

**WATER PROVISION IN URBAN CENTRES, WATER SOURCES
AND SUPPLY INSTITUTIONS: A CASE
STUDY OF LUBAGA DIVISION
KAMPALA**

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DECLARATION

I WASSWA-NSUBUGA FRANCIS declare that this piece of work is mine and has never been presented in any University or Institution of higher learning for an academic award.

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DEDICATION

This dissertation is dedicated to my late father Salongo Isaaya Nkugwa Bakunga, my mother Nalongo Imelda Nalukenge, my maternal Auntie's and the entire family, for their parental, financial and spiritual support which have enabled me to attain this level of education.

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I do appreciate the permission and tolerance given to me at my place of work to enable me finish this work.

Wasswa-Nsubuga Francis

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ABSTRACT

The study was carried out to establish the challenges faced by the formal and informal institutions in the supply of water and the extent to which people get access to this water in Lubaga division.

It addressed the questions like, the nature, functioning and relative importance of agents involved in provision, the mechanisms and modes of accessing water in urban areas, the challenge urban people face while trying to get water, and the adaptive strategies designed by the urban population to sustain their water supply.

The research then revealed that residents of Kampala access water sources differently and often have to combine several sources of different cost and quality. The water utility provider, National Water and Sewerage Corporation (NW&SC), caters for most of the bulk water supplies to the city of Kampala. The research revealed that 52% of the households receive their water directly from NW&SC, 32.7% get water from underground sources, at the same time other sources play a major role in water supply in Rubaga Division.

Commonly, households access water from others who have a connection to the public piped water system, or from spring well or they buy from distributing vendors that ferry water by pushcart, tanker trucks or bicycles.

The research reviewed the role of formal and informal providers in Rubaga Division and finds part of the distribution system both the piped and un piped to be in the private hands. To understand the relationship, the politics of provisioning were probed into. The challenges experienced while accessing water have been discussed. The people of the study area have devised coping methods, some of which are deliberate, while others are done unconsciously.

It was concluded that water vending as a popular way of providing water should be strengthened, because it might produce a more rapid and replicable improvement in the standard of service especially to the urban poor.

CHAPTER ONE

INTRODUCTION

Fresh water is emerging as one of the most critical natural resource issue facing humanity. The World's population is expanding rapidly, yet there is no more fresh water on earth now than there was 2000 years ago, when the population was less than 3% of its current size. Water is literally the source of life on earth, and there are no substitutes for water and it could be said water is life. This is true because the human body is 70% water, people begin to feel thirsty after a loss of only 1% of bodily fluids and risk death if fluids loss near 10%.

As indicated in the Uganda Water Action plan of the Ministry of Natural resources, 1995, Water is a major factor in the socio-economic fabric of society as well as a determining factor in the development potential of the Nations. Water forms a vital part of social and physical or material infrastructure.

Water plays a key role in health, industry, agriculture, energy and general consumption. Fresh water is used to meet necessities of life such as drinking, cooking, collective and individual hygiene, heating and cooling of buildings, security of society, industrial and agricultural activities. It is therefore indisputable that water is the priceless resource.

A country's level of fresh water use reflects and in fact is one of the key measures of its level of economic development. It is further argued that in a country, people's use of water depends not only on minimum needs and how much water is available for use but also on the level of economic development and extent of urbanisation. Generally urbanisation increases water use drastically.

In Uganda, Domestic water supply is based on both surface and groundwater source. Surface water is the dominant source of large urban supplies like in Kampala,

while ground water forms free basic source for rural supplies and a number of small towns.

In 1991, Uganda's total population with access to safe water represented 25.0%. Corresponding values for the rural and urban areas were 18.5% and 74% respectively. By 1993, however, the water supply average of the Directorate of water development (DWD) had reached 28% and continued to rise to 31% in 1994 and 36% in 1995 for the whole country. (State of the environment reports 1996) However, DWD aims at attaining coverage of 100% and 75% for urban and rural areas respectively by the year 2000. The current degree of accessing water is closely linked to the method of distribution.

The table below gives the methods of water distribution in Uganda by percentage of population served.

Table I: Water Access methods; Rural and urban 1991

Description	Rural	Urban
Piped water inside	0.15	6.24
Piped water outside	1.58	30.32
Bore holes	7.56	10.57
Protected springs	9.25	27.36
Open well/springs	56.56	19.39
Streams/river	15.53	3.16
Lake/pond dam	8.92	2.48
Other	0.45	0.45
Total	100	100

Source: State of the environment reports 1996.

Piped water supply bore holes, and protected wells and springs are considered to be safe water sources; water from other sources is considered unsafe unless otherwise treated. However those who cannot access the safer means are continuously using these sources.

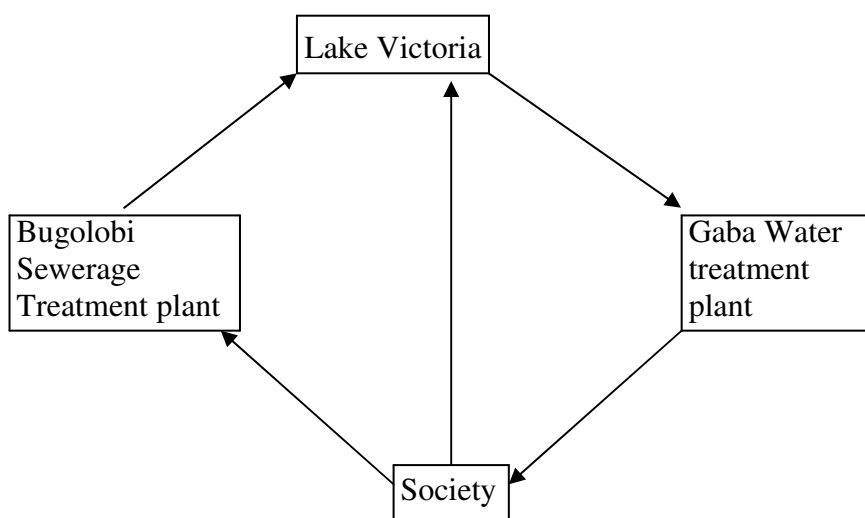
The following institutions are responsible for the provision of water supply and sanitation (WATSAN) in Uganda.

- a) The Water Development Department (WDD).
- b) The National Water and Sewerage Corporation (NW&SC) currently responsible for the towns of Kampala, Entebbe, Jinja, Mbarara, Masaka, Tororo, Mbale.... Etc.
- c) The Ministry of Health (MOH).
- d) The Ministry of Local Government (MOLG).
- e) The Ministry of Women in Development, Youth and Culture (NWIDYC).
- f) Numerous Non-Government organisations, international donors, community based organisations and local communities.

In Kampala, Lake Victoria plays a vital role in the provision of Watsan services. Water from Lake Victoria is treated and supplied to the society. Members of society are categorised as domestic, institutional, commercial, and industrial consumers. On consumption of water, members of the society pass out, waste water either through the Central Sewerage network, Nakivubo Channel or other non-point sources which all ends up in Lake Victoria. Other sources of water in Kampala include the Boreholes, Protected springs, Openwell/Springs, Streams, Rivers and Lakes.

Figure I: Shows a schematic diagram or the WATSAN cycle in Kampala urban district.

Figure I: The hypothesised WATSAN Loop in Kampala.



Source: Sam Kyagaba Dec' 99

The major institution that supplies water in Kampala is the National water and Sewerage Corporation (NW&SC) set up as a government owned parastatal under decree No. 34 of 1992. It is charged with the functions of operating and developing water supply and sewerage services in any defined area on self sustaining and national basis. As of June 1999, NW&SC water supply area had a reticulation composed of 816 km of pipeline of at least DN 75mm. The total numbers of individual connections were 30,457 with 768 public standpipes /kiosks. These installations were estimated to be serving 42% of Kampala's total population of 950,000, which is low service coverage, given the projected population growth rate of 4% and industrial growth rate of 16% p.a. (Kyagaba '99'). Such information raises the question of how the remaining

56% of the people access water, at the same time how will the future water requirements be met.

In its mission statement, NW&SC aims at providing reliable Water and Sewerage services to enhance public health and environmental protection. The water sector is heavily funded by foreign aid but the city's priority water needs have not been appropriately addressed. Water and sewerage services are concentrated in the core urban centre, leaving the peri-urban high density, low-income settlements like those of Lubaga Division without adequate services. This raises a question of how the people in these settlements cope.

Over the past decade, the NWSC has invested about US \$ 120 million in water and sewerage, with approximately US \$ 80 million of this amount invested in Kampala water service area alone (Lund centre for Habitat Studies). The practical water production capacity of the city is now 100 million litres per day. This production represents a theoretical capacity to satisfy a demand of one million people who are served through approximately 40,000 water connections. We should not forget that these people are the ones who are able to pay for the water.

Namagembe (1973), in her study of the provision of and use of water in Kampala, gave factors that influenced the water board to install any public standpipe. These were as follows:

The board would put up a standpipe as soon as it became aware that dangerous contaminated water is being used in a certain area. It is normally the Health department, which is responsible for such reports. The situation today is different; these health reports are no longer forthcoming. That is why there is less installation. On the other hand, when standpipes with a fee charge are installed in the hope of

discouraging the people from using dirty water, people still use the other sources because they are free of charge.

They would also put up a standpipe if the population density were high, like 2000 people per mile. This is because the board conceived a certain minimum threshold level of population as necessary to support a standpipe. But some areas showed that they are unable to cover the expense. For example areas of Nateete have a standpipe in a distance of every 500 metres, while Ndeeba with a higher density has only one, every 1500 metres because of the weak payment capacity.

The water board by then also avoided remote places because of the economic cost of piping the water. Places, which were one kilometre or more from the water main were, considered being distant and therefore too expensive to serve in terms of construction costs. The access today depends on the applicants' financial ability and those who cannot afford have been denied access.

The fourth factor according to Namagembe, where a standpipe may be installed in the absence of the foregoing factors, is a place where financially promising activities are carried on. But if such places are remote, the residents, concerned may sometimes be asked to contribute towards the construction of the pipeline.

NW&SC operations on the other hand have been beset with low performance efficiencies, high levels of un-metered premises, reaching almost 49 percent, low bills collection efficiency levels of around 70% and over staffing.

The situation has affected the ability of NW&SC to finance both minor and major capital works, and extend the service to peri-urban Kampala. The gap has been filled with the private sector providers, whose involvement in water operations in Kampala is a limited distribution of supplies made available by the NWSC.

As Kjellen (1999) observes for Dar es salaam, “the provision, supply and use of water can vary radically between neighbourhoods within the same city. The most obvious variations manifest themselves between rich and poor neighbourhoods, but differences also persist between areas of similar level of development- especially where household connections are rare. Not only does the physical setting vary, but also the formal and informal institutions that provide for the use and abuse of water.” Hence the need for provisioning in areas with limited access , such as the Lubaga study area.

Statement of the Problem

Water plays a vital role in our lives and is a basic need in all aspects of life. This is emphasised by the saying that water is life and there are no substitutes for water, (Ssewakiryanga, 1996). Because of its role the constitution of the republic of Uganda, emphasises in article 29, clause 1 that: “Every person is entitled to clean and safe water”. The implication of this statement is that government is committed to ensure that clean and safe water is available to every person. It does so through the National Water and Sewerage Corporation, a government parastatal charged with providing sewerage and water services in various parts of Uganda. NW&SC extend main pipes from which people can connect secondary pipes to their houses on payment. Despite the importance of water and the government's emphasis of a person being entitled to clean and safe water, a number of settlements have limited access to it. People move quite long distances in search of water and others find methods of coping to satisfy the water need. They use unclean, contaminated water, which is a threat to life.

Small-scale independent providers have come up to supplement National Water& Sewerage Corporation (NW&SC), but they also do not reach every where.

Even where they reach a small percentage of people with money can access their services.

Therefore this study is concerned with the ways of accessing and provision of water in Kampala district. Lubaga division is the study area. The study focuses on both the informal means of water provisioning and provision in the area. Accessibility through the formal means is also taken into consideration so as to establish why the two scenarios manifest themselves with in the same locality.

The study explores the extent of informal and formal water provisioning and provision mechanisms and dynamics involved, with respect to different groups of people in Lubaga division.

The informal sources in this study include those that are known such as buying from standpipe, buying from a water vendors – who are usually men using pushcarts and bicycles. The other informal sources used by people indirectly include wells, ponds, and streams among others. While the formal means refer to those mechanisms of access that are registered and the sources are known. In each of the source of water provisioning there is local politics that is involved for one to get access to the water.

Objectives of the Study

The general objective of the study is to establish challenges faced by the formal and informal institutions in the supply of water and the extent to which people get access to this water in Lubaga division.

