Ghana Aquastat FAO, 2005

Figure 3.2: Drainage Map of Ghana

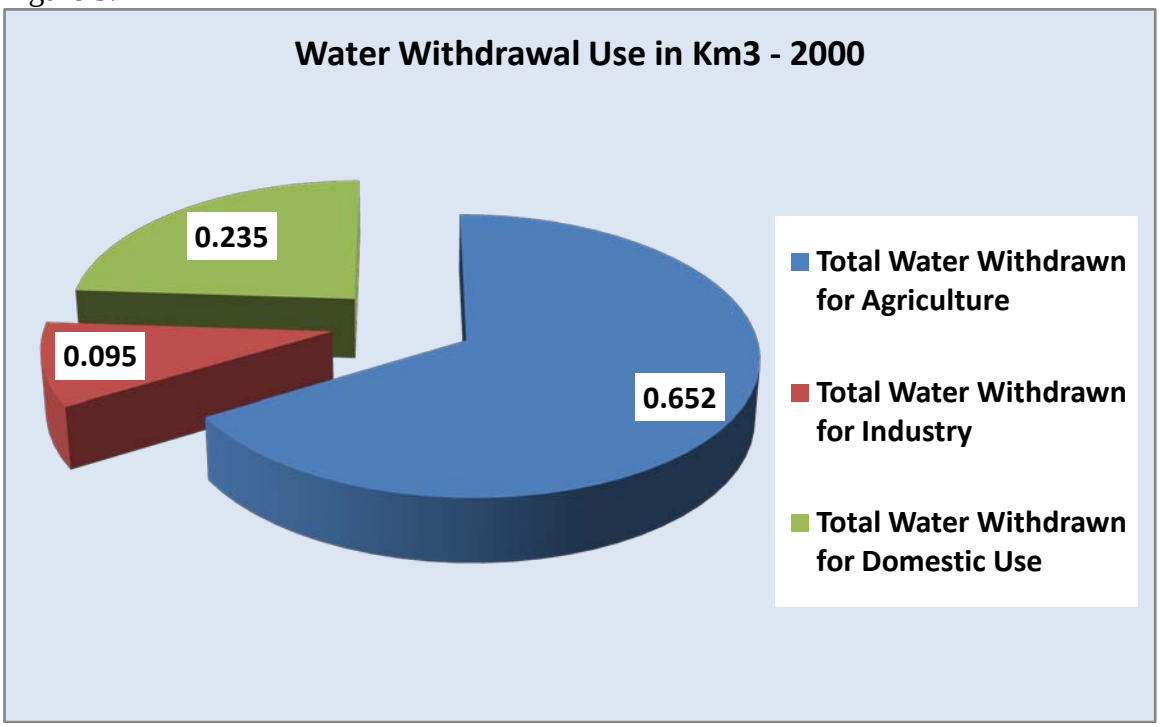
Source: FAO Country Statistics, 2005

Figure 3.3



Source: Based on figures from FAO Country Statistics, 2005

Figure 3.4



Source: Based on figures from FAO Country Statistics, 2005

In spite of the abundance of water resources, Ghana still suffers from inadequate water supply to its rural and urban areas. Only 61% of urban residents have access to improved water supply. Available data shows that, in Accra, the capital, only 25% of residents have 24 hour water supply. For about 30% of residents, water supply service averages 12 hours a day for five days a week. For another 35% of residents, water supply is estimated at two days per week. For the remaining 10% who live mainly in poor neighborhoods at the periphery of town there is no access to piped water supplies. (WaterAid Ghana, 2005) Ghana Water Company, the only regulated utility service which provides water to all urban areas in Ghana, has water coverage of only 59%. The total daily water demand is estimated at 763,300 m^3. However, with an unaccounted-for-water rate of 50% for the Ghana Water Company Limited, the amount that is effectively sold is about 280,000 m^3.

The high unaccounted-for-water contributes to the low water supply coverage of GWCL. Several factors account for this high unaccounted for water. A remote cause is the protracted political instability which left the country without a development agenda until the middle of the 1980s. GWCL has therefore not been able to grow to meet the growing demands for water supply. Population growth in Ghana has also exploded in the last 50 years. With a population of 6.7 million in 1960, the population is estimated at 23 million currently representing almost a 350% increase. The population has grown faster that the government has been able to keep up with infrastructure development.

Table 3.1: Ghana: Population Growth from 1921 to 2005

Year	1921	1931	1948	1960	1970	1984	1990	2000	2005	2008
Pop. in Millions	2.3	3.1	4.1	6.7	8.6	12.2	15	18.8	22	23
% Growth		34.78	32.26	63.41	28.36	41.86	22.95	25.33	17.02	4.55

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

Starting in 1994, there has been an increased effort on the part of the government of Ghana to restructure the water sector and position it to meet the water demands of Ghanaians. Two management arrangements, one for rural water supply and the other for urban water supply were set up to manage the water system in Ghana. In the urban sector, the restructuring has been aimed at encouraging private sector participation (PSP) in the delivery of water. As part of the restructuring and in preparation for public sector participation in urban water supply, the government has set up various institutions in the water sector to serve as facilitators and provide the backbone for a viable PSP regime. In this direction, the Ghana Water and Sewerage Corporation which hitherto was a full government corporation operating both rural and urban water was changed to Ghana Water Company Limited, a publicly owned. A Community Water and Sanitation Agency was set up in 1998 to facilitate rural water supply and a Water Resources Commission was established in 1996 to see to the environmentally sound management of water resources in Ghana. In 1997, the Public Utility Regulatory Commission was established to see to the regulation and provision of quality utility services. To coordinate the activities of the various institutions and get them to conform to government policies in

the water sector, a water directorate was created within the Ministry of Works and Housing to coordinate all activities in the water sector.

3.2: Institutional Development

The first urban piped water system was built around 1928 in the city of Cape Coast. The Water Supply Division of the Public Works Department (PWD) was charged with the responsibility of supplying water to both urban and rural areas. After Ghana attained independence in 1957, PWD was divested of its Water Supply Division in 1958. The Ministry of Works and Housing (MWH) gained the Water Supply Division until 1965 when water supply and sewerage was placed under Ghana Water and Sewerage Corporation. The Ghana Water and Sewerage Corporation (GWSC) was established by the Ghana Water and Sewerage Corporation Act of 1965, ACT 310. ACT 310 charged GWSC with the provision, distribution and conservation of water supply and the establishment, operation and control of systems in both urban and rural areas. GWSC also had the responsibility of setting tariffs for water and sewerage, conducting water research, making engineering surveys and plans, constructing and operating water works and conducting any other activity related or incidental to water and sewerage supply. ACT 310 therefore gave the GWSC a catch-all authority in water with the responsibility to build, operate and regulate water and sewerage services in Ghana.

After 1965, a series of protracted military takeovers in Ghana adversely affected the economy and thus the water and sewerage functions of GWSC. [9] Clapham (1996) argues that protracted conflicts in Africa directed governments' attention to security issues away from development in the social infrastructure of the economy. In 1983, when some semblance of stability had been established, Ghana took advantage of a World Bank sponsored economic recovery program aimed at macro economic stability in Ghana to put the GWSC on track to recovery. GWSC adopted a 5 year rehabilitation and development plan under a Water Sector Rehabilitation Plan aimed at institutional strengthening through manpower development, rehabilitation and expansion of existing service and decentralization of water and sewerage supply. Following the decentralization plan in the five year rehabilitation and development plan, GWSC was to concentrate on the provision of water and sewerage in urban areas only. A semi-autonomous division within the GWSC called the Community Water and Sanitation Division was created in 1994 and charged with the responsibility of rural water and sewerage supply

As part of the water restructuring policy, a Community Water and Sanitation Agency (CWSA) was created by the Community Water and Sanitation Agency Act of 1998, ACT 564. ACT 564 created CWSA as an autonomous public agency charged with the responsibility of playing a facilitating role along side district assemblies to provide "safe water and related sanitation services to rural communities and small towns". This change now absorbed the Community Water and Sanitation Division within GWSC.

[9] Between 1965 and 1981, there were at least six attempted or successful military coups d'etat reported in Ghana.

GWSC itself was transformed from a statutory corporation by a Legislative Instrument (LI. 1948) into a limited liability company called the Ghana Water Company Limited (GWCL) in 1999. With this change, GWCL was certified as a company charged solely with the provision of water supply in urban areas in Ghana. It no longer had responsibilities for sewerage, rural water supply, water research or regulation of the water sector. The transformation of GWCL was part of World Bank and International Monetary Fund (IMF) sponsored Structural Adjustment Program (SAP) in Ghana. In line with SAPs emphasis on economic liberalism, the transformation of GWSC into a limited liability company was to position it to invite PSP in urban water supply. Under the SAP, it was envisaged that private sector participation in the public sector will help reduce operating loses, improve management standards, inject more capital and thereby increase efficiency and effectiveness culminating in quality services in the water sector.

3.3: Legal and Institutional Framework for Water

Before Ghana was colonized by the British, an elaborate regime of rules and regulations were formulated by the communities to guide their water use. Colonialism and the emergence of modern Ghana has led to the creation of other supplemental rules guiding domestic and agricultural use of water. Faced with increasing pressure on water resources as a result of dwindling supply and increase in population, the government has introduced a series of legislation and policies to regulate the water sector. The customary rules and regulations pertaining to water use have therefore been supplemented or done away with completely. For instance, in customary law, water in all its forms, rivers, lakes,

streams and ponds was regarded as public property and therefore not subject to individual ownership. Water resources existing in a particular community was held or protected by the traditional authority in trust for the people of the community. Members of the community in which the water resource existed had the first priority of use. It must be noted that no matter how long a community member used water, such usage did not ripen to ownership or a right to the amount of water used. In the dry season, the traditional authority had the right to make reasonable apportionment of water to community members. Nonmembers of the community were allowed to use the water only in times of plenty when there is enough to spare.

The customary rules pertaining to water use have been changed and in some cases supplemented by statutory law. The Water Resources Commission Act of 1996, Act 522, altered the customary water regime in existence before 1996. Act 522 created the Water Resources Commission as a body corporate and clothed it with ownership of water resources, its management and control. According to Sarpong (2000), these statutory changes for the most part took place without the knowledge of the customary water custodians. It presupposes therefore that, in traditional settings, people still regard water as a public property subject to use by the members of the community.

A number of statutory institutions have since been created to among other things ensure a comprehensive water resource management in Ghana. Among these institutions, the most important are the Ghana Water Company Limited (GWCL), the Public Utility Regulatory Commission (PURC), the Water Resources Commission (WRC), the

Community Water and Sanitation Agency and the District Assemblies. The institutions of interest with direct responsibility to urban water supply are PURC and GWCL.

3.3.a. The Public Utility Regulatory Commission

The Public Utility Regulatory Commission (PURC) is an independent regulatory institution set up to regulate water and electricity services to consumers. PURC was set up in October 1997 under the Public Utility and Regulatory Commission Act of 1997, ACT 538. The functions of PURC as provided under Act 538 are to provide guidelines on rates chargeable for provision of utility services; to examine and approve rates chargeable for provision of utility services; to conduct studies relating to economy and efficiency of public utilities and to maintain a register of public utilities. Other functions of the PURC include the protection of the interest of consumers and utility providers, monitoring standards of performance of utility services and conducting investigations into standards of quality of service given to consumers. The PURC also must take steps to promote fair competition among utility providers in urban water supply.

From the functions as provided under ACT 538, PURC has identified their main regulatory tools as setting water rates, regulating and monitoring the activities of GWCL and embarking on public education to sensitize consumers about the functions of PURC. Section 16 of Act 538 provides guidelines as to how water tariffs are to be fixed by utility companies. These functions are aimed at ensuring that there are safe, clean, adequate, reliable and efficient services to the consumer while at the same time ensuring that consumers pay reasonable prices for the sustenance of utility providers.

To further ensure consumer protection, PURC directs utilities to display copies of their schedule of charges at their offices for the public. Public utility companies must also develop a comprehensive Customer Charter outlining expected services to be provided, and the rights and obligations of the consumers. This charter is therefore expected to serve as a guideline as to what standard the utility company holds itself up to and the kind of services consumers should expect.

In consonance with the functions under Act 538, the PURC has adopted as its mission a commitment 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"

It must be noted that in the water supply sector, under Act 538, PURC interprets its obligations as being limited to the regulation of the activities of GWCL only. Thus, PURC jurisdiction is limited to urban water supply and has no jurisdiction in the regulation of water supply in small town and villages. Their current regulatory jurisdiction does not extend to the activities of small scale water providers too.

3.3.a.i: Tariff Structure

By far, the most important function of the PURC is setting of tariffs by which utility companies charge consumers. PURC has been setting tariffs since its inception in 1998. Act 538 provides in section 16 (3) that the tariff guidelines provided by PURC must strike a balance between consumer interests, investor interests and the cost of production for the service providers. Act 538 gives PURC a blanket authority in rate

setting. Section 17 provides that PURC must take all costs into consideration before setting tariffs and utility companies are under obligation to follow such tariffs. Act 538 does not provide for a challenge as to the reasonableness or otherwise of the tariffs set by PURC. PURC therefore has a wide discretionary power in tariff setting.

Since GWCL is the only recognized company providing water in urban areas, PURC uses a nationwide uniform tariff structure. In addition, a core principle of PURC is to set tariffs at cost recovery level. PURC recognizes that water tariffs in urban Ghana have for a long time been subsidized and underpriced. To make it easy on consumers, PURC has opted for a transitional phase in approach to full cost recovery. Thus, since 1998, water tariffs have been increased gradually and in 2005, PURC stated that tariffs will reach full cost targets by 2010. (PURC, 2005)

The tariff structure reveals a cross subsidization between different user categories. Although supply cost to non-domestic users is lower due to economies of scale, non-domestic customers are charged a higher tariff than domestic customers. For domestic customers, PURC utilizes an increasing block rate pricing scheme to set prices for water consumed. In 1998 and 1999, PURC used two separate three tier increasing block rate tariff structure. Then from 2001 to 2006, PURC used a two tier increasing block rate tariff structure.

According to the PURC, the lowest tier of water blocks reflects a lifeline tariff. The lowest tier of blocks of water is set to cover the basic water needs of the poor and its price is determined taking into consideration the ability of the poor to afford them. It must be noted however that lifeline rates are not necessarily set within the affordability

range of the poorest urban dwellers. PURC recognizes that a sizeable number of urban dwellers, a majority of whom are poor, who are not currently not served by piped water from GWCL are paying more per unit of water than those currently served by piped water. Thus, to be fair to those who are not currently served by piped water service, lifeline water rates “are not overly generous and at least cover basic operational costs”.

PURC designates 1000 liters of water as one block. The blocks of water which constitute the first tier or qualify for lifeline pricing has changed three times within the last 10 years. PURC does not offer any reason as to the changes; whether they felt less water was needed for basic necessities when they reduced it from 1999 to 2001 or whether they felt more water was needed for basic household chores when they increased it from 2002 to 2006. (Table 3.2)

Table 3.2 PURC Approved Monthly Tariffs for GWCL

DATE	Quantity of water used (1000 Liters)	Approved Rates in cedis (per 1000 Liters)
1998	0 -13	400
	13 - 45	1000
	45+	1400
1999	0 - 10	500
	10 – 40	1300
	40+	1820
2001	0 - 10	990
	10+	3600
2002	0 - 20	3000
	20+	4500
2003	0 - 20	3500
	20+	4800
2004	0 - 20	4031
	20+	5528
2005	0 - 20	4031
	20+	5528
2006	0 - 20	4850
	20+	6750

Source: Based on water tariff information provided by PURC

3.3.b. Ghana Water Company Limited

GWCL is an independent public company created in 1999 to succeed GWSC. The creation of GWCL was part of the water sector restructuring effort of the government. The restructuring of GWCL was partly to increase its efficiency and effectiveness and also position it to encourage private sector participation in the water sector. The main objectives of GWCL are;

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

• conduct water supply related research,

• make engineering surveys and plans as appropriate,

• construct and operate water works in urban areas,

• submit tariff proposals to PURC for review and approval, and

• conduct other related or incidental activities.

Currently, GWCL operates under the direction of the Ministry of Water Works and Housing which has oversight authority over the sectorial policies within the water sector. GWCL is governed by an eight member board of directors. GWCL operates 86 urban pipe water systems in urban areas across the country. The total installed capacity of the water systems operated by GWCL is 737,000 m^3 per day as against an estimated urban demand of 939,070 m^3 per day. There is therefore a shortfall in urban water supply because of the fact that potential demand outstrips potential supply. Water supply problems are compounded by the fact that even though GWCL has the capacity to produce 737,000 m^3 per day, administrative and distributional inefficiencies put actual supply at 551,451 m^3 per day. The inefficiencies in GWCL account for most of the shortages in urban water supply to customers within the piped network of GWCL.

Most of the problems that affect GWCL were inherited from GWSC. GWSC was a public corporation that was, for a considerable period of time, kept under the dictates of politicians. (Mensah, 1999) It operated at a time when there was no independent regulatory institution to monitor its activities. GWSC operated as a water supplier, water resources manager and a water supply and resource regulator. Accordingly, politicians were able to keep water tariffs low with the aim of protecting consumers for a long period of time. (Ministry of Works and Housing Report, 1998) From 1990 to 1997, average tariffs ranged

from \$0.15 to \$.20/m^3. Public policy objectives of GWSC were to a large extent geared towards satisfying political ends instead of strengthening the corporation to efficiently and effectively supply water. With low tariffs and interference from politicians, the corporation was plagued with low investment and general breakdown of some of its water systems. (Mensah, 1999)

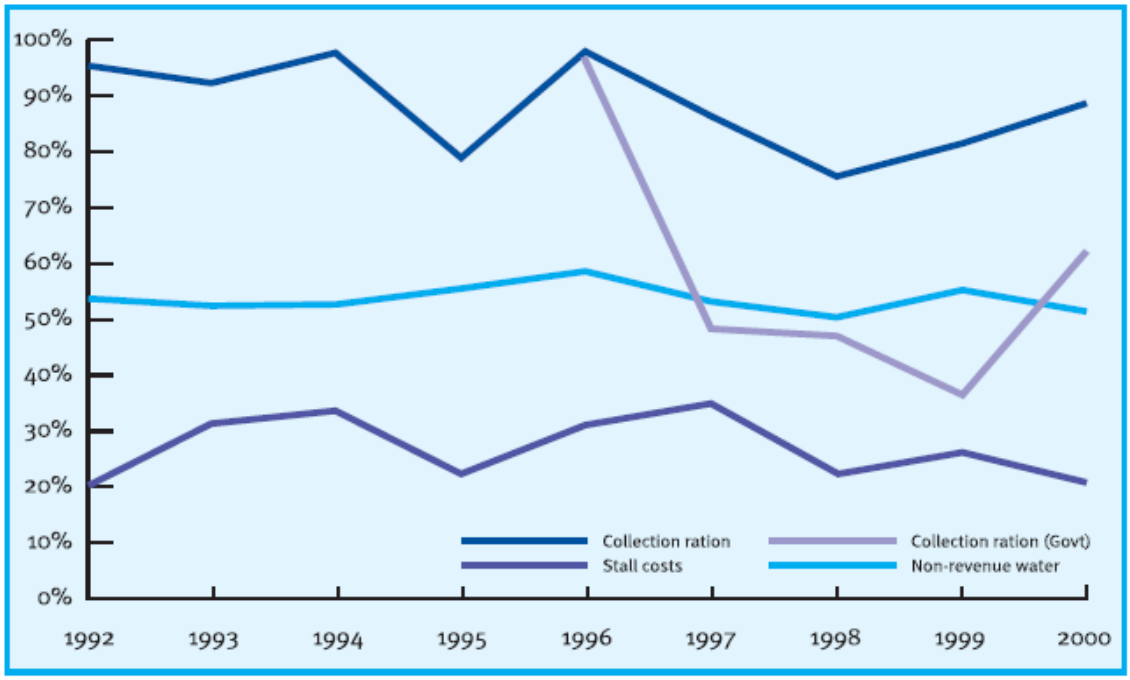
One of the important problems that confronted GWCL when it came into existence in 1999 was therefore capital investment to maintain the existing water systems and to undertake expansion work to cover the ever increasing urban population in Ghana. In 2005, PURC estimated that a total of \$891 million will be required to meet the MDG goal of 85% urban water coverage by 2015. (PURC, 2005) According to calculations put up by WaterAid Ghana, a total expenditure of \$85 million is needed each year to be able to reach the MDG goal of 85% urban water coverage by 2015. However, current spending averages only \$17 million annually. GWCL is therefore in need of an average of \$68 million in investment funds annually to reach it MDG goals.

Currently, the commitment of the government and other donor partners to the water sector is woefully inadequate. In the 2002 government of Ghana Budget for instance, 21% of funds were allocated to poverty reduction under the GPRS program. Only 1% of the poverty reduction budget or 0.2% of total spending was allocated to the water and sanitation sector. (WaterAid Ghana) From 1990 to 2003, Ghana's major donors contributed \$220 million to the urban water sector. It is estimated that within the period of 2004 to 2010, donor support (excluding NGOs) for the urban water system will be \$185 million. The government of Ghana should therefore increase its financial commitments in the water sector and at the

same time convince donor partners to increase theirs as well in order to meet it water supply targets in 2015.

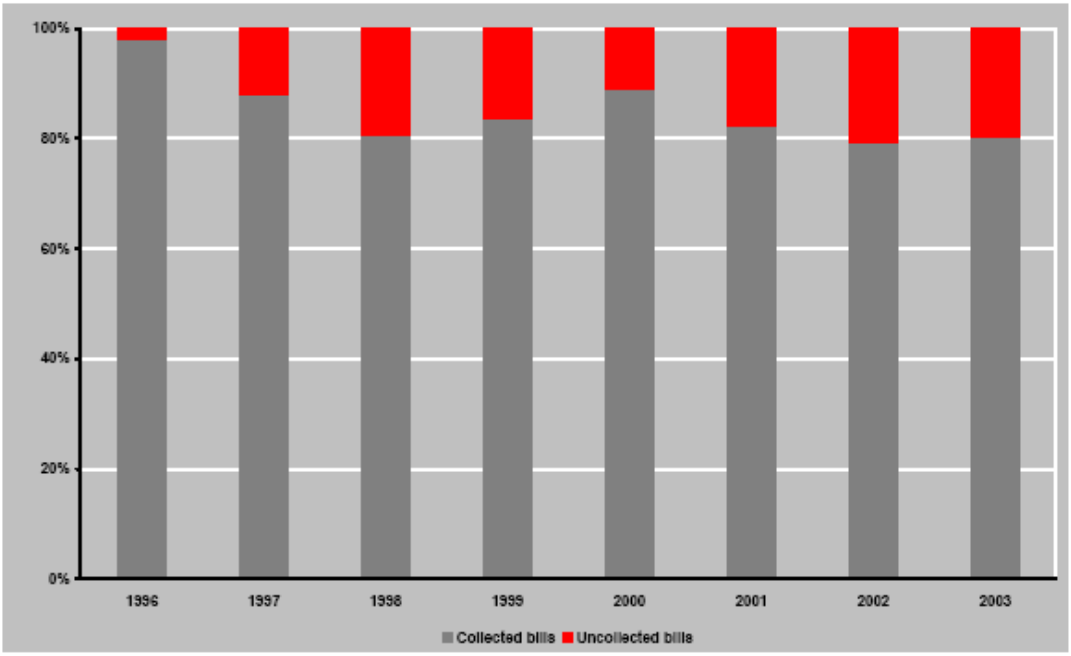
Another significant problem faced by GWCL is the inefficient collection of water bills. The proportion of bills collected for all customers has not seen any significant improvement. Figure 3.6 shows a significant decrease in the proportion of bills collected from 2000. A major reason for the low rate of bill collection is the failure of the government of Ghana to pay for water services used in government facilities. Figure 3.5 depicts that GWCL collection rate for government is worse than other consumers.

Figure 3.5: Performance of Ghana Water Company Limited, 1992 – 2000



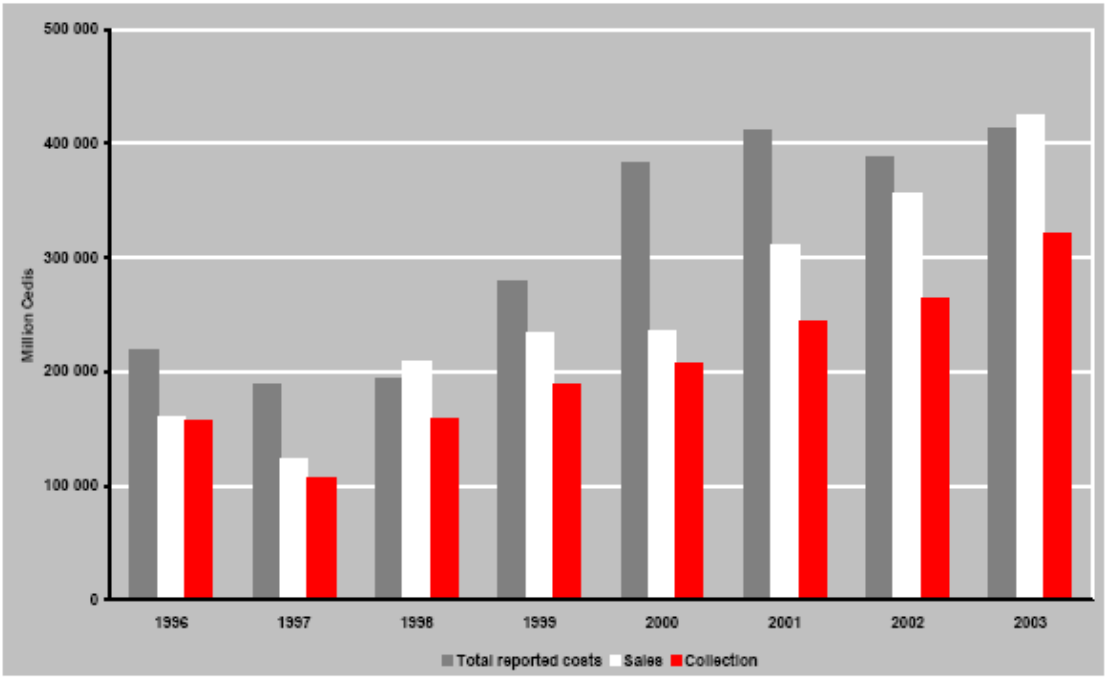
Source: WaterAid Ghana (Retrieved August, 2008)

Figure 3.6 GWCL Billing and collection performance (%)



Source: PURC Review of Performance of GWCL 1998-2003

Figure 3.7 Real Cost/Income Analysis



Source: PURC Review of Performance of GWCL 1998-2003

The low collection rate significantly affects the financial stability of GWCL. Figure 3.7 shows that though sale of water outstripped cost of production in 1998 and 2003, GWCL revenue collected from sales was not enough to cover the cost of production. From 1996 to 2003, collection rates have always been lower than actual sale of water. Although the cost of production for the period under review was always more than the value of water sold, getting the collection rate to equal the value of water sold will better the financial situation of GWCL.

GWCL continues to perform poorly in the quality of water supplied at 'consumers' tap'. A performance review taken by the PURC from 1998 to 2003 into the quality of water supplied by GWCL showed that water quality in eight out of the ten regions served by GWCL was unsatisfactory. Since most of the independent water regulatory institutions were established in the late 1990s, available data on water quality from an independent regulator only starts from the late 1990s. Without any independent regulation during the existence of GWSC, it is highly likely that water quality under GWCS was even worse. Thus, a satisfactory water quality in two of the ten regions served by GWCL may constitute a change in the quality of water supplied at 'consumers' tap' and represent an upward match to score satisfactory water quality for all ten regions under its jurisdiction. Until the next performance review is conducted, one cannot authoritatively draw a conclusion on the overall performance of GWCL with regard to water quality. However, the prospects are not looking good as a World Bank sponsored water supply review indicated that chemicals needed at treatment plants were in short

supply and dosing instruments were faulty at some treatment plants. (Ghanaweb.com, 2008)

It must be noted that since the inception of GWCL in 1999, the government has, as part of the water sector restructuring, undertaken various water development projects with the view of increasing the quantity and quality of water served by GWCL. Such development projects have focused on rehabilitation of existing water supply systems to increase its designed capacities. With funding provided by the government, GWCL has also embarked on limited system extensions and construction to harness new water sources to serve consumers who are currently not covered by the GWCL piped water system. Among the projects being undertaken are the Accra-East-West-Weija (AEWW) interconnection and the Kpong Water Supply Expansion Project. The AEWW involves the laying of a 12 kilometer pipeline from the Accra terminal to the Weija treatment plant. When completed in the third quarter of 2008, this project is expected to add 15 million gallons of water a day to residents of the eastern part of Accra. The Kpong Water Supply Expansion Project involves the expansion of the existing water treatment plant to increase its capacity to 250,000 m^3 daily and the construction of a new treatment plant with the capacity to supply 285,000 m^3 of water daily. When completed, the project will increase the water supply to eastern Ghana and the eastern part of Accra.

3.4. Private Sector Participation

One of the main reasons for the restructuring of the water supply system in Ghana was to position the sector to engage the private sector in the supply of urban water. Under

the Ghana Poverty Reduction Strategy (GPRS) the government placed strong emphasis on ensuring adequate water supply to Ghanaians as part of efforts to reduce the incidence of poverty. (GPRS, 2002) Under the GPRS the government stated that "[t]he policy on private participation in operation and maintenance of service delivery will be finalized…" The government argued that involving the private sector in the supply of water in urban areas will increase financial resources for investment, improve technical management and efficiency and improve the quality and quantity of water supplied to consumers. This position taken by the government of Ghana is also well supported in the literature. (Vickers & Yarrow, 1991; Clarke et. al., Cowen &Tynan, 1999; Nicola, 2004; Bakker, 2003) The poor performance of GWSC as evident in the data above also supported the argument for a public-private sector collaboration in the water system.

An earlier attempt at private sector participation in the water sector failed when a 10 year lease contract between the now defunct Azurix, a subsidiary of Enron and the government of Ghana was cancelled. This lease contract failed mainly due to allegations of corruption and also increasing public opposition to water privatization. (Public Citizen, 2002)

In 2006, Ghana Water Company Limited entered into a five year management contract with Vitens Rand Water Services BV of Netherlands and its subsidiary in Ghana, Aqua VitRa Limited operating under the joint name of Aqua Vitens Rand Limited (AVRL). The main components of the management contract are system expansion, rehabilitation of existing water systems, capacity building to enhance the skill and competence of the staff of GWCL and project management. Under the system expansion

and rehabilitation component, the operator must work to increase the amount of treated water for sale, extend service to low income areas and rehabilitate existing networks to reduce non-revenue water (unaccounted-for-water). The operator also must work to ensure safety at the various dam sites and also procure and install billing meters for consumers. Under the capacity building and project management component of the contract, the operator shall among other things train seconded staff and offer technical assistance to the grantor.

Since the agreement is only a management contract, AVRL does not have to provide any funding for the project. They rather get paid for the services of managing the urban water system in Ghana. The grantor, in this case the government of Ghana through GWCL, has to provide the funding for the realization of the target components set out under the contract. The contract is estimated to cost $120 million. The government of Ghana is providing $12 million while its development partners, the World Bank and the Nordic Development Fund, are providing $103 million and $5 million, respectively.

Under the contract, AVRL is entitled to contract with consumers for the supply of water on behalf of the GWCL. AVRL will therefore issue bills, receive payments and disconnect consumers for non payments. The facilities of GWCL also shall be under the care of AVRL for the duration of the contract. Upon satisfactory execution of the contract, AVRL shall have the right to submit a bid for a leasehold agreement. After a retrenchment program to reduce excess personnel, the regional staff of GWCL will be transferred to AVRL for the duration of the contract.

AVRL shall be paid a base fee for it services and the base fee shall be increased by incentive packages or decreased by performance penalties as contained in the management

contract. In addition to the base fee, AVRL shall receive financial incentives based on the extent to which it exceeds performance targets as stated in the contract. The base fee will also be reduced by penalties based on the extent to which AVRL falls behind on the targets of the contract.