The specific objectives are as follows:

- i) To establish the locational characteristics of the water sources and agents involved in water provision.

- ii) To study the dynamics that are apparent during provisioning and provision at the water sources.
- iii) To find out the indicators that relate to failure of the poor to get access to water provided by government.

Research Questions

In order to carry out this study the following questions offered guidance in attempting to address the problem.

1. What is the nature, functioning and relative importance of the agents involved in the provision of water?
2. What are the mechanisms and modes of accessing water in urban areas?
3. What challenges do the urban people (rich/poor) face while trying to get water?
4. What adaptive strategies are designed by the urban population to sustain their water supply?

Scope and Purpose of Study

The study covered water sources, supply, and challenges and coping mechanism with in Rubaga division's thirteen parishes, namely; Namirembe/Bakuli, Lungujja, Kasubi, Kabowa, Mutundwe, Najjanankumbi I, Najjanankumbi II, Ndeeba, Busega, Nakulabye, Luby, Lubaga and Nateete.

A study on the number of people in a household, their income, how and where they access water, problems they face in getting water and how they cope in cases of inadequate water was done.

The purpose of the study is to address the nature, functioning and importance of the water supply institutions. The mechanisms and modes of accessing water in urban areas will also be established. And also look into the Challenges the urban people face while trying to get water and the adaptive strategies they have to sustain their water supply.

This study is of special importance to policy makers in the area of water supply management. This is because we need to generate information that will influence the design of a significant intervention in raising the level of safe water coverage. For example by 1998, it was at 40%, while the Department of Water Development (DWD) aims at attaining coverage of 100% 75% for urban and rural areas respectively by the year 2000.

The study is also important in the understanding of politics of water supply especially at the household level. Households are the end point targets for any development initiatives. Therefore understanding the social relations and ideologies here in, is an important step in forming any intervention. For we need not only build new wells but also a new ideology.

Scholars interested in the area of urban dynamics and resource allocation and management with particular reference to water will find such a study a useful reference point for research. It is also an important contribution to the policy makers involved in land use planning and regional development.

The information will help in understanding how people get by as a basis for the policy question of how people can be helped to get by.

Significance of the Study

Studies in Uganda done in the area of natural resources and specifically focusing on water provision in urban centres are very few and date way back in time. Among these is the Uganda Water Action Plan document no. 006 of 1995, which lays emphasis on the fact that, “The first priority in water resources allocation will be the provision of water in adequate quantity to meet domestic demands”. “Allocation of water to meet Irrigation, livestock, industrial and other demand will be done considering the economic, social and environmental value of water.” The document does not look at water development as a matter of urgency but rather as a factor of economic social and environment value.

The water supply and sanitation sector policy framework draft of August (1994), notes that improved water supply and sanitation services have major social, economic, health and environment impacts on life in general. Some of the benefits that results from water supply and sanitation also have a positive effect on investments in other sectors, such as education and industry and the effect is mutual.

Studies that have been done by scholars on water like Nakabale (1965), Kyambadde (1981), Matovu (1976) have left some questions not answered. They do not present guidelines that can be considered for planning and provision of water on a sustainable basis. Secondly they do not tell us about the problems facing the users or institutions which provide water. And most importantly of all, the coping methods in case individuals fail to access these water sources. Therefore there is need for further research in order to fill these missing gaps.

White, G.F., Bradley, D.J. and White, A.U. (1972) outline the stages of community water development that would apply to a particular town. And also explain the effect of prevailing policies on water supply of modern drawers of water.

Abba, E.T. (1977) analyses water quality problems in rural and urban areas of Moyo. His findings show that there is a relationship between water quality and source preference.

Matovu, H.M. (1976) examines the sources of domestic water supply in Entebbe municipality. He presents a statistical analysis on the relationship between supply and demand. He does not consider commercial, industrial, and institutional usage of water.

Gauff Engineers (1982) carried out a house survey with the objectives of reviewing the extent and conditions of water supply and sanitation prevailing in Kampala City for planning purposes. They report that historical, financial, social and hydro-geological factors affect the planning of water and sewerage with no statistical analysis. They found out that some of the problems facing National Water and Sewerage Corporation and Kampala City Council include shortage of operating and capital funds.

Batwala, R. (1991) has carried out a study on the problems of residential housing in Mulago II parish. She presents reasons for the few water sources in the parish. She attributes this to the 1970 decree, which stated that water at public standpipes should be free. This consequently led to lack of funds to maintain them, hence their closure.

Christine, V.W.S. (1989) Calls for a strong element of community participation and education in water supply projects. She argues that, the community should have a say in the preparation of plans and maintenance of new systems. She goes ahead to say that there should be special provisions for weaker social-economic categories such as the poor, women and disabled. When the disadvantaged groups are involved, their interests will be significantly represented when planning for water supply.

Ndyabahika Mateete (1996) examines in detail the factors affecting the planning and provision of utilities within urban areas in Kampala urban district. He explores the source of these utilities to the point when they are provided to the users. He however, does not point out the consequences, and coping methods in case individuals fail to access these water sources.

Sam Kayaga (1999) in his paper presented to a workshop on Nature, society and man emphasises the importance of Lake Victoria in Water & Sanitation services delivery in Kampala. He discusses the relationship between the rate of pollution on Lake Victoria and sustainability of water services in Kampala. He does not discuss in detail the mode and mechanisms of water provision and consequences experienced where water provision is inadequate.

Chilufya Peter Sampa (2000) studies the demand for water at stand posts in the peri-urban areas of Kampala. He also seeks to establish the social economic and demographic characteristics of the peri-urban population in Kampala and throws more light on the relationships between price and water from this water service.

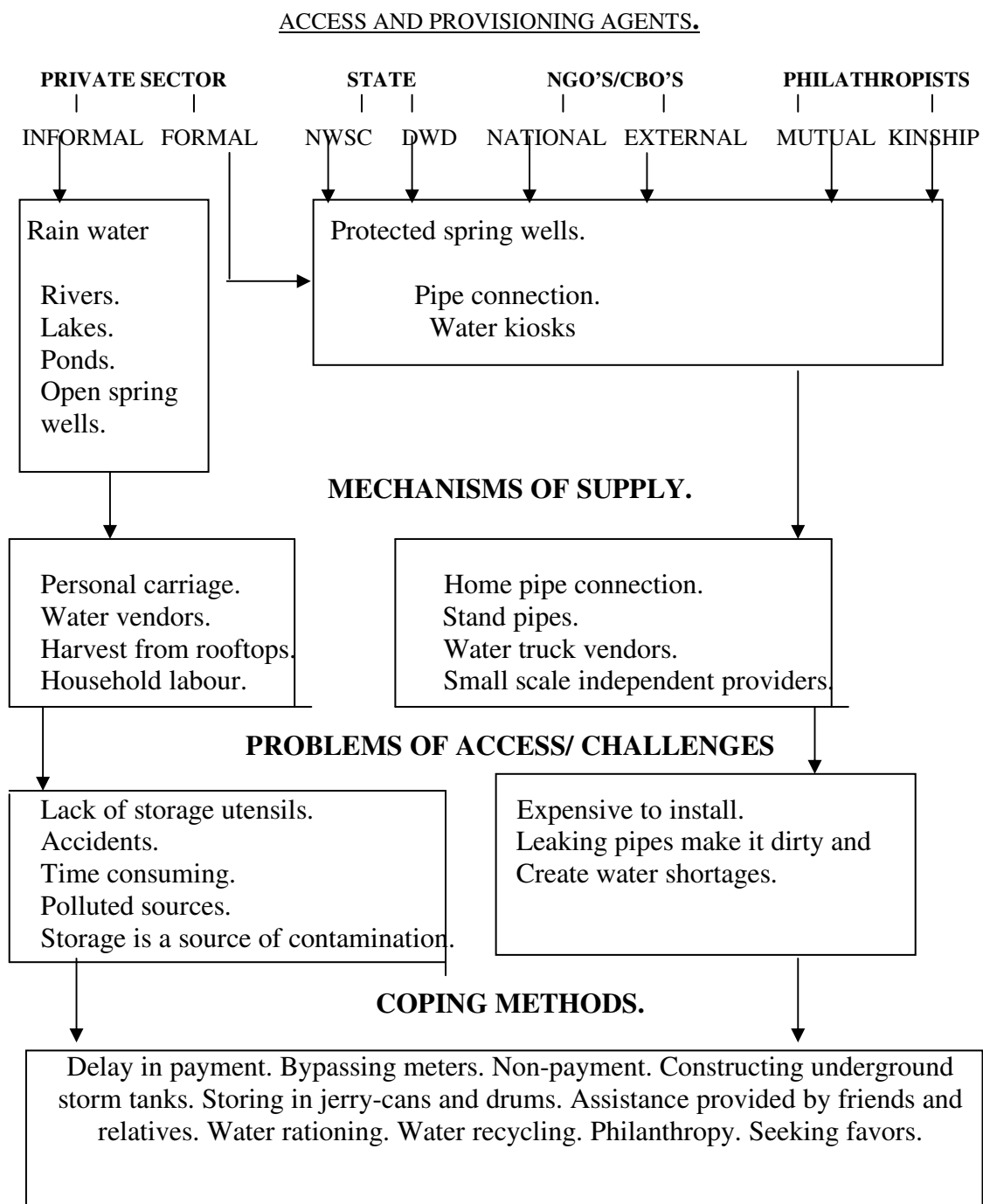
The World Bank under the "water and sanitation program for Eastern and Southern Africa" studied about the strengths, weakness, opportunities and threats to Small Scale Independent Providers (SSIPs) operations and how it impacts the urban poor. At the same time tried to understand the institutional and legal context in which they operate.

It is upon these findings that I draw the insight of finding out more about water provision in Kampala. And most important of all, is to explain how people cope in this era of liberalisation and structural adjustments. The study is on the conditions of access of the urban areas where they work and live. And this is to be discussed while relating to the specific historical and current characteristics of the particular urban area.

CHAPTER TWO

CONCEPTUAL FRAME WORK AND LITERATURE REVIEW

CONCEPTUAL FRAMEWORK OF AGENTS OF WATER PROVISIONING IN URBAN CENTRES.



Conceptualisation of People, Provisioning and Place

'Provisioning' in this study means providing for ones self or supplying something to an individual after failure or withdraws from providing this service of other agents of provision. It could be seen to include informal means of providing supplies to meet people's needs in a given geographical 'place' or location occupied by people. Individuals may have effective ties with their environment or 'places' where they generate satisfaction through production. The utility generated provides them with the urge to produce and provide for themselves those items that they may need in life (Sengendo and Mwaka 1998).

The modes of Provisioning as a result of own production or being provided by others, by individuals and their households is seen as being affected by features of their immediate environments 'the place'. This may be reflected in the quality and quantity of water and their neighbourhood characteristics. These can lead to either satisfaction with prevailing circumstances or stress if there are differences between the requirements and desires of the individual or household and the actual qualities of their present environment.

The way individuals perceive their phenomenal environment conditions, or conditions of their attitudes towards everyday life either become formal or informal. Thus their modes of provisioning react or adapt to such attitudes accordingly.

Hence, the modes of water provisioning and provision in Lubaga division for production and reproduction may be a function of accessibility to water facilities and needs. Accessibility to the water sources and needs as real 'place' may be a product of;

- a) Set of agents involved in the provisioning of those needs and facilities
- b) Politics surrounding the place

- c) Particular structure of the people in terms of education, culture, class ethnicity, income levels, marital status
- d) The local endowment of available resources for provisioning.

Hence the framework of 'people provisioning and place' could be based on political economy where emphasis is on categories of providers seen as agents of reproduction and the agency of consumers that developed and the contradiction in relations between different groups of people and the providers (Andrae 1997).

There fore, access to water one of the basic requirements of man can be looked at in the context of a number of aspects. These include the actual water source in any form; the environment in which the water source is located 'place' and the services it offers that is production and reproduction. The failure of people to get access to all the above aspects leaves them with no choice but to use the informal means and channels to provide themselves with any type of water. This is well illustrated in the framework above.

It is the responsibility of the state to provide water to its citizens. However, in Kampala and Uganda at large, there are other agents that are private, non-governmental and philanthropic that provides water.

As noted in the framework, there are formal sources of water. These are the known sources and whose procedure of acquiring water through them is well known. There are also the informal sources that in reality are the natural/underground sources.

From these sources, water gets to the consumers through the mechanism of supply. Informal sources are accessed by people carrying utensils especially jerry-cans, water vendors usually sell water to consumers or house hold/support from the family members who go to the sources and fetch water. There is also the harvest of water from

the roofs and the overland flow from roads. Some of these water sources are not sustainable.

Formal mechanisms of supply are mainly surface flow, where water is pumped from natural sources, through pipes to consumers. Some consumers still have to walk to a standpipe and carry the water home or they have to depend on the water truck vendors.

There is however challenges involved in getting this water as shown in the framework. And the problems experienced informally do also infringe on the formal access whose majority do not have home pipe connect, but rather get the water from the standpipes.

Given the above problems and the occasional scarcity of water the people in Kampala have devised coping strategies. Popular of which is the avoidance to meet the payments for water. Water is rationed while those who cannot access water easily have learnt to get water through mutual kinship relationship.

This review draws from a diversity of writing on water sources, water policy, water supply, water control and management, water resources and other water issues discussed from different perspectives.

Water overview

As indicated in the Uganda Water Action Plan of the Ministry of Natural resources, 1995, water is a major factor in the socio-economic fabric of society as well as a determining factor in the development potential of the Nations. The rapid growth in population and increased agricultural and industrial production require adequate and safe water supply.

Globally between 12.5 and 14 billion cubic meters of water are considered available for human use on an annual basis (Population Reports, 1998). This amounts to about 9000 cubic metres per capita per year as estimated in 1989. By the year 2025 global per capita availability of fresh water is projected to drop to 5100 cubic metre per person as another 2 billion people will have joined the world's population.

However, these figures give a false impression, because fresh water supply is not evenly distributed around the globe, throughout the seasons, or from year to year. In some cases water is not where we want it, nor in sufficient quantities. In other cases we have too much water, in the wrong place, at the wrong time.

Fresh water is emerging as one of the most critical natural resource issue facing humanity. The world's population is expanding rapidly. Yet there is no more fresh water on earth now than there was 2000 years ago, when the population was less than 3% of its current size, (Population Reports 1998). Human beings can survive for only a few days without fresh water. In a growing number of places people are withdrawing water from rivers, lakes, and under ground sources faster than they can be recharged.

According to population reports 1998, today 31 countries, accounting for fewer than 8% of the world population, face fresh water shortages. By the year 2025, however, 48 countries are expected to face shortages affecting more than 2.8 billion people (35%) of the world's projected population. Among countries likely to run short of water in the next 25 years are Ethiopia, India, Kenya, Nigeria and Peru. Parts of other large countries, such as China already face chronic water problems. As population grows and water use per person rises, demand for fresh water is soaring, yet the supply of fresh water is finite and threatened by pollution.

Leonardo da Vinci – the eminent Renaissance scholar and philosopher said, "Water is the driver of nature". Many may have considered it as an over statement in the past, but at the thresh hold of the 3rd millennium, no sane individual would disagree with Leonardo's view. Water is becoming an increasingly scarce resource for most of the world's citizens. The current trends indicate that the overall situations are likely to deteriorate further, at least for the next decade, (Biswas 2000)

The historical importance of water is also cited in a saying by a Sri-lankan Monarch that "Let not a single drop of water, that falls on the land go into the sea without serving people" (Parakram Bahul, King of Srilanka A.D 1153-86, in Clarke (1991).

Cain Cross et al, (1990) talk of the essential paradox of community water supply, being that, in one sense, every one has a water source, while in another most people do not have any. But she asserts, for human life every one has a water source. The author says "it may be dirty or inadequate in volume or several hours walk away but never the less, water must be available (p.47).

This striking difference in water availability within countries and between the rich and the poor when accessing water is well brought out in one of the UN publications "Earth times". Ask a person in New York what he thinks about water problem and will probably say "What problem"? Ask a person in New Delhi and you will be lucky if you escape with a 15 minutes lecture on how water flows once a day, and if you drink it without boiling it, chances are you get sick.

Crump, A. (1991) argues that every human being requires about 80 litres of water daily to support a reasonable standard of living while 5 litres are needed for basic survival. He points out that the average consumption varies from 5.4 litres per day in Madagascar to 500 litres per day in United States. But total water use is continuously

increasing and by the year 2000, global consumption of water will be ten times greater than it was in 1990.

Peter Gleick, president of the Pacific Institute for Studies in Development, Environment and Security, proposes that instructional organisations and water providers adopt an overall basic water requirement of 50 litres per person per day to meet the basic needs – drinking, sanitation, bathing and cooking (Population Reports 1998).

It is further argued that people's use of water in a country depends not only on minimum needs, how much water is available for use, but also on the level of economic development and extent of urbanisation. Urbanisation increases water use drastically. For example in 1900 the average American household used as little as 10 cubic metres of water per year compared with more than 200 cubic metres today.

A country's level of fresh water use reflects and in fact is one of the key measures of its level of economic development. In developing regions of the world people use far less water per capita than in developed regions. In Africa, annual per capita water withdrawal for personal use averages only 17 cubic metres (85 litres per day). In contrast comparable water use in the United Kingdom is estimated at 122 cubic metres per year (334 litres per day) and in the United States 211 cubic metres per year (578 litres per day). India for instance uses 90% of all water for agricultural purposes, with just 7% for industry and 3% for domestic use. (Population Reports 1998). The higher the level of development, the more water is used for domestic and industrial purposes and less for agriculture with the exception of Japan.

At the same time, in developed and developing countries alike, competition among water uses is increasing. As might be expected, tensions are particularly high in water short areas where population pressures, urbanisation and development combine to create intense demand for limited fresh water resources.

Tensions are well brought out by studies carried out by Andrae (2000), when she studies "the current agency patterns and relations of water provisioning in the marginal low-income area of Kano". She attempts to explain the intra-community contradictions in Kano related to water provisioning, whose solutions have not always been peaceful. Communities have also exhibited frustration at the scarcity of water to their main competitor, the water intensive industries, which use a lot of water allocations at the expense of the community demands. In other cases industries have polluted water sources thus arousing strong feelings against the industries and at state institutions outside the community.

A number of developed water short countries currently face tensions over water, including Belgium, the United Kingdom, Poland, Singapore and the United States. In Southern Britain for instance, urban demand for water is growing so fast that it is out pacing the capacity of rivers and aquifers to supply it during the drier summer months. In Western United States, farmers who want more irrigation water for their crops face off against fast growing urban areas that demand more water for households and other municipal uses.

In developing countries rapid urban growth often puts tremendous pressure on antiquated, inadequate water supply systems. For instance between 1950 and 1980, the populations of many cities in Latin America, such as Bogota, Mexico, Sao-Paulo, have greatly increased. So is the population of African cities like Nairobi, Dar-Es-Salaam, Lagos and Kampala because of the rural exodus. Yet many agencies are not equipped to manage the urban water supply. While some countries have ineffective water allocation system.

Thus the inhabitants often resort to other alternatives which include the fresh water streams, springs or lakes. However, these alternative sources are also degraded

and exhausted in the course of time and the cities are forced to invest huge amounts of money in construction of dams or pipelines to bring water from more remote sources. When adequate funds are not available the problem becomes complicated. Pipelines in adequate quantity and quality are not installed and expansion of the systems is halted. Consequently less water is available per person. The water shortage makes communities to get access to water, which in most cases is of very poor quality.

Water supply systems in urban centres were originally designed for smaller populations and limited use. They have become inadequate and obsolete. They thus need maintenance which is expensive - short of these repairs, the systems end up with leakage's and drops which increase risk of contamination.

The urban centres are further challenged by requirements to provide sewerage systems which pose serious environmental havoc. Waste water through open drains and gutters is discharged into the environment. This poses another problem of treatment of waste water which is extensive and in many cases beyond the capacity of the third world urban authorities. This waste discharge into the environment is a serious health hazard. Surface water near the river banks or lakes can get easily contaminated by the waste discharge, resulting into epidemics.

The population report (1998) also reveals that in much of the world, polluted water, improper waste disposal, and poor water management, Cause serious public health problems. Such water related diseases are Malaria, cholera, typhoid and schistomiasis harm or kill millions of people every year, and prevent millions of people from leading healthy lives and undermining developmental efforts. About 2.3 billion people in the world suffer from diseases that are linked to water. This is well illustrated in the table below which shows the incidence of disease that is related to water.

Table 11: Incidence and effects of selected diseases in developing countries (excluding China)

Type of Disease	Estimated Cases/Year	Estimated death/Year
Diarrhoeas	875 million	4,600,000
Ascariasis	900 million	20,000
Guinea worm	4 million	*
Schistosomiasis	200 million	*
Hook work	800 million	*
Trachoma	500 million	**
* Effect is usually debilitation rather than death.		
** Major disability is blindness.		

Source: Esrey et al, international water and sanitation centre: partners for progress. Approach to sustainable water supplies, technical paper series no. 28.

These figures reveal just how dangerous and economically devastating unsafe and insufficient water can be and underlie one of the greatest potential benefits of improved supplies.

Some 60% of all infant mortality are linked to infections and parasitic diseases, most of them water related. In some countries water-related diseases make up a high proportion of all illness, among both adults and children. In Bangladesh, for example, estimated three-quarters of all diseases are related to unsafe water and inadequate sanitation facilities. In Pakistan one quarter of all people attending hospitals are ill from water related diseases. (Population reports 1998).

The only hope remains for the ground water to provide an economical and feasible option if there are no geological constraints. It has been observed that the

ground water is less vulnerable to degradation and contamination. Unfortunately there is a shortage of hydro geologists or ground water engineers. As such ground water resources are not properly understood and they remain under utilised. (Source: The message: Joint Energy and Environment projects Newsletter, July 1994) “Urban Water Supply in the third world”. p 142.

Table 3 shows the increase in the proportion of the population with access to water and sanitation between 1975 and 1990 for low-income and middle-income countries. The figures for 1990 still suggest that more than one third of the population in low-income countries and one-quarter of the population in the middle income countries lacked access to water.

Table III: The expansion in water supply and sanitation, 1975 - 1990
(percentage of population with access).

	Coverage in low income countries		Coverage in middle income countries		Coverage in high income countries
	1975	1990	1975	1990	1990
Water	40	62	54	74	95+
Sanitation	23	42	44	68	95+

Source: World Bank, world development report 1994, infrastructure of development. Oxford University Press. Oxford & New York, 1994.

For Asia and the Pacific, around a quarter of the population lacked safe water in 1991 although the size of the region’s population still meant that around 800 million people lacked access to safe water. Less than a quarter of this region’s total population had water piped into the home. Bore holes with hand pumps, protected dug wells and public stand pipes provide water for around half

the population that had safe water supply. For the urban population with provision for safe water, around two – thirds had house connections with around a fifth relying on public stand pipes. (Urbanising world). The following are examples of the inadequacies in the provision for water supply in cities;

Dar-Es-Salaam (Tanzania); from a survey of 160 households drawn from all income levels in 1986/87, 47% had not piped water supply either inside or immediately outside their houses. While 32% had a shared piped water supply. Of the households without piped water 67% buy water from neighbours while 26 percent draw water from public water kiosks or stand pipes. Only 7.1 percent buy water from water sellers. Average water consumption per person is only 23.6 litres a day.

Jakarta (Indonesia); less than a third of the population have direct connections to piped water system; around 30 percent depend solely on water vendors whose prices per litre of water are up to fifty times that paid by households served by the municipal water company. Over a third of the population - rely on shallow wells (most of which are contaminated), deep wells or nearby river water. Over half of all dwellings have no indoors plumbing and much of the population have to use drainage canals for bathing, laundry and defecation.

Faisaabad, (Pakistan); over half of the population have no piped water and most of those that do not have piped water have to rely on hand pumps with water of poor quality.

Karachi (Pakistan) in 1988, 66.6 percent of house holds had piped water, among the Katchibadis, only 50.3 percent had piped water - perhaps not surprisingly only 36 percent of the housing in the Katchibadis inhabited by the lowest income quintile had piped water.

Calcutta (India); with a total population of around 10 million, some 3 million people live in bustees and refugee settlements which lack potable water, endure serious annual flooding and have no systematic means of disposing of refuse or human wastes. Some 2.5 million others live in similarly blighted and un serviced areas. Piped water is only available in the central city and parts of some other municipalities.

Khartoum (Sudan); the water supply system is working beyond its design capacity, and able demand continues to rise. The coverage of the poor, with low income groups in squatter settlements suffers all through the cost of paying the most for water, often bought from vendors. Breakdown and cuts in the supply systems are common.

Kinshasa (Congo DRC); around half the urban population (some 1.5 million people) are not served by piped water network High-income areas are often 100 percent connected while many, other areas have 20 - 30 percent of houses connected - essentially those along the main roads. The sale of water flourishes in areas far from the network – in these areas water is usually obtained from wells, the rivers or deep wells.