The success of the management contract depends to a large extent on the ability of GWCL and other regulatory agencies to monitor the performance of AVRL. For instance, adjustments in the base fee can be made only with data on the performance of AVRL. Performance measures like reduction in the unaccounted for water needs an accurate water production levels to measure. Other indicators like extension of services to areas outside the network are relatively easy to measure. Extension of water supply services to areas outside the coverage areas will have physical infrastructure and consumer satisfaction as indicators of performance. Personal interviews conducted with officials at the GWCL show that GWCL does not have the capacity to collate the data necessary for a full performance review of the management. Speaking on condition of anonymity, one senior policy staff of GWCL said that almost three years into the management contract, GWCL has not been able to establish a baseline for AVRL on which to measure the unaccounted-for-water.

In the second year of operation by AVRL, the residents of Accra experienced an uncharacteristically acute water shortage in the first quarter of 2008. Residents and civil society groups who were initially opposed to the management contract did not hesitate to call for the immediate abrogation of the management contract with AVRL. AVRL responded to the water crisis by pointing at power shortages and scheduled maintenance of the water systems that serve the Accra metropolis. According to the minister in charge of Water Works,

a mid term review is underway and the performance of AVRL in the water sector will fully come to light once the review is completed.

3.5. Urban Poor

Although extension of water infrastructure to serve the poor was a component of the management contract, two years into the contract no significant improvement in the services to the poor has been recorded. Under the contract, low income areas are defined as all areas which do not receive piped water services from GWCL. For purposes of this research, low income areas have been defined as areas which do not receive regular or piped water services from GWCL and areas with higher concentration of residents with average annual income at the threshold level of $400.

The urban poor in Ghana find themselves in a very vulnerable situation. When GWCL was created in 1998, it was mandated to supply water to urban areas in Ghana, i.e. cities or towns with population exceeding 5000 residents. There are areas or communities within these urban centers which exist almost as autonomous communities, but are regarded as part of the larger city because of their proximity to the city limits. Thus, though these communities would have been regarded as rural because of the size of their populations, there are regarded as urban because of their geographic location. These communities tend to be at the urban fringes, exhibit shanty town characteristics and have a high concentration of poor people. The communities are characterized by low income dwellers, squatters, inadequate infrastructure, and low levels of education. A sizeable proportion of the residents are also rural-urban migrants who have migrated to the cities in search of work. GWCL, which caters to the needs of the more traditional urban

centers, therefore severely disadvantage these poor urban dwellers. Although there is a severe inadequacy of water supply in such areas, their plight is hidden within the aggregate data obtained for the entire urban areas. Thus, though GWCL says that urban water coverage is 59%, coverage in the poor neighborhoods is around 20% and in worse areas below 5%**.** In Accra, GWCL water connection rates average 90% in high-income areas and 16% in low-income settlements. (UNDP, 2006) In fact in some of these poor neighborhoods, the living arrangements make it almost impossible for the GWCL to extend pipe service to the area. Residents raise up structures anywhere within the community, in most cases, without official approval. In Nima and Ashiaman for instance, cars cannot easily drive through most of the area. Buildings and structures have been erected on every possible space in the community. GWCL will have to demolish almost half of all the structures in the neighborhood to lay new pipes.

As part of the water restructuring project, a Community Water and Sanitation Agency (CWSA) was created in 1998. The main function of CWSA is to assist district assemblies with water supply in rural areas. Since some rural dwelling units are not suitable for piped water systems, CWSA facilitates the construction of boreholes and hand dug wells to make water readily available to such rural dwellers. Boreholes and hand dug wells are also a suitable alternative to rural communities with fewer people to economically afford the convenience of network piped water systems. Boreholes and hand dug wells therefore serve as a cheap alternative to get reliable and clean water supply throughout the year. However, since poor communities within the urban centers are not rural areas as defined by the government of Ghana, they do not come under the

jurisdiction of CWSA and can therefore not benefit from the boreholes and the hand dug wells provided by CWSA. Poor communities in urban centers therefore resort to buying water from water vendors and small scale water suppliers. Where there is a piped water system close by, family members walk to fetch water or pay for people to cart water to their residence. In communities which are far from piped water supply, residents pay small scale water suppliers who fetch water in motorized tanks for delivery. There is a lot of controversy about the source and quality of the water supplied by the motorized tanks. Residents in poor communities pay three or four times what residents on the GWCL network pay for water. In Accra, many of the 800,000 people living at or below the poverty line pay 10 times more for their water than residents in non poor areas. (UNDP, 2006) The operations of the small scale water suppliers do not come within the purview of the PURC and therefore are not required to adhere to the regulations of PURC. PURC itself has not shown any interest in regulating the activities of the small scale water providers. In its 2005 tariff policy statement, though PURC agreed that the best pro-poor measure of water supply will be to extend GWCL coverage to such areas, it said that the operations of the small scale water providers should be left to the market forces. Because of information asymmetry, consumers do not have the necessary information to make the right decision as to whom to buy water from and how much to pay. The urban poor are therefore left at the mercy of the small scale water suppliers while the non-poor enjoy the protection of PURC and the convenience of piped water from GWCL. It is the plight of the urban poor that forms the basis of this research.

Chapter 4

Methodology

4.1 Introduction

Urban water supply continues to pose a problem for SSA countries. SSA countries still lag behind the rest of the world in urban water coverage. Most urban areas across SSA have relatively very little provision of water. And water provision in these urban centers suffers from low pressure and intermittency in service. For instance in Burkina Faso, only 61% of urban population has access to water. And on the very low side, Guinea Bissau and Mauritania's urban water coverage is 29% and 34%, respectively. (UN-HABITAT, 2003) Within these cities are the peripheral municipalities or the disadvantaged urban communities. These disadvantaged urban communities or peripheral municipalities that tend to have high concentration of low income dwellers have very low water coverage in comparison to the rest of the larger urban communities.

Using the case study approach, this research looks at how to ensure adequate water supply to disadvantaged urban communities in Ghana

4.2 Hypothesis

To answer the question of how to ensure adequate water supply to disadvantaged urban communities in Ghana, this research revolves around the following hypotheses;

H_1 Small scale water suppliers in the informal sector provide a valuable water service to disadvantaged urban communities.

H_2 Disadvantaged urban communities pay substantially more per amount of water consumed relative to non disadvantaged communities

H_3 Disadvantaged communities are willing to pay more for improved services in water utility.

H_4 Disadvantaged communities are not well informed about the decision making institutions in the water sector.

4.3 Mixed Method

This research utilizes the mixed method approach to investigate how to ensure adequate water supply to disadvantaged neighborhoods in urban places in Ghana. The mixed method approach combines quantitative and qualitative research methods either during the data collection stage or the data analysis stage of a research project. (Creswell, 2003; Cooper & Schindler, 2001) The usefulness of the mixed method of research lies in the fact that a research that combines both qualitative and quantitative data analysis enhances better understanding of the research questions than using either approach exclusively. (Creswell & Clark, 2006) For instance, where both methods lead to a convergence in the results or solutions to the research questions, results can be deemed more accurate.

4.3.a Mixed Method Type

In this research, a simultaneous mixed method design was used to gather data on water use patterns, water institutions and water infrastructure problems. A congruent nested mixed method design was used to analyze the relationships between water sector

stakeholders. This method involved simultaneously collecting qualitative data via interview of stakeholders in the water sector and focus group discussion with water consumers while at the same time taking quantitative data from water consumers via survey methodology.

The mixed method approach was used, first, because of its benefit of corroboration. Conclusions reached at the end of this research will be more accurate if data gathered via qualitative means about water use patterns and the nature or state of water systems and water stakeholders converge with quantitative data gathered from water consumers. In addition, by the nature of survey methodology, there is a limit to the depth of information that can be provided by respondents. An interview on the other hand allows the researcher to explore the questions better and where necessary ask follow up questions for clarification.

4.4 Subjects of the Study

The subjects for this research include city and community staff, key employees of public agencies with direct responsibility in the water sector, small scale water providers, key staff of the GWCL and selected residents of disadvantaged urban communities. All subjects were at least 18 years old and none of the subjects were in the vulnerable population group as defined under Institutional Review Board's (IRB) criteria for research involving human subjects.

4.5 Case Study Approach

To a considerable degree, an effective local governance regime with inputs from water providers and water consumers is very essential to ensure that there is adequate water supply to poor neighborhoods and underserved urban centers. However, the best means to achieve this is not that simple. This is because, to a large extent, there are considerable differences in urban centers in SSA. In SSA, urban centers are springing up continuously and there are wide variations in their demographic composition. (Baker, 2003) In addition, the technical capacity of government support and local economic base differ from area to area. However, water policies towards these urban centers have for the most part been uniform. Thus, national governments and international agencies often support policies in urban centers with very little or no area specific information. (UN-HABITAT, 2006)

Getting the right and detailed information to make a firm policy choice entails detailed household data, data on available water provision, data on the particular needs of the area, property regimes and demographic changes. The best way to get reliable information for policy decisions is to go to the source – at the local level. The case study approach is therefore appropriate for this research. According to Yin (1984), case studies are appropriate research methodology when the focus of the research involves "how" or "why" questions. Case studies are also appropriate when "the focus [of the research] is on a contemporary phenomenon within some real life context". Using the case study approach, this research investigates how to ensure adequate water supply to disadvantaged urban communities in Ghana. The case study approach is very flexible in

this circumstance as it will allow the opportunity to examine the complexity of living arrangements in disadvantaged urban areas. Direct research at the case study areas through direct observation and interviewing can reveal subtle information that would have otherwise not be apparent in a 'survey only research' or in evaluating written documents and other government regulations. For instance, through direct observation, the researcher was able to observe different water use patterns in disadvantaged communities. In addition, subtle ways in accessing water in these communities which may be deemed illegal are very difficult to capture in regulatory documents.

The multiple case studies approach was used for this research because of a number of reasons. Multiple case studies offer the investigator an opportunity for comparing identified cases. Also, evidence obtained from multiple case studies is frequently deemed more persuasive. Multiple case studies therefore add to the overall robustness of the research design. (Yin, 1984)

Using the case study approach for this research is not necessarily to find the one best way to cater for water supply inadequacies, but rather, to be able to identify common patterns in categories of urban centers and then design and suggest a policy or mix of policies to help ensure adequate water supply.

4.5.a Case Study Selection

In choosing the case study area, the researcher sought large urban centers with a high migrant population. Looking at the demographic figures for the principal urban centers in Ghana, Accra stood out. Accra, which also serves as the political and commercial capital of Ghana had 41% of the population of the principal urban centers. In

addition, with a migrant population of 41%, it was the single largest urban center in terms of migrant population. (Ghana Statistical Service, 2000) The case study areas were therefore selected from Accra and its environs.

In selecting the case studies, the researcher sought to identify disadvantaged urban communities that have various characteristics, including communities with a high concentration of low income dwellers, multi ethnic communities, communities with a high concentration of squatters, settler communities and communities that have a particularly low or no coverage of water supply. The case study areas were selected through consultation with water policy stakeholders in Ghana, current research and review of the literature.

One of the important criteria for selecting the case study areas was the extent of water availability or coverage in the area. To this end, the researcher sought places that had little or no piped water coverage from the Ghana Water Company. Other areas considered were areas that are deemed to be under the water coverage of GWCL but experience erratic flow. To be included in the case study as an erratic flow area, the area must have water flow at least once every three weeks.

The choice of case study areas also included income levels. According to the Accra Metropolitan Assemble (AMA), almost every residential community had enclaves of poor and non poor residents. Since this research is interested in disadvantaged communities, the researcher sought areas that had high concentration of poor residents. The AMA has divided residential communities into four income zones for the determination of poverty levels. Average Income levels diminish from zone one to zone

four residential communities. (Local Government Bulletin, 2002) Zone one residents have an average household income of US$ 1,519. Zone two residents have an average household income of US$ 883. Zone three and four communities have an average household income US$ 793 and US$ 460, respectively. Using AMA's four income zone residential categorization as a guide, communities that were included in the case study has to exhibit zone three or zone four characteristics.

Communities that have a high concentration of one ethnic group were avoided because it may slant the research findings. Particular tribes or ethnic groups may have their unique cultural practices when it comes to water use and there may also be a strong sense of community which will lessen the effect of inadequate water supply on the elderly and children. Thus, to be considered as a case study community, the community must be cosmopolitan in nature with various tribes and ethnic groups represented.

Rapid urbanization in Ghana and attendant increased rural-urban migration has led to the springing up of many illegal and unauthorized housing structures. (Illegal or unauthorized housing structure is defined as houses built without a valid building permit or a building constructed on unauthorized places within the community) Most of the communities that have illegal and unauthorized structures have high population density and are filled with many low income residents who lack basic infrastructure facilities. Thus, one other criterion for the case study selection was the presence of illegal and unauthorized housing structures.

The specific case study areas were selected through a combination of expert advice and literature review. The researcher consulted experts in water supply

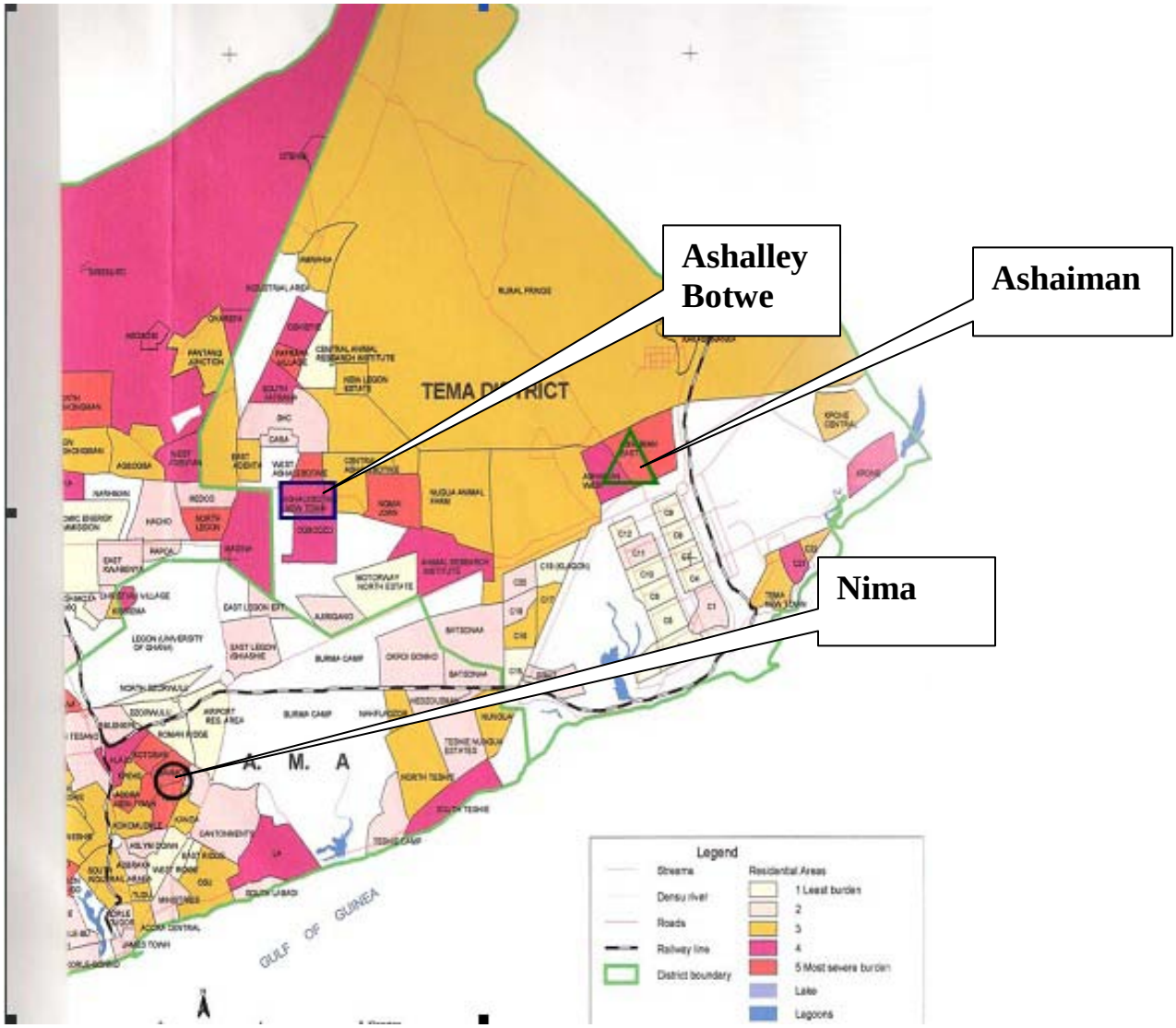
management, community development and community experts. Advice was sought from the executive director for Grassroots Africa, a senior official of the Ghana Water Company, an official at the Ministry of Water Works and Housing, and the Assembly Members of selected communities. Various reports by the United Nations on water supply such as 'Meeting Development Goals in Small Urban Centers and 'Water and Sanitation in the World's Cities were also consulted.

Using the selection criteria described above, the case study was narrowed to the communities of Ashaiman, Ashaley Botwe, Madina, Nima and Sukura. Due to time and financial constraints, the researcher selected the three communities of Ashaiman, Ashaley Botwe and Nima to form the basis of the case study research. In selecting the final three cases, the researcher was careful to select the most unique to ensure that cases represented different disadvantaged communities. Nima is the oldest disadvantaged community that meets all the case study selection criteria. Ashalley Botwe is one of the most dynamic disadvantaged communities in terms of development. Since this community is at the urban fringe with more room for expansion, new construction and settlements are spring up every day with new migrants moving in. Ashaiman is the farthest community from Accra central and yet located between the urban area of Accra and Tema.

In addition, case study research with three cases is not unusual. Many case studies research in the literature are conducted with three cases. In Maton and Salem (1995) three cases were selected in studying community empowerment. Eisenhardt (1989) also argued that in a multiple case study approach, grouping cases into three or four different cases

would suffice to learn about the subtle differences and nuances in the case study areas as they relate to the subject under study.

Figure 4.1: Map of Greater Accra Metropolitan Area showing the Case Study Areas



Source: AMA Rapid Assessment Survey 2001

4.6 Selecting Key Informants for Interview

Interviewing key informants was very critical for finding the state of water supply in disadvantaged urban communities. It also provided insight into how residents coped with inadequate water supply and efforts at the local and national level to address the problem. Key informants also provided a rare insight into the operation of small scale water providers. The key informants consisted of officials from the Public Utility Regulatory Commission, municipal assemblies, selected water tanker providers (small scale water providers), Ghana Water Company, The Ministry of Water Resources, Works and Housing, and Non Governmental Organizations in the water sector.

Individual interviewees were selected based on their official position in their organization. The small scale water providers were selected based on their ownership and operation of water supply business. The researcher explored organizational charts and identified interviewees based on their position in the organization and their work responsibilities. Thus, an effort was made to select as close as possible subjects whose work schedule directly involved water supply management or regulation. Once an expert is identified, the researcher asked the person for suggestions in identifying interviewees in the other organizations.

Arrangements for the actual interviews were made after all the key officers had been identified. Arrangements for interviewing small scale water providers and officials at the municipal assemblies were completed first. Since they dealt directly with the communities of the case study, their responses were helpful in designing follow up questions that were asked officials in the other organizations. With the rest of the

organizations, the order for the interviews was purely for convenience sake. However, the interview time table had to be abandoned midstream when it became obvious that most of the selected interviewees had very tight schedules. Most of them could not meet on the mutually agreed time. The interviews were therefore conducted when an official could spare some time. Some interviews were therefore conducted during lunch break; others were conducted after 6pm and even on weekends.

Interviews were requested mainly via telephone and personal visits. At the first contact with an interviewee, the researcher explains the purpose of the study and why he or she has been identified as a potential interviewee. The next step then was to ask their permission to be interviewed at their convenience. At this time, a copy of the research protocol and an introductory letter as approved by Clemson University Institutional Review Board (IRB) was made available to the interviewee. The actual questions for the interview were not made available in advance to the interviewee since could have influenced their responses during the interview. An appointment for the interview was then set up at the convenience of the subject. Most of the interviews took place at the subject's office or within the office premises.

On the day of the interview, copies of the research protocol and the letter of introduction were given to interviewees to refresh their memory. At the beginning of each interview, permission was requested from the subject to record the interview session by a tape recorder. Each interviewee then had to sign an audio consent form with their initials permitting the audio tape and releasing the tape for research related uses. Subjects were assured that the recorded tape would be used to make up for gaps in the interview notes

and their names will not be identified on any documents resulting from this research unless an additional consent has been sought.

The interview sessions varied considerably from one interviewee to the other. The duration of the interview was typically between one to two hours. Where necessary, follow up interviews were conducted to seek clarifications on earlier statements. Telephone calls were generally made to request follow up interviews and the same consent procedure was followed for the use of an audio recorder. The interviews were mostly one-on-one.

4.6.a The Interview Questions

Since the organizations included in the interviews were varied with different goals and missions, the questions were diverse. However, in general, the questions for the interviews were designed to elicit relevant information pertaining to water supply management and regulation in Ghana. The questions therefore explored the regulatory regime in Ghana and the participation of consumers in regulatory changes and decision making process in setting tariffs. It also explored the role of local assemblies and Non Governmental Organizations in the urban water sector. What is the existing government policy on water supply in urban areas and what are the perceived changes to this policy in the future? In addition, the questions looked into the operations of small scale water providers and what the providers perceived to be their bottlenecks.

The interview questions explored these general areas;

- Public Utility Regulatory Commission (PURC)
    - Responsibilities of the PURC
    - Citizen participation in the work of the PURC
    - Decision making process in the tariff and pricing regimes

- Municipal Assemblies
    - The collaborative role of the municipal assemblies

- Selected Water Tanker Providers
    - Operations of the small scale water provider
    - Perceived bottlenecks in their operation
    - Possibility for government assistance in their operation
- Ghana Water Company
    - Role of Ghana Water Company in urban water supply
    - Extent of water coverage for consumers of Ghana Water Company
    - Any collaborative efforts with other small scale water providers
- Non Governmental Organization (Water Sector)
    - Specific water related services provided to urban communities
    - Community participation in the work of the NGO
    - Funding sources for the NGO
- Ministry of Water Resources, Works and Housing
    - Government policy on urban water supply
    - Statistics on urban water supply
    - Availability of fresh water sources
    - Strategies for reaching the urban poor

The complete list of questions as administered to each interviewee has been attached in Appendix A.

4.7 Focus Groups

The focus group discussions were conducted in the three case study areas. The focus groups method was chosen because of its advantages. Krueger (1994) points out that focus groups are social in orientation with the ability to obtain valuable data in a socially conducive environment. Krueger points out that people are social beings and when they interact with and listen to each other they are able to inform and provide valuable insight about a particular topic.

Another advantage of the focus group method is that it affords the researcher the flexibility to probe further into a particular issue to elicit important information. Kruger

(1994) argues that this approach works especially well when the researcher uses an unstructured probing method with the aid of question guides instead of having set questions for the focus group.

Logistically, this method is inexpensive and relatively easy to conduct. Focus groups allow the researcher the opportunity to have many people at the same location to speak to a particular issue. This works particularly well when the members of the group are representatives of the population of interest and have divergent views. (Krueger, 1994) Information gathered is immediate unlike a survey where you have to allow time for mailing.

Finally, focus groups are inexpensive as compared to other research methods. With about 7 to 10 participants, paying for a meeting venue, refreshments, services of an assistant and monetary incentives for participation, this method is cheaper that paying to conduct 100 or so individual surveys. (Krueger & Casey, 2000)

There were two focus group discussions in each of the three case study areas making a total of six focus group discussions. Each group comprised a representative group of seven residents in the case study areas. According to Krueger & Casey, the ideal size of a focus group for noncommercial topics is six to eight participants. (Krueger & Casey, 2000) Seven participants are big enough to ensure that a wide variety of experiences are shared in the group discussion and also not too large to prevent participant ample time to share their experiences.

To ensure a representative sample of residents in the area, participants in the focus group discussion were drawn from different categories of water users living in the areas.

The selection was therefore based on a combination of demographic information and expert advice.

The help of the assembly member for the area was solicited to recruit potential focus group participants. (Assemble Members are elected representative of the community to the municipal assembly) At the first contact with an Assembly Member, the purpose of the study and why his help will be very helpful to the research is explained. A research protocol and an introductory letter as approved by Clemson University Institutional Review Board (IRB) were then made available to the Assembly Member. At this meeting, the researcher also explained the criteria for selecting participants to the Assembly Members and then invited them to suggest possible focus group participants. To ensure that the Assemble member did not suggest only his friends or acquaintances, the suggested list of participants is vetted to ensure that they meet the requirements set for participation in the focus group. The participant must be a full time resident in the community. Since the communities are cosmopolitan in nature, no three participants must come from the same tribe or ethnic group. Participants should vary by age and gender. And participants must not live in only one section of the community, but must represent all areas of the community.

After the participants were identified, the researcher met with them individually and explained the purpose of the study and why their input in the focus group would be helpful. Once they agreed to participate, copies of the research protocol and an introductory letter as approved by Clemson University Institutional Review Board (IRB) are made available to them. At this time, the participants were also informed about the

meeting place and the time for the meeting. The researcher also made it clear to the participants that refreshments would be provided at the meeting and a token of $1 will be available to reimburse transportation cost. The focus group discussion took place within about a two mile radius of the residences of the participants and going by local transport $1 was about enough for fares. There seems to be a consensus in social science research that participants in focus groups need to be given incentive packages to motivate them to show up for the discussion. (Morgan, 1997; Morgan & Krueger, 1998; Krueger & Casey, 2000). In fact, in each of the three communities, at the day of the focus group discussion all participants showed up on time and stayed throughout the entire one and half hour period.

The venues for the focus group discussions were identified with the assistance of the Assembly Members. At Nima, the focus group discussion took place at the Community Social Center. At Ashalley Botwe, it was held at the house of a medical officer in the area. Most local meetings took place at this address. At Ashiaman, the discussion took place at a 'hang out joint' which played the role of a community center. These venues were selected carefully to ensure the comfort and convenience of the participants. According to Litoselliti, participants in a focus group need to be comfortable and at ease to freely discuss their experiences. (Litoselliti, 2003)

To ensure that participants fully engage in the discussion, the decision was taken to divide the focus groups into two groups in each community. Group one comprised participants between the ages of 18 and 35 and group two comprised participants above the age of 35 years. Studies have shown that young people refrain from challenging or

contradicting elderly people in public settings. Given Ghana's patriarchic society, it was felt that it was particularly important to group participants by age. (Kandiyoti, 1988; der Geest, 2004)

On the day of the focus group discussion, the researcher briefed the participants again about the purpose of the study and why their input in the focus group discussion will be helpful. At this time, the ground rules for the discussion were set. The researcher made sure that participants were aware there was no right or wrong answers to the discussion points. The researcher's was only interested in their personal views as pertaining water use in their communities. At this time, permission was requested from the participants to audiotape the group discussion. Each participant then had to sign an audio consent form with their initials permitting the audio tape and releasing the tape for research related uses. Participants were assured that the recorded tape would be used to make up for gaps in the written notes and their names would not be identified on any documents resulting from this research.

To ensure the full attention and effective moderation of the focus group discussion by the researcher, an assistant was hired to take notes during the group discussion. Once all the ground rules had been laid, the discussion began. During the group discussion, each participant was given ample time to express his or her views. In the few occasions where one or two participants tried to dominate the discussion, the researcher politely asked them to allow others to share their experience as well. Specific questions were directed to people who seemed particularly quiet so as to get their views as well. Krueger & Casey warn that a focus group moderator must look out for the one or

two people who try to dominate the group discussion. They explain further that to get good information from a focus group discussion, the moderator must ensure that every participant is given ample time to share their views.

The focus group discussion lasted between an hour and half to two hours. The participants were allowed to have their refreshments during the group discussion. Since the refreshment was either a canned soda or a bottle of water, it was felt that having it during the group discussion would not significantly affect the quality of the audio recorder or the discussion. At the end of the group discussion, $1 was given to the participants to cover their transportation cost.

Points discussed followed the following theme;

- Personal background information
- General knowledge about water institutions in Ghana
- Participants' water use behavior
- Participants' perception of the state of water supply in their communities

Attached to appendix B is the complete list of discussion points in the focus group protocol.

4.8 Survey Method

The objective of this survey was to collect more information about water use patterns from residents in the case study area. Unlike the personal interviews and focus groups, the survey method allowed efficient collect of data from a bigger sample of residents in a relatively timely manner. A total of 100 respondents were surveyed in each of the three case study areas. Since the research focuses on disadvantaged urban communities which have predominantly low income residents and people with very little education, the survey questions were read out to most of the respondents instead of

allowing survey respondents to fill it out on their own. In addition, administering the survey removes the possibility of confusing questions by the respondents.

Two research assistants were hired to help administer the surveys. The research assistants were given copies of the research protocol so that they would familiarize themselves with the research. The researcher also discussed each of the survey questions with the assistants to ensure that they were ad idem as to the meaning of each question and what the nature of the response should be. The researcher also explained to the assistants the method to be used to identify the survey participants.

Stratified systematic sampling method was used to identify the respondents for the survey. Patten (2001) argues that, when used properly, systematic sampling produces a population sample that is basically as valid as a sample obtained by using simple random sampling. A respondent was identified in every third house in the case study communities. To further ensure that the respondents were a representative sample of the community, participants were selected based on the sub areas of the communities. For instance Nima is divided into Nima east and Nima west. Ashalley Botwe and Ashiaman had ‘old town’ and new town’. These divisions were therefore taken into consideration to ensure that respondents were drawn from each sub area of the community. In addition, steps were taken to ensure that females and males were well represented in the survey. In developing countries, women play a very important role in ensuring that their families have sufficient water. (Shiva, 2002) Women therefore have very important information when it comes to water use patterns in their communities. In addition, disadvantaged urban communities are often times the recipient of rural-urban migrants. Rural-urban

migrants often times include a sizeable number of men who go to urban areas in search of greener pastures for their families back in the villages. Thus, it is not uncommon to find males-only households in disadvantaged urban communities. Having left their families in the villages, such men are solely responsible for their water use. In disadvantaged urban communities, men also have very important information on water use patterns. A male participant was therefore identified in every sixth house. This was not so difficult to do since almost all the houses in the case study areas are 'compound houses'. (Common houses are multiple family dwellings) Such houses have an average of 15 residents and it is therefore not difficult to identify a male or female in the household.

Once a participant is identified, he or she is read the survey participant statement as approved by the Clemson University IRB. The statement gave a brief description of the research and the nature of their participation. It also stated that the survey was anonymous and participants were free to opt out of the survey at any time. (Attached to Appendix C is the full statement as read out to survey participants)

Chapter 5

Case Study 1 – Nima

The community of Nima is located at the northeastern part of the city of Accra and is one of the suburbs within the Accra Metropolitan Assembly in the Greater Accra region. Nima has a total population of 69,044 and 2429 households. (Ghana Population and Housing Census, 2000) Nima community is a quintessential peri-urban community in Accra made up of a constellation of people of mosaic ethnicity. (Konadu-Agyemang, 2001; Turner & Kwakye, 1999) In the household survey, all respondents answered that they live in a compound house. The name Nima, which means "strangers resting place" was first applied to parts of the city of Accra settled by Alhaji Amadu Futa, a settler from the northern part of Ghana in 1931. Futa, a Muslim cattle dealer, acquired the property from a traditional GA family purposefully as a settlement and also for cattle grazing. Due to Futa's Muslim norms of hospitality to strangers, Futa accommodated 'Muslim strangers' who were thronging to the area in search of jobs at the time. Futa's compound attracted many strangers who had come to the city of Accra, especially from the Northern part of Ghana. The area therefore grew as a place that socializes new migrants to the city life in Accra. Today, though Islam is still the predominant religion in Nima, the place is made up people from different ethnic groups in Ghana as well as migrants from within the West African sub-region. Residents have nicknamed the community United Nations to reflect the many tribes and nationalities represented in the community.