Madras (India); only 2 million of the 3.7 million residential consumers within service areas of the local water supply and sewerage board are connected to the system. On average, they receive some 36 litres per capita per day. The rest within the service area must use public taps, which serve about 240 persons per tap. Another million consumers outside the service area must rely on wells - but supplies are inadequate too because of falling ground water levels.

The extent of the inadequacies are perhaps surprising, given that most of these cities are either capitals or among the most prosperous cities in their countries. Where data is available for a range of urban centres within a country, the proportion of the

population with piped supplies is generally much lower in smaller urban centres. For instance, in Argentina, the smaller the urban centre the higher the proportion of households lacking piped water (and connection to sewers).

In Bolivia, a much higher proportion of the population of the two largest and most prosperous cities Lapac and South Cruz have safe water than in Tariza and Sucre where close to half the population lacked provision for water supply.

However, this is not always so, for instance, in Ecuador in 1988, many of medium sized cities in the Sierra had a higher percentage of houses with piped water (and sewerage) than, Quito, the largest city in this region and also the capital. While in the coastal area, several medium sized cities had a higher percent of houses with water than Guayaquil, Ecuador's largest city, although all had a lower proportion of houses with sewerage.

It is clear that major progress has been made in Brazil in improving the provision of water supply and sanitation during the late 1970's and the 1980's. In Sao-Paulo, for instance, although there is still a need to improve the quality and reliability of water supply, especially for low income groups, the public water supply network reaches some 95 percent of all houses connection.

In general, the higher the per capita income of the country, the higher the proportion of the city's population with water piped to their plot. It also shows that some cities have a much higher proportion of their population – with water piped to their plots relative to their country's per capita income while others have a much lower proportion.

The continent of Africa, despite its substantial water resources, experience chronic water shortages and this is due to uneven distribution of water and rainfall.

In Africa, the experiences and challenges in the management and utilisation of water resources provide enormous opportunities for the socially sustainable development. Water gives life to African people and is essential to the regions social, economic and environmental security (Cleaver, Kevin (1996) in Sharma. N.P. et al "African water resources challenges and opportunities for sustainable development", World Bank Technical paper NO. 331)

The paper further observes that about two thirds of the rural population and one quarter of the urban population are without safe drinking water, and even higher proportions lack proper sanitation. It is estimated that by the year 2000, approximately 300 million African's will risk living in a water scarce environment.

Furthermore, it is indicated that recurrent and localised drought decreases food security. While water – borne and water related diseases cause millions of deaths each year. Environmental degradations are increasing and to complicate matters all of the countries in the region share one or more trans- boundary river basins. The poor who often have the most limited access to water resources feel the greatest and most immediate impact of this situation.

In Sub-Saharan Africa (SSA), as in the rest of the world, human Welfare and economic development depend on the wise use of water. Globally, water provides positive condition to survival of life for humanity, fauna and flora. This calls for better water management if improved life conditions are to be achieved.

According to the population reports, 1998, over half of the population in Africa was not served with safe water by 1996, and only a small proportion had a house connection. Most relied on one of three sources; Public standpipes, bore holes/hand pumps and protected dug wells. Of Africa's 440 million rural inhabitants in 1991, less than 15 million had water piped to their homes. Most of the house connections were in

urban areas but only of the three urban dwellers in Africa one had water piped to their homes. Close to half the urban population served with safe drinking water did not have house connections, around 32 million relied on public stand pipes, while 15 million had taps in the yard with the rest relying on some other source.

They usually rely on one of two sources, water from the streams or other surface sources. In urban areas are often little more than open sewers, or water purchased from vendors whose quality is not guaranteed. The price per litre is between 4 and 100 times the amount paid by richer households for publicly provided piped water. Table below illustrates how much those so served often have to pay in a few selected cities.

Table IV. Differentials in lost water (ratio of price charged by water vendors to prices charged by public utility)

City	Price Ratio of water from private vendors: Public utility
Abidjan	5: 1
Kampala	4:1 to 9:1
Lagos	4: 1 to 10:1
Nairobi	7:1 to 11;1

Source: World Bank, World development report 1998.

The politics of provision of services.

H. Sengendo (1999) agrees with North (1993) that "it is the politics that shapes economic performance because it defines the rules of the game". Since independence, the people of Uganda and Kampala have experienced democratic and military regimes to the present they live in a liberalised economy where the struggle for every day survival has come to dominate life.

Lubaga division is the second highly populated division in Kampala district and most of the people are low and middle-income earners. The low income people in this area survive by practising small scale urban farming (dairy and poultry dominate), cooking laundry services, car washing and car repair servicing, metal works water vending, peddling machine repairs, participating in evening/day markets, petty commodity trade and many of the youths are cyclists (boda-boda). While the middle income people do get involved in carpentry, flour milling, local brewing, metal fabrication and house rental services.

On the other hand the few who live slightly above the poverty line survive as politicians, lawyers, medical doctors, educationists, engineers, merchants and hoteliers who own lucrative business enterprises in the main centre.

The middle and low-income group of settlers raise some concerns, in that there is high mobility with in the unplanned settlements and high dependency ratio as away of survival. Their means of accessing water is buying from water vendors and where possible from a standpipe, but at huge costs.

The politicians of the day have taken advantage of the conditions prevailing in the region to get voters support. Politicians have often promised in their manifestos that they will provide services like improved roads, piped water, spring wells electricity among others. However, the local politicians have failed to meet those promises once voted in power. The area member of parliament of Lubaga south one time threatened to go on a hunger strike or even mobilise people not to pay taxes if roads in his constituency were not repaired.

During the presidential campaigns, the president had to go around convincing people to vote him and also those people who he can work with or else if people fail to do so resources were not going to come to their side. In May 2001, the president came

to Lubaga division and campaigned for one contestant because the incumbent Member of Parliament was an obstacle to his policies to the development of Lubaga division. He even told voters at a public rally how some local leaders of Makindye, Lubaga, and Kawempe, and Kampala LC 5 chairman should not be voted to leadership. But to his dismay the people were willing to vote them back. But their presence partly explains why social facilities are not well provided in the divisions. Social services are still poor when they are found so close to the city centre. Busega, Mutundwe, Lubyala and Kabowa which are at the periphery of the city, infrastructure in these parishes is not yet developed, for example water mains have not been extended to most parts of these parishes.

The water sector in Uganda

The water sector is vital because of the role this commodity plays in the health of the population, agriculture, industry and the environment. Many governments protect water to ensure economic development and prevention of pollution or depletion of this renewable resource. The government of Uganda is no exception to this.

Uganda is endowed with abundant water resource. At least 15% of the land is covered with water. Uganda occupies an area of 241,038 square kilometres of which open water and swamps constitute 43,941 square kilometres (GOU 1998). The water resources are not evenly distributed in Uganda the largest region, the Northern region only has 3% of its area covered by open water and permanent wetlands, while the western region has about 10% of its area covered by water.

The availability of clean safe water and adequate sanitation services improves the health, and hence the productivity and general quality of the population. However the status quo presents difficulty in the provision of clean potable water in some areas

hence the need to have effective plans which shall ensure that investment is made where it is most needed. A review of the overall performance of investment made in the 1970s in the urban areas revealed disappointing results though the proportion of funds allocated to urban water systems has remained high (GOU1998)

Water resource has to be preserved to avoid pollution and environmental degradation, and ensure that future generation benefit from the resource. Hence the need to regulate the water sector, such that water resources are managed well and water use is efficient.

In Uganda, Domestic Water supply is based on both surface and groundwater source. Surface water is the dominant source of large urban supplies, while ground water forms free basic source for rural supplies and a number of smaller towns.

The current degree of accessing water is closely linked to the method of distribution. Piped water supply, bore holes and protected wells and springs are considered by DWD to be safe water sources; water from other sources is considered unsafe unless otherwise treated. Such as the swamps, rivers and streams, storm rainwater and burst pipes for those who cannot afford to buy piped water. The table below gives the methods of water distribution in Uganda by percentage of population served.

Table V: Water Access Methods; Rural and Urban by region 1991.

Description	Regional Variation						
	Rural %	Urban %	Total %	Central %	Eastern %	Northern %	Western %
Piped water inside	0.15	6.24	0.94	11.26	6.91	0.29	3.39
Piped water out side	1.58	30.32	5.29	11.26	6.91	0.29	3.39
Bore holes	7.56	10.57	7.95	3.33	8.64	21.11	3.89
Protected springs	9.25	27.36	11.59	13.60	9.45	6.36	14.77
Open well/springs	56.53	19.39	51.73				
Stream/river	15.53	3.16	13.93				
Lake/pond dam	8.95	2,49	8.11	71.81	75.00	72.24	77.94
Other	0.45	048	0.45				
Total	100	100	100	100	100	100	100

Source: MFEP, 1991; Population and housing census; Analytical report Vol. III.
(Household and housing characteristics)

Water supply

It is estimated that as of 1990 only 20% of the population had access to safe drinking water whereas urban coverage is estimated at just over 50%.

The majority of the population in the rural areas depends on sources of water other than piped water as revealed by the table below.

Table VI: Water Source in Rural Areas

Source	%
Springs and wells	66.3
Streams	26.5
Lakes	2.3
Bore holes	3.8
Gravity flow schemes, Piped water and others	1.12
TOTAL	10

Source: Ministry of Planning and Economic Development
Statistical Department: Population and Housing Census 1991.

The distances travelled to water source vary greatly depending on the geographical location. It is between 500 metres mostly in the south and central regions of the country to as much as 5 km in the dry areas particularly in the Northeast.

In the drier areas the water sources tend to be temporary so distances increase during the dry seasons as water sources dry up. The traditional urban centres particularly the old boundaries have piped water but because the water network have not been extended to cover areas of the new boundaries the population in these areas and that of new towns depend on boreholes, springs and wells, some gravity schemes.

The position of other urban areas is quite different because those that have piped water (the traditional towns), it is mostly found in the Central Business District and some high-income residential areas as well as the old "African Quarters". The extension of the water supply in these towns has been very slow and mostly to markets

and car parks. The high-density low-income settlements hardly have access to piped water. Water supply in the other urban areas is estimated as below:

Table VII: Water sources in other urban areas.

Source	%
Piped	38.1
Springs/wells	41.6
Streams/others	7.3
Boreholes	13.0
Total	100

Source: Population and Housing Census 1991

The figure for that getting water from lakes, dams and valley tanks is negligible. There is a growing demand for improved water systems to cope with the increasing growth of urban populations and industrial/commercial growth in many urban centres.

Trends in urban migration also indicate that people move from infrastructure – deficient towns to live in low-grade (peri-urban/slum) settlements in larger towns with facilities, for example, water. Provision of such facilities in the source towns is therefore an option to remedy the increasing unhealthy conditions in larger towns' peri-urban/slum areas. Currently the average water supply coverage in the 11 towns served by NWSC is about 53%. Urban populations that are not served seek alternative source, which are sometimes unsafe particularly in crowded informal settlements where chances of using polluted sources are high.

Given the inability to raise enough resources to extend and sustain free or subsidised water supply services, Government has opted to remove this subsidy with the result that water charges for formal sources have shot up to an average of U.Shs. 12,000/= per month for domestic use per household. This has caused a lot of resentment on part of the consumers.

Another important source of water for both urban and rural populations is rainwater, which is collected from the rooftops of houses, but the usage is very limited because the harvest is always small due to absence of large containers. So this source only supplements other sources already outlined above. There are very few instances where people have constructed big tanks to last them a long time.

Water sources in Kampala

There are several sources of water for the Kampala residents though the majority (50.4%) depends on piped water whose supply is irregular in many areas of the town. The remainder depends on protected springs, streams and wells and buying water from vendors. Such delivery is costly and the water may not be clean. Given that piped water supply is not always constant there are times when the 50.4% of the population have to resort to other sources. There is a lot of piped water wastage, as much as 40%, due to old pipes in the water network, which keep bursting. Kampala is one of the areas that have been greatly affected by increased costs of water as a result of governments' withdrawal of water subsidies.

Table VIII: Existing water supply coverage and water Unaccounted for in selected towns served by NWSC.

Area	Population served (%)	Unaccounted for water (%)
Kampala	40	56
Jinja	61	55
Entebbe	48	33
Tororo	59	51
Mbale	60	33
Masaka	79	42
Mbarara	50	58
Lira	43	32
Gulu	35	24
Average	53	43

Source: NWSC (1998) (a).

Water unaccounted for is also an indicator of the efficiency of any water supply system. It basically refers to the ratio of water supplied to that actually sold. However, the estimated population that is connected onto the central sewerage network is paltry 7% covering only 13.5% of the Kampala Sewerage catchment area. Clearly, the service coverage for both Water and Sewerage is inadequate for Kampala, especially so when given the projected population growth rate of 4% and industrial growth rate of 16% p.a.

In the report of “Uganda first urban project - Revision of Kampala structure plan” (1994), it is noted that, “it is not possible to supply water to the whole city and satisfy the demand for water nor will it be possible in the near future.

Given the fact that the urban centre has attracted many people leading to a rapid population increase which has not been matched by the growth and development in basic physical infrastructure, society's means of accessing water, which is one of the basic needs of man has been greatly affected. It is projected that many people in the city continue and will continue to get water through other means. For example people have resorted to various means in order to cope, the most abundant source is rain water which is collected from the run off of roofs of houses but the use is limited because the harvest is always small due to absence of large containers. Harvest of rainwater in Kampala is minimal and mostly occurs in the peri-urban areas.

Table IX: Water Sources in Kampala

Source	%
Piped Water	50.4
Springs/well	47.3
Streams/River	0.5
Bore Hole	0.8
Others	1.0

Source: Ministry of Finance and Economic Planning, Statistical Department, Population and Housing Census 1991.

The urban society is not homogeneous; hence their access to water supply sources and the various mechanisms that facilitate the provision of water are bound to be determined by the Socio-economic and political capacities.

Piped water is the major source of water supply in Kampala district. The water intake treatment located at Gaba (Kiruba Island) has a capacity of 45,000 to 55,000 cubic metres per day. The system covers both high and low level supplies spanning

approximately 80% of Kampala district. The distribution is through reservoir tanks backed by boosters.

Table X: Location of reservoirs for Kampala Water Supply.

High Level Reservoirs	Low Level Reservoirs
Muyenga	Nakasero
Naguru Hill	Mutungo
Mutungo	Bunga
Namirembe	Namirembe
Makindye	
Buziga	
Kololo	

Source: National water and Sewerage Corporation.

Table XI: Location of booster stations for Kampala Water Supply.

High Level Boosters	Low Level Boosters
Buziga	Makerere
Makindye	Mulago
Namirembe	Nakasero (Residential Lodge)
Kololo	Mbuya
Mutungo	
Gaba	

Source: National Water and Sewerage Corporation.

According to the National Water and Sewerage Corporation (NWSC), 75% of the districts' population has access to piped water although only 8% of the households actually have running water in their houses.

Protected springs are a source of water supply for 36% of Kampala district households while unprotected spring supply 11%. They are located in high-density settlement areas in the suburbs and therefore susceptible to pollution related to human activities.

Table XII: distribution of protected springs in Kampala division

Division	No/. of Protected Springs
Rubaga	148
Nakawa	63
Kawempe	58
Makindye	43
Central	6
Total	318

Source: Water Development Department (1996)

Boreholes are not a major source of water supply in Kampala district. There are only 38 boreholes supplying about 4000 residents (0.5%) of the district population.

Streams, rivers, lakes, ponds, dams etc supply approximately 10,500 people (1.4%) of Kampala district. Lubigi/Mayanja river and Nakivubo channel are major streams draining the district and traverse high population density areas often of the low income groups like Kisenyi, Nakawa, etc. Luzira and Namuwongo is known to have bilharzia. All these water sources are therefore not suitable for consumption without treatment.

(Source: District state of the Environment Report, Kampala District, NEMA 1997)

Quality of water in Kampala

According to the District State of the Environment Report for Kampala District (1997) by NEMA, a test carried out on most Kampala spring water sources revealed the presence of *E. coli* in water samples an indication of faecal contamination. The streams are heavily polluted with domestic and industrial effluents and lake Victoria which is a source of water for poor communities living along the shore like Gaba, Luzira and Namuwongo is known to have bilharzia. These water sources are therefore not suitable for consumption without treatment.

National Water and Sewerage Corporation abstracts water from the source, which is usually, located at a point that is remote from human activity, (for human activity brings about pollution). The water at this point is usually calm and relatively free of soil particles and floating debris. From the source, water is carried through a pipe known as the intake to the treatment works. At the mouth of the intake pipe there are a series of screens whose purpose is to prevent suspended particles from entering the system and finding their way into the pumps. The water then enters a tank known as a sump from where it is pumped to the next stage of clarification where suspended impurities from water are removed using Coagulation and Flocculation processes. Water then is treated by filtration. Filtration involves causing the water to flow by gravity through graded sand media to remove any suspended particles that may have passed the clarification stage.

Disinfection stage follows filtration and its main purpose is to kill all harmful micro-organisms that could be in the water. Through disinfection the colour and smell of the water is also improved. The process involves mixing of the water with a saturated solution of a chlorine dose ensures that not only are the germs in the water at the time of application killed but those from subsequent contamination of water during

distribution and storage will be killed. After disinfection the water is allowed to settle in a tank known as the retention time, during which the chlorine does its intended work. This is the final stage of water treatment.

Water is then pumped to reservoirs, which are usually located at a high point such as those at Muyenga from which it is then distributed to the public.

Supporting the above engineering, NW&SC has well equipped laboratory facilities to analyse the quality of water at different stages of treatment and distribution in order to ensure that it meets the required standards.

There has been an existence of a large consumer market and a good utility service system, which has led to a steady growth of a number of industries based on water. These include the ice plant in Bugolobi, Uganda Breweries in Luzira, soft drinks at Nakawa chemical plants, food processing industries etc which consumes about 30% of the water with in Kampala district.

Policies and legislation

Since the beginning of the 1990- decade, the government of Uganda, through the Ministry of water, Lands and Environment, has drawn up and enacted laws and plans of action and policies to govern the water sector. In November 1995, a new water statute was enacted which was a result of a water sector legislation study. Government, at the same, time carried out a Water Action Plan (WAP) (1993-4) study through which key water resources management plans were identified. These guided the development of the requisite water sector policy and legislation framework. These studies led to the formulation of the National Water Policy (NWP) 1999.

The National Water Policy (1999) has a new approach based on the continuing recognition of the social value of water, while at the same time giving much more attention to its economic value. Some of the policy directives include the following:

The sustainable provision of clean safe water within easy reach and good hygiene sanitation practices and facilities based on management responsibility and ownership by the users, with decentralised governance.

Promotion of awareness of water management and development issues, and the creation of the necessary capacity for the sector players at different levels.

Promotion viable management options for the resources management and provisions of water supply and sanitation services at all levels.

The National Water policy devolves from the translation of the constitution of Uganda, which states that: "the state shall endeavour to fulfil the fundamental rights of all Ugandans to social justices and economic development and shall in particular ensure that all Ugandans enjoy rights and opportunities and access to education, health services, clean and safe water, work, decent shelter, adequate clothing, food, security, pension and retirement benefits (GOU 1999, page 6). Therefore government has to ensure that the people of Uganda are provided with and have easy access to clean safe water.

The National Water Policy incorporates the Water Statute (1995), that provides for the use, protection and management of water resources and supply. The Water Statute provides for the constitution of water and sewerage authorities as well as the legal framework of water and sewerage undertakings. The Water Statute of 1995 is broad based and includes all water resources, that is underground water and surface water. It protects the water systems and wetlands from pollution and other contamination to ensure that this resource is preserved for the present and future generations.

With the current trend of managing resources going towards community participation and decentralisation of power, the water sector has been included in the local Government Act 1997, which defines roles for the different levels of governance

in the provision and management of water related services and activities. Again this emphasises the importance of water to human survival. It is therefore important that the different levels of governance include the district level, which co-ordinates the management of natural resources and the environment. The district forms a committee and a department, which comprises water, environment, forestry and meteorology. The next level is the municipal/urban council level. As the councils have the responsibility for water supply, giving water licences, and also licenses for solid waste disposal and drainage systems. The councils play a leading role in the operations as well as maintenance of supplies for domestic and industrial use.

The next level is the sub county level. Under the Local Government Act, the sub-county is a legal entity and will have responsibility in the areas of provision of water and sanitation services and protection of natural resources including water. The local level involves the water user groups who are to manage, operate and maintain point water sources, such as standpipes. The existing local councils will play a role in setting local priorities and enforcing bylaws, monitoring and mediating in water management issues.

Another policy that has water provision as a key directive is the Uganda plan of Action for children (UPAC) 1992. UPAC is a policy document in the area of child survival development and protection upon which government restructures resources allocation required to make the provision of basic social service a priority.

Following the different policies and statutes that have been passed for the provision of clean and safe potable water, it is recognised that the government of Uganda has the provision of water on high priority. The government has established two organs, one a department in the Ministry of Water, lands and Environment, the other a corporation formed under the water statute, to ensure that the objective of clean

water to all is achieved. The two organs are the Directorate of Water and Development (DWD) and National Water and Sewerage Corporation (NWSC).

The DWD is charged with the provision of water in areas designated to it (mostly rural areas), to ensure that the population accesses water easily. The NWSC, created by the 1995 statute provides water to urban areas.

In conclusion it can be noted that the Government of Uganda recognises the social and economic importance of water. The government has set up policies to ensure that water is preserved and managed effectively and efficiently. It has done so by identifying and incorporating key players in the water sector in the management of the resources.

Private sector participation in Water supply

The concept of private sector participation in public service provision embraces a wide range of policy approaches. At one end of the spectrum is outright privatisation, or the "transfer of ownership and control from the public to the private sector, with particular reference to asset sales"(Henning& Mansoor 1988)

In developing countries, increased private sector participation in public services, including privatisation of state owned enterprises is often part of a broader reform process whose goal is to resolve or preclude a macro-economic or fiscal crisis. More important is the pervasive discontent with the performance of state-owned enterprises. This has attracted private sector participation as a way to reduce the economic inefficiencies associated with public management and ownership. In the wake of the 1980's debt crisis, private sector participation has gained support for yet a third reason, namely, that it offers a means of facilitating repayment of international debt, both through the proceeds expected from the sale of publicly owned enterprises and through reductions in government financial support for public services.

Strategies of private sector participating in public utility have been promoted as a means towards achieving general goals: expanding service coverage and raising its quality, generating resources to finance future investments, increasing economic efficiency, reducing fiscal burdens and introducing technological advances.

Many governments have successfully leveraged the increased public discontent caused by infrastructure systems, poor service delivery and chronic inefficiencies to win political acceptance of private sector participation in the water utilities into their overall economic stabilisation programs.

A study in the six developing countries has shown that, a partnership between the private and the public sector has emerged as a promising way to improve the performance of public water utilities, expanding services coverage and raise the quality of service, increase operating efficiency, provide alternative mechanisms of financing infrastructure investment, and reduce the burden on public budgets.

In *Buenos Aires* the Argentine federal government entered into a concession agreement with a private firm in 1993, as part of an extensive national privatisation program undertaken to stabilise the economy.

In *Cancun-Mexico*, the provincial and municipal governments were unable to meet the increasing need for water and sewerage services because of explosive growth in the tourist industry and the resulting population surge. The private sector was invited to meet the demand under a concession contract.

In *Cartagena-Colombia*, the municipal water and waste -water company had become identified in the public mind with chronic inefficiency, political interference and poor service. The national government had stepped in several times to restructure the company but all efforts had failed. Ultimately, the mayor of the city decided to

liquidate the company and in 1995 a new company was constituted under joint public private ownership.

A mixed enterprise was also formed in *Gdansk-Poland* in 1992, in the context of democratic reforms and decentralisation to meet the need for system expansion as well as the need for better wastewater treatment facilities.

In *Guinea* water supply was reaching less than 40% of the urban population in 1989. After failing to reform the public water company, the national government entered into a lease arrangement to provide water services for the capital city of Conakry and sixteen other towns.

In *Santiago-Chile*, public corporation were formed to operate water and sanitation services as autonomous commercial enterprises, with the state as the majority share holder. Service contracts have been relied on extensively since 1979, and a comprehensive tariff system was developed to replace cross-subsidies with targeted subsidies funded by the central government.

The analysis of these six cases suggests that private sector participation in the water and wastewater sector is likely to result in sharply improved managerial practises and higher operating efficiency.

Overall, private sector participation has led to improved service quality and expanded coverage. Management has been strengthened, productive efficiency has improved quickly, and sound commercial practices have increased revenues. Water losses have diminished, and attention to customers has improved significantly. Many of these initial successes have resulted from relatively simple management improvement that did not require large investments or sophisticated technologies.

For example, in Guinea, water supply coverage increased from 40 to 52 percent of the urban population between 1988 and 1994, and the share of urban household

equipped with water meters increased from 5 to nearly 95 percent. The Santiago water utility has implemented a contracting policy that has promoted competition, reduced costs and increased flexibility operating costs have been reduced by half.

Gains in operating and productive efficiency are not an automatic result of private sector participation, however unfavourable macro-economic conditions, weak regulatory environments and inadequate incentives can limit or nullify any gains in productivity.