The population of Nima grew tremendously as a result of the growth in the city of Accra. Starting from the 1960s, through the seven year development plan of Kwame

Nkrumah, the city of Accra experienced rapid industrialization culminating in the expansion of the manufacturing and commercial sectors within the Accra metropolis. The bust and boom of rapid industrialization, though short lived, served as the genesis of the rapid growth in Nima. From an estimated population of 29,797 in 1984, the population of Nima had grown past 69,000 in 2000. (Ghana Statistical Service) Many rural migrants who were attracted to the city of Accra during the later part of the 1960s through the 1970s and 1980s ended up at Nima. In the 1960s, Nima served as a ready shelter for the many construction workers who found themselves in Accra working on the numerous infrastructure development projects commissioned by Ghana's first president, Kwame Nkrumah.

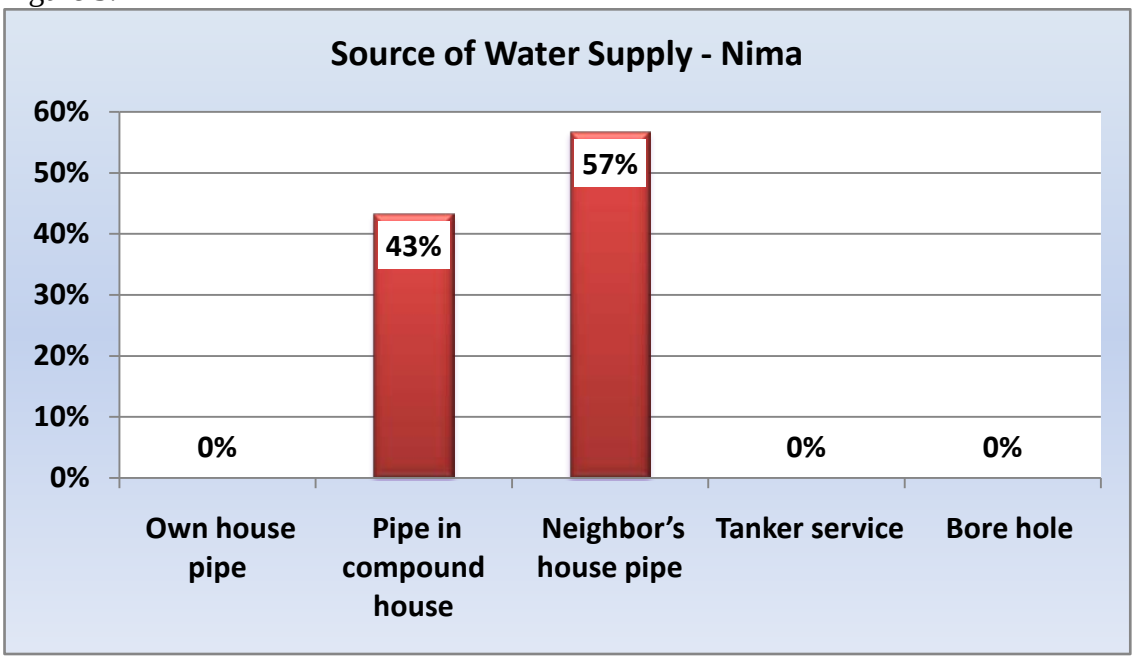
Nima continues to be a popular destination for new arrivals from villages within Ghana and other economic refugees from neighboring West African countries. (Huber, 1999) The community also serves as a transit point for many traders who bring their goods from all parts of the country to the city of Accra for sale. Thus, the growth in Nima is not attributed only to natural growth but predominantly to in-migration. (Ghana Population and Housing Census, 2000) Residents from other parts of the city who have been edged out of residential areas where property rates and cost of living have shot up have also found Nima to be an accommodating and affordable alternative.

5.1 Source of Water

The Nima community is within the piped network of the Ghana Water Company Limited (GWCL). However, according to GWCL, approximately 50% of households are

connected to the piped network. Thus, about half of residents get their water supply not directly from GWCL but through middlemen or water vendors. (Songsore et al, 1998) In the household survey, 56.7% of respondents indicated that they get their water from a neighbor's house pipe and 43.3% responded that their source of water was a pipe located within their compound house. (Figure 5.1) It must be noted that these results do not account for residents' source of water during seasonal water shortages where water from GWCL operated pipes becomes extremely erratic. In times of extreme water shortages where there is little or no water flowing through the pipes, residents travel outside the neighborhood to get access to water.

Figure 5.1



Source: December 2007 Household Survey

The focus group participants indicated that they used water primarily for the essentials of drinking, cooking, bathing and washing. This fact is corroborated by the fact

that the Nima community is a predominantly poor neighborhood with low income residents. (Songsore et al, 1998) The Accra Metropolitan Assembly (AMA) has classified Nima as a third class residential area with a mean annual income of $793. Few people have personal cars or any of the possessions that more affluent groups own which demands high water usage. The compound housing type is typically a rectangular block with numerous rooms. Each room is rented and occupied by one family unit. The housing structures are such that no individual tenant has enough personal space for gardening or maintaining green grass, which will demand high water usage. During the field study in the community, the author did not notice any green area in the whole community except occasional flower pots containing flowers.

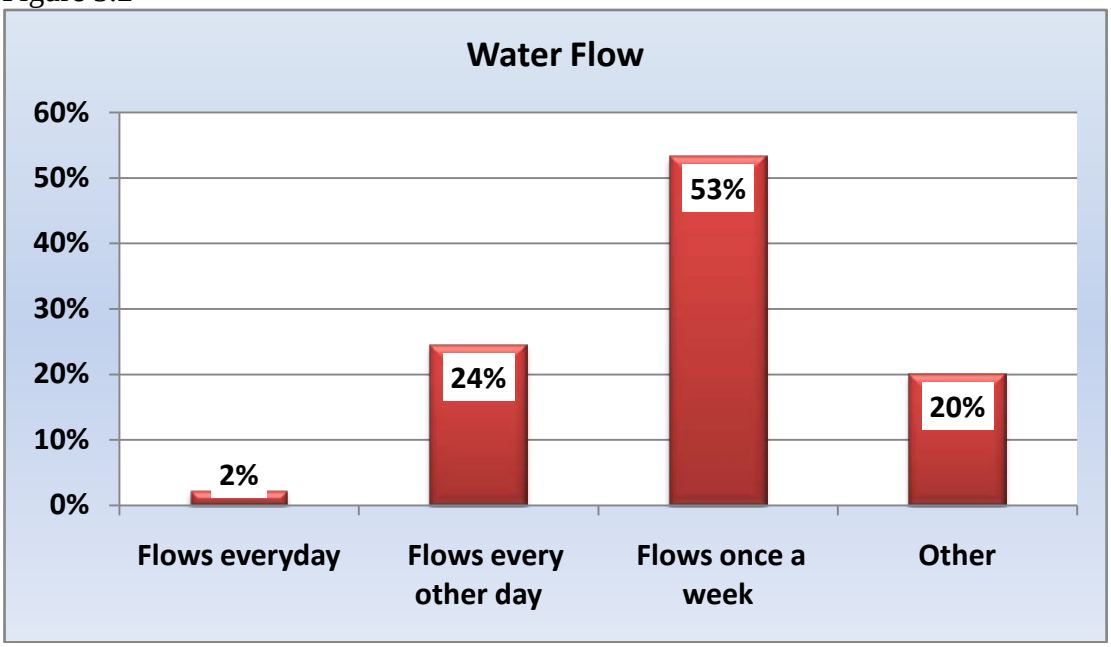
5.2 Water Scarcity and Stress

Frequency of flow of water is a major concern for the residents of Nima. Erratic flow does not affect only households with piped water but also poses a major challenge for households without piped water too. As indicated in figure 5.1, 56.7% of the survey respondents indicated that they get their water supply from their neighbor's house pipe. Thus erratic flow affects all residents. In figure 5.2, 53.3% of the survey respondents who reported having water pipes in their households said water flowed about once every week. Another 24.4% reported that water flowed through their pipes about every other day while only 2.2% responded that their water flowed daily. Of the 20% who responded 'other', 95% indicated that even though they have water pipes in their households, water hardly flows through them. Respondents at the focus group did not hide their frustration at all when it came to the issue of water reliability. Focus group participants were

particularly frustrated with the nocturnal flow of water. One person retorted that when water flows, it flows from midnight to 5 am when most of them were asleep. Thus, if you are not lucky enough to realize the water is flowing during the night, you will be left with no water in the morning. Another explained that she will really appreciate it if there was an advance notice from GWCL as to the exact date and time that their pipes will be flowing.

Madam F, a focus group respondent, is 62 and has lived in Nima for most of her life. Her husband is deceased and she lives with 5 of her grandchildren and their parents together with 3 other families in a big compound house. Madam F, a rice and soup seller gets to the market to sell her wares by 8 am and gets back home at 6 pm. She is lucky to have a water pipe in the compound house that she lives in. However, the water flow is very unpredictable - flows an average of 4 hours twice in a week. Madam F's frustration is that she does not know when water will flow through her pipe. Thus, residents in the compound house leave the tap running all the time so that they will know when the water is flowing. However, when nobody is home and the water starts flowing, their container can overflow for the duration of the water flow or until a residents get home. Whenever this happens, they see an increase in their water tariffs. To Madam F, even though water flows only twice a week, her life would be much easier if she knew exactly what time and the duration of water flow.

Figure 5.2



Source: December 2007 Household Survey

In interviews conducted at the GWCL headquarters, officials did not deny these figures neither did they deny erratic flow of water in the community. In fact GWCL officials corroborated the severe water shortages in the area and went ahead to give a litany of reasons for the water flow problems in Nima. A senior official at the GWCL acknowledged that Nima is within the coverage area of the GWCL and should under normal circumstances receive regular water supply like any other area within the city. However, a contributory factor to water shortages in the community is as a result of the rapid expansion of population and structures in the area. Population and housing units have more than doubled since the 1960s while pipelines laid in the area have not seen any major facelift. Official development plans have not been able to catch up with the rapid population growth in the area. The official indicated that GWCL planning in the area has been limited due, in part, to the fact that most of the growth in the area is extra legal.

Structures have been erected haphazardly without proper legal authorization. Most of these developments went unchecked during the protracted political instabilities of the later part of the 1960s through the 1980s. For instance, uphill areas of the community have not seen a drop of water from their pipes in the last seven years because of the fact that high concentration of development at the lower elevations prevents the pressure of the water from climbing to uphill areas in the relatively small pipes. Thus, utility and urban planners are confronted with the development of a settlement which has left very little room for infrastructure planning. Officials at GWCL stated that even if they had enough resources to upgrade pipes in the community, they would have to demolish over half of the structures in Nima to be able to upgrade the water system in the area. It seems like this option is almost out of the question now. Breaking down structures would come with a huge resettlement cost to the government. Even though the initial erection of these structures was illegal, allowing the structures to stand for so many years can be said to be a tacit approval by the government. The residents can therefore not be evicted now without any form of resettlement package. In addition, there are now in Ghana a number of human rights activists who stand ready to embark on legal action to protect the rights of the disadvantaged city dweller. In any case, the political cost associated with such an action might be too costly to be borne by a politician. The actions of the government in relation to squatter communities in Accra speak volumes about this. There seem to be very little political will on the part of government to evict squatters or break down illegal structures. In 2007, for what many in the press described as being fear of losing electoral votes, the government reversed a decongestion exercise in central Accra embarked on by

the Accra Metropolitan Assembly (AMA). AMA had embarked on a decongestion exercise including evicting squatters and permanently removing traders and illegal residents within the central business district of Accra. The official reason given for halting the actions of the AMA was that it was inhumane to evict people when it was so close to the Christmas holidays. The traders and the residents were never evicted after the holidays and have since continued in their illegality. In addition, the relatively poor performance of the NPP political party in the 2008 election in the city of Kumasi was blamed on the decision by the Kumasi Metropolitan Assembly to decongest the Kumasi Metropolis.

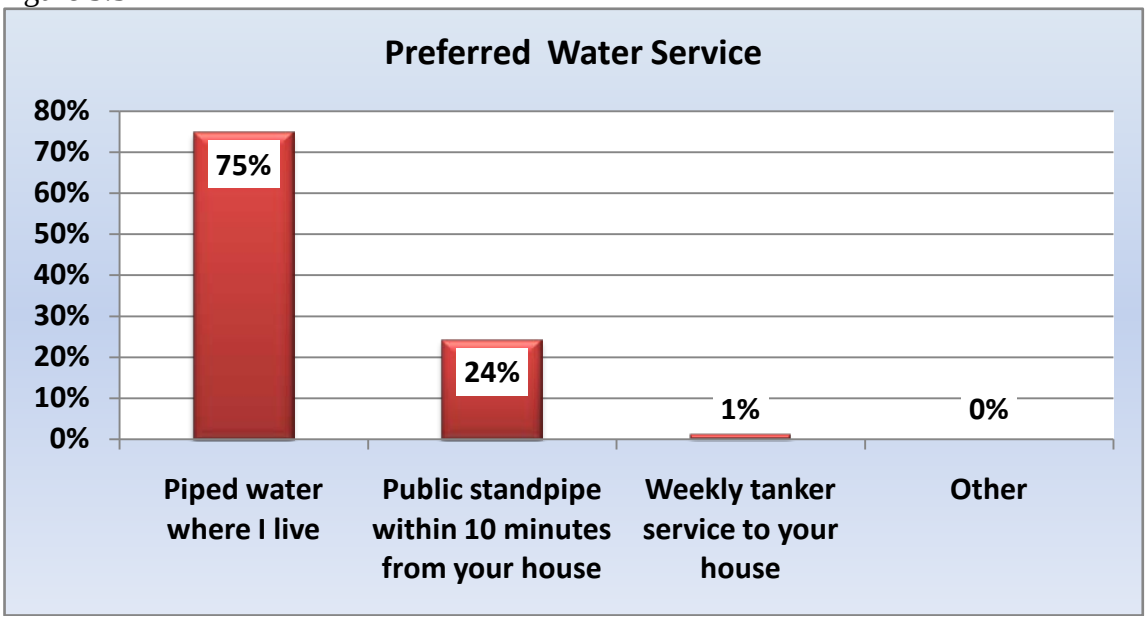
The severe level of water scarcity in the area has led to all sorts of illegal water activities in the area. At the focus group discussion, participants mentioned illegal tapping and sale of water in the area as very widespread. At Nima East, some residents have broken laid pipes to the area and have resorted to extracting water from the pipes with the help of portable motorized water pumps into large containers for sale. These pipes which are supposed to be hidden underground have been exposed due to prolonged erosion and human activities. The illegal water connections are going on with great impudence as perpetrators are not doing much to hide their activities. It seems like illegal water tappers know they can indulge in their illegality with no consequences from the authorities because even open water pipe leakages have received almost no attention from the authorities. Some landlords in the community do not allow tenants to fetch water directly from the pipes in the household. They rather let the pipes flow directly into large tanks and then resell them to tenants. These landlords engaged in water reselling have

explained that the water flow is erratic and thus the way to ensure continued water supply in the household is to store water. Participants in the focus group claimed that though they have reported the illegal activities of residents in the area to the police as well as to GWCL, no action seems to have been taken against them. At GWCL, officials attributed the high un-accounted-for water of 50% partly to the activities of such unscrupulous illegal tappers who do not pay for the water services. In addition, in the process of illegally tapping water from laid pipes, a lot of treated water is spilled. GWCL officials explained that they were doing everything possible to apprehend people who engage in illegal connections. They however acknowledged that their efforts are hampered by personnel and budgetary constraints.

In a way, it seems that residents in the area do acknowledge the veracity of the problems in their community. An exhaustive solution to the problem might be decongesting the area to get rid of illegal structures. However, this is a solution most of the people are not willing to go with. Some participants have lived in the area for a number of years and have established deep social ties to the area. So, it will be very difficult to move them out of the area entirely. In addition, even if they were compensated to move, they might not find affordable housing alternatives in the city as property rates have increased sharply in other parts of the city. It is important to note that respondents to the survey were more interested in a convenient water supply system and not necessarily a pipe network in their living quarters. In fact, at the focus group discussion, 10 out of the 14 participants said they were not interested in owning their own pipe. They did not want the responsibility of having to pay monthly bills. To most of

them, paying for every bucket of water used was more bearable instead of paying a lump sum at the end of the month. They felt that they are better able to monitor their budget if they pay for services daily instead of monthly.

Figure 5.3



Source: December 2007 Household Survey

In the survey, 74.7% of the respondents said they will prefer piped water in the house where they lived to be shared by other tenants and not necessarily in their individual living quarters. (Figure 5.3) Another 24.2% of residents preferred a public standpipe that was close where they lived. (Figure 5.3) In fact, to the survey respondents and the focus group participants, the most important issue was the reliability of water flow. Madam A, a 58 year old lady who sells boiled rice and beans at the local market said; “if the water flows consistently for four hours every other day, I will be very content. I will be able to plan my life well if I know exactly when the water flows”.

5.3 The Water Business

The people of Nima over the years have developed an intricate extra legal market for buying and selling water. Leading this extra-legal water business in the Nima community is the landlord or his agent. In households with piped water, two types of arrangements exist. First, since compound houses share a common water meter, the landlord or his agent receives the water bill and then shares the water bill among the tenants in the household. The criterion for sharing the bill is based predominantly on the size of every family unit within the compound house. With this arrangement, non-tenants are not allowed to fetch water in the household. This method of sharing the cost of water however can be unfair as some small families may free ride on the others by using more water than some big families. Thus, other criteria used have been based on the number of times members of a family unit shower in a day or the number of times a family unit do laundry. In sharing the water bill, participants explained that the best practice is for the landlord to display the water bill together with each tenant's share of the bill in a common area to ensure transparency in sharing bills. However, as noted by participants in the focus group discussion, the method of sharing the water bill is not transparent as some landlords are in the practice of not showing the water bill to the tenants. They only display what each individual tenant is responsible for paying. It is not surprising therefore that some participants accused Landlords who refuse to make full disclosure of water bills as being exploitive.

In the second arrangement, tenants pay the landlord or his assigned representative for every bucket of water used. Landlords buy poly-tank containers typically with a

storage capacity of 3000 to 5000 gallons to store water for retailing. If the compound house is connected to the piped water network, the tank is filled with water during water flow or the landlord buys water from independent water tanker operators. Though the sale of water is predominantly to tenants of the house, it is however not uncommon to get water customers from other compound houses in the neighborhood, especially during times of acute water shortages. There is an informally constituted water sellers' association in the community to regulate the activities of the water sellers', however, not every water seller in the community adheres to the rules of the organization. For instance, even though the association had posted a price list for water based on container size at vantage points within the community, the price of water in the community varied greatly and with no enforcement mechanism in place the association has no means of enforcing compliance with its rules.

There are also individual water purveyors who fetch water using buckets or some other container for sale in the community. If for any reason, a resident can not walk to the water vendor to fetch water, these individual water purveyors can be contracted to go and fetch water. These individuals, mainly made up of immigrants from other West African countries, can be called on the streets and sent to fetch water. The charge for this type of water is based on the travel time as well as whether the source of water is piped water of hand-dug well water. This is the most expensive way of getting water in Nima. The services of the water purveyors are therefore utilized by customers in the areas of the community with the most water stress or areas that are further away from the nearest

water vendor. Residents who live by themselves or do not have relatives or children to send for water typically utilize the services of the individual water purveyors.

There are a lot of public health concerns with the services provided by the water resellers. Tanks are hardly cleaned for contaminants and when they are cleaned, unsuitable laundry detergents are used. The health concerns are compounded in the case of the individual water purveyor as the source of their water cannot be easily ascertained by the consumer. Community participants to the research talked about instances where hand-dug well water has been sold by the individual water purveyors as treated piped water. The purveyors also use old paint containers to fetch water. For fear of losing their containers, consumers prefer that the water purveyor uses his own container to fetch water. The water is then emptied into the consumer's container when the purveyor arrives. A cursory examination of the paint containers revealed residue of paints in and all over the container.

Used Paint Containers Used to Fetch water by the individual water purveyors

Source: December 2007 Household Survey

An Individual Water Purveyor on His Way to Fetch Water

Source: December 2007 Household Survey

Children seem to be affected most by the water scarcity in Nima. (Songsore et al, 1998) Apart from being the most vulnerable group to various water related diseases like Malaria and Diarrhea, they are also the likeliest group of people to be struck by cars. Parents and guardians send their children to fetch water, and in Nima this in most cases entails crossing the main highway that cut through the community. Respondents in the focus group lamented that on average about 10 children are involved in a water related car accident yearly in the community.

5.4 Payment for Water Service

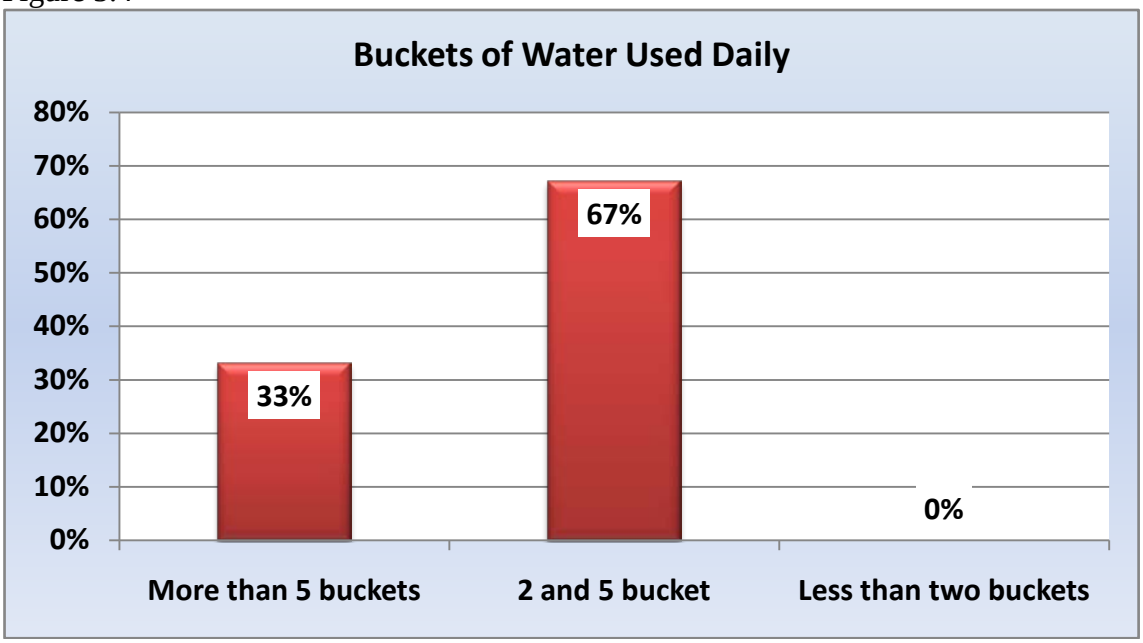
Data collected from Nima indicate that residents pay more for water in real terms and also as a percentage of their income than other parts of the urban area. Irrespective of whether there was a pipe in a household or not, members of the community consume water mainly by buckets and thus pay for each bucket of water used. This study therefore wanted to find out the number of buckets consumers used per day and how much they paid for each bucket of water. In the survey, 39% of respondents indicated that they used more than 5 buckets of water a day and 59% indicated that they used between 2 and 5 buckets a day. (Figure 5.4) The average bucket used for water in Nima can hold about 35 liters of water. Respondents reported paying an average of .07 cedis for each bucket of water used. (Table 5.1) Thus for the 59% of respondents who reported using between 2 and 5 buckets of water per day, they spend between 0.14 – 0.34 cedis a day for water. And the 39% who reported using more than 5 buckets spend more than 0.34 cedis a day for water. The PURC, the legislatively mandated organization to determine tariffs for

water, has a two step increasing block rate pricing mechanism for the water sector. In 2006, the first 20,000 liters of water supplied by GWCL was priced at 0.4850 per 1000 liters of water used. Consumption beyond 20,000 liters is priced at 0.6750 per 1000 liters of water used. However, the residents of Nima pay an average of 2 cedis every 1000 liters of water consumed. Residents of Nima are therefore paying as much as 4 times what non disadvantaged urban water consumers with piped water in their houses pay.

Table 5.1: Water Prices in Nima

Number of Buckets	**Number of liters**	**Nima Price (Cedis)**	**PURC Approved Price (Cedis)**
1	35	0.07	0.0145
2	70	0.14	0.029
3	105	0.21	0.0435
4	140	0.28	0.0581
5	175	0.35	0.0726

Figure 5.4



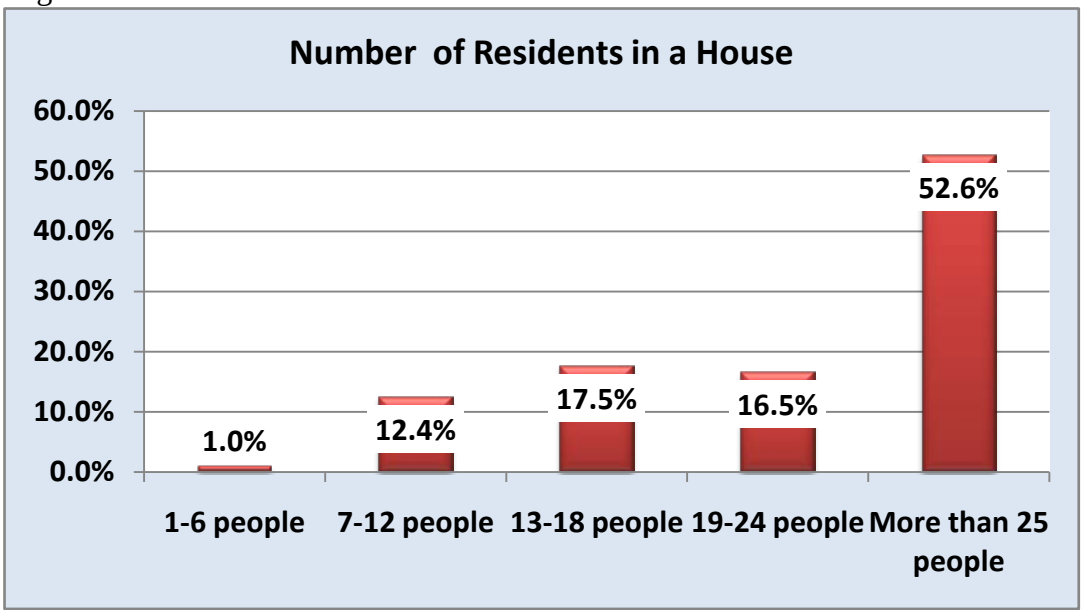
Source: December 2007 Household Survey

The two tier pricing structure adopted by the PURC prices the first block of water very low to ensure that low income consumers will at least be able to afford enough water for their essential use. PURC terms this first block of water as the lifeline water block. (PURC, 2005) In the compound household in Nima, there is mostly a single water meter serving the entire household. However, since compound households are mostly multiple family dwellings, the number of family units within the compound house ends up sharing the same water meter. In this housing arrangement, GWCL sees the compound house with multiple family units as one household for the purpose of billing. The high occupancy nature of the compound household often puts the collective consumption of the residents above the lifeline water block and into the relatively expensive block. This system of household living arrangement is very prevalent in peri-urban neighborhoods in developing countries. (Whittington, 1992) Although compound housing presents a very

cheap and affordable housing alternative for the urban poor, according to Whittington, it renders the life line water pricing useless.

In the household survey, 52.6% of residents reported that they lived in a compound house that had more than 25 people living in the household. (Figure 5.5) Out of the 52.6%, 68.8% reported that they used more that 5 buckets of water a day. Based on their water consumption per day, an average family unit of 4 will consume an estimate of 5500 liters of water per month. However, a compound house with 5 different family units will consumer almost 30,000 liters of water per month. Thus the aggregate consumption of a household in Nima will exceed the lifeline water block of 20,000 liters which is priced relatively cheaper to accommodate the urban poor.

Figure 5.5



Source: December 2007 Household Survey

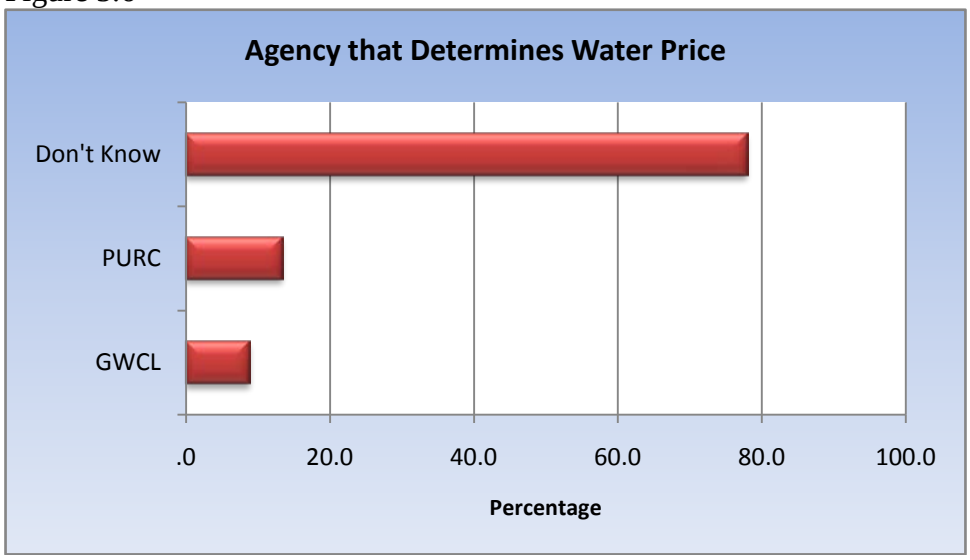
5.5 Consumer Involvement in Water Planning

There seems to be a shift towards a bottom-up approach rather than a top-down approach to public decision making and public administration. (Pressman & Wildavsky, 1984; Ostrom, 1990; Osborne & Gabler, 1993; Gortner et al, 1997) The theory behind decentralization is predicated on the idea of involving citizens at the local level in the decision making process. (Hope, 2000; Francis & James, 2003) Public involvement and awareness of decision making processes ensures that government policies are well targeted. There is also a sense of ownership of projects that comes with public involvement of community projects. Once there is a sense of communal ownership, communal protection of public projects is easily achieved. The governing body therefore saves on policing cost. (Ostrom, 1990)

At Nima, there seems to be very little awareness of the decision making process pertaining to the water sector. Without the requisite knowledge of the decision making process, residents cannot fully participate in the decision making process. At the focus group discussion, participants said that the authorities have kept them in the dark about the decision making process and actual decisions made within the water sector that affects them. Within the last 5 years, participants recounted only two occasions when a nonprofit organization had come to the community to elicit their views about the water situation in the community. Further enquiries determined that these nonprofit organizations that went to the community were neither affiliated with the official water agencies nor acted on behalf of the water agencies. Participants displayed very little knowledge about the problems that confront the water sector and knew almost nothing

about the decision making process. It comes as no surprise therefore that the survey results indicated very little knowledge about decision making matters within the water sector. In the survey, 77.9% of the respondents in Nima said they did not know the agency that determined the price of urban water. (Figure 5.6) It is interesting that even though they had the choice of naming either GWCL or PURC, the majority of the respondents chose 'don't know' as answer. From interacting with the respondents, the general sense was that people have very little trust for these public agencies whether or not they knew their names.

Figure 5.6



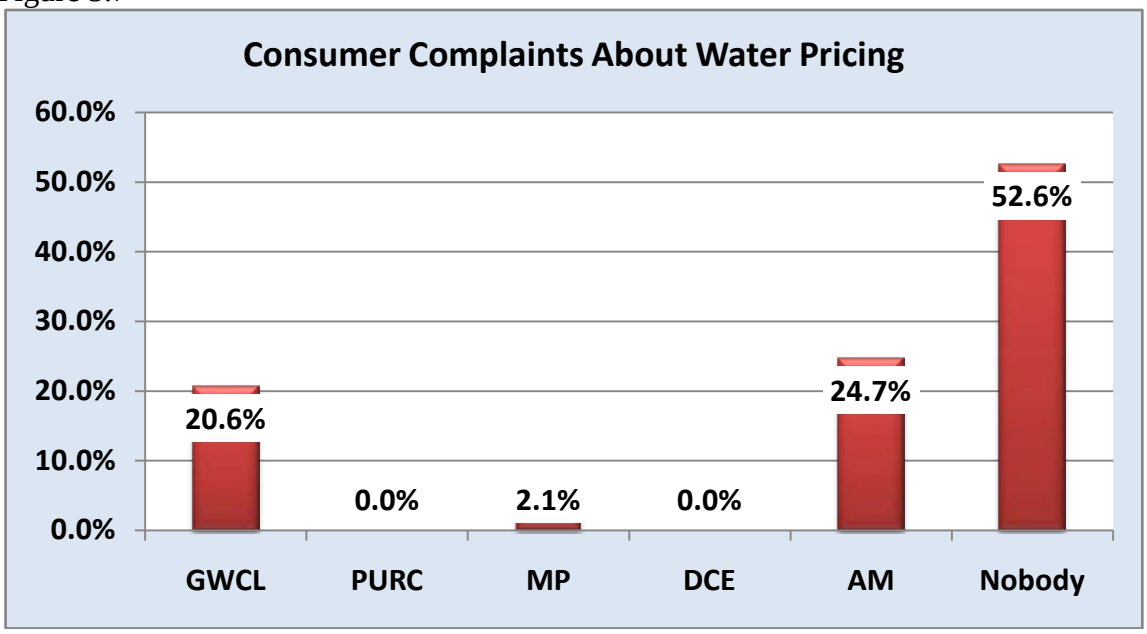
Source: December 2007 Household Survey

Act 538 which set up the PURC mandates it to receive and act on consumer complaints about water pricing issues. Act 538 also mandates a consumer representative on the board of PURC to ensure that consumer interests are taken into consideration during tariff adjustments and other regulatory deliberations of the institution. PURC is also required to carry out public education about its activities and important issues

affecting the water sector. However, only 6.7% of respondents said they would complain to PURC about pricing issues while 68% of respondents indicated they had nobody to complain to. (Figure 5.7) In fact, officials at the PURC indicated that their mandate was limited to the regulation of prices for GWCL. They regarded water pricing by intermediaries or water vendors as falling outside their jurisdiction. Thus, to them they were not the right institution for consumers in Nima to complain to.

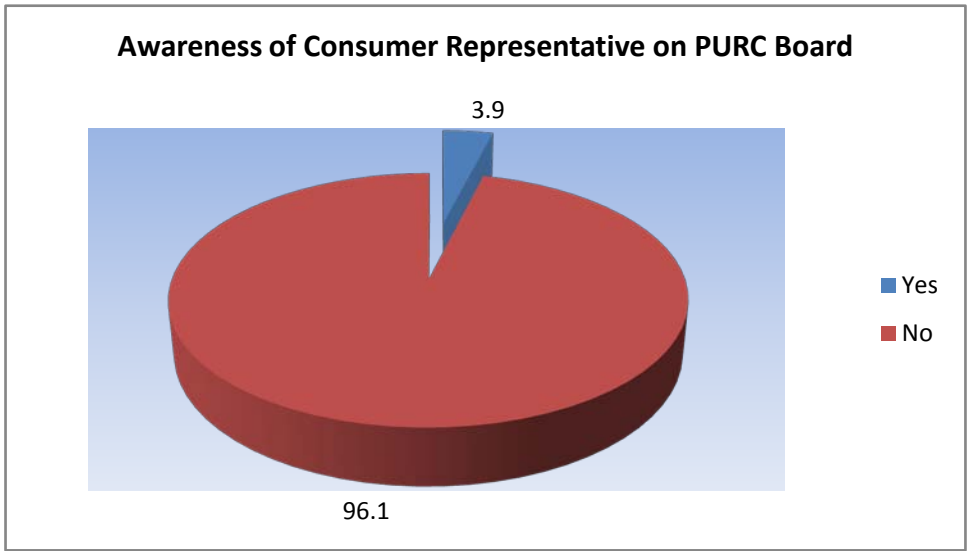
When respondents were asked if they knew there was a consumer representative on the board of PURC to represent consumer interests, 96.1% of respondents did not know about the existence of such a consumer representative. Thus, even those who receive their water directly from the GWCL did not know of the existence of a consumer representative through whom they can channel their views on regulatory issues and performance of the GWCL.

Figure 5.7



Source: December 2007 Household Survey

Figure 5.8



Source: December 2007 Household Survey

It must be noted that officials at GWCL and PURC indicated a strong commitment to public education and public involvement in the decision making process in the water sector. PURC, for instance has conducted a number of public education sessions as well as participatory meetings to elicit the views and ideas of civil society groups. The success of these efforts have however been limited as meetings have been very few and limited to organized groups. At GWCL, a senior planning officer reiterated the need for public education and public involvement in the planning and decision making process. Budgetary and personnel concerns seem to limit the abilities of these agencies to embark on a wide scale public education.

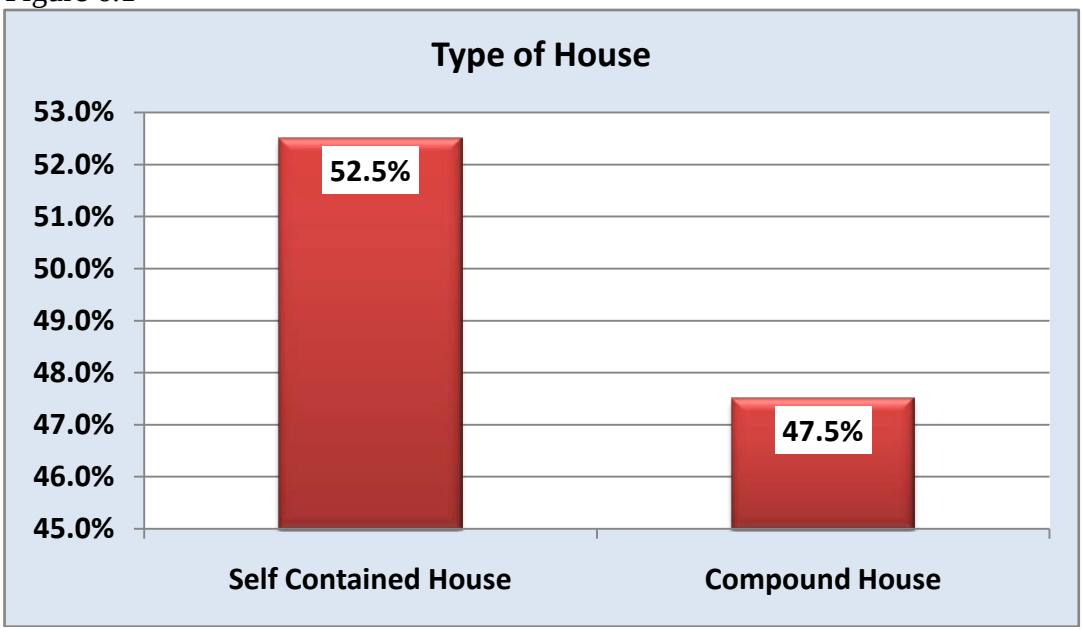
Chapter 6

Case Study 2 – Ashalley Botwe

Ashalley Botwe is one of the fastest growing suburbs in the city of Accra. (Yeboah, 2003) In 1960, Ashalley Botwe was a small town located north of the city of Accra with a few dwellings and less than 200 inhabitants. However, since the 1980s, the population and housing stock in Ashalley Botwe has grown steadily. Population figures in 2000 indicate a growth of over 3000% since the 1970s with population increasing from the low 300s to 11,974 in 2000. (Ghana Population and Housing Census, 2000)

In terms of income levels, Ashalley Botwe is a mixed settlement area with both low income and middle income dwellers. Thus, housing types are also mixed featuring the compound housing style which is mainly occupied by low income earners and the single family unit or self contained house which is mainly occupied by middle income and high income earners. In the survey, 47.5% reported that they lived in a compound house while 52.5% reported living in self contained houses.

Figure 6.1



Source: December 2007 Household Survey

6.1 Source of water

Ashalley Botwe is one of the most water stressed areas in Accra. (Adjibolosoo, 2007) According to GWCL, its water supply to Ashalley Botwe meets only 45% of the water needs of the community. In some areas within the community, no pipes have been laid at all and in some areas where pipes have been laid, no water has flowed through them for the last 10 years. The experience of Mr. A, a long time resident of Ashalley Botwe sums up the level of water stress in the area.

Mr. A is gainfully employed as an accounts clerk in a government agency. His wife is trader at the local market. They have lived in Ashalley Botwe for the last 7 years after they moved from the eastern region of Ghana. He and his family live in a house with two other families. When he rented the apartment, there was already a pipe connection in the house; however, for the last seven years that he has lived in Ashalley Botwe, not even

a drop of water has flowed through the pipe. Every morning, the children will have to fetch water from a neighboring vendor for bathing before they go to school. Mr. A said further that “my brother, the water is so expensive that I am forced to take one shower a day and when I do that I only use half bucket (about 17 liters).”

Mr. A’s story is very typical in the community of Ashalley Botwe. Portable water is so scarce in the community and so expensive that simple daily routines like washing and bathing become a burden to many residents. One participant in the focus group discussion recounted a situation where a woman was caught stealing water from a local water vendor and was nearly lynched. This woman had no money to purchase water, but desperately needed some water for household chores. When she thought nobody was looking, she made a quick dash to steal a bucket of water. When the vendor who was watching from his window saw what was going on, he accosted the woman amidst shouts of thief! thief! A crowd quickly gathered and the woman was nearly beaten if the respondent had not opted to pay for the water. Respondents to the survey as well as the focus group discussions were so eager to participate, because they wanted to voice their displeasure about the state of water supply in the area. In fact, it was difficult controlling the focus group discussion in Ashalley Botwe. Respondents were so emotional about the water situation and they just wanted to vent and not necessarily speak to the questions being asked. At any opportunity, someone would say “we have been buying water from vendors for so long that we are just tired.” Residents living in this area do not enjoy adequate water supply services from GWCL. Some focus group respondents explained that their houses were fixed with network pipes, but water has not flowed through these

pipes for years. Madam G, a 47 year old seamstress and resident of Ashalley Botwe for 5 years explained that she has not seen a drop of water flow through her pipe for the last 5 years. There was a general sense of frustration on the part of respondents because they could not understand why as tax paying members of the society their area seemed to have been forgotten by the government while other areas in the city have 24 hour water supply service.

The survey result indicated that 48.5% of respondents got their water supply from water vendors who plied their trade with mobile tanker service. (Figure 6.2) Another 51.5% of respondents got their water supply from a variety of sources which ranged from hand-dug wells and boreholes to stream water. For the 51.5% of respondent who get their water supply from other sources, the community has developed a sophisticated local water supply system to meet their needs. This system provides water through buckets and small containers for immediate use or storage for future use.

Because there is very little piped water in this area, the water sold in buckets is mostly well water or water dispensed from stored tanks. Individuals who have the financial means in the community arrange for their own hand-dug wells. The hand-dug well may serve only one household or may be opened up for sale to other residents in the community. Where water from the hand-dug well is sold to members of the community, customers fetch water with their own bucket and pay an agreed amount for every bucket of water fetched. If the hand-dug well is located in a compound house, then members of the household will have to pay for every bucket of water used as well. It must be noted

however that a group of residents in a compound house may pull resources together for their own private well.

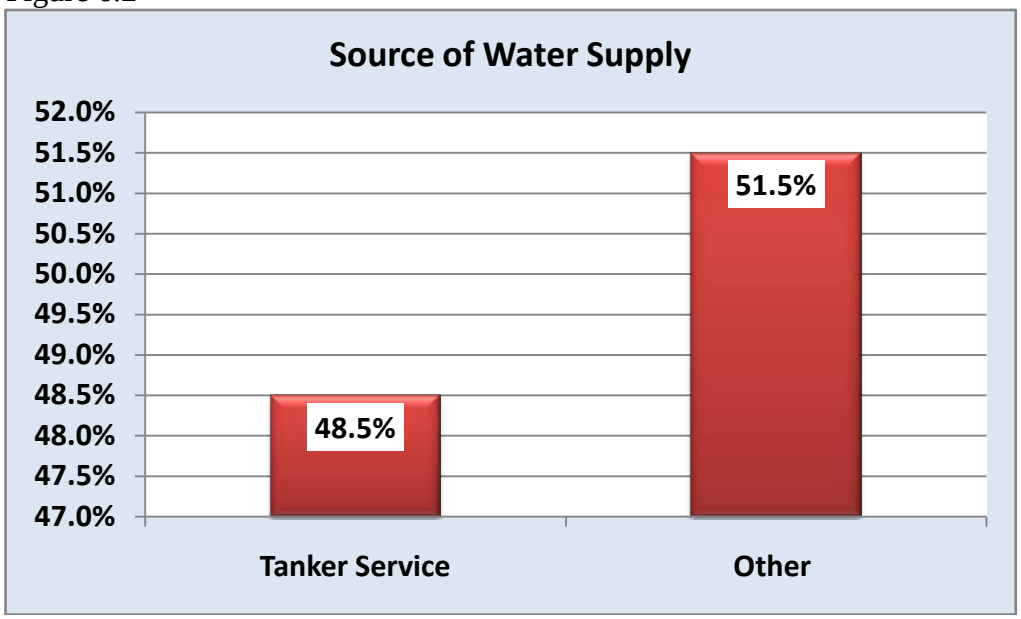
Another group of vendors sell water from their water tanks to members of the community. In this group, the vendors buy a poly-tank container (containers range in size from 200 gallon capacity to over of 1000 gallons capacity), fill them with water and sell them by the bucket to consumers. Unlike the hand-dug well which depends on ground water availability and thus depends on seasonal availability and flow of ground water, poly-tank water sellers have water all year around. Poly-tank water sellers are able to buy water from other parts of the city throughout the year. Poly-tank water sellers are therefore more popular than the hand-dug wells.

A Typical Poly-Tank Container

Source: Ghanaweb.com 2008

For the 48.5% who reported their source of water as tanker service, it must be noted that most middle income earners of the community buy poly-tanks for their personal use. Others also buy poly-tanks for the dual purpose of personal use and retailing. Residents who can afford their own poly-tank enjoy a door to door water service albeit at a rate more expensive than official water rates. Where the poly-tank is for personal use, the water is not sold to people outside the home. The poly-tank containers in the community range in various sizes, however, the storage capacity of most poly-tanks are a maximum of 10,000 liters.

Figure 6.2



Source: December 2007 Household Survey

In the nutshell, the choice of service, i.e. as to whether one will opt for tanker service or other means of water, depends on the level of income. The cost of the poly-tank is beyond the means of the ordinary community dwellers. In addition, owning a personal poly-tank means one must have the financial ability to pay a lump sum of money upfront for water. Even though on the aggregate, it costs more to buy water by the bucket, most residents who purchase water by the bucket often times do not have the lump sum money to pay for filling a poly-tank size water container. As depicted in Table 6.1, all respondents who reported earning less than 35 cedis said they did not use water tanker as their water source. For the respondents who reported earning between 50 cedis and 100 cedis per month, 69.7% of respondents reported using other sources of water. It must be noted that 75.6% of those who reported tanker service as their source of water also reported earning more than 100 cedis per month.

Table 6.1 Income levels and Source of Water

Categories		More than 100c	50-100c	35-50c	Less than 35c
Tanker service	% within Source	75.6%	20.0%	4.4%	0
	% within Income	57.6%	32.1%	33.3%	.0%
Other	% within Source	50.0%	38.0%	8.0%	0.04
	% within Income	42.4%	67.9%	66.7%	100.0%

Source: December 2007 Household Survey

6.2 Mobile Tanker service

The market void created by the lack of network pipe in the community has been filled by the operations of the mobile water tanker services. (GWCL, 2000; Triche et al, 2006) The mobile tanker services therefore provide access to water to households that are outside the reach on the services of GWCL and households that experience erratic water flows. Some households in the community do not possess the requisite legal permit for the house and therefore cannot acquire water through GWCL even if given the opportunity. Thus, the services of the tanker operators become very crucial for the extra legal settlements. (GWCL, 2000)

Generally, two types of mobile water tanker operators operate in this community. Type 1 is a water tanker truck or a light truck mounted with a water tank. The storage capacity of these types of trucks can be up to 20,000 liters. The travel distance of these water trucks varies considerably depending on the season. In the dry season, water trucks can travel in excess of 50 miles in search of water for consumers.

The second type of mobile tanker service is a locally manufactured two wheeled motorized vehicle mounted with a water tank. The tank for this two wheeled motorized vehicle is built locally out of scrap metals. The tank is fitted with a portable water pump to aid the extraction of water as well as for the transfer of water from the tank to the consumer's receptacle. The second type usually has a short travel range. Type two is also the most commonly used in Ashalley Botwe, especially among low income and middle income earners. This study therefore focused on the operations of the type two mobile tanker services.

Mobile Water Tanker: Type 1

Source: December 2007 Household Survey

The two wheeled mobile tanker is usually individually owned. Its operation is however done by a hired driver and a driver's mate. Within the community, there is a central place where the drivers wait everyday for their services to be called. (Appendix D) The drivers have mobile telephones and can therefore be reached anytime to provide water services. Consumers will have to inform drivers ahead of time what the water will be used for. The type of use determines the source of water the driver will deliver. When the water is for drinking, the drivers deliver treated tap water. The drivers travel to the nearest neighborhood with pipe water to buy the piped water for the consumer. When the use is bathing and washing, the drivers will deliver hand-dug well water or stream water. The drivers deliver water from the nearest source irrespective of the quality if the consumer's use is construction or some other out door use.

At the focus group discussion, participants complained about the quality of water from the two wheeled mobile tanker. One woman explained that in most cases there was the presence of particles in the water as well as an unusual odor. Participants who used the services of the two wheeled tanker service doubted the source of the water. They have no way of checking the information provided by the driver. Hand-dug well water can easily be passed as treated water. However, even though participants admitted the health risk involved in this type of water, they explained that under the circumstances, this type of water was the most affordable. To minimize the risks, some participants said they boiled the water before they used it for cooking or drinking. Others said they used the water solely for bathing and washing and rather depended on packaged portable water (Sachet Water) as their source of drinking water.

Mobile Water Tanker: Type 2

Source: December 2007 Household Survey

The drivers that were interviewed in the course of this research denied ever deceiving their clients as to the source of water in their tanks. Further probing however established that their practices itself was very detrimental to the health of their customers. Because drivers must pay a fixed commission to the owners of the vehicle, which is usually high, the more trips they make in a day the more money they will make for themselves. Thus, it is not uncommon for a driver to cart dirty water for construction and right after that cart treated tap water in the same tank, without washing it, for another consumer for drinking. When the drivers were asked if they ever cleaned their tanks, all respondents were quick to say they clean their tanks regularly. However, the time interval

for cleaning differed significantly from one driver to the other. The most frequent cleaning was once every two weeks. And the most infrequent was three times a year. The response of most drivers put the average range of cleaning time from once a month to once every other month. Another red flag was that the drivers climbed into the tank to clean them and they reported using laundry detergents for cleaning their tanks.

The practices of the two wheeled mobile water tankers were brought up in the interview with a representative of PURC. The representative said the practice was unfortunate, and then went ahead to explain that PURC does not regulate the operations of the tanker operators. Consumers therefore have to be careful in choosing the services of the two wheeled tanker drivers.

It must be noted that because the quality of the water can not be verified and thus poses a health risk, the activities of the two wheeled motorized tanker services are not recognized by the government. Surprisingly however, the operators claimed that they paid taxes for their operations. At a visit to the local Internal Revenue Service, the officer in charge explained that according to Legislative Instrument 1727, all commercial vehicles had to pay a levy for the operation of their commercial vehicles. Thus, though the services of the two wheeled motorized tanker are not officially recognized, they have to pay tax for operating a commercial vehicle.

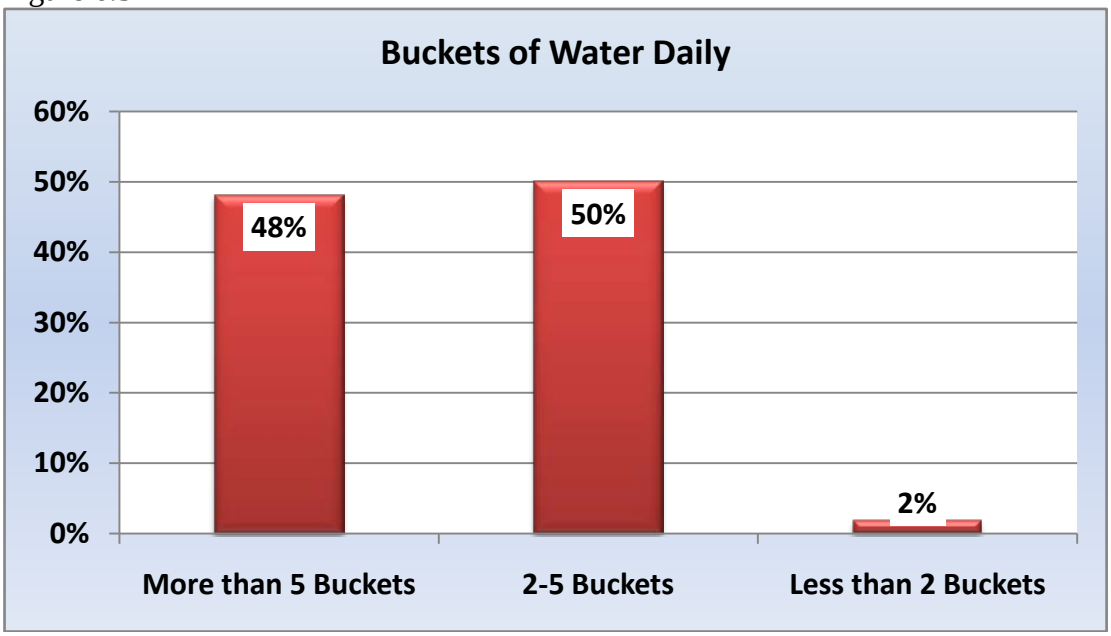
6.3 Payment for Water Service

The data collected show that consumers in Ashalley Botwe paid higher prices for water than consumers in areas served by GWCL. Consumers reported paying an average

price of 0.25 for a 35 liter bucket of water which translates into 7.14 cedis per 1000 liter water consumed. However, PURC has set the price of every 1000 liters of water consumed up to 20,000 liters at .4850 cedis. (PURC 2006 Water Tariffs) Thus, water consumers in Ashalley Botwe who buy water by the bucket on the average spend 14 times as much as their counterparts being served directly by the GWCL.

The survey summary indicated that for respondents who reported using other means of water source apart from tanker service, 50% used about 2 to 5 buckets of water daily. (Figure 6.3) Another 48% indicated that they used more than 5 buckets of water a day. Thus the majority of the respondents spend at least 15 cedis to over 37.5 cedis per month for water service alone.

Figure 6.3



Source: December 2007 Household Survey

It must be noted however that for respondents who reported using more than 5 buckets of water a day, 56% of them reported earning less than 100 cedis a month. For

respondents who reported using between 2 and 5 buckets per day, 42.3% also reported earning less than 100 cedis a month. Thus, a large chunk of the respondents' income goes to water supply alone leaving them with very little resources for food and shelter. For these categories of respondents, a small health care situation becomes a crisis because of lack of funds.

Table 6.2 Income levels and Number of Buckets of Water Used

Categories		More than 100c	50-100c	35-50c	Less than 35c
More than 5 buckets	% within Bucket	44.00%	48.00%	4.00%	4.0%
	% within Income	42.3%	60.0%	25.0%	50.0%
2-5 buckets	% within Bucket	57.7%	26.9%	11.5%	3.8%
	% within Income	57.7%	35.0%	75.0%	50.0%
Less than 2 buckets	% within Bucket	.0%	100.0%	.0%	.0%
	% within Income	.0%	5.0%	.0%	.0%

Source: December 2007 Household Survey

Respondents who used the services of the two wheeled motorized tanker service paid an average of 8 cedis for a 350 gallon tank. This translates into 22.8 cedis per 1000 liters of water consumed. 65% of respondents reported using tanker service at least once a month while 25% reported using the service every other month. For respondents who reported using tanker service once a month, 30% also reported earning less than 100 cedis a month. And for those who responded using tanker service twice a month, 11.1% reported a monthly income of less than 100 cedis. Thus, consumers in Ashalley Botwe

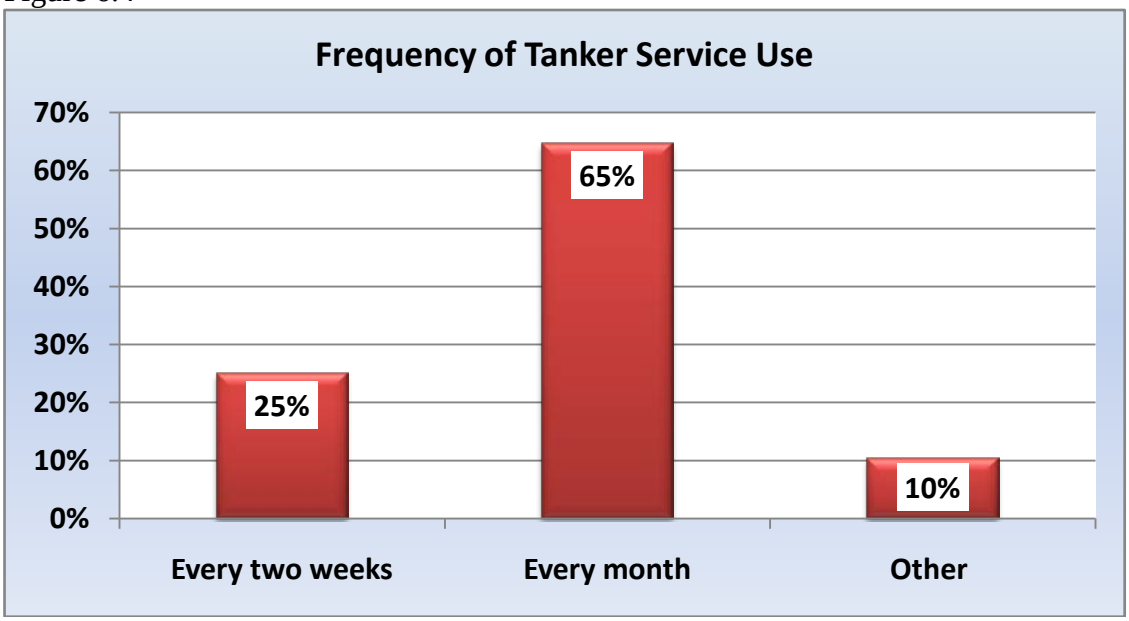
who depend on water tanker service for their water supply also spend a substantial part of their income on water.

In spite of the fact that residents are already spending a sizeable portion of their income on water, respondents in all income brackets reported that they will be prepared to pay more for water if there was a guaranteed source of clean and reliable water supply.

Table 6.3 Income levels and Frequency of Tanker Service Use

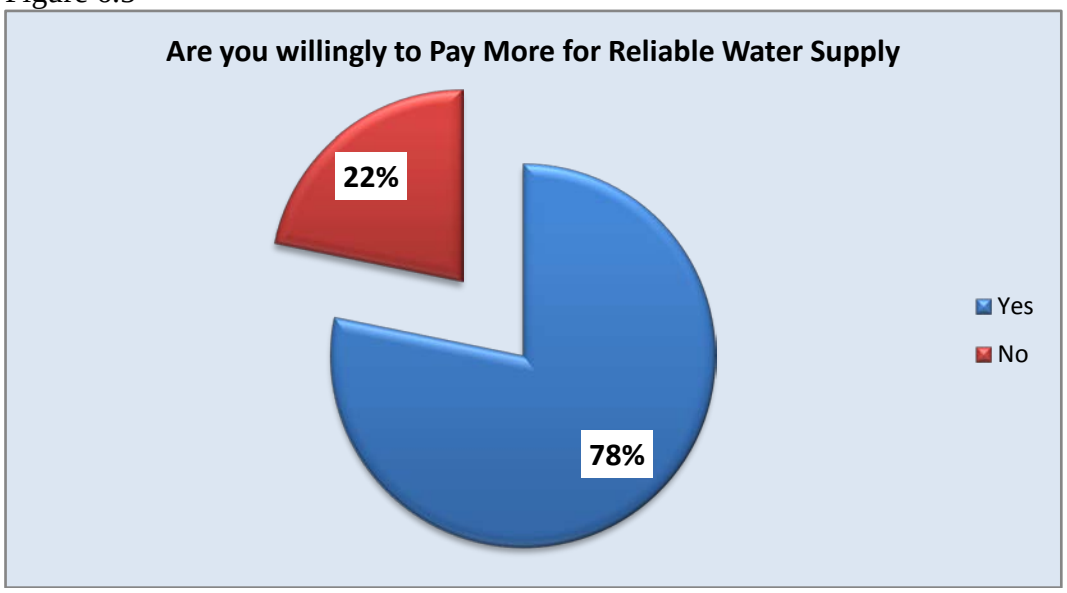
			Income		
	Category		**More than 100c**	**50-100c**	**35-50c**
Tanker Service	**Every two weeks**	% within Tanker	88.90%	0.00%	11.10%
		% within Income	23.50%	0.00%	50.00%
	Every month	% within Tanker	70.00%	26.70%	3.30%
		% within Income	61.80%	100.00%	50.00%
	Other	% within Tanker	100.00%	0.00%	0.00%
		% within Income	14.70%	0.00%	0.00%

Figure 6.4



Source: December 2007 Household Survey

Figure 6.5



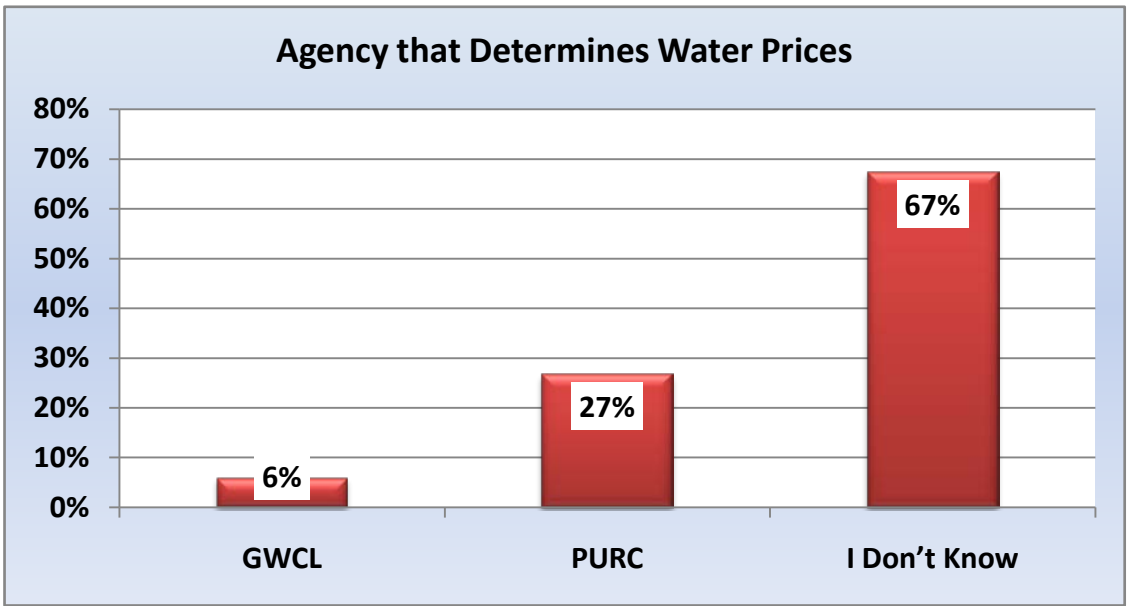
Source: December 2007 Household Survey

6.4 Consumer Involvement in Water Planning

Participants at the focus group said local officials do not engage them or consult them on any issues related to water supply within the area. Some participants expressed the opinion that local politicians do not consult them on any issue affecting their community but only come to the people when the next election cycle is getting near. The outcome of the focus group discussions was confirmed by the lack of basic knowledge about the public institutions whose decisions and actions affect their water supply.