Moreover, initial gains and benefits, although important and positive, cannot by themselves compensate for the structural problems in ineffective public institutions, low productivity, low domestic saving rates, regressive tax systems and extreme poverty and income disparities-that explain much of the poor overall economic performance in developing countries.

William Dillinger (1994) concludes that, under present conditions the risks of investment in water supply and wastewater sector is significant, and the rewards uncertain. Given this imbalance, private firms are unlikely to be able to finance large investments in the sector. For the foreseeable future the bulk of financing will therefore come from cash generated by own operations and from borrowings under pinned by a positive cash flow.

The character of the studied “place” and its influence on water provision in Lubaga

Historically, Lubaga is part of the Mengo area, which has attachment to the Buganda Kingship. This area hosts the Kabaka's palace and it is the uncontested economic, cultural and religious centre of the Baganda. It's origin dates back to the time when the Kabaka hosted the arrival of H.M. Stanley, a missionary, who taught Kabaka's people many things among which was crafts and religion.

The Kabaka donated land to the missionaries to construct places of worship that is Namirembe and Lubaga Cathedrals for the Anglican and Catholic Churches respectively. As a matter of fact these two institutions own a lot of property in this area. Most important of which is Land of the prime areas. Only areas, which were of special interest to the kingship, other than water sources, were not allocated to them. But these churches have done so much for the space they were given, that it is developed with infrastructure.

The Buganda Kingdom or Kabaka privately owns most of the land in Lubaga division. The religious institutions own land under free hold tenure system, while the Buganda Kingdom and private individuals own land under mailo land tenure system. Some individuals hold land under leasehold system acquired from the city council. Those who have “bought themselves out” of the private mailo land system, hold it under mailo land tenure system. This trend makes the area of study to be one of permanent settlers whose majority is of the Christian faith who are sometimes selective when relating with non-Christians. Considering the conditions of water access, in order to get connected to the main, one has to get permission from the land owner for the

space where the line is to be laid. And in instances where social networks are to apply these neighbours may not cooperate well.

The Kampala structure plan reveals that Lubaga Division is a residential area of high density with commercial areas found in parishes nearer to the city centre having better developed infrastructure and utilities, for example water mains are well laid out. Such places have access to water and are well served.

In parishes at the periphery of the city, the infrastructure in these parishes is not yet developed such, as the water mains have not been extended to most parts of these parishes. These are the areas where people have to depend on other provisioning mechanisms.

These aspects, together with a number of other local and external factors are contributing to the different ways people get water. There is a very big disparity in the way people are supplied with water and access water sources.

The area also reflects another classification based on income. The majority of the people are low- income earners. The study revealed that 80% of the respondents spend less than shs 100,000 per month on basics like transport education accommodation medical entertainment, power and fuel. These people occupy the low land value areas associated with low construction costs in the flat valley bottoms that often flood during the heavy down pours. Within these dense areas, slums and unplanned settlements have developed without adequate infrastructure, like Nakulabye, Nateete, Ndeeba and Najjanankumbi parishes. There fore such people find it hard to pay for water user costs connection fees to the public water supply. Water being a basic need, they have to provide for themselves hence provisioning

CHAPTER THREE

METHODOLOGY

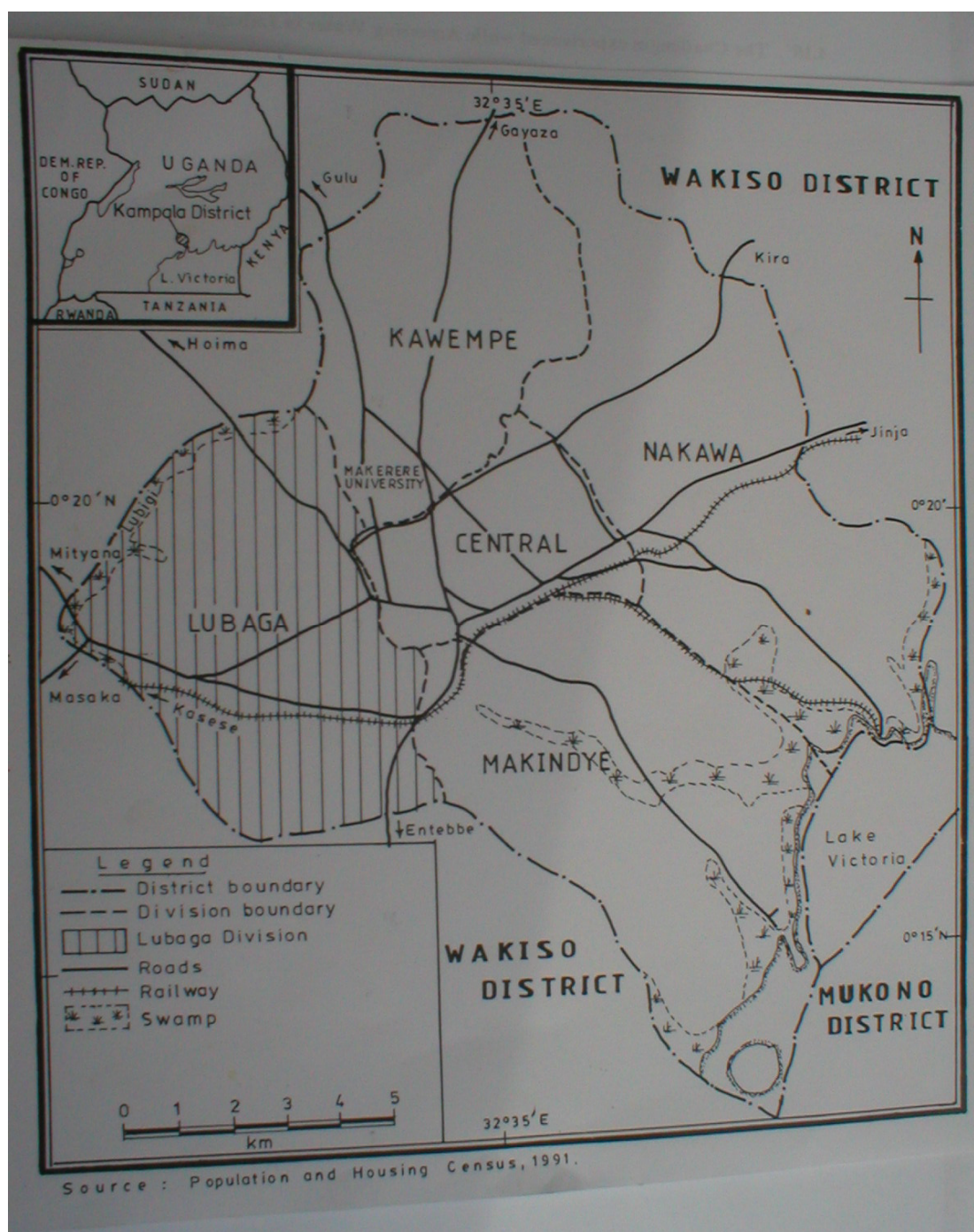
This chapter examines the research methods that were applied during the study of “water provision in urban centres, water sources and supply institutions”. It deals with the research design, sampling technique and population size, data collection procedure, data collection methods and instruments and data processing and analysis.

Area study

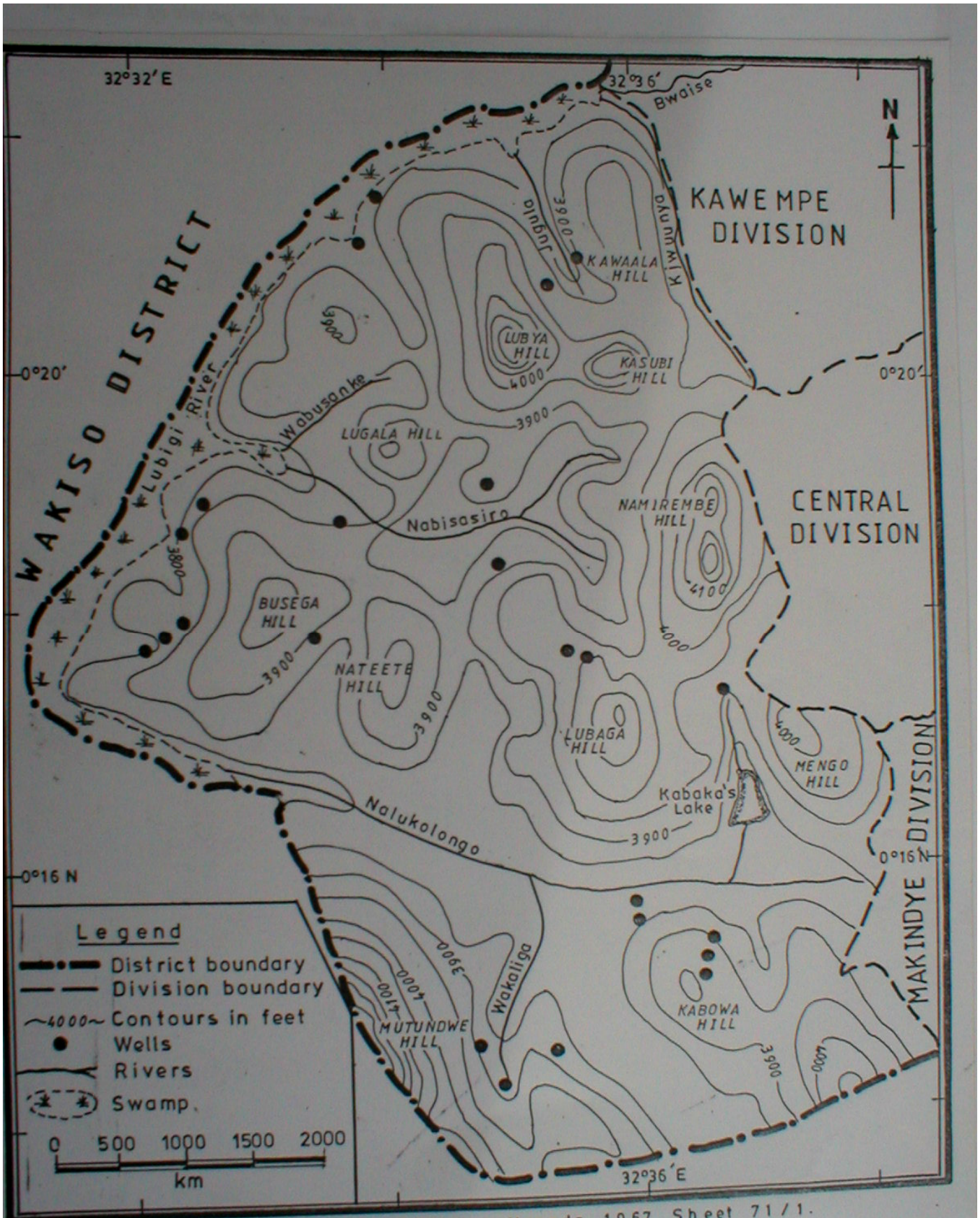
Lubaga division is one of the five major administrative units of Kampala District found in Central Uganda (See Map 1). It forms the Western part of Kampala District/City and borders with the divisions of Kawempe, Kampala Central and Makindye in the east and Wakiso district in the north, west and south. It is located between longitude $32^{\circ} 30'$ and $32^{\circ} 35'$ East of Greenwich and latitude $0^{\circ} 16'$ and $0^{\circ} 22'$ North of the equator as shown on Map 2. It extends over an area of approximately 33 square kilometres that is 39,972 hectares, approximately 23% of the total area of Kampala district. The division is made up of 13 administrative and planning divisions in form of parishes. These parishes are; Namirembe/Bakuli Parish, Lungujja Parish, Kasubi, Kabowa, Mutundwe, Najjanankumbi I, Najjanankumbi II, Ndeeba parish, Busega parish, Nakulabye parish, Lubyia parish, Lubaga parish, and Nateete (*see map 3.*).

Lubaga Division is a local government at sub-country level, which is commonly referred to as Local Council III (L.C. III). The Division is a corporate body with the authority and responsibility of carrying out its own budgeting and planning as an autonomous body.

MAP 1: SHOWING THE LOCATION OF RUBAGA DIVISION IN KAMPALA DISTRICT.