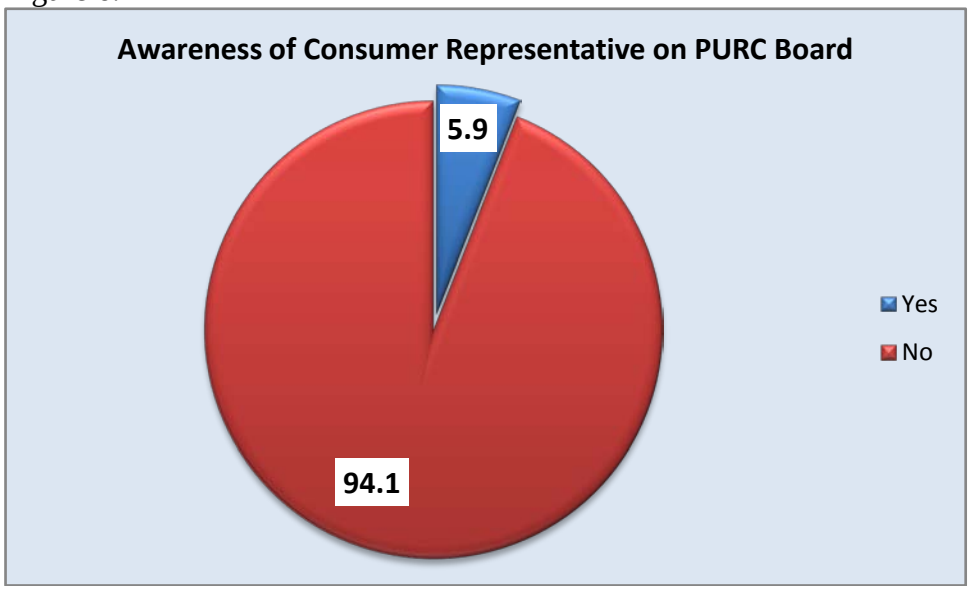
Among the survey participants, only 26.7% of respondents correctly identified the government regulatory agency that was responsibly for determining the prices of water. (Figure 6.6) A total of 67.3 survey respondents indicated that they did not know the government regulatory agency in charge of determining water tariffs. 64% of respondents said they did not know who they will complain to if they felt that water prices were too high. (Figure 6.8) And 94% of respondents did not know that they had a consumer representative on the board of PURC through whom they could channel their concerns.

Figure 6.6



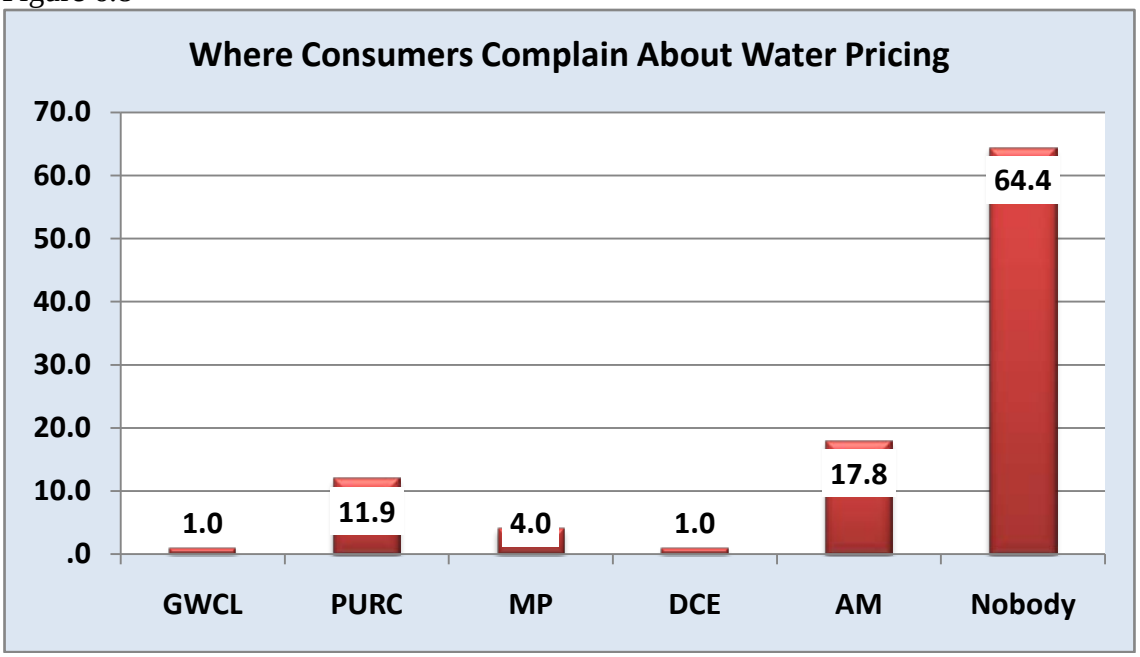
Source: December 2007 Household Survey

Figure 6.7



Source: December 2007 Household Survey

Figure 6.8



Source: December 2007 Household Survey

Chapter 7

Case Study Three – Ashaiman

Ashaiman is a sprawling community located northeast of the city of Accra. The population of Ashaiman boomed during the 1960s with the development of the Tema harbor in 1962. The Tema harbor now handles almost two-thirds of all goods coming into the country as well as goods for neighboring landlocked countries. (Tema, 2009) After the harbor was constructed, a 64 square mile area north of the harbor was acquired by the government to be developed into an industrial/residential city. This area became a magnet for new residents in search of jobs. The Tema Development Corporation, the agency in charge of developing the city was however not able to cope with the influx of the new arrivals. New arrivals unable to find housing in the harbor city ended up in an area north of Tema that eventually became known as Ashaiman. Subsequently, residents who were later priced out of the growing harbor city also ended up in Ashaiman. Ashaiman has continued to be a popular destination for new arrivals from the rural areas as well as migrants from the West African sub region.

Today, Ashaiman is one of the fastest growing communities in Ghana. The population of Ashaiman grew from 22,549 in 1970 to 150,312 in 2000 and continues to grow at the rate of 4.6% annually, the highest growth rate in Ghana. (Ghana Population and Housing Census, 2000; World Bank, 2008) Population growth and the construction of structures in Ashaiman have been faster than local officials' attempt at regulating the development. Like other disadvantaged communities in Ghana, people have built on public spaces or erected structures without the requisite building permit. Because of the

informal nature of the growth and development of this area, Ashaiman lacks many amenities of a modern city. The community continues to struggle with sanitation issues such as poor drainage systems and improper waste disposal systems. Ashaiman also is regarded as one of the most severely water stressed areas in Ghana. (Amenga-Etego & Grusky, 2005)

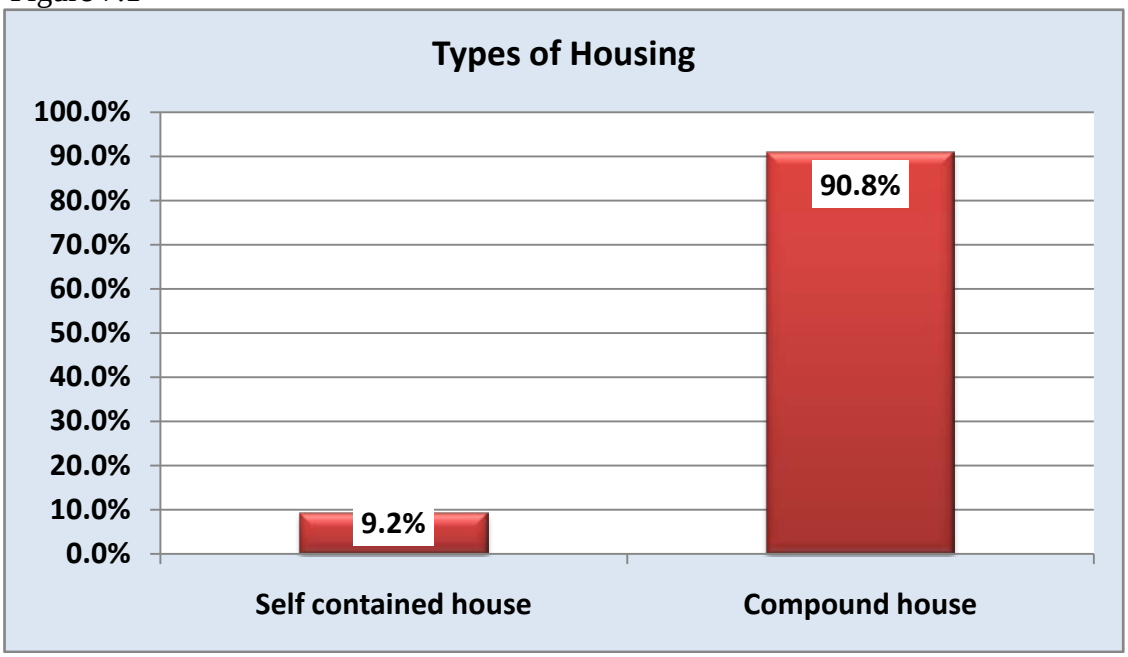
7.1 Housing type

Due to the informal nature of developments at Ashaiman, there is very little planning and organization in terms of how structures are erected in the neighborhood. Thus, some buildings are erected close to each other while others are constructed near gutters and drainage systems. Many buildings, especially compound houses which house multiple family units, have no toilet facilities. Every single space in these houses has been converted to living quarters for rent. Some landlords in the area interviewed were not able to provide any legal documents for their properties. Ownership in properties was expressed verbally. One landlord said he could not find the document showing he had legal ownership to his property. He expressed no worries about the fact that he has no title to his property because he felt all his neighbors knew he owned the property. Of the respondents who participated in the survey, 90.8 responded that they lived in a compound house and 9.2% responded that they lived in a single family unit. (Figure 7.1) Compound houses in the urban area have been associated with low income neighborhoods and the residents of compound houses in the urban areas have also been among some of the low

income dwellers in the urban area. (Tipple et al, 1999; CHF International, 2004; AMA, 2004; Fiadzo, 2004; Afram & Owusu, 2006)

As explained by Tipple et al (1999), compound houses are typically high occupancy houses. Especially in the urban areas, compound housing provides cheap and affordable housing to rural urban migrants as well as residents priced out of other parts of the city. In the household survey, 91.4% of respondents who said they lived in compound houses also reported a monthly income range of 50-100 cedis and 89.7% of those who reported monthly income of less 35 cedis also reported living in a compound house.

Figure 7.1



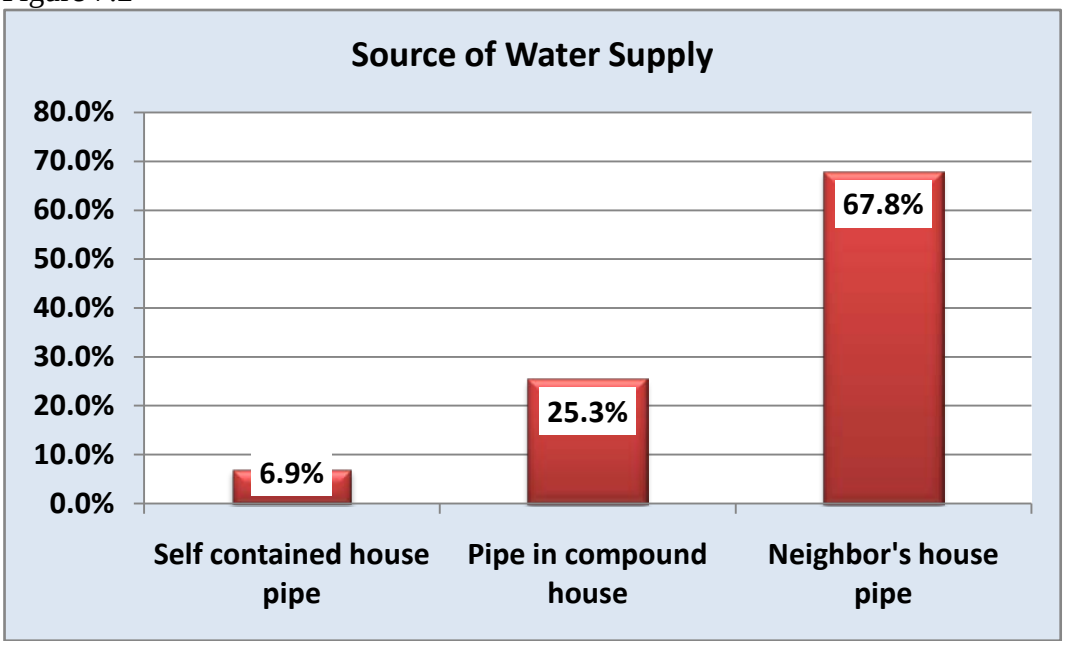
Source: December 2007 Household Survey

7.2 Source of Water

Although Ashaiman is within the network coverage of GWCL, water flow is erratic and in some homes non-existent. Residents therefore depend on water resellers and water vendors for their source of water. In a 2000 report issued by the GWCL, Ashaiman was identified as one of the communities in Ghana where the practice of individual water retailing is expanding rapidly. (GWCL, 2000) Results of the household survey indicated that 67.8% of respondents depended on their neighbor's house pipe for their source of water. 23% of respondents reported depending on the house pipe in their compound house for their water supply and 6.9% of respondents reported depending on house pipes in their self contained house.

In Ashaiman, respondents reported using their water for the most basic necessities. In the focus group discussion, participants indicated that they used their water for washing, cooking, bathing and drinking. With the exception of a few flower pots and small back yard gardens, there were no green areas in all the 120 houses visited during the research field study. None of the high water consumption facilities like swimming pools and elaborate front lawns were seen in the community. On the second day of the field trip, a handful of community residents were observed washing their commercial vehicles in front of their homes.

Figure 7.2



Source: December 2007 Household Survey

The focus group discussion at Ashaiman revealed a water market similar to the water market in Nima. Informal community water markets have over the years emerged to serve consumers who experience erratic flow of water and those in the informal settlements. In some areas within the community where there are a lot of illegal developments, residents do not have the requisite legal documentation for their structures and therefore cannot acquire water through the GWCL. Their main source of water supply then is through the water vendors. The vending system thus fills an important water supply gap within the community. Through the water vendors, low income unapproved and unplanned communities have access to water supply regularly. Water vendors identified within the community do not have any special permit from GWCL to operate their business. Officials at the GWCL indicate that these vendors are treated the same as any other domestic customer with no privileges or punishments.

Often, individuals who have pipes in their houses build underground water tanks or buy poly-tank containers for water storage. Typically, in a compound house, it is the landlord or a relative of the landlord who owns and operates the water vending business. At the focus group discussion, participants explained that these water tanks are filled when the tap flows or are supplied by private motorized water tanker service. Water is then dispensed into buckets for sale to individual customers within the community.

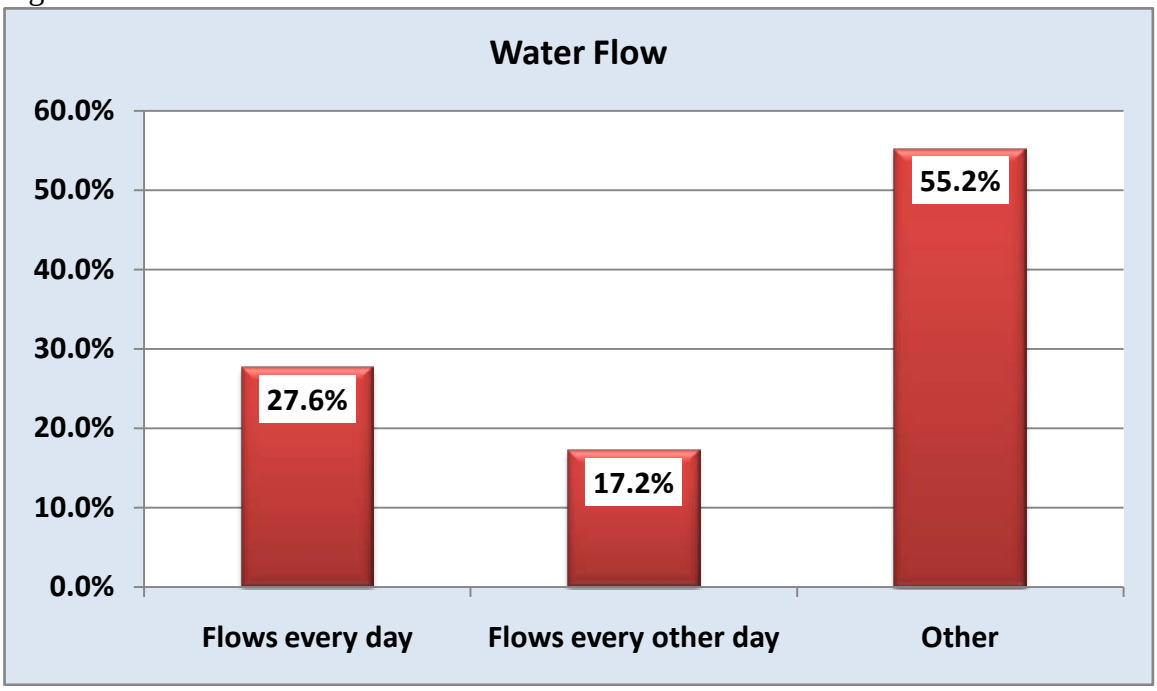
Residents in a compound house with piped water also have to purchase their water from the landlord. Compound houses typically do not have plumbing in the individual rooms. There is a common pipe in the court yard to be used by all the tenants. In some cases, the tenants use the common pipe water within the house without paying anytime they draw water. Rather, the landlord divides the bill among the tenants in the house when the water bill is received from GWCL. In this arrangement, the use of the common pipe is limited to tenants and their family members only. However, just like Nima, participants questioned the modalities their landlord or his agent used to share the water bill. Landlords wanting to make some extra money have done away with the practice of monthly bill sharing so that they can sell their water to a wide range of customers. In this arrangement, tenants in the compound house as well as water consumers outside of the house pay for every bucket of water used. Landlords who reside in areas where water bills are fixed make a windfall profit by selling to as many customers as possible.

7.3 Water Scarcity and Stress

Water flow from GWCL is severely erratic in Ashaiman. The frequency of flow affects quantity of water that will be available for use by consumers especially those consumers who live in illegal structures as well as the un-served. In addition, the frequency of flow determines the prices at which consumers will pay for their water supply. Infrequent flow means water vendors will have to buy water from the independent motorized water tankers. As indicated in figure 7.3, only 27% of the household survey respondents reported that their pipes flowed everyday and 17.2% reported that water flowed about every other day. It must be noted however that daily water service does not mean a 24 hour service. In most cases, water flowed for a few hours either during the day or at night. For 55.2% of the respondents, water flowed a few days a month; some also said water flowed a few hours in a month while others did not have pipes in their hours at all. Officials of the GWCL indicated that though they have a piped network in the area, population has far outstripped the installed capacity of the water system. Thus, there are areas where the pressure of the water from the pumping station is just not strong enough to make it to individual houses. It must be noted that the number of households in Ashaiman that received water from GWCL varies depending on the time of the day. Fewer households with pipe connections receive water during the peak periods of early morning and weekends. Officials also noted that some households are not connected with piped water because of an illegality with either the acquisition of the property or in the construction of structures. Like Nima, there are also some unscrupulous consumers who have illegally tapped into the main pipe system that brings

water to the community thereby limiting the ability of law abiding consumers to have access to water in their households. Although the problem of illegal water connections has attracted a strong response from the GWCL, their efforts at curbing the practice has been hampered by dwindling budgetary allocation and resilient law breakers.

Figure 7.3

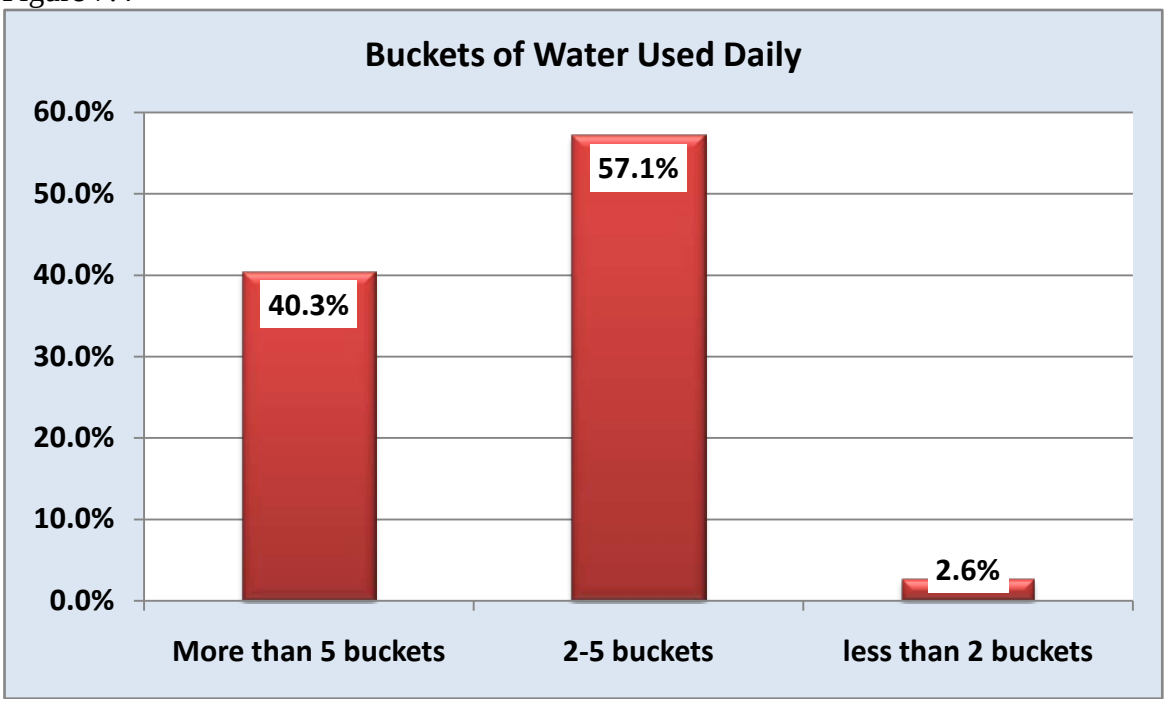


Source: December 2007 Household Survey

7.4 Payment for Water Service

The quantity of water used by the respondents to the survey as well as the participants of the focus group varied considerably. Family size was an important determining factor in the quantity of water used by the respondents. Survey analysis for Ashaiman indicates that 57.1% used about 2 to 5 buckets of water daily and another 40.3% of the respondents reported using more than 5 buckets of water every day. Only 2.6% reported using less than two buckets of water in a day. (Figure 7.4)

Figure 7.4

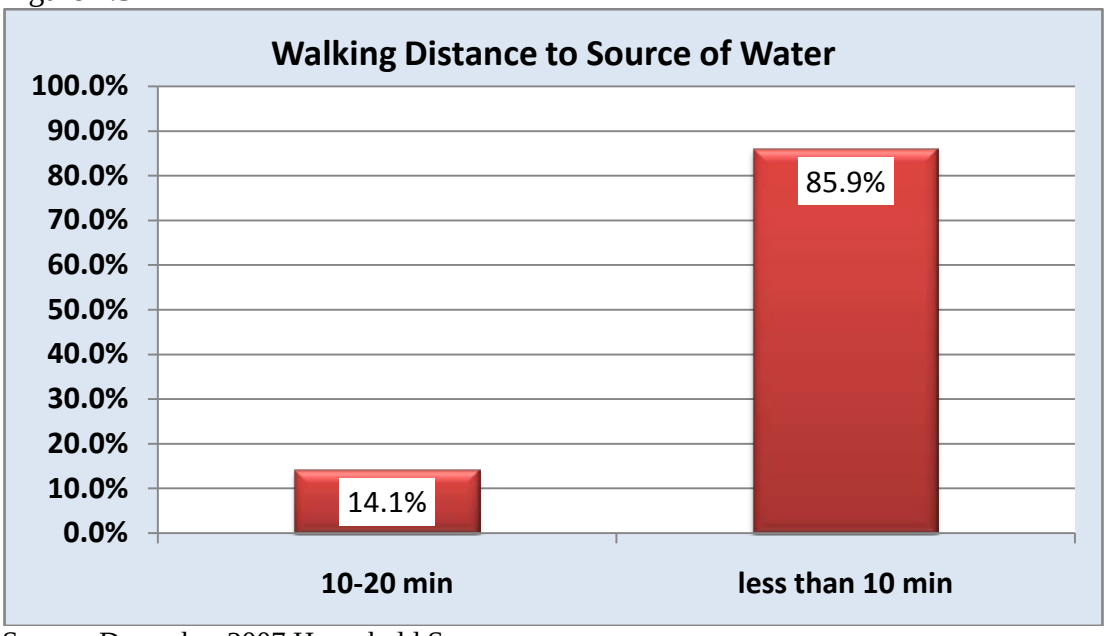


Source: December 2007 Household Survey

According to participants to the focus group discussion, there are numerous water vending businesses spread throughout the community. Thus, it takes a relatively short walk to travel to the source of water. Analysis of the survey response showed that 85.9% of respondents walked less than 10 minutes to get to their source of water. And only 14.1% of the respondents walked between 10 to 20 minutes to get to the source of their water. (Figure 7.5) This phenomenon was supported by officials interviewed at the GWCL. In addition, in a report published by the GWCL in 2000, it was explained that the business of water vending was fast expanding in peri-urban communities which included Ashaiman. It must be noted however that the travel time to the source of water varies considerably during the dry season or in periods of acute water shortages. In the dry

season, consumers in peri-urban neighborhoods can travel 2-3 miles to get to their source of water.

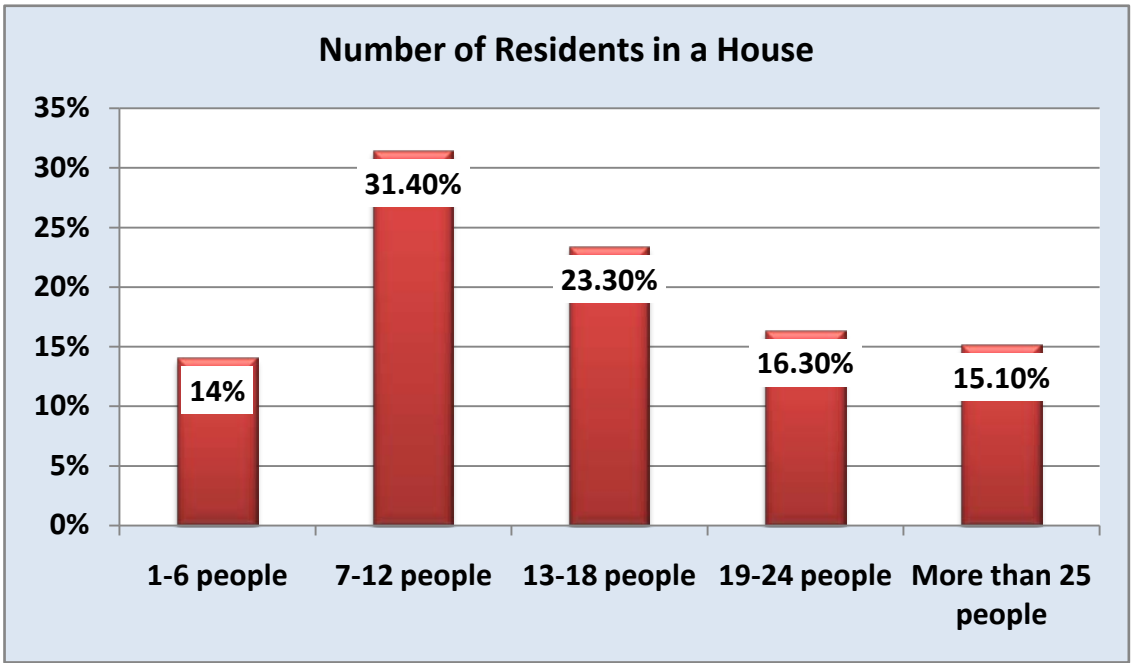
Figure 7.5



Source: December 2007 Household Survey

At the time of this research, the average price of 35 liters of water for a bucket in Ashaiman was 0.07 cedis which translates into 2 cedis per 1000 liters of water consumed. Thus, for the 57.1% of residents who reported using between 2 and 5 buckets of water, they spent 0.14 – 0.34 cedis a day for water as opposed to the PURC approved rate which should be between 0.0288 and 0.0721 cedis. Even for the few residents who shared a bill from GWCL, the high occupancy of the compound house means that they pay more for water than an average family of 5 using the same quantity of water in a self contained house. Thus, in a compound house with 10 family units sharing a water meter and using an average of 5 buckets of water a day each, their total monthly water consumption will be 54,250 liters. According to the PURC, every 1000 liters of water consumed up to

20,000 liters of water will attract a monthly bill of 0.4850 cedis and consumption in excess of 20,000 will a higher tariff of 0.6750. However, if all these 10 family units lived in a house where they had their own water meter, their water consumption would be less than 20,000 liters per month and thus their bill will be calculated based on a tariff of 0.4850 cedis for every 1000 liters of water consumed.



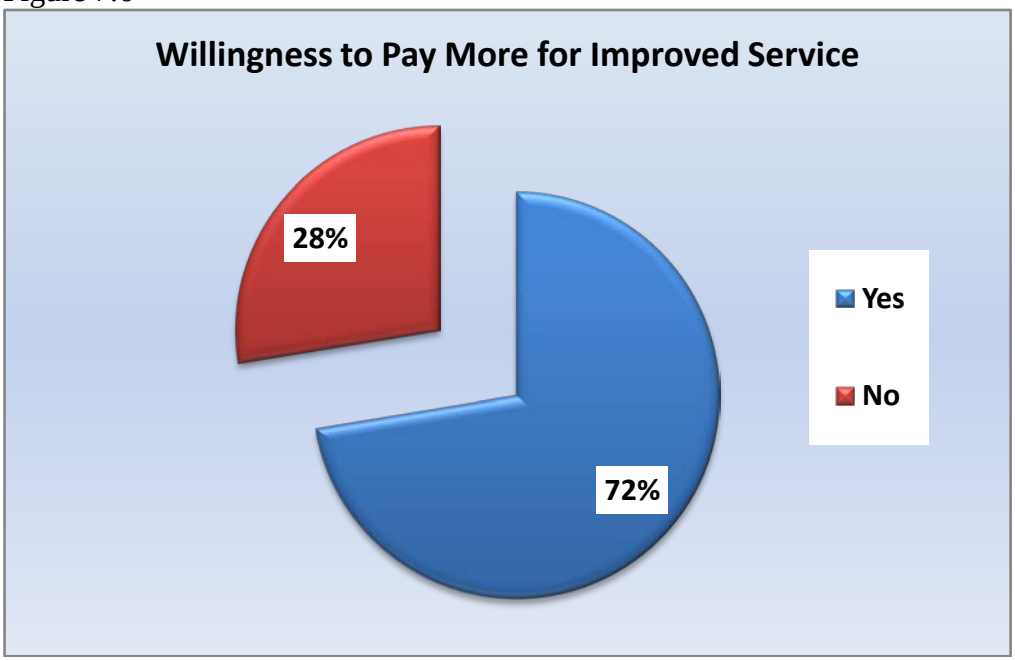
Source: December 2007 Household Survey

In spite of the relatively high prices consumers pay for water, research respondents in Ashaiman expressed their readiness to pay more to ensure a reliable flow of water. At the focus group discussion, participants lamented the daily chore of walking to a neighbor's house to fetch water. Disputes over prices and quantity fetched can easily escalate into a quarrel between the consumer and the water vendor which can easily strain the relationship. Once the relationship is strained, a consumer will have to find an

alternative vendor for his source of water. Children seem to bear the brunt of the severe water shortages in the community. At the focus group, Madam X, a 'Kenkey' seller at the local market, has 2 daughters and a son. Every morning, the children will have to walk about 150 meters to fetch water for the household chores before they go to school. A Madam Y also explained that she has gotten into a fight a couple of times with the local water vendor because of issues of the hygienic nature of the water tank. She is no longer allowed to fetch water at this place and now has to go twice as far to get water on a daily basis. Despite the already high prices that residents in Ashaiman pay for water services, 72% of the respondents to the household survey answered that they will be prepared to pay more money for water if it was guaranteed that there will be a reliable and clean source of water where they live.

It must be noted however that expressing a willingness to pay more for improved services does not necessarily mean residents will be able to afford to pay more. The ability to pay more for water will to a large extent depend on wage levels of residents. In addition, the survey question did not establish a base level for the price of water, thus respondents' answers may be based on an assumed base level which may vary from one respondent to another.

Figure 7.6



Source: December 2007 Household Survey

7.5 Consumer Involvement in Water Planning

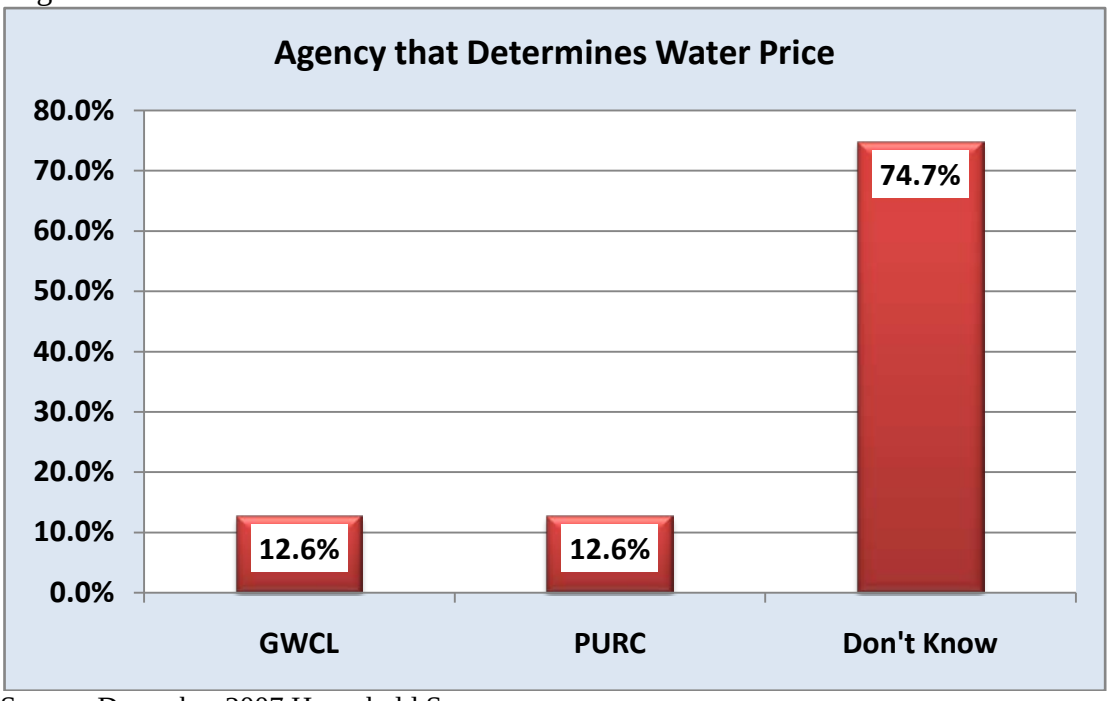
There seems to be very little awareness among the people of Ashaiman about some of the important issues affecting the water sector. Overwhelmingly, respondents to the focus group discussion felt the reason for their water inadequacies was because successive governments have chosen to neglect them. One participant claimed that water inadequacies were part of a grand scheme by the government to neglect low income people and rather focus all its energy on the more affluent. In a way, the persistent water inadequacies in the face of abundant water resources may seem like an attempt to prevent some citizens from enjoying this basic need. However, though some government policies or the omission of other policies may be complicit in water inadequacies, the problems are far more complicated that a simple explanation that government has decided not to

provide for disadvantaged communities. Other respondents pointed to government corruption as the main reason for the water inadequacies in their communities. Corruption may also play a role in the slow development of the infrastructure system in the community, but there are also other equally very important issues affecting water supply in peri-urban neighborhoods for which residents in these neighborhoods can help address. Some very important problems affecting water supply issues are illegal water connections, illegal settlements and construction projects that flout local ordinances. Also, the high cost associated with harnessing new water resources and transporting them to urban centers hinders the ability of the authorities to undertake new water projects in the short term. Some participants did not see anything wrong with the population explosion in the area. Some participants, obviously being oblivious to the huge capital investments needed to process and transport water to needed places in urban centers, said there was enough water in the Volta Lake to cater for all the people in the area. Participants did not think that illegal structures and the unplanned nature of settlements in the area were big enough problems to affect the water supply in the area.

Although some focus group participants and survey respondents were very bitter about the exorbitant prices charged by the water vendors, they felt they had no avenue to complain about such issues. The low knowledge of the community about water decision making issues was reflected in the responses to the household survey. In the survey, 80.7% of the respondents did not know that PURC was the agency legislatively mandated to determine the water tariffs. When respondents were asked who they would complain to if they had issues with water pricing in their community, 89.5% said they would

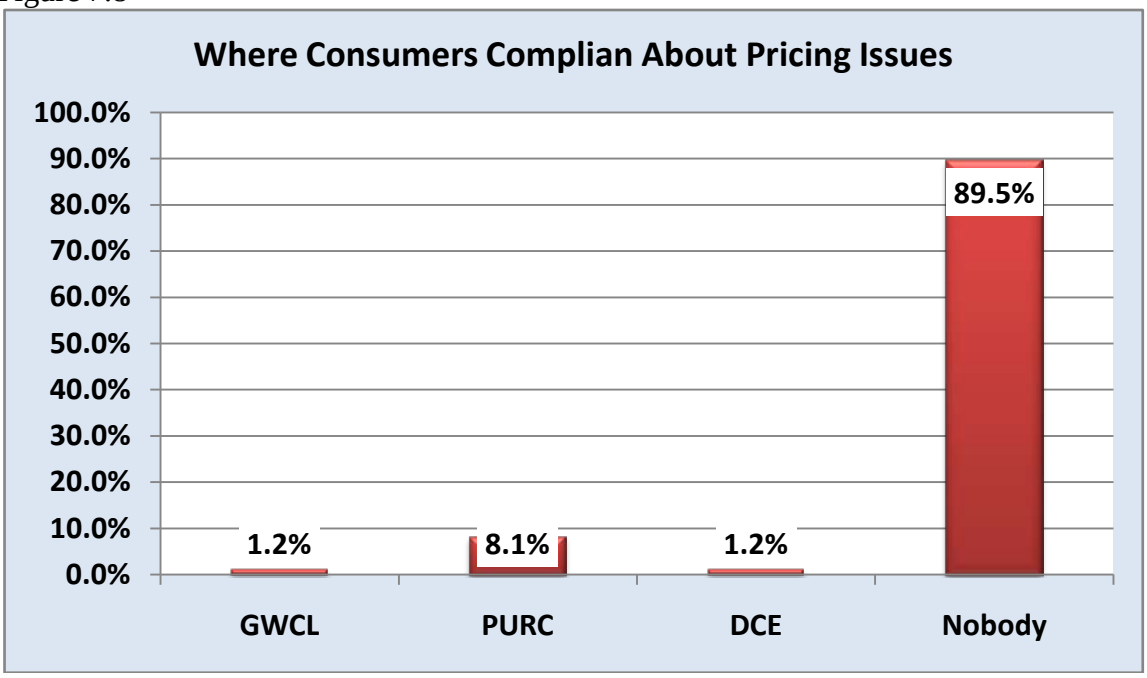
complain to nobody. Then, 1.2% of the respondents said they would complain to their DCE and another 1.2% said they will complain to the GWCL. Only 8.1% of the respondents named PURC as the legislatively mandated agency to receive complaints about pricing and performance issues.

Figure 7.7



Source: December 2007 Household Survey

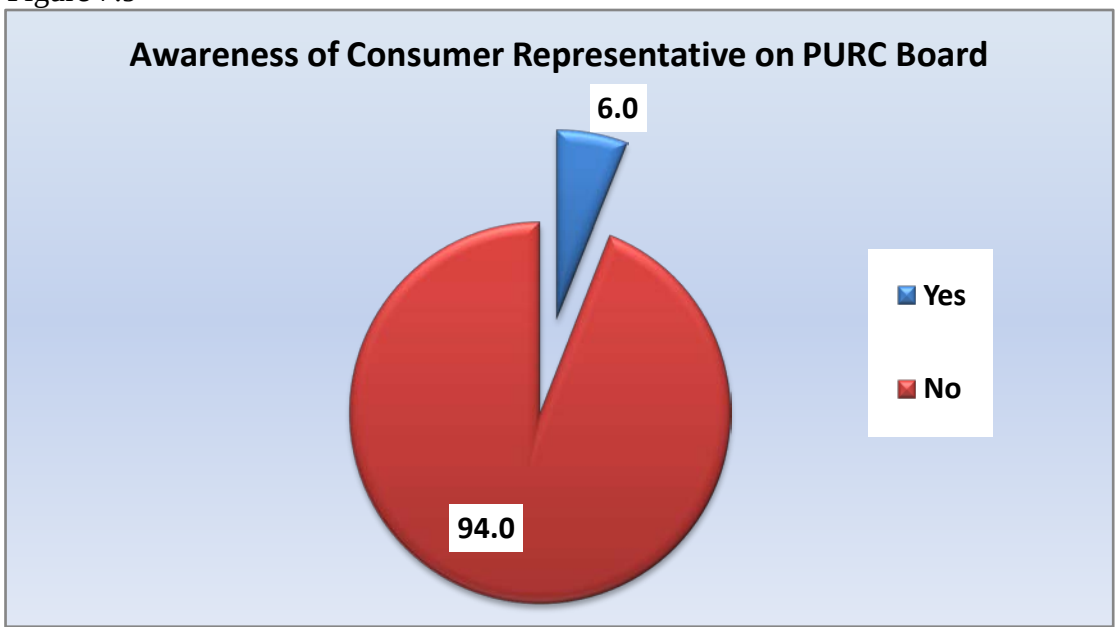
Figure 7.8



Source: December 2007 Household Survey

Perhaps the agencies responsible for water supply have to increase their public education as well as public involvement in the decision making process. This low level of information was reflective in the frustration of the people. Survey participants were very angry about the water situation. They felt a sense of powerlessness in their predicament, feeling nobody cares about their welfare and they have no avenue for redress. People were of the opinion that politicians only show up during election year to ask for their vote, but quickly forget about their needs as soon as the election season was over. When respondents were asked if they knew there was a consumer representative on the board of PURC through which they could channel some of their concerns, 94% of the respondents were not aware.

Figure 7.9



Source: December 2007 Household Survey

Chapter 8

Case Study Comparison

8.1 General Overview of Case Studies

In this research analysis, the three case studies have revealed some of the key problems that confront peri-urban communities in Ghana. Each case study divulges some of the significant attributes of the quintessential peri-urban neighborhoods and how these attributes have contributed to the problems in water supply. These communities are dynamic in their development, are characterized by a mosaic of different land use patterns and are inhabited by people of different economic status and ethnic identities. These three communities like other disadvantaged neighborhoods are plagued with poor infrastructure development and a continuous deterioration of the surrounding environment. (Olumjimi & Gbadamosi, 2007) According to Birley and Lock (1998), peri-urban communities are the most attractive areas to rural migrants and they serve as the most conducive location for the establishment of squatter settlements and affordable alternatives in hopes of deriving benefits from the city. Thus, the area constantly changes and reflects a rapid population growth. (Ford, 1999) As indicated in the case studies, all three communities have proved to be a drawing point for migrants. Ashalley Botwe was barely a community in 1970; it was at best a rural area with only a few inhabitants and houses. The growth of the city of Accra in the latter part of the 1980s and the 1990s saw an increase in the population of residents in the area. Migrants and new workers coming into Accra to work increasingly found themselves settling in the relatively less expensive areas in Ashalley Botwe. In addition, city residents who as a result of the growth have

been priced out of neighborhoods like Cantonments, Airport Residential Area and Dzowulu found Ashalley Botwe a cheap alternative.

In Ashaiman, rapid population growth in the area took place during and after the construction of the main seaport terminal in Ghana. Migrants in search of jobs at the harbor hub quickly filled up the area. Subsequently, returning peacekeeping troops with saved income from their missions settled in Ashaiman as their income was not enough to earn them places in other residential areas. Thus, within Ashaiman, there are suburbs called Middle East, Lebanon, Jericho and Bethlehem named after areas where peacekeeping troops from the various assignments settled. Nima grew as an area that socializes new migrants to the city of Accra. Because the original settlers in the area were Muslims, the community has grown as a Muslim community that welcomes people of the Islamic faith of all tribes and nationality. There are also residents of other faiths like Christianity and African traditional religions who are in the minority.

Available figures indicate a rapid population growth for Nima, Ashalley Botwe and Ashaiman between 1970 and 2000. Between 1984 and 2000 for instance, Ashalley Botwe and Ashaiman grew by 2820% and 195%, respectively, which was more than the population growth for the entire Accra Region. (Table 8.1)

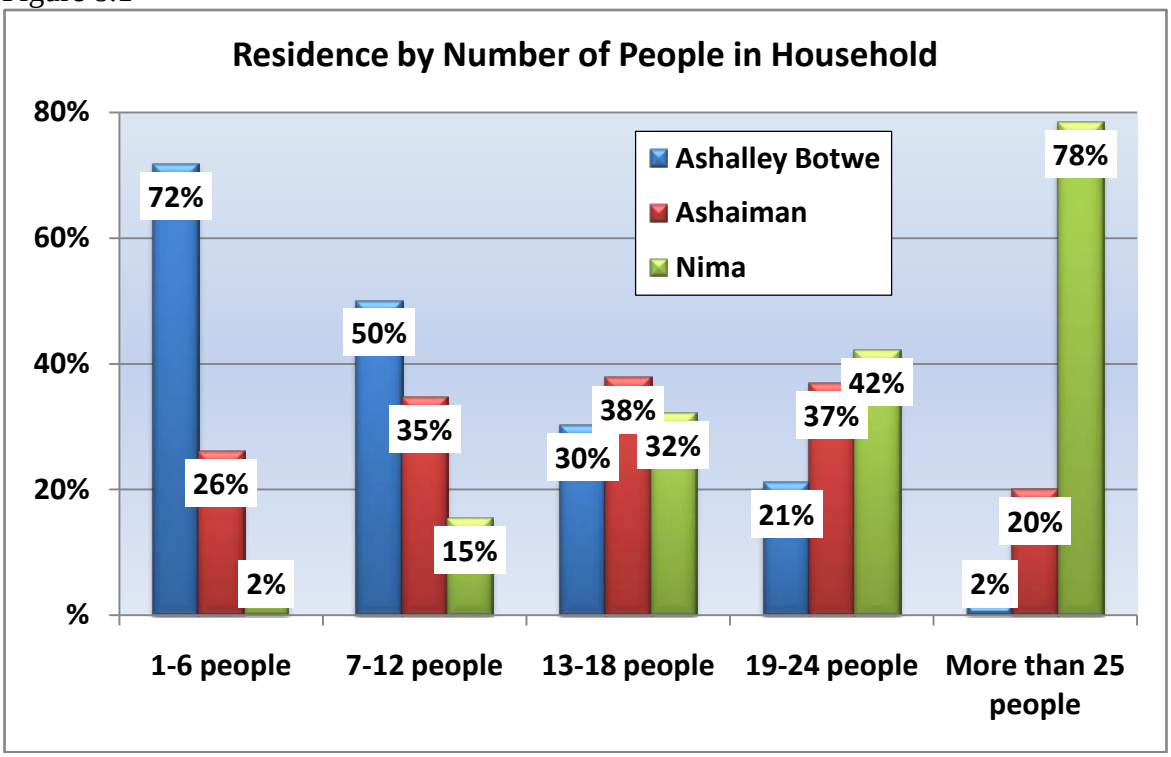
Table 8.1 Population Change

	Population			Population Change		Percentage Change	
Area	**1970**	**1984**	**2000**	**1970-1984**	**1984-2000**	**1970-1984**	**1984-2000**
Accra Region	734,896	1,203,292	2,548,975	468,396	1,345,683	63.74	111.83
Ashalley Botwe	383	410	11,974	27	11,564	7.05	2820.49
Ashiaman	22,549	50,918	150,312	28,369	99,394	125.81	195.20
Nima	52,270	52,906	69,044	636	16,138	1.22	30.50

Source: December 2007 Household Survey

It must be noted however that the population growth rate for Nima was relatively low compared to the other areas. This can be attributed to the fact that Nima, which is one of the oldest peri-urban communities, had already seen its dramatic population growth in the 1960s during the 7 year development plan of Kwame Nkrumah. Being located at the middle of the city as opposed to the outskirts, it has had limited room to grow as other residential areas in the city of Accra have expanded to the borders of Nima during the same period. Although population growth has slowed down considerably during the last two decades, Nima is still a peri-urban neighborhood with one of the highest concentrations of people in the country. Available figures indicate that of all the three communities Nima has the highest density of people living in one house. (Table 8.2) In this research, of the respondents who said they lived in a house with 25 or more people, 78.5% of them lived in Nima as against 20% and 1.5% for Ashaiman and Ashalley Botwe, respectively. In the 19-24 people in a house category, Nima once again outranked the other communities and placed almost the same with Ashaiman and Ashalley when it came to the 13-18 people in a house category. (Figure 8.1)

Figure 8.1



Source: December 2007 Household Survey

With the housing density figures, Ashalley Botwe seems to be different from the other communities. The influx of new people, mainly people who have seen an increase in their incomes as a result of the relative economic prosperity in the 2000s is fast changing the residential make-up of Ashalley Botwe. Middle Income earners who cannot afford a single family unit is traditional residential areas have found Ashalley Botwe a welcoming alternative. It comes as no surprise therefore that of the survey respondents who reported living in single family units, 87% reported living in Ashalley Botwe. (Figure 8.2) Single family units tend to have more affluent residents and a lower density of residents and this explains the low density of residents in households in the community. In addition, the data indicated that for respondents who reported earning

more than 100 cedis per month, 65.6% lived in Ashalley Botwe. However, in spite of the demographic changes in the community, as indicated from above, Ashalley Botwe is still a disadvantaged urban area which suffers from acute water supply shortages.

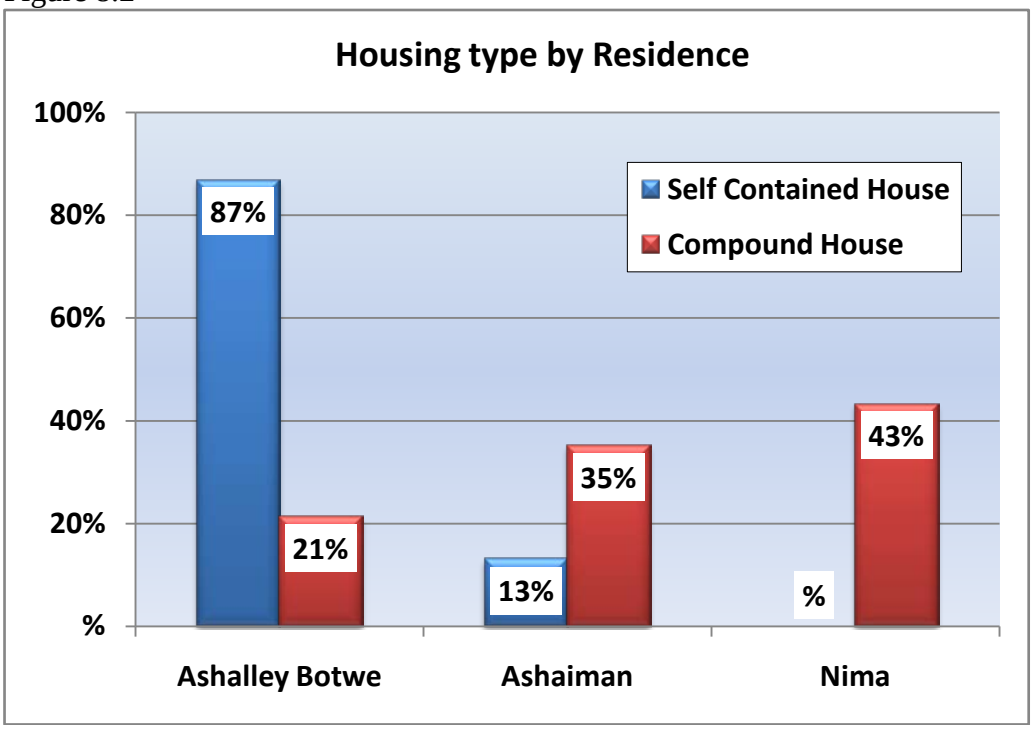
The high concentration of people in Nima and Ashaiman in particular is because of the presence of a high concentration of compound houses. (Figure 8.2) Compound houses which are typically found in disadvantaged neighborhoods are rectangular housing units with multiple family dwellings. Its construction is such that it allows multiple families to dwell in one house. Often, compound house residents share compound kitchen and toilet facilities. Where there is a piped water network in the compound house, it is normally located in the common courtyard. (Figure 8.3)

Table 8.2 Housing Stock

	Average Household Size (2000)		
Area	**Population**	**Housing Stock**	**Household Size**
Accra Region	2,548,975	238,078	10.71
Ashalley Botwe	11,974	1,667	7.18
Ashaiman	150,312	9,813	15.32
Nima	69,044	2429	28.42

Source: December 2007 Household Survey

Figure 8.2

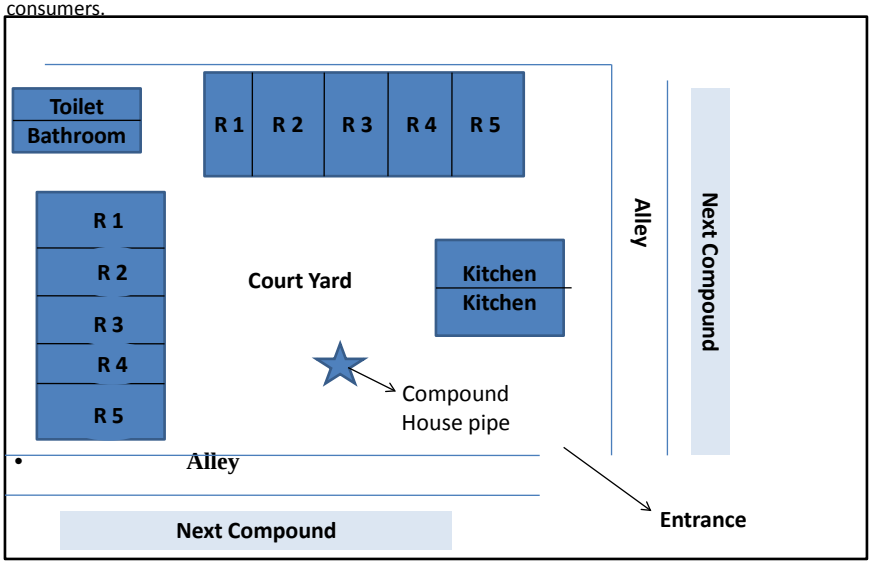


Source: December 2007 Household Survey

Figure 8.3

A Compound House Layout

Each room (R) is occupied by a separate family unit. Toilet and kitchen facilities are shared by tenants in the compound house. Where pipe water exists, the pipe is located in the common courtyard . The pipe is usually fitted with a tank and water is sold from the tank by buckets to consumers.



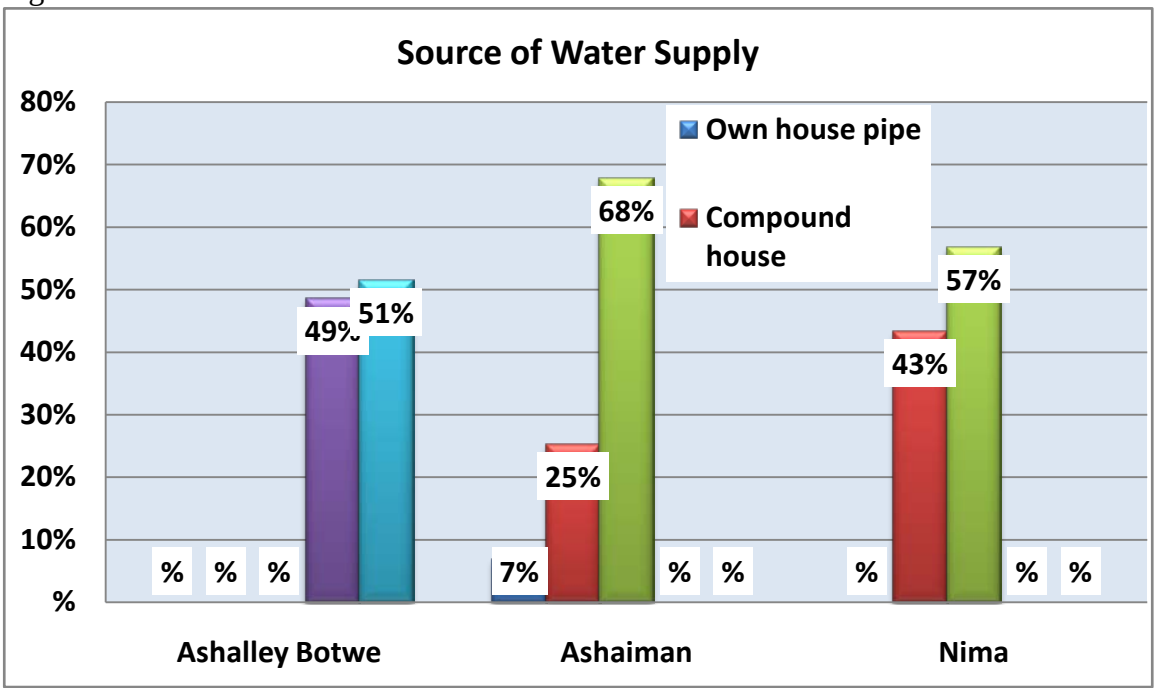
8.2 Role of the Small Scale Water Providers

Peri-urban communities are often the last to receive water services from official water and sanitation providers. (Snell, 1998) In spite of this, like all communities, residents must strive to get water for everyday activities like drinking, cooking, bathing and washing. In cases where pipe networks reach poor neighborhoods, individual home connections are often beyond the means of the average resident. In addition, public utility pipes may be ill maintained and lack upgrades to allow new residents the opportunity to legally connect to the system. Also, the informal nature of development may prevent many from acquiring the necessary legal documents necessary for pipe connection. In light of these circumstances, small scale and private water providers become a crucial service of choice for the majority of peri-urban dwellers.

In all three case studies under review, small scale and private water providers provide an invaluable service to the residents. Residents in the case study community have come to depend on the services of the small scale water provider even though their services are inefficient and sometimes come with public health risks. It must be noted that although all the case study communities depend on small scale water providers, the type of provider and market arrangements of the small scale water providers are somewhat different for each community. In Ashaiman and Nima, 67.8% and 56.7% of respondents answered that they bought water from their neighbors, respectively. (Figure 8.4) In Ashalley Botwe, 48.5% of respondent said they depended on water services from the mobile tanker service and 51.5% of respondents depended on a combination of private sources which included buying from middlemen who have purchased water from

tankers for resale, hand dug wells and streams. (Figure 8.4) In Ashaiman and Nima, the market arrangements for water are similar. In both cases, the private providers are usually local residents in the community who sell water by buckets to their customers who are typically members of the community. In this arrangement, the businessman or woman acquires a poly-tank container or builds a water tank with concrete and then fills the container or tank with water for subsequent sale. The water that fills the container or the tank is usually piped water. During periods of water flow, the tanks and containers are filled up and are topped regularly to ensure regular water supply to the customers. During times of acute water shortages from GWCL, mobile tanker services are contracted to fill the containers.

Figure 8.4



Source: December 2007 Household Survey

Table 8.3

Source of water	Community	Main Use	Comments
Neighbor connected to water system	Ashaiman and Nima	All purposes (Drinking, cooking, washing)	Most trusted source of water
Water Vendor	Ashalley Botwe, Ashaiman and Nima	Mainly cooking and washing	May boil water for drinking
Water Purveyors	Nima	Cooking and washing	
Tanker Service	Ashalley Botwe	Mainly cooking and washing	Most of these consumers live in areas with no piped water from GWCL. Depend on sachet water for drinking
Well	Ashalley Botwe and Ashaiman	All purposes (Drinking cooking washing)	May boil water for drinking

It must be noted that in both communities, research participants explained that there are numerous instances of illegal water connections on the part of these small scale providers. Some of the business men and women tap directly into the main lines coming into the community and in the process limit the pressure of the water pressure from reaching other consumers. This phenomenon was very prevalent in Nima. In spite of

persistent resident complaints both to the police and officials of GWCL, nothing seemed to have been done about them. Officials at GWCL admitted the problem of illegal water connections, but explained further that their limited resources prevent them from cracking down on all illegal connections. Thus, in both Nima and Ashaiman, illegal water tappers operate with impunity. Sensing a lack of credible commitment on the part of the authorities for cracking down on their activities, they have made no attempts to hide their illegal practices. At Nima, the Assembly Members for both Nima East and Nima West pointed out illegal connections to the researcher. However, the Assembly Members were helpless as they do not possess the authority or the tools to stop the illegal connections.

In both communities, potential customers to the water businessmen and women included both those who had piped water in their compound house and those who did not. The purchase price of the poly-tank container or the construction cost for the water tank is often beyond the means of the average resident. Thus, such residents only store water in small containers which is often exhausted quickly in between flows. In between periods where their small containers have been exhausted and the time when the pipe will flow, these residents rely on the services of the water businessmen and women. For those who do not have pipe water in their compound house, especially the illegal settlements, the water retailers become their only source of water supply.

Ashalley Botwe shares some similarities as well as differences in the market arrangement for water with the other two communities. The similarity is that there are also private water retailers who buy poly-tank containers and build water tanks for water business. The arrangement then is the same as exists in Ashaiman and Nima. However,

the difference is that unlike the retailers in Ashaiman and Nima who depend predominantly on treated water directly from GWCL pipes to fill their tanks, retailers in Ashalley Botwe fill their tanks with water from small scale mobile water tanker operators. Ashalley Botwe is an acute water stress area with some homes reporting no water flow in the last seven years. Thus, the direct piped water to fill the container and the tanks for resale are just not available.

In spite of the difference in the arrangement of the market structure of the small scale water providers, all three communities face the same public health risks. Apart from the fact that open drains and standing water in the communities breed insects, individual households within the communities have literally become breeding grounds for mosquitoes. Since water flow is erratic and unreliable, many consumers have adopted the practice of storing water in containers for future use. The practice of storing water, often in open containers attracts mosquito eggs. The high temperatures in the area aid the development of eggs into larvae and eventually to a mosquito. Mosquito bites in the area increases the incidence of the malaria infections. According to the Tema Health Directorate, malaria is one of the top ten health conditions in Ashaiman. In fact, malaria has been identified as a serious health problem for all peri-urban communities in Ghana. (Warren, 1999; Robert, 2003; Klinkenberg, 2004; Keiser, 2004) It must be noted also that the breeding of mosquitoes in peri-urban areas is a threat to other parts of the city as well as mosquitoes do not respect boundaries. It is not surprising therefore that the Ministry of Health reported that the economic cost of malaria in Ghana is $772.4 million annually.