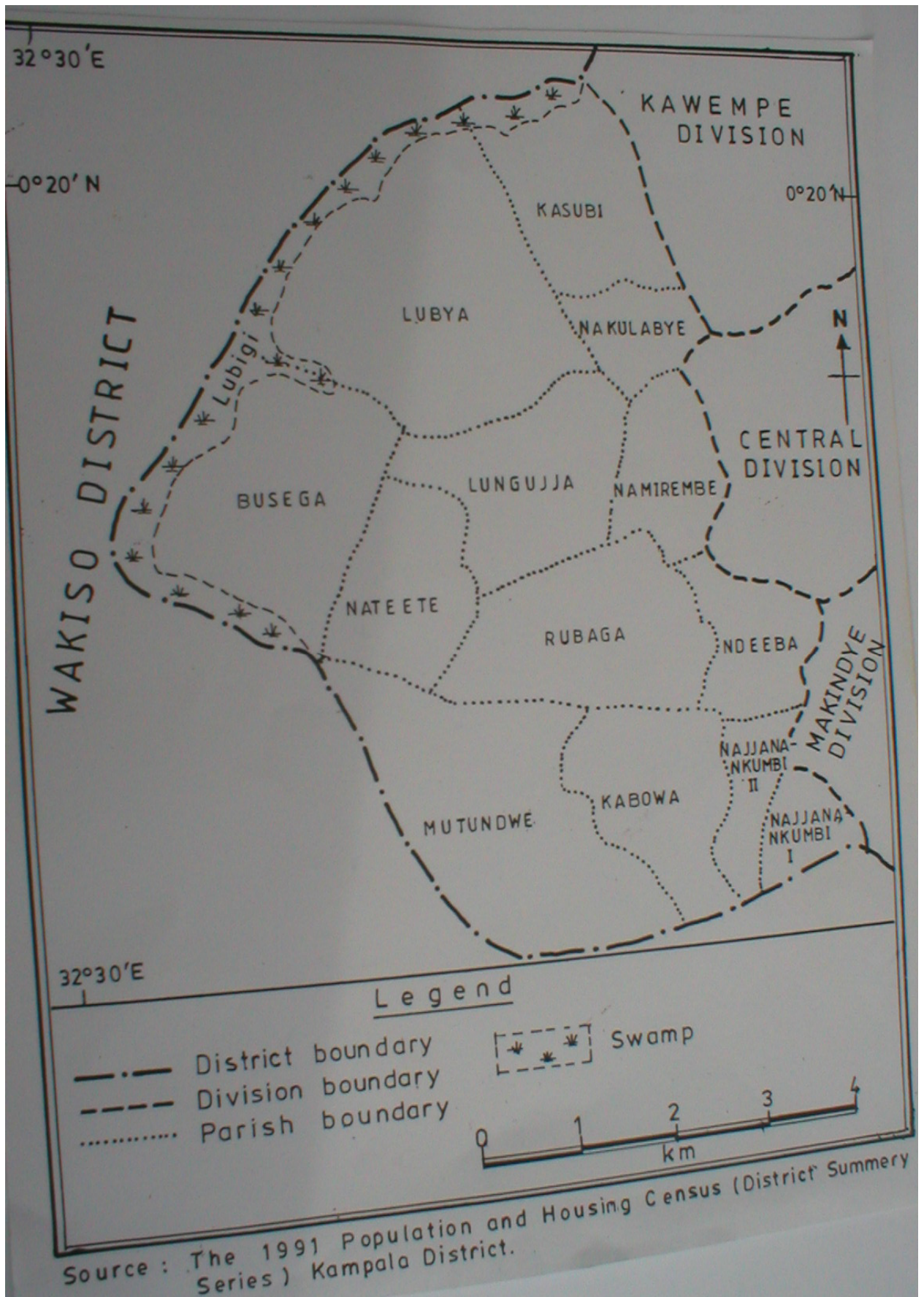


MAP 2: A MAP OF RUBAGA DIVISION SHOWING NATURAL WATER SOURCES.



Source : Department of Lands and Surveys Uganda, 1967 Sheet 71/1.

Map 3: SHOWING THE ADMINISTRATIVE UNITS OF RUBAGA DIVISION



The administrative structure is composed of an elected Division Council and a Technical Management Committee which is appointed by the District Service Commission. The Division Council has an Executive Committee with five secretaries headed by a Chairperson and the Vice-Chairperson.

The total number of people in Lubaga division in 1980 was 103,746 persons and the figure had increased to 179,328 in 1991. This was 23.6% of the entire population of Kampala district (1991, population and housing census report).

These figures indicate an increase of 75,582 over a period of ten years or on average 7,558.2 over a period of one year. It in turn indicates that there was 73 percent increase in population over a period of 10 years and 7 percent increase over a period of one year.

The projected population of Lubaga division in 1999 is 264,369 people (Kampala structure plan 1994) representing a 47.42 percentage increases. This population is distributed within thirteen (13) parishes as indicated on the table below.

Table XIII. Showing population distribution by parish in Lubaga division 1991.

Parish	Area in Hectares	Pop. 1991	Density 1991	Growth Rate	Pop. Projected 1999
Najjanankumbi 1	94.10	9.299	99	5.24	13.992
Najjanankumbi 2	96.90	9.271	96	6.16	14.956
Kabowa	269.30	12.431	46	5.70	19.369
Mutundwe	526.50	12.279	23	6.42	20.200
Busega	599.00	8.661	14	4.32	12.148
Nateete	220.30	14.088	64	5.04	20.878
Lubaga	386.30	15.124	39	6.07	24.233
Namirembe	197.10	16.381	83	5.32	24.799
Lungujja	284.80	10.681	38	6.50	17.677
Lubya	719.80	12.207	17	4.32	17.122
Nakulabye	102.50	15.275	149	3.55	20.792
Ndeeba	200.70	19.421	97	2.55	23.755
Kasubi	299.00	24.290	81	4.69	35.048
TOTAL	3996.3	179.408	45		264.369

Source: Kampala Structure Plan 1994.

Research Design

According to the purpose and objectives of this study the design adopted was multifaceted in nature. The plan and structure of the investigation was a combination of different research designs that is; survey, ethnography, document review and record analysis. The study incorporated both qualitative and quantitative strategies.

The quantitative strategies are evidenced by the data presented (tabulated) while qualitative strategies are indicated by results presented in form of narration. The research design involved deriving statistical population using various sampling techniques.

Sampling technique and size

The population of the study included the urban stakeholders, both those in the delivery system and the recipients of the urban water supply. These include the personnel from the public sector, Ministry of water lands and environment, National Water and Sewerage Corporation, Directorate of Water Development, the private sector (Non- governmental organisations, community based organisations), the urban local authorities and the urban households Selected as follows:

Directorate of water development (1), Commercial provider (1), Water vendors (4), Directors of NGO's (2), Directors of CBO's (2), Kampala City Council (1), Chairpersons of Local authorities (5), Urban households (256), giving a total Sampling of 272 persons. These were purposely selected because they are the key urban stakeholders in the production and water service delivery.

Data Collection Procedure and Methods

A pre-test of research instruments was done on the selected samples who were teachers of selected schools in Rubaga division. This was done to test the consistency and validity of the instruments. Corrections and revisions were subsequently done. 127 villages were randomly listed, after which a systematic sampling method was administered where by every 4th (fourth) village was selected coming up to 32. And then in each village, eight (8) households were randomly selected.

In each household, the head of the house or responsible mature person was subjected to a questionnaire. In circumstances where the person was not competent to work with a questionnaire the researcher would guide the respondent. But in many instances housewives were at home and capable of giving the necessary information.

An exception was also considered, when a hotel, laundry place, cooking place, washing bay, was found. These were administered with a questionnaire and considered as households and questions that were inapplicable were ignored. A total of 257 households were successfully interviewed. These are the recipients of the water. This was done to get the modes, problems and mechanisms of accessing water in the area

Besides the administering of a questionnaire to water users, in depth interviews and discussions were held with senior officials in the ministry of water and mineral resources, the National Water and Sewerage Corporation, Private independent providers and community based organisations were also interviewed. The purpose of the in-depth interviews was to explore and understand more deeply identified issues at hand. Further still the method enabled to probe for more detail and explain unclear questions.

Interviews as Nisbet and Watt (1980:13) point out provide important data, but they reveal only how people perceive what happens, not what actually happens. Therefore the observation method was used along side the interviews.

Observation reveals the characteristics of groups or individuals which would have been impossible to discover by other means. Using this method, I was able to identify the water sources and deduce the peculiar characteristics of the supply institutions and the type of people who gain access to these water sources. Further information was got through the participation in the sanitation and health evaluation exercise with the healthy inspectors from the division headquarters.

The ethnographic method was highly integrated so as to understand the politics of accessing and supply of water in Rubaga division.

Community Based Organisation (CBO's) handling health and sanitation related services like water and health were visited. Discussions were held with the coordinators and supervisors and the people who are directly impacted by these services.

Photography was a vital method that worked as real proof for the characteristics and implication of the water sources on water provisioning. For this reason a camera was used to record information in the exercise.

Secondary data was used in the design and formation of the background of the study. A thorough document review was carried out, which included policy papers, academic papers, research reports, programme reports and evaluation/assessment reports. These were carried out in the following areas; public libraries, private sector, resources centres, and government departments, like the DWD and organisations involved in the provision of water and promotion of sanitation and from seminars and workshops of people, place and provisioning.

The instruments used during the research process included the following, questionnaires, topographic maps, cameras and computers. Maps were also used to locate some of the areas that are serviced and provided with water.

Data processing and Analysis

Data analysis consisted of running various statistical procedures and tests on the data. This involved, generating frequency distribution tables and percentages. These were later presented in form of graphs and charts. Data collected was coded or analysed using SPSS package, because it was the most versatile programme used by social scientists. Data was tabulated into percentages and frequency tables.

Limitations to the Study

The major limitation of this study was that of language. Since the questionnaire was in English, some respondents could not easily interpret the questions and were not willing to accept the challenge. So some questions were not answered as required, these were categorised as non-response.

Some respondents were suspicious about the whole exercise, thinking that the data being collected was for the NW&SC. So there was a problem of releasing the correct information especially from those associated with illegal water connections. Upon detecting the suspicion the researcher would produce the university identity card as a formal way of identification.

Schools were not willing to give out information concerning water expenditure and water use. The little information that was given out was done with a lot of suspicion. While many kept on making references to the top managers who were hard to find. In this case estimates provided by the junior officers were used to work out the characteristics of water use.

Non-responses were also encountered, because of the busy schedules of the urban dwellers. This resulted into failure to meet deadlines. In such circumstances, a delayed questionnaire would be ignored and instead another would be administered to another respondent so as to maintain the sample number.

The financial constraints needed to accomplish the research in time. Expenses were incurred in making appointments and following them up. Report making expenses were high, but these were solved depending on the prevailing circumstances at a time. Where possible work was done and payment was effected after.

Sometimes personnel of NW&SC would not be in office when visited, as they would be attending meetings, workshops, and conferences. This caused unnecessary

delays and time wasting. But the patience, long waiting and persistent visiting solved the problem.

At one time, joining a group of health inspectors in a health assessment exercise in Nakulabye parish was used as participant observation. This method helped much in getting to know the local politics of provisioning. Respondents were willing to give the information because at the end of the exercise, the best hygienic zone would be rewarded. This was done in Nakulabye parish by the Kampala integrated community development programme. All in all the study was carried on well and the results are presented in the following chapter.

CHAPTER FOUR

PRESENTATION OF RESEARCH AND INTERPRETATION OF FINDINGS.

Locational characteristics of water sources.

There are three main sources of water for commercial use and domestic consumption in Rubaga Division namely: Piped water supply from National Water and Sewerage Corporation (NW&SC) supply mains, underground sources (spring wells, shallow wells and bore holes) and surface water (streams and Lakes).

Piped Water

According to Kampala Structure Plan Report 1994, 30% of Rubaga population had access to piped water from NW&SC of which it was very little compared to other Division in Kampala District as shown in the table below:

Table XIV: Piped water coverage within Kampala

Name of Division	Percentage coverage
Rubaga	30
Kawempe	42
Nakawa	60
Makindye	65
Central	78

Source: Kampala Structure Plan 1994

The study revealed that piped water was the main source of water, where by 52.1% of the people get water from NW&SC pipe system. Source of this piped water is L Victoria where it is treated at Gaba treatment plant before distributing it through the mains in the whole of Kampala. The assumption is that this water is free of pollution and any other pathogens. The test done on pipe network quality was 100 % compliant with OFC/100ml and the pH compliance rate of 100 %(state of environment 1998). However the people are always advised to boil water before it is consumed.

Water is distributed through pipes which may be either located in a home or at a focal point where it can be accessed through buying. But not all people can afford the mechanisms required to get water, instead people illegally connect to the water source thus increasing the water unaccounted for.

The underground sources

These sources include the spring wells, shallow wells and bore holes. Rubaga Division has over 70 protected spring wells, of which 90% were protected under Rubaga Division Programme for the Alleviation of Poverty and the Social Costs of Adjustment (PAPSCA) a Water, Sanitation and Health Education Programme, of these thirty-seven (37) spring wells require some form of repair and maintenance.