8.3 Water Prices in the Case Study Area

The case study analysis shows differences and some similarities in water pricing in the study area. Residents who have piped water systems in their houses are expected to pay less than those without piped water. According to the published pricing structure of PURC, a bucket of water or 35 liters of water should be priced at 0.0145 cedis. (Table 8.4) Thus, an average family of 5 living in a single family house with piped water from GWCL will have their water consumption priced at the PURC rate. However, in the disadvantaged neighborhood, a compound house with multiple families may end up paying more on average that a single family living in a single family unit. Although the price of water consumed by this compound house will be priced using the PURC approved rate, since multiple families share water meter in the compound house, they are more than likely to consume past the 20,000 liters threshold into the second pricing tier. However, as individual family units, their consumption will not be up to 20,000 liters. (Figure 8.1)

It must be noted that many respondents in the case study areas including some respondents who reported having piped water in their compound house still buy water by the buckets. In Ashaiman and Nima, residents who consume water by buckets paid an average of 0.07 cedis for every 35 liters of water consumed. In Ashalley Botwe, residents who consumed water by buckets paid an average of 0.25 cedis for every 35 liters of water consumed. In Ashalley Botwe, residents who bought their water directly from the two wheeled mobile water tanker paid an average of 0.21 cedis for the same amount of water.

Table 8.4 Water Prices in the Case Study Areas

Number of Buckets	Number of liters	Ashalley Botwe Price (Cedis)	Ashaiman Price (Cedis)	Nima Price (Cedis)	PURC Approved Price (Cedis)
1	35	0.25	0.0700	0.0700	0.0145
2	70	0.50	0.1400	0.1400	0.0290
3	105	0.75	0.2100	0.2100	0.0435
4	140	1	0.2800	0.2800	0.0581
5	175	1.25	0.3500	0.3500	0.0726

Source: December 2007 Household Survey

The prices charged by the small scale water providers are higher than the approved pricing guidelines because they do not have to adhere to the PURC pricing guidelines. In addition, the small scale providers incur transactional cost like transportation and purchase of equipments which is passed on to the water consumer. Officials at PURC explained that PURC is only responsible for regulating the activities of GWCL and thus the activities of all other operators fall outside their gamut. It must be noted, however, that the price differentials in the case study areas reflect the level of water scarcity in the locality. According to GWCL, unlike Ashaiman and Nima where more than 50% of water demand is met, in Ashalley Botwe GWCL is able to meet only 45% of the water needs of the residents. In addition, residents in Ashalley Botwe reported earning more than residents in the other two communities. Thus, there is a higher demand for water in Ashalley Botwe than the other two communities.

Although the activities of the small scale water suppliers are not regulated, in all three communities there were local institutions that have made attempt at some regulation. In Ashaiman and Nima, there were a number of Water Sellers' Associations.

However, membership in these associations is voluntary and people can decide to be a part of it or not. In Ashaiman, there were three different water sellers' associations. In Ashalley Botwe, there was a water tanker association in place to regulate the activities of the water tanker operators in the areas as well as other surrounding communities. Like the other water sellers associations in Nima and Ashaiman, the water tanker association in Ashalley Botwe is also voluntary. With no compulsion and no selective incentives, very few small scale water operators join these organizations.

The chief concern of these voluntary organizations is the regulation of prices that can be charged by the small scale water operators. In Nima and Ashaiman, a list of approved prices as stipulated by the respective water sellers' associations were displayed on a number of buildings. However, there was very little indication in both communities that water sellers took the price list seriously. In both Ashaiman and Nima, water prices varied considerably. Prices ranged from 0.05 cedis to 0.1 cedis per bucket. In Ashalley Botwe, focus group participants said there was no consistency in the prices charged by the water tanker operators. Participants explained that consumers have to bargain with the driver for almost every trip of water. Thus, those who retailed water by buckets in Ashalley Botwe changed their prices according to how much they paid the tanker drivers for their water supply. The tanker drivers explained that they could not adhere to any pricing guidelines because the bulk of their transaction cost was associated with transportation cost. There is not a single source point for the drivers to fetch water for their consumers. Drivers have to travel to wherever water was available which in turn vary their transaction cost per trip.

The water associations in all three communities were not so much concerned with regulating the quality of water their members sold. In fact, in Nima and Ashaiman there is no such attempt at all at quality assurance for their consumers. In any case, the associations do not possess the technical know-how as well as the financial resources to arrange for quality checks. In Ashalley Botwe, water tanker operators are generally told to either cart construction water, which tends to be dirtier or domestic water, which tends to be cleaner. However, there are no enforcement mechanisms in place to ensure that individual drivers comply with this directive. In addition, the voluntary nature of the associations makes any attempt at regulation futile. Membership in the water associations does not give one any special advantages, thus associations risk loosing members if they push any regulations that will increase the operating cost of members.

8.4 Consumer Desire for Improved Services

It is interesting to note that in spite of the fact that residents in all three communities paid higher prices that the fees approved by PURC, respondents to the household survey in all three communities expressed a high desire to pay more for improved water service. In the focus group discussion, participants, especially in Ashalley Botwe lamented about the trouble they have to go through to get their water supply from water vendors. In Ashalley Botwe 78.2% of survey respondents indicated that they were willing to pay more than what they were currently paying for improved service in water. In Ashaiman and Nima, 72.4% and 76% of survey respondents, respectively, answered that they willing to pay more for improved water services. (Table

8.5) It must be noted that participants in Ashalley Botwe were slightly more likely to answer that they were willing to pay more for water than the other two communities. In fact, of all the respondents who indicated their willingness to pay more for water service, 44.4% of them lived in Ashalley Botwe as opposed to 23.6% and 32% in Ashaiman and Nima, respectively. (Table 8.4) This difference can perhaps be explained by the fact that residents in Ashalley Botwe have a higher level of water scarcity than the other two case study areas. Only respondents in Ashalley Botwe reported that they walked between 20 to 30 minutes to their water supply.

Table 8.5 Willingness to Pay More for Water Service

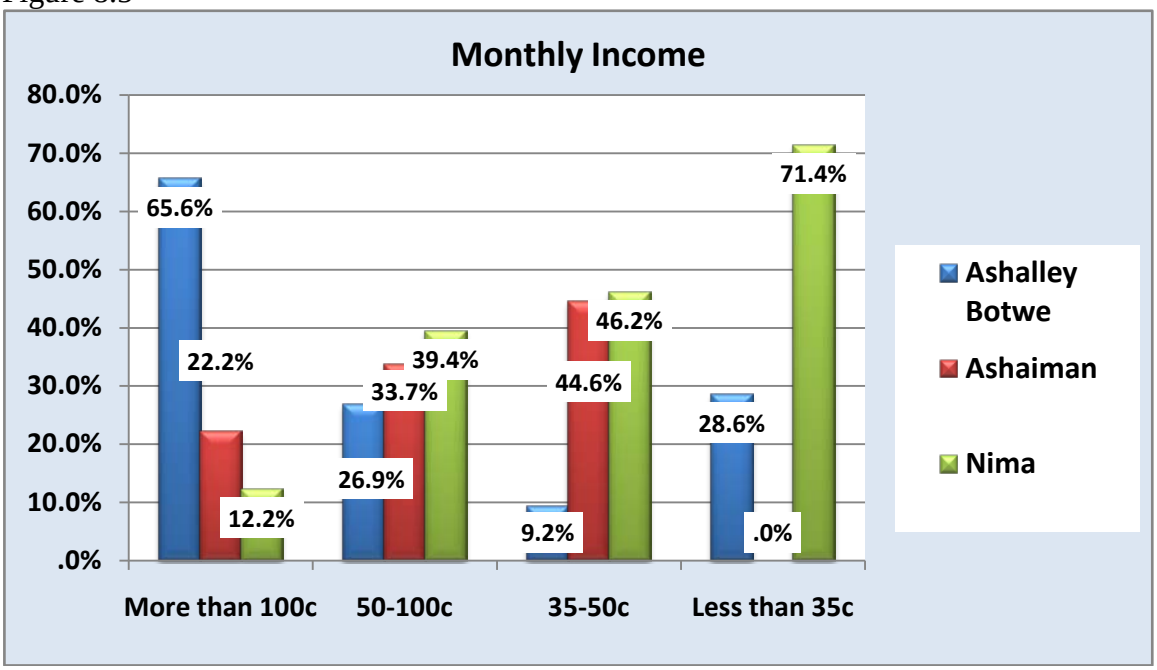
Residence		Pay More for Improved Water Service	
		Yes	No
Ashalley Botwe	% within Residence	78.2%	21.8%
	% within Paymore	44.4%	39.3%
Ashaiman	% within Residence	72.4%	27.6%
	% within Paymore	23.6%	28.6%
Nima	% within Residence	76.0%	24.0%
	% within Paymore	32.0%	32.1%

Source: December 2007 Household Survey

In addition, the survey results indicated that respondents in Ashalley Botwe earned more than respondents in Nima and Ashaiman. Thus, their likelihood to answer that they were willing to pay more may be borne out of the fact that they are likely to have more disposable income than respondents in the other areas. The household survey indicates that for respondents who answered earning more than 100 cedis a month, 65.6%

of them lived in Ashalley Botwe as opposed to 22.2% and 12.2% for Ashaiman and Nima responsible. (Figure 8.5)

Figure 8.5



Source: December 2007 Household Survey

It must be noted that the work of other scholars have corroborated the results in this research. In Gulyani et al (2005), in a willingness to pay study among peri-urban neighborhoods in Kenya, it was found that residents in the area who do not have access to water supply were willing to pay more for improved prices even though current prices for water in the area was more than what the official utility service charge.

It is worth noting also that willingness to pay for improved services does not mean ability to pay for improved services. (Olsen & Smith, 2001) It can be argued that income levels within the case study communities may limit the ability of consumers to

pay more for improved water services even though they are willing to do so. In the household survey, a total of 76.1% of all respondents answered they were willing to pay for improved services, however, 66.2% of respondents answered earning less than 100c a month. At the current rate of water prices in the communities, consumers are spending a substantial part of their income on water alone and any further increase will be almost unbearable. (Table 8.4)

8.5 Community Involvement in Decision Making

In all three communities there was very little awareness of the basic decision making agencies in the water sector. At Nima, none of the household survey respondents knew that PURC was the regulatory agency tasked with the responsibility of determining water prices. In Ashalley Botwe and Ashaiman, only 26.7% and 12.6%, respectively, correctly identified PURC as the regulatory agency in charge of determining water tariffs. It is interesting to note that when respondents where asked what government agency determines water tariffs, a high percentage of respondents in all three communities said they did not know even though only two agencies were given as options. In Ashalley Botwe, 67.3% of respondents said they did not know, 74.7% of respondents in Ashaiman did not know and 91.8% of respondents in Nima did not know either. It must be noted however that of the respondents who correctly identified PURC as the agency responsible for determining water tariffs, there were a lot of differences in the responses in the communities. Participants in Ashalley Botwe were more likely to identify the correct agency than participants in Ashaiman and Nima. Of all the respondents who correctly

identified PURC as the agency responsible for determining water tariffs, 71.1% lived in Ashalley Botwe and 28.9% lived in Ashaiman. (Table 8.6)

Table 8.6 Agency that Determines Water Prices

Residence		Agency that Determines Water prices		
		GWCL	PURC	Don't know
Ashalley Botwe	% within Residence	5.9%	26.7%	67.3%
	% within Agency	24.0%	71.1%	30.6%
Ashaiman	% within Residence	12.6%	12.6%	74.7%
	% within Agency	44.0%	28.9%	29.3%
Nima	% within Residence	8.2%	.0%	91.8%
	% within Agency	32.0%	.0%	40.1%

Source: December 2007 Household Survey

In the focus group discussion in all three communities, participants expressed their frustration about water supply in their community and said further that they feel left out in the crucial decision making process that affects their water supply. Research participants expressed the view that their interests were not taken into consideration when decisions about water supply were made. Even when they complained to GWCL about water leakages and illegal water connections, no action seems to be taken about these situations. There was therefore a sense of general apathy among participants when it came to water installations in the communities. In Nima, the Assembly Member for the area took the researcher to areas within the community where there were cracks in the pipe with water seeping out. The Assembly Member explained that these seepages as well as others in the community have gone unrepaired for months.

Although there were numerous pricing concerns expressed by research participants, they seem not to know the proper agency to channel such complaints. The overall service performance of GWCL including their handling of consumer complaints as well as maintenance records are within the regulatory jurisdiction of PURC. In fact, parliament has mandated PURC to handle water pricing complaints as well as complaints about the performance of GWCL. However, in the household survey, when residents were asked what agency they will complain to for issues pertaining to water pricing, 64.4% in Ashalley Botwe said nobody and 89.5% and 52.6% in Ashaiman and Nima, respectively, also answered they will complain to nobody. (Table 8.7)

Table 8.7 Consumer Complaints About Water Pricing

Residence		Consumer Complaints About Water Pricing					
		GWCL	PURC	MP	DCE	AM	Nobody
Ashalley Botwe	% within Residence	1.0%	11.9%	4.0%	1.0%	17.8%	64.4%
	% within Complaint	4.5%	63.2%	66.7%	50.0%	42.9%	33.7%
Ashaiman	% within Residence	1.2%	8.1%	.0%	1.2%	.0%	89.5%
	% within Complaint	4.5%	36.8%	.0%	50.0%	.0%	39.9%
Nima	% within Residence	20.6%	.0%	2.1%	.0%	24.7%	52.6%
	% within Complaint	90.9%	.0%	33.3%	.0%	57.1%	26.4%

Source: December 2007 Household Survey

PURC among other things is to protect the interest of water consumers and where necessary initiate investigations into the quality of service provided to water consumers. PURC must also take into consideration consumer interests when reviewing water rates. To signify the importance of consumer welfare in water delivery, parliament has mandated the governing board of PURC to include a domestic water consumer

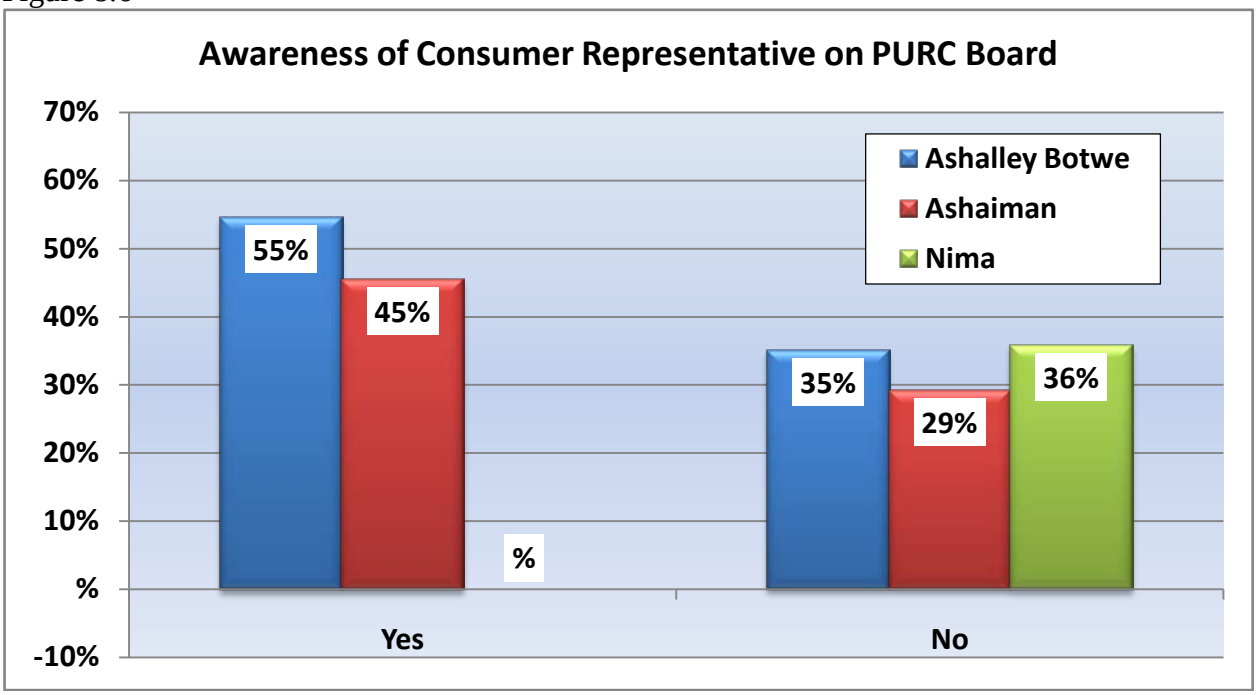
representative and also to embark on public education to sensitize consumers about the work of the commission. Thus, the consumer representative will be a permanent mouthpiece of consumers. Consumers may therefore channel their concerns to PURC through their representative. Interestingly, there was very little awareness among the research participants about a consumer representative on the board of PURC. In Nima, none of the respondents to the household survey knew about the existence of a consumer representative on the board of PURC. Ninety four percent of respondents in Ashaiman and 94.1% respondents in Ashalley Botwe did not know of the existence of the consumer representative. (Table 8.8) It must be noted that for the respondents who were aware of a consumer representative on the board of PURC, 55% lived in Ashalley Botwe and 45% lived in Ashaiman. (Figure 8.6) A higher knowledge of the consumer representative on the board of PURC in Ashalley Botwe strengthens the assertion that this community has a higher development prospects as indicated by a higher income level and higher number of single family units as opposed to the other two communities.

Table 8.8 Awareness of Consumer Representation on PURC Board

Residence		Awareness of Consumer Representative on PURC Board	
		Yes	No
Ashalley Botwe	% within Residence	5.9%	94.1%
	% within Representative	54.5%	35.1%
Ashaiman	% within Residence	6.0%	94.0%
	% within Representative	45.5%	29.2%
Nima	% within Residence	.0%	100.0%
	% within Representative	.0%	35.8%

Source: December 2007 Household Survey

Figure 8.6



Source: December 2007 Household Survey

8.6 Implications to Water Supply in Disadvantaged Neighborhoods

The findings in this research add to the body of research that establishes that there are growing differentials in the water supply coverage in urban areas. Although urban centers in SSA struggle to ensure adequate water supply coverage, there are communities within these urban areas which are hit hardest by water supply shortages. (Champetier et. al., 2000; Hall et al 2004) These disadvantaged communities are not limited to Ghana, but exist throughout urban centers in SSA. In Nigeria, there is Okobaba and Shomuluin in Lagos. In Kenya there is Nigeria, Kibera and Mathare in Nairobi, and in Tanzania, there is Temeke and Changombe in Dar es Salaam. Although water supply is the cities of Dar es Salaam, Nairobi and Lagos are inadequate; the disadvantaged communities within these cities have peculiarly low water coverage. With the findings in Nima, Ashalley Botwe and Ashaiman, this research establishes that the existence of disadvantaged communities and their attendant water supply crisis is not a local issue but part of systemic urban development problems across SSA. In fact, such disadvantaged communities with severe water infrastructure problems are also present in developing countries in Asia and Latin America. (Wilson, 2002; McIntouch, 2003) Thus, there is the need to single out such communities in the urban centers, research their unique characteristics to ensure that policy interventions are well targeted.

The study also throws light on the characteristics of the disadvantaged neighborhoods in SSA. Although differences exist in terms of geographic location and climatic conditions, there are also a lot of similarities. Thus, even though Ghana, Senegal, and Nigeria have more water resources than relatively arid countries like Mali, Burkina

Faso, and Ethiopia, water supply inadequacies are typical in all countries. The growth of disadvantaged communities is due mainly to the high rate of urbanization throughout SSA. As pointed out by the United Nations, population in cities like Abidjan, Dar es Salaam, Dakar, Kampala, Kinshasa, Nairobi, Lagos, and Lusaka have grown more than twenty fold between 1950 and 2000. (UN HABITAT, 2003) The city of Accra and its environs grew by fivefold between 1970 and 2000. This rapid urban growth has accounted for the growth in the disadvantaged neighborhoods of Nima, Ashalley Botwe and Ashaiman. Urban infrastructure growth has however lagged behind partly because of past protracted political instabilities and improper planning. (Clapham, 1996; Rothchild, 1997; Schraeder, 2004) In addition, the demographic makeup of Nima, Ashalley Botwe and Ashaiman which is characterized by migrants, low income dwellers and, squatters communities is in consonance with the demographic characteristic of disadvantaged communities throughout SSA. (Rakodi, 1997; de Soto, 2000)

As evidenced by the case studies, the problem of water supply inadequacies in the disadvantaged communities is significantly linked to the problem of urbanization and infrastructure development. Thus, a clear policy of systematic urban planning and urban renewal will be an important step to solve the problem of water inadequacies in the long run.

Within SSA, reforms in the water supply sector often involve decoupling rural water supply and urban water supply. The idea is that since urban centers and rural centers have different characteristics and different water needs, separating them ensures organizational specialization which then leads to efficiency and effectiveness. In this

direction, Tanzania, Ghana, Mali, Burkina Faso and Uganda have set up different institutions to specifically cater for the needs of urban dwellers and rural dwellers with separate policy tools. However, as evident by these case studies, some disadvantaged communities exhibit rural characteristics which make urban policies difficult to implements within these communities. Thus, remapping communities based on their characteristics will ensure that it is placed under the best institution to guarantee greater effectiveness of policy interventions.

This research cast doubts on the notion that the private sector participation should be the lead policy tool in addressing urban water supply problems in SSA. With prodding from the international donor agencies, many countries in SSA have adopted private sector participation as the lead policy tool to affect change in the water sector. Within the literature, scholars have espoused private sector participation in water as an important policy tool to realize increased investments and technical know-how in the water sector and thus increased water supply in urban areas. It is believed that such efficiencies will trickle down to the poor residents in the urban centers. (Rogers, P. et al. 2002; Boardman and Vining, 1989; Tynan, 2000). Nonetheless, this case study has shown that issues are more complicated in the disadvantaged communities. Improvements chalked by the private sector citywide may not necessarily trickle down to disadvantaged communities. In Ghana, three years into the five year management contract with AVRL, disadvantaged communities like Nima, Ashalley Botwe and Ashaiman are yet to witness changes in their water supply. Also, in Mali and Burkina Faso, benefits of private sector participation to disadvantaged communities have been minimal. (Balance & Tremolet,

2005) Within the disadvantaged communities, the widespread existence of squatter communities and the absence of proper legal titles to properties create a big challenge for private sector involvement in the water sector. (Nickson, 2001) In Sierra Leone for existence, the disadvantaged urban communities have not been able to take advantage of subsidized water connections because of the absence of legal titles. The nonexistence of proper property titles may pose a great challenge to the private operator in identifying and catering to the needs of these communities. In addition, weak regulatory regimes and low knowledge of the functions of water institutions within the disadvantaged communities will limit the level of accountability of the private provider, especially within disadvantaged neighborhoods. In this case study, in spite of the existence of a private manager, the communities have created their own informal institutions to cater for their water needs. Thus, instead of private sector participation as the lead policy tool in solving urban water supply inadequacies, a multi policy approach is needed to cater to the different water needs in urban SSA. Equal emphasis should therefore be placed on community empowerment and mainstreaming informal community institutions for greater oversight.

This research's contribution lie with showcasing the importance of the small scale water providers in ensuring the water needs of the disadvantaged communities. Throughout SSA, disadvantaged communities in Abidjan (Côte d'Ivoire), Nairobi (Kenya), Dakar (Senegal), Kampala (Uganda), Dar es Salaam (Tanzania), Conakry (Guinea), Nouakchott (Mauritania) Cotonou (Benin), Ouagadougou (Burkina Faso) and Bamako (Mali) rely heavily on the service of the small scale water provider to meet their

water supply needs. (Collignon & Vézina, 2000; Manu, 2001; Gulyani et al, 2005; Kariuki & Schwartz, 2005; Triche et al 2006) In spite of their importance, many have only in recent times gained acceptability as a possible option for developing and managing water supply to urban areas. Many governments and donors still consider small scale water providers as temporary – although some have been in existence for more than 15 years – and operators who take advantage of problems in the urban water sector to gouge their customers with services that do not meet technical standards. (Kariuki & Schwartz, 2005) This case study highlights the importance of the small scale water providers within SSA. Disadvantaged communities like Nima, Ashalley Botwe, Ashaiman and the many that dot urban centers in SSA would go unserved if not for the services of the small scale water providers. Thus, working with these providers to create standards to improve water affordability, quality and efficiency and also look for ways to expand their services to make up the shortfall in services from the national grid will be very beneficial to water consumers.

It must be noted however that the operations and ownership regimes of the small scale water providers is very heterogeneous. Thus, a first step at increasing knowledge and understanding about the small scale providers is to generate a theoretical construct of the differences in their operation and ownership regimes. This will help address the scope and scale of their operations and how best their services can be improved.

Chapter 9

Summary and Conclusion

Available evidence indicates that urban water supply in Ghana is erratic and in some places nonexistent. However, it is disadvantaged areas like Ashalley Botwe, Nima and Ashaiman that feel the full brunt of water supply shortages in urban areas. The combination of low wages, poor planning and cutthroat small scale water providers exacerbate their plight. The majority of health problems in the peri-urban neighborhoods are directly associated with water inadequacies. There is always less water in these neighborhoods to ensure that good personal hygiene skills are adhered to after visiting the bathroom, which culminates in a high incidence of diarrhea and other gastrointestinal diseases. The overcrowded nature of these neighborhoods as well as high household occupancies helps spread these diseases. Also, the act of storing water in buckets and other open containers for future use easily becomes breeding grounds for mosquitoes which in turn infect residents with malaria.

Apart from the fact that residents in disadvantaged communities pay too much for water supply, they often have to leave their home, and join long queues every day to get their water supply. In addition to time wasted in getting water supply, residents often find themselves involved in quarrels in the queues to get water. Children living in disadvantaged communities often pay dearly for the water inadequacies in the area. Children who have to fetch water every morning often arrive at school late and tired, thus hampering their school performance. It is not uncommon for children in these neighborhoods to be involved in lorry accidents when they have to cross busy streets

daily to get to their water source. In fact water supply inadequacies affect all aspects of life in the disadvantaged community. Water supply affects commercial activities especially the cost of food in these neighborhoods. With the presence of many middlemen, residents in disadvantaged neighborhoods are constantly at risk of consuming untreated and bacterial infested water.

Beyond the disadvantaged communities, the effects of inadequacies in water supply in the disadvantaged communities reverberate throughout entire urban centers and beyond. Communicable diseases which are endemic in disadvantaged communities is no respecter of boundaries, thus residents in other parts of urban centers are constantly at risk of being infected. The healthcare cost can potentially burden local healthcare facilities and thereby distort local economies. In addition, inadequate urban infrastructure like reliable water supply facilities is a disincentive for potential investments in such communities.

With continued population increase and dwindling financial resources, the policy of choice to solve the urban water supply problems has been private sector participation in the water supply. In spite of strong opposition from Non Governmental Organizations as well as civil society groups, the government of Ghana entered into a 5 year management contract with AVRL in 2005. Although one of the aims espoused in the management contract was expansion of water services to disadvantaged neighborhoods, there seem to be very little hope that this objective will be achieved. First, under the contract, the government has to provide the bulk of the funding for any expansion work. Since one of the reasons for PSP is that the government does not have enough financial

resources to invest in the water sector, there is little hope that the government will be able to provide the needed capital for the expansion project. In addition, more than 3 years into the contract, a baseline for measuring the performance of the private manager is yet to be established. In any case, in the event that resources can be provided to expand water services to disadvantaged communities, the development patterns in some of these neighborhoods make it impossible for network pipes. Because of the informal nature of development in disadvantaged communities, almost half of houses and structures would have to be demolished to make way for laid pipes.

It must be noted that the since the private manager took over the management of the urban water systems, there has been considerable improvement in the revenue collection. Net operating surplus increased from GHc 1.9 million in 2005 to GHc 20 million in 2008. However, much more money is needed to ensure that water systems are managed regularly and unserved areas are duly provided with water.

As a result of rapid population growth and years of little or no attention to infrastructure developments, substantial investment in the water sector to ensure adequate water supply in urban centers. According to the United Nations Development Program (UNDP), an estimated US$ 5 billion in investment is needed annually to ensure 85% water and sanitation coverage by 2015. However, current total budgetary spending in the water and sanitation sectors in SSA is estimated at US$ 800 million annually. This amount could possibly see an increase to US$ 2.5 billion through cost recovery measures adopted by service providers and mobilizing finances locally. It is not likely that donors will be able to provide enough to make up for the shortfall in finances. In Ghana,

WaterAid International estimates annual investment of US$ 85 million to reach 85% water coverage by 2015 while current expenditure in the water sector is estimated at only US$ 17 million annually.

There are no quick fixe or even a single solution to ensure adequate water supply to urban centers. What is needed therefore is a coordinated effort on the part of stakeholders that creatively combines various policy instruments while paying attention to the peculiar water needs and local conditions in the area. In this direction, the following recommendations are to help ensure adequate water supply to disadvantaged urban neighborhoods.

1. Increased Government Expenditure in the Water Sector

Ultimately, government bears the responsibility to ensure adequate water supply to all water consumers and the adverse human development problems emanating from inadequate water supply is clear. There must therefore be increased budgetary to the water supply sector. In 2002, out of the 21% of budgetary funds allocated to poverty under the GPRS program, only 1% was directly allocated to water and sanitation programs. Very few public investments do more to enhance human security and build prosperity than investments in water and sanitation, yet very few resources comparatively are devoted to the water sector.

Low government expenditure on water supply is a pervasive problem throughout SSA. (UNEP, 2006) According to UNEP, most countries in SSA spend around 0.5% of GDP on water and sanitation. In 2001, Kenya spent only 0.6% of GDP on water and

sanitation, Uganda spent 0.5% of GPD on water and sanitation in 2002 and on the low end, Zambia spent only 0.1% of GDP on water and sanitation in the 2003-2004 budget years.

Recommendation 1: The government must increase the budget allocation of resources spent in the water sector. To do so will require an increase in revenues to close the gap between water infrastructure needs and current funding capacity.

2. Increased cost recovery measures

A very important measure is to increase tariffs to accelerate the move to full cost tariffs for consumers with piped water. Disadvantaged communities are already paying 5 times and in some cases even more on their water service now as compared to consumers who are within the pipe network of GWCL. The principles of equity demand that at the very least those who receive service from GWCL pay the full cost of the service provided by GWCL. Under the current arrangement, residents in disadvantaged neighborhoods who are often poor are subsidizing the water services of consumers with piped water. The increasing block rate tariff for water consumption is set such that those who consume more water will pay a higher rate. Revenue from the high rate is then used to subsidize lifeline water blocks for low income consumers. However, because of the existence of compound housing in disadvantaged communities, the aggregate consumption of residents often end up going beyond the lifeline water block and into the expensive block.

To ensure that poor households are not priced out with the introduction of full cost recovery tariffs, the lifeline water arrangement should be maintained. However, the

lifeline water block should be reviewed to ensure that not more than what is needed for basic needs is allocated. This will ensure that consumers who use more than what is required for basic needs pay more for the additional water used.

One problem that was apparent in the analysis of the case studies was broken down pipes, leakages and illegal connections. These problems are present in other disadvantaged urban communities. These problems account for the high unaccounted-for-water of over 50% for GWCL. With such high unaccounted-for-water, the utility company will have to extract more water, incur additional water treatment and conveyance cost while at the same time realizing fewer revenues. Water maintenance within the urban areas must be prioritized with the high risk areas receiving the most attention first. In addition inadequate responses to consumer complaints of leakages and illegal connections give the impression of a lack of credible commitment of water agencies to deal with the issues. If consumers get the impression that there is no credible commitment on the part of public agencies to respond to these complaints, they will stop making complaints altogether. It must be noted however that consumer complaints about leakages and illegal connections have the potential of saving water agencies from incurring additional cost to identify these problems. In additions, once no action seems to be taken against illegal connections, offenders can develop a culture of impunity where such illegal activities will be tacitly approved. Water agencies must therefore devote more resources to fight illegal water connections and also seek more community involvement in identifying illegal connections. Assembly Members within the communities should be empowered with the requisite tools to partner water utility staff in

identifying illegal water consumers. Using the law enforcement agencies, culprits of illegal water connections must be dealt with swiftly and effectively to send the right message to others who may think of going down that path.

Recommendation 2: PURC must move toward full cost recovery for water delivery systems. The lifeline water policy should however be kept to ensure that low income dwellers connected to the pipe network are able to meet their basic needs. For disadvantaged neighborhoods without service, efforts must be made to provide more efficient and cost effective delivery systems including standpipes and tanker delivery services.

3. Immediate technical and financial support for small scale providers

As the case studies indicate, small scale water providers provide very valuable services to the disadvantaged urban community. Small scale water providers are relied on as the main source of water for disadvantaged urban areas in Ghana providing more than two-thirds of all their water supply. Apart from Ghana, disadvantaged communities in Kenya, Nigeria, Sierra Leone, and Tanzania as well as in other African cities rely heavily on the services of the small scale water provider. (Manu, 2001; WSP, 2003; Kariuki & Schwartz, 2005; Gulyani et al, 2005) In spite of their importance, several problems exist in this sector. Chief among them is lack of access to capital to purchase tankers, containers, water pumps and resources to maintain their equipments. They also face constant harassment from local officials as well as utility providers. These problems have been exacerbated by the refusal of government and other practitioners to pay close

attention to the services of the small scale water provider thereby preventing the effective policy support for their efficient engagements. The lack of support from government as well as practitioners has been due to the fact that; i) the services of the small scale water provider are seen as a short-term fix to water inadequacies in the urban area. (ii) policy makers have dealt with a few large public enterprises that have historically handled urban water supply. To them, it is easier to deal with the few large enterprises than to deal with a heterogeneous group of small scale water providers; iii) International technical standards sometimes do not recognize the activities of the small scale water providers. For instance, because of the controversy surrounding water handling, the Joint Monitoring Program of the World Health Organization does not consider water tankers and water vendors as sources of safe water supply. (WHO, 2005)

Nonetheless, donor agencies and NGOs like the World Bank, CIDA, DFID and WaterAid International have increasingly recognized the services of the small scale water providers and thus provide some assistance. However, such assistance is severely hampered by the heterogeneous nature of the operations of the small scale water providers as well as the lack of a coherent organization of their trade.

With rapid population growth, urbanization and scarce financial resources, governments in SSA cannot effectively provide for all its urban population in the foreseeable future. Already, civil society groups have charged that the MDG goal of ensuring 85% water coverage by 2015 is unattainable giving current policies. (AllAfrica.com, 2008) As a result, the services of small scale water providers have almost come to stay. (Kariuki & Schwartz, 2005) If government wants to make real

progress at achieving the MDG goal of ensuring 85% water coverage by 2015, then steps must be taken immediately to formally recognize and legitimize the activities of the small scale water provider.

Too little attention has been devoted to regulating small scale water providers. The lack of attention creates a serious regulatory gap especially from the point of view of poor households in disadvantaged communities. This regulatory gap can be closed by adopting policy interventions that regulate the quantity, quality and prices of the small scale water providers. Formal recognition will make it easy for small scale water providers to effectively organize into corporative associations through which their activities can be effectively regulated. Public agencies can then partner with the small scale providers to ensure that proper equipments are used for the trade and strict hygiene standards are adhered to. For instance, individual business owners who pass a periodic hygiene and equipment test can display a sticker to that effect. Public agencies, through the corporative associations can use negative market incentives like suspensions or withdrawal of licenses for operators who do not adhere to the strict standards. Consumers can then use the market information supplied through the hygiene stickers as well as membership in approved water associations to determine the services they choose.

In addition, public agencies must work to ensure them easy access to capital as well as ensure financial and technical support for buying equipment and building containers. For instance, technical support to the two wheeled water provider must ensure that the proper materials are used to construct their water tanks. There must also be technical support to facilitate the designing of tanks so that drivers wouldn’t have to stand

in the tanks to clean them. Education on the frequency of cleaning tanks as well as the right cleaning materials to use will remedy the scenario where drivers clean their tanks once a month with laundry detergents. Water resellers should also be assisted as to the proper place to site containers and build tanks to either prevent or drastically reduce the build up of spirogyra.

PURC has consistently said that they will not regulate the prices of the small scale water providers, especially because of the fact that transport cost which makes up the bulk of production cost for the small scale provider is difficult to control. PURC has therefore argued that prices should be subjected to the law of demand and supply. However, in the water business there is a high level of information asymmetry in favor of the small scale water provider. Not only do consumers find it difficult to ascertain the source of water, they also have very little information about the quality of water delivered to them. With no enforced regulations and very little information available, consumers do not have enough information to make the right choice as to whom to buy from. Distortions in the market therefore make it easy for the poor to be further exploited. In any case, consumers who fall sick as a result of the negative externality of the operations of the small scale providers may burden the health care cost of the government. In addition, other adverse effect from the health problems may be eventually felt throughout the economy as loss job man hours increases. This will eventually affect the economic productivity of some sectors in the economy. If PURC hope to fulfill its mandate of protecting the interests of consumers, then it is incumbent upon them to regulate the activities of the small scale provider.

PURC must work with GWCL to ensure that small scale providers, especially tanker services do have access to quality water. Existing booster stations (water treatment centers) must be expanded to ensure that small scale providers can buy water for resale. In fact, GWCL must proportionally allocate treated water to small scale providers. Consumers in the disadvantaged communities are also tax paying members of the society and must therefore benefit from their taxes. If piped networks can not be constructed quickly to all needed areas, then water treatment centers should be sited strategically close to disadvantaged areas to ensure that tanker services as well as other small scale suppliers have access to treated water. GWCL must work to ensure that water sold to small scale providers is sold at bulk water rate. When water treatment centers become easily accessible to tanker services, it will reduce their transportation cost and thereby translate into reduced prices for consumers. In a survey conducted by PURC in 2005, consumers rated water accessibility as the most important water issue (PURC, 2005)

Recommendation 3: The government should enact appropriate legislation to officially recognize the services of small scale water providers. The recognition of small scale water providers should include being subjected to the regulatory supervision of PURC with licensing or certification programs to assure reliable water service.

4. Collaborate with residents and civil society groups in water decision making

It is important that water supply agencies actively engage consumers in the decision making process as well as in the implementation of policies. Burby (2003) and Syme (1994) have argued that lack of public involvement in government plans often lead

to wrong solutions and an apathetic public. Policies that have low public involvement tend to be dominated by technical experts and may then raise the fundamental issue of democratic participation in governance. In addition, as Lindblom and Cohen (1979) have acknowledged, citizens possess pertinent situational knowledge that can help ensure that policies take account of local conditions and reflect local values. The relevant situational knowledge is lost when there is no committed attempt at actively engaging the public and the policies government seek to implement may seem irrelevant to the citizenry. In engaging consumers, public agencies must also make the effort to engage the civil society groups that represent the interests of the consumers. The way forward is to use information, subtle persuasion and openness to ensure mutual understanding, trust and to achieve consensus on a course of action. The current process of heavy handedness, name calling and secrecy only deepens the mistrust between stakeholders. Current civil society opposition to water privatization has been due to the fact that civil society stakeholders have fundamentally regarded the planning process as shrouded in secrecy. As Gleick et al (2002) notes, water is too important to human health that in privatizing water services, governments must set up clear guidelines that among other things must ensure transparency and include all stakeholders in the decision making effort.

Through a committed engagement process during planning and implementation, potential opposition to policies can be identified in the front end and dealt with appropriately. As Pressman and Wildavsky (1984) have noted, policy implementation that is revolutionary and not evolutionary is more likely to fail. In 1992, the city of Cartagena, Columbia was confronted with a situation very familiar in other developing

countries – inadequate water supply. The city responded to the crisis with a management contract, but the effectiveness of the contract was affected by strong public opposition to the agreement. Acuacar, the private company eventually won the support of the people when, with the help of the government, they implemented a large public relations campaign. The private company organized educational campaigns for community leaders and other stakeholders about the water treatment process, other important operating issues as well as the vision of the private company for the city. The water managers also listened to the concerns of the consumers and addressed them in an open and collaborative manner. In Cartagena, the efforts of the private operator not only demonstrated their commitment to reform water services, but it also began to alter the view of most residents that portable water was a free and ever abundant resource. In Ghana, a committed engagement process has the potential of changing the relationship of the government and the private company on one hand and civil society groups from one of distrust to mutual trust and coordination.

Public understanding of the critical issues affecting the sector also helps to sell 'unpleasant' policies to consumers with little or no opposition. Opposition still exists about the rate of water tariffs in the country even though current water tariffs are heavily subsidized. The current tariff rate of US$ 0.30/m^3 is far below the full cost recovery rate of about US$0.70 m^3. Any sustainable maintenance of water systems as well as expansion works will depend to a large extent on the financial health of the water agency.

Involving water consumers in the planning and implementation of water policies also creates a sense of ownership in community projects. (Smith, 2004) Communal

ownership of public projects fosters a culture of maintenance which may mature into an elaborate community self policing system. (Ostrom, 1990) Telling on residents who engage in illegal water connections as well as small scale water providers who flout regulatory rules will reduce agency policing costs. A genuine interest in communal projects will also ensure that community members give prompt and accurate feedback about the nature of projects in the areas. To ensure maximum benefit from feedback, they must be investigated and acted upon in a timely fashion.

GWCL and PURC officials consistently mentioned inadequate resources as one of the limitations impeding their efforts at discharging their obligations fully. Transparency on the part of water institutions and public action by citizens can start a process of bottom up regulation which will compliment official actions. In Bangalore, India, the use of citizens report cards have given community groups and consumer associations greater say in reforming utility companies and improving performance by publishing utility performance assessments. In this direction, PURC and GWCL should grant to consumer groups and civil society groups access to their operations. In India, the utility company joined forced with civil society groups to undertake public meetings and also administer surveys to measure consumer perceptions about utility services. Through this process, there was evidence of improvement in water services with local consumers reporting improvement in efficiency and less bribes being paid for water connections. (Adikeshavalu, 2004; Paul, 2005)

Recommendation 4: PURC and GWCL should encourage the formation of water committees within the disadvantaged neighborhoods. PURC and GWCL can then use the

water committees as well as civil society groups operating in the community as a conduit to get their education and policies across to the communities. The water committees can also provide important situational information as well as useful feedback to guide PURC and GWCL policies in the communities.

5. Interagency coordination to limit squatter settlements

There seems to be very little coordination between the different governmental agencies. Local government officials have very little coordination between GWCL and PURC. In AMA, a planning official pointed out that there is no formal relationship between the local government and the key water supply agencies. Local government agencies are however mandated to initiate development projects as well as implement other government projects at the local level. Thus, better coordination between local government officials and the water supply agencies will ensure that all the necessary information needed at the community level is solicited to ensure a proper management of water supply systems. In addition, since local government institutions are directly involved with local communities, local government institutions can become partners in ensuring small scale water provider compliance with regulations as well as help reduce the incidence of illegal water connections.

Ultimately, a major problem of water inadequacies in the disadvantaged neighborhoods is the issue of illegal settlements. The financial costs of breaking down illegal structures as well as the political costs are sometimes too prohibitive for water agencies to undertake any progressive water supply planning. In Senegal and Cote

d'Ivoire for instance, efforts on the part of governments to reduce water supply inadequacies in disadvantaged communities by providing subsidized water connections have been hampered by the existence of numerous illegal settlers who do not have the requisite documentation to participate in the program. (Luria et al, 2005) A concerted level of coordination between developers, planners and utility providers will be very instrumental in handling the problems of illegal structures. Often, planning departments and city councils are ill equipped to handle the avalanche of building permits as well as handle defaulter developments. The result is the overnight mushroom of unplanned, un-serviced and in many cases unrecognized neighborhoods.

Recommendation 5: The Ministry of Water Works must create an interagency task force involving GWCL, PURC, District Assemblies, town planning department and civil society groups to coordinate water supply management and most importantly curb the growth of squatter communities in urban centers.

6. Rain Water Harvesting

Rain water harvesting can also be used to supplement piped water. In fact, rain harvesting has the potential to provide cheap and available water to disadvantaged communities. With torrential rainfall occurring during the months of April to June and September to October in most part of southern Ghana, there can be available rainwater to enhance the water security of residents.

According to UNEP (2006), a threshold of 200 millimeters of rainfall is considered the minimum rainfall arrival to embark on a viable rainfall harvesting

program. In Ghana, rainfall ranges from 800 millimeters to 2000 millimeters and within the case study areas, rainfall ranges from 1000 millimeters to 1400 millimeters. Thus, the whole country is conducive for rainfall harvesting. Rainwater stored in storage tanks in disadvantaged communities has the potential to supplement their water use throughout the year. Extensive rainfall harvesting is already underway in Kenya, Botswana, Malawi and Uganda. In Kenya, Maasai women taking part in a pilot rainfall harvesting program in Kisamese, Kenya have reported gaining four hours in a day due to reduced demands on their time to travel to their water source.[10]

In fact, in Ghana, the culture of rain harvesting has been very strong for a very long time especially among rural folks and with little modification; rainfall harvesting can be used throughout entire urban areas. In consultation with estate developers and builders, modifications can be made to the current building codes to facilitate rainfall harvesting. Requiring newly constructed houses to have rain caps for harvesting rain water will ensure readily available water to supplement domestic use such as bathing and washing. Technical assistance can also be provided to owners of existing houses who will want to modify their homes to maximize rain harvesting. In addition, urban residents can use rain water for washing cars and gardening so that the pressure on GWCL to continually increase their production of treated water will be minimized. Water savings realized from this program can then be channeled to supplement the needs of disadvantaged communities' water needs.

[10] Steiner, Achim UN Under-Secretary-General and UNEP Executive Director. (2006) Press release accompanying the release of a report compiled by the United Nations Environment Program (UNEP) and the World Agroforestry Center in Nairobi, Kenya. Available at http://www.unep.org/Documents.Multilingual/Default.asp?ArticleID=5420&DocumentID=485&l=en

Within the disadvantaged urban communities, local government and civil society groups utilizing communal labor can collaborate to construct rainwater harvesting points throughout the communities where rainwater will be harvested and stored in tanks. This will then provide supplemental water service to the residents, especially for the most vulnerable who do live in any permanent structure that will enable them embark on their own water harvesting projects.

Recommendation 6: The government should amend the building code to require rain water harvesting in urban centers with water supply problems. Then, the ministry of water works through community and civil society groups should offer subsidized rainwater harvesting equipment to builders to encourage compliance with the building code.

7. Collaboration between water institutions in SSA

The problem of inadequate water supply is not limited to one SSA country. It is a pervasive problem that permeates all urban centers in SSA and also throughout the developing world. The problems are therefore not new and many countries have embarked different strategies to address these problems. A formal collaborative regime between different water agencies through the sub region will help propagate best practices and avoid mistakes.

For instance, Kenya and Tanzania in 2005 embarked on a citizens' audit approach to improve water providers' efficiency. (UNDP, 2006) Water utilities are often unaccountable, not transparent and unresponsive to consumer concerns. Thus, it is hoped

that when citizens' participation is incorporated into the governance structure, utility providers will be more responsive to the needs of consumers. In Kenya, the cities of Kisumu, Mombasa and Nairobi have launched a water and sanitation social audit that brings together residents associations, NGOs and service providers. This audit has been used successfully in other parts of the world to improve the performance of service providers in Philippines, Ukraine and Vietnam. (Paul, 2005)

Collaborating with the Greater Horn of Africa Rainwater Partnership (GHARP) can help water agencies in Ghana to develop a sustainable water harvesting program while avoiding earlier mistakes. Established in 2001, the GHARP is a regional network of rainwater associations involving Ethiopia, Kenya, Tanzania and Uganda. GHARP seeks to promote effective rainwater harvesting and management by sharing technologies to, among other things, increase water supply and ensure food security. This is a partnership that holds prospect for other SSA countries that struggle to ensure adequate water supply.

In Cote d'Ivoire, apart from lifeline water policies, the Water Society of Cote d'Ivoire (SODECI) has also licensed water resellers in the informal settlements to ensure increase in water supply. Available evidence indicates that water coverage has steadily increased for the last 10 years in Abidjan, the largest city. In addition, with surtax on water bills, the water agency is able to provide 75% subsidy to low income dwellers for first time water connection. (Collignon, 2002) In this case, because the requirement to qualify for the subsidy was proof of legal settlement, many poor households in the informal sector were not able to take advantage of the subsidy.

In KwaZulu Natal in South Africa, as part of efforts to increase cost recovery in the water sector, the utility company introduced prepaid water meters. Each family had to buy a plastic card with a chip for R60 (about US$9) with additional "water units" available for purchase to supplement the card. People who were not able to pay for the cards resorted to unapproved water sources to satisfy their water needs. Subsequent research found that prepaid water meters negatively impacted hand washing and other hygienic practices. Eventually, this policy contributed to the worse cholera outbreak in South Africa's history with more than 200 deaths recorded. (Public Citizen, 2003) Amenga (2003) reported that Ghana through a British company was installing prepaid water meters on a pilot basis in some part of the city of Tema. Collaboration with water agencies in South Africa will help to avoid a repeat of the problems South Africa experienced in 2003.

Recommendation 7: The Ministry of Water Works should initiate a collaborative relationship with sister agencies throughout SSA to share best practices. This initiative should start with sister agencies in neighboring countries and then proceed to other regions.

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APPENDICES

Appendix A

Consumer Survey About Water Delivery and Consumption

1. Where do you live?
   A. Ashalley Botwe
   B. Ashiaman
   C. Nima

2. What type of house do you live in?
   A. Self contain house (Single family unit)
   B. Compound house (a house with multiple families living in)

3. How many people live in your house including yourself?
   A. 1 – 6
   B. 7 – 12
   C. 13 – 18
   D. 19 – 24
   E. 25 +

4. How long have you stayed in your house?
   A. More than five years
   B. One to Five years
   C. Less than one years

5. Do you own or rent your residence?
   A. Own
   B. Rent
   D. Other _____

6. Do you have a water meter in your house?
   A. Yes
   B. No

If "no," please skip to question 8.

7. If you have a meter, how many family units does your water meter serve?
   A. One
   B. 2 - 5
   C. 6 - 10
   D. 11 - 15
   E. N/A

8. What is the source of your of water supply?
   A. Own house pipe

B. Pipe in compound house
C. Neighbor's house pipe
D. Tanker service
E. Bore hole
F. Other ____

9. How would you describe the quality of your water supply?
A. Very Clean
B. Somewhat Clean
C. Somewhat Dirty
D. Very Dirty

10. Which government body determines the price of water?
A. Ghana Water Company
B. PURC
C. I don't know

11. Where would you complain about a water pricing problem?
A. Ghana Water Company
B. PURC
C. Member of Parliament
D. District Chief Executive
E. Assembly Man
F. Nobody

12. Are you aware that a consumer representative sits on the board of the PURC?
A. Yes
B. No

13. What do you like best about your water service?
Answer _____

14. What do you like least about your water service?
Answer_____

Piped Water (Answer questions 15 and 16 if you answered "own house pipe" as the source of your water supply in question 8)

15. How often do you get a water bill?
A. Every Month
B. Every other month
C. Other _____

16. How reliable is your piped service?

A. Flows everyday
B. Flows every other day
C. Flows once a week
D. Other _____

Water tanker (Answer questions 17 and 18 if you answered "tanker service" as the source of your water supply in question 8)

17. How often do you buy water from the tanker services?
    A. Once every two weeks
    B. Once every month
    C. Once every three months
    D. Other _____

18. How much do you pay per trip for tanker service?
    A. More than 60 cedis
    B. 40 – 60
    C. 10 – 39
    D. less than 10 cedis

Water well/pipe some where/outside home supply (Answer questions 19 to 21 if you answered "neighbor's house pipe," "public stand pipe," "bore hole," or "other" as the source of your water supply **in question 8)**

19. How many buckets of water do you use in your household a day?
    A. More than 5 buckets
    B. Between 2 and 5 bucket
    C. Less than two buckets

20. How many minutes does it take you to walk to your source of water?
    A. More than 30 minutes
    B. Between 20 to 30 minutes
    C. Between 10 to 20 minutes
    D. Less than 10 minutes

21. How much do you pay to for a bucket of water?
    A. More than 10p
    B. 5 – 10p
    C. 1 – 5p

Closing Questions – All participants

22. Would you be prepared to pay more money for water if it is guaranteed that you will have water within 10 minutes from your house?

A. Yes
B. No

23. Which of the following water services would you prefer?
A. Piped water where I live
B. Public standpipe within 10 minutes from your house
C. Weekly tanker service to your house
D. Other _____

25. What do you think should be done to ensure adequate water supply in your community? Who should do it?

_____

26. What is your monthly household income?
A. More than 100 cedis
B. 50 – 100 cedis
C. 35 – 50 cedis
D. Less than 35 cedis

27. What proportion of your income do you spend on water?
A. More than two thirds
B. Half
C. One third
D. Less than one third

28. Are you male or Female
A. Male
B. Female

Appendix B

Focus Group Protocol

Opening Questions

1. Group members make personal introductions. Name and where you live
2. Are you comfortable being part of this discussion?
3. Have you heard about the Public Utility Regulatory Commission?
4. Do you know the functions of the Public Utility Regulatory Commission? What are the functions?
5. Describe any governmental agencies responsible for water supply and their responsibilities to you

Introductory Questions

6. Do you have piped water in your house?
7. If not, how many buckets of water do you use a day?
8. What are the main sources of water supply for your household?
9. How do you use your water in your house?
10. How much do you use for each action?

Transition Questions

11. What member of the family is primarily responsible for ensuring that the family has enough water for domestic use?

Main Questions

12. How would you describe the quality of the water you use? (Clean or Dirty/ Clear or has particles/ Odorless or smelly)
13. How do you pay for your water (monthly, weekly, daily etc)?
14. What is the proportion of your income spent on water? How expensive is your water service relative to food and electricity?
15. Would you be prepared to pay more money for water if it is guaranteed that you will have water within 10 minutes walk from your house?
16. What do you think should be done to ensure adequate water supply in your community? Who should do it?
17. Who do you go to when you have trouble getting enough water for domestic use?

Ending Questions

18. If you had the chance to give advice to the Minister of Water Works, what would you say?
19. We want you to help us evaluate water services to your community. Is there anything we missed? Did you come here to say something that you did not get the chance to say?

Appendix C

Statement read to survey participants

Hi, my name is Kweku Ainuson, and I am a graduate student in the Policy Studies program at Clemson University. I am here because I would like to ask you to participate in my dissertation research with a quick survey. My research examines the current state of water provision in peri-urban areas in Ghana and seeks ways to appreciably improve it. Your input through this survey will provide very useful information about both issues.

If you're willing to participate, you can decide which questions on the survey instrument you wish to answer. Please do not write your name on the survey instrument or give any information that will make it easy for somebody to identify you.

The survey will take twenty minutes and includes twenty seven questions. Your participation is voluntary and you can decide not to participate in the survey.

All information collected from this research will be kept in a locked cabinet and kept confidential.

Appendix D

Tanker Station

Appendix E

Letter for Focus Group Participants

(On a Clemson University letter head)

My name is Kweku Ainuson, and I am a graduate student in the Policy Studies program at Clemson University. I am writing to request your participation in my dissertation research. Please find an abstract of my research attached. My research examines the current state of water provision in peri-urban neighborhoods of Ghana, asking whether and how it might be improved in terms of supply consistency and quality. Your participation in this research will illuminate both of these issues.

I am asking you to take part in a focus group discussion as your contribution to this research. The focus group discussion will take place at the public meeting place adjoining the local library. The topics for discussion will be selected to address current issues in peri-urban water provision in Ghana. I estimate the discussion time to be about an hour. With your permission I will audiotape the discussion.

The information I will obtain during the discussion session with you will be kept confidential. The tape recording and any notes I shall take will be stored in a locked cabinet. Your name or any identifying information will not be used in any research or report. After the completion of this research, I may save the tape and notes for use in future research by myself or others. However, the confidentiality guaranteed here will be the same for any future use of the tape and notes.

I expect you to be involved in only one focus group discussion session. After the session is over and you have had the chance to initial the audio release form, you will not be contacted again for this research.

I do not envisage any personal risks or cost in taking part in this research. You will also not benefit directly from your participation, but I hope your inputs will help to benefit disadvantaged communities by identifying options to cater to their water needs.

You are not under any obligation to be part of this research. If you take part in this research, you can refuse to participate in any discussion topic and may opt out at any time during the discussion.

If you have any questions or concerns about this study please contact Dr. Caitlin Dyckman at Clemson University at or Kweku Ainuson at kainuso@clemson.edu. If you have any questions or concerns about your rights as a research participant, please contact the Clemson University Office of Research Compliance at 864.656.6460.

Appendix F

Statement Read out to Focus Group Participants Prior to Their Participation

Hi, my name is Kweku Ainuson, and I am a graduate student in the Policy Studies program at Clemson University. I have asked you to be a part of my dissertation research project today because your perspective will provide valuable insight into ways to improve water supply in peri-urban areas of Ghana.

We are going to discuss issues about peri-urban water supply in Ghana. You are free to express your views about an issue in any manner you feel comfortable. I will moderate this discussion. When I feel an issue has been thoroughly discussed, I will introduce another issue. This exercise should take about an hour. You can decide which issues you will not want to discuss. Your participation is voluntary and you can decide not to participate in the discussion at all. If you choose to participate in the discussion, you will not be identified in person in any further research or publication that will arise from this research. All notes and information taken from this discussion will be locked in a cabinet.

With your permission, I will record the entire session or parts thereof. After the discussion session, you will get the opportunity to tell me how you want the audio record to be used by filling out an audio permission slip.

Appendix G

Interview Protocol

Public Utility Regulatory Commission (PURC)
(Statutory Body to Regulate the Operations of Utility Companies)

1. My understanding is that your responsibilities include ensuring consumers have water readily available when needed and also build a regulatory regime that will respond to the water stakeholders concerns, and ensure equity in the provision of water services. Would you agree to this statement or would you like to add more to it.?

2. Do you responsibilities extend to the activities of small scale water providers?

3. How are consumers interests represented in the decisions of the commission?
    a) How do you ensure that you solicit inputs from a representative sample of consumers?
    b) What is the extent of public education to teach consumers about the responsibilities of the commission?
    c) What is the extent of public education to teach consumers water conservation measures?

4. How do you ensure that utility companies take poor areas into consideration when planning expansion projects?
    a) Do you review expansion projects and assess their effects on all consumers and potential users?

5. Tariffs have been reviewed annually for the past three year, on what information do you base your decision to review tariffs?
    a) What is the decision making process to review tariffs?
    b) Do you consider income levels?

6. What pricing mechanisms do you use?
    a) What are the economic justifications for your pricing mechanisms?
    b) Are tariffs aimed at full cost recovery?
    c) Do you face any problems in ensuring fairness in water tariffs?

7. The 2003 country report on water supply found that poor neighborhoods pay more for water than non-poor neighborhoods. How do you intend to solve the price differentials between the poor and non-poor neighborhoods?

8. How do you ensure that subsidies are accurately targeted and reach their intended beneficiaries?

a) How do you ensure that multi household settlements with only one water meter benefit from life line water rates?
b) How do you intend to solve the problem of price differentials in water cost between the poor and non poor?

9. The government has responded to this year's increase in electricity tariffs by increasing the lifeline threshold. Do you get such government intervention in the water sector? What effects are such interventions likely to cause?

Municipal Assemblies

1. Do you have any collaboration with PURC?
    a) Do you share any information pertaining to the residents of your municipality with the PURC?
    b) Are all the residents in your municipality represented in the deliberations of the PURC? If not, what group is excluded and why?

2. How many water service NGOs operates in your municipality?
    a) Do you have any formal collaboration with the NGO (s)?
    b) Are the NGOs active in all areas of the municipality or just a single sector?
    c) In your opinion, are the NGOs able to reach the water needs of communities they serve?

3. Do you know the number of small scale water providers in your municipality?
    a) Do you officially recognize their operations?
    b) Do you play any supportive role? If so what role do you play?
    c) Are they required to pay taxes? If so, how do you establish their tax rates?

4. Has your municipality received any complains about the services provided by the small scale water providers?

5. In your opinion, how do you assess the services provided by the small scale water providers?

6. What are the poverty mapping strategies in your municipality
    a) Do you have specific information about the extent of water coverage for poor neighborhoods in your municipality?
7. How does your municipality approach squatters?
    a) Do you have a formal policy to deal with squatters? If so, what are they?
    b) Are there any plans to integrate squatters in the municipality and provide them with land titles?

c) Are there plans to stop squatters from occupying other public lands in the future

8. Are there any specific measures your municipality is taking to improve water services to the poor communities? In your opinion, how can we improve water services to the poor communities?

Selected Water Tanker Providers

1. Is your business registered with the government?
2. Is this business your only source of income?

3. Who are your main customers?
    a) What parts of the city do you supply water to?
    b) How frequently and for what duration do you supply water to consumers?
    c) Is your water supply the only source of water for your clients? If not, how do they supplement?

4. Do you have competitors? If so, who are your competitors?

5. How many water trips do you make in a week?
    a) How much do you charge per trip?
    b) How do your prices compare to government rates and your competitors?

6. What is the source of your water
    a) Do you get water from public places (piped water, river, stream, etc)?
    b) Do you check the quality of the water before you cart to the customer?
    c) Do customers inquire about the water source?
    d) Do you pay to get the water? If so, how much per gallon?

7. How many times do you wash your tank in a year?
    a) Does anyone determine how many times you wash your tank? If so, who?
    b) What chemicals/cleaning agents do you use?
    c) Does any one inspect the cleaning? If so who?

8. Do you pay any taxes or fees to the government?

9. Do you have any technical/informational from the government?

10. What are some of the challenges you face in your business?

Ghana Water Company

1. What sector of the population does the government require you to serve?
2. Are you able to meet your requirements to all these sectors? If no, who doesn't receive water and how do you make that determination?
3. How are you ensuring that poor neighborhoods receive water when needed?
4. Do you have any sub-contractors working with you to meet your service requirements? If so, who?
5. What is the percentage of piped water connection in urban areas?
6. What is your billing cycle? (Get a copy of the bill)
7. What information do you include in your bill?
8. How do you collect your bills? Do you have vendors? Do you contract out bill collection?
9. Do you recognize the operation of small scale water providers?
10. Are you in collaboration with other water providers to improve your services? If so, how? In what ways?

Ministry of Water Resources, Works and Housing

1. What is the government's official policy on urban water supply?
2. What percentage of the urban population has access to water supply when they need it?
3. What are the sources of water for urban consumption?
4. How much surface and ground water are available for urban water supply?
    a) Considering population growth and water demands, what are the projections in the country for water supply?
    b) Are there any conservation plans in place to ensure efficient use in the country's water resources?
5. What strategies do you propose to ensure that water will be readily available for urban uses?
6. There is evidence that poor neighborhoods in urban areas pay more for water services than non poor neighborhoods. How do you propose to bridge the gap?
7. Do you have any strategies in place to upgrade slums in urban areas – if so, how much progress have you made?
8. What are some of the problems that your ministry faces in the water sector?

Appendix H

Audio Consent Form

Clemson University letter head

As part of this research I have made an audio recording of you while you participated in the project. I will like you to indicate below what uses of these records you are willing to consent to. I will only use the records in ways that you agree to. In any use of these records, your name will not be identified.

1. The records can be studies by the research team for use in the research project.

Audio _____ (initial)

2. The records can be used for scientific publication.

Audio _____ (initial)

3. The records can be played at meetings of scientists interested in the study of urban water supply.

Audio _____ (initial)

4. The records can be played in public presentations to nonscientific groups.

Audio _____ (initial)

5. The records can be played on television and radio.

Audio _____ (initial)

I have read and above description and give my consent for the use of the records as indicated above

_____ Date _____

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