The study revealed that 32.7% of the respondents were accessing water from protected spring wells. These underground sources are found in places with relatively high population and among the middle and low-income areas of Kawaala, Busega, Ndeeba, and Nateete among others.

The spring wells are located in the valley bottoms, which are prone to flooding during heavy rains. The shallow wells are open, and as a result the storm water and over land flow seriously pollutes them, which makes their quality questionable.

At the division, routine water tests carried out by the Health Officers at the Division revealed that during rainy seasons, water from some spring wells has faecal contamination emanating from the pit latrines that have been constructed adjacent to them. For example, in November 1998, 39.13% of the 27 sampled spring water wells had a contamination level of 11-50FC/100ml (Grade C). This was during the wet season. Samples taken during the dry period January 1999 showed that 22.22% of the spring water wells had a contamination level of 11-50FC/100ml.

Nabulagala well is very close to the people's residences. This kind of settlement has an effect on the quality of water. Residents have been advised to boil water before drinking it on the boards in the middle ground in the picture below "FUMBA KU MAZZI AG'OKUNYWA", (boil the water before drinking it)

Plate 1: *Settlements like these in the background are likely to affect the quality of water.*



Water contamination in the Division is also highly related to the sewerage, sanitation and hygienic habits. There is no central sewerage system in Rubaga, so the

6% of the households with water borne sanitary facilities use septic tanks. The 1991 population and housing census report, states that 94% of the population had no access to improved domestic sanitary facilities. 77% shared pit latrines and only 15% had a pit latrine to a household while 2% of the households had no facility at all. It is common practice, therefore in areas with high water table like Nateete, Ndeeba and Nalukolongo where a large number of pit latrines have elevated vault pits which act as holding tanks are normally emptied into nearby drainage channels creating major risks for many residents. (See picture below).

Plate 2: Shows an elevated vault pit, which is emptied in the rain season through a valve



The study further revealed that households without any sanitary facilities and households with full latrine pits, or households that do not want to use their latrines at night for security reasons resort to using plastic bags for excreta disposal. The full bags are then deposited into garbage containers or thrown into storm water drains, latrine pits or just anywhere. This indecent disposal of waste leads to the contamination of the underground sources such as the open well spring well shown in *the picture below*.

Plate 3: *Showing an open well which is susceptible to contamination.*



The spontaneous building in the region has had an effect on the location characteristics of the water sources in the division. People are building houses and pit latrines so close to the underground water sources. An example is the Mugaga well in Kawaala, which was protected under the PAPSCA project. Presently in its catchments, buildings have been constructed and it has been planted with banana plants. *See picture below.*

Plate 4: Shows a well, whose water flow has been affected by human activities.



This in the end has resulted in the reduction in the water flow. This is the evidence of increase in urban settlement that does not match with social development.

Nateete, Nalukolongo, and Kawaala are marshy areas that have been reclaimed by human settlement. The water table is so high that there is no doubt of a high level of contamination from the pit latrines. See below picture which shows, an open well that was dug not far away from a pit latrines (pit privy). The Well is also susceptible to contamination from overland flow. The Apron of the well is also not well maintained which can lead to disease.

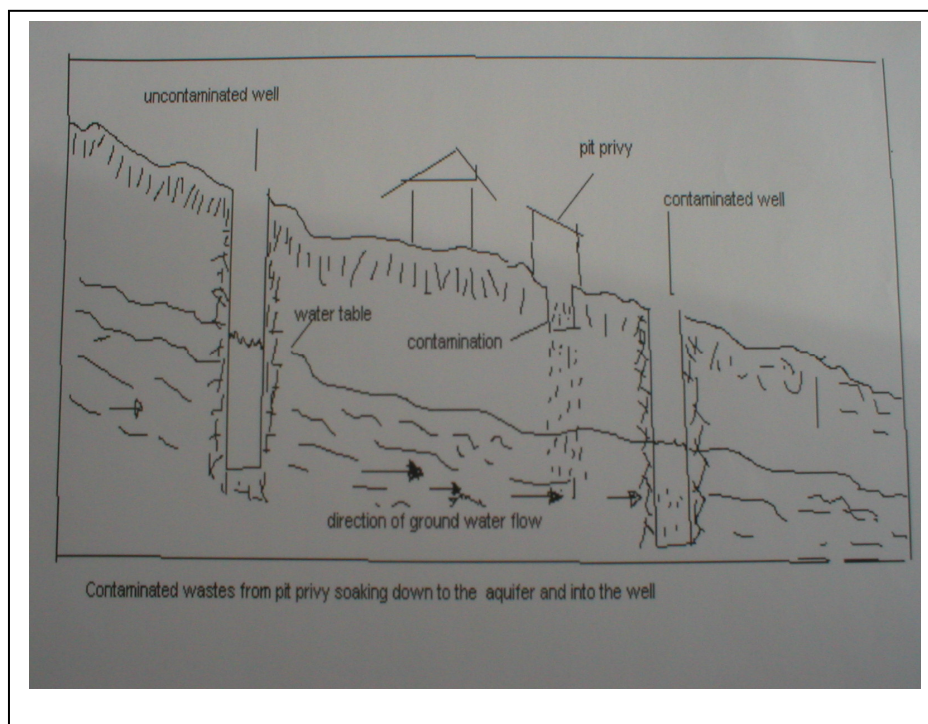
Plate 5: Showing an open spring well found below a toilet.



From the photograph above it is evident that a pit latrine next to a spring well will contaminate the water that soaks downwards into the soil. Usually the polluted drainage will become filtered and purified within a short distance as it travels downwards, but if the water table is too close to the surface purification may be incomplete before the water enters the intake. A well should therefore be located as far away from potential sources of pollution as possible certainly no nearer than 50m and at a higher level of the water table. But this is not the case in the study area.

As earlier noted, this area has no central sewerage system. Most people use pit latrines and they are common in the places that are densely settled. The recommended distances are not achieved.

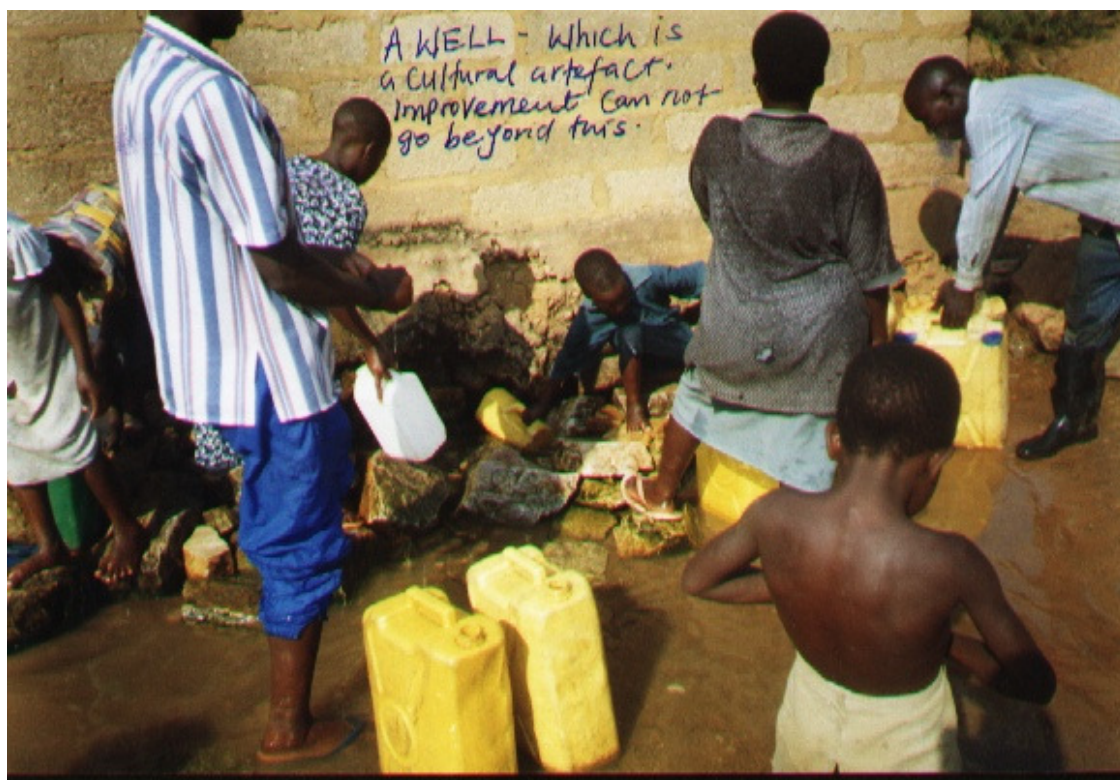
Figure showing the contamination of a well by wastes from a pit privy soaking down to the aquifer and into the well.



Further still an open well without a wall head is always potentially dangerous.

The ground around it becomes worn and slopes towards the hole allowing rain and spillage to wash into the well. In Ndeeba-Mutaawe zone, a stream was half protected with out pipes, simply because it has cultural attachment and therefore has been left as an antiquity. People crowd on this well because they have to get water by scooping as shown in the *photo below*.

Plate 6: Shows a partially protected well, with out a wall head



Other sources.

Under this category are lakes, streams, rivers, rainwater and swamps. Lubaga is drained by rivers and swamps, which are part of the Lake Victoria system. Swamps like Wakaliga, Nalukolongo, and Nabisasiro are sources of water for a number of protected wells.

The area is also drained by Kabaka's Lake, occupying the valley between Mengo- Lubiri and Rubaga hills and is part of the Nalukolongo river systems. It is a source of water for people around Ndeeba, Lubaga and Mengo. The water from the lake is used to irrigate gardens, making of building bricks and for domestic purposes for some few individuals who live around the lake. Some people especially those involved in building and car washing use water from rivers Nabisasiro, Cane and

Nalukolongo channels though it is severely polluted. Even water from storm water drainage channels like Nalukolongo channel that has faecal pollution.

Rainwater is also harvested from roofs, but it is hindered by the fact that people lack large utensils to keep the water to last for many days.

The study revealed that the swampy lands have been lost mainly to settlement and agriculture, so the water table has gone down while it is exposed to evaporation. The clearing of these marginal or fragile lands has created flooding problems in the area. Normally these areas attract low land value and are therefore a last resort place of abode for those people with low income. As a result these areas have become heavily congested and with increased population growth, much of the swampland is likely to give way to residential premises. Therefore the people who have been depending on these sources have to get an alternative source of provisioning.

The agents of provisioning and dynamics that are apparent during provisioning and at the sources.

It is the responsibility of the state to provide water to its citizens or to see to it that they are provided for. However in Lubaga division there is more than one agent that provides water. These include the private sector and the state, Non-governmental organisations (NGO's)/Community Based Organisations (CBO's) among others.

From the field findings it is evident that most of the water is got informally from formal sources. A distinction between formal and informal sources has to be drawn here.

The formal agents follow state regulations, they have a code of operation and is known and understood, at the same time legal action can be taken against them for any thing that goes wrong in their service. While the informal agents of provisioning have their own regulations which are applied differently according to the area of operation.

Informalisation of service provision as Andrae (2000) reveals in her studies, is a powerful process currently experienced in African cities. It is the other side of the state withdrawal and incapacity to provide for urban populations in times of liberalisation and increasing population numbers under receding opportunities for wage work as a base for survival.

She further argues that urban politics of reproduction is increasingly played out as informal politics. To understand the politics of urban development it has become essential to know more about informal politics. A closer probe reveals that informal relations also penetrate formal ones so that it is difficult to ever talk of pure formal politics of providing, because the interface is broad and complex.

Rubaga division peoples' ways of access to water can be explained in the following ways; people get water from places and sources known to them like house pipe connection, the standpipes, spring wells among others.

There are those people who access water from vendors who get water from the known and unknown sources to the users. For example people buying from another person tap is not the registered user so in this case is accessing water informally from a person whom may have got the connection through formal way although it is not always the case.

Another group accesses water from any other provider (bicycle, pushcarts, head carriage, and truck suppliers) whose source is not known to the users.

There is also that group of consumers who cannot afford pipe connection, buying from vendors, but affected by distance to get the water source. Such group gets water from the nearby sources that may be close to them including small streams, rainwater among others.

The dynamics of accessing state provided water.

The development of water resources in Uganda is a responsibility of the department of water development, while the National Water and Sewerage Corporation (NW&SC) do the distribution of water. The distribution of water is done through the piping system, from a centralised plant at Gaba on Lake Victoria.

To get connected to this system of water supply a formal application is made to the corporation. This application has to be endorsed by the local council (village level) executive. The application is channelled through these local administrators, because the corporation wants to be assured that the individual applying for water is a resident of the area, has the ability to pay up the bills and also to make sure that he/she is not re-applying after defaulting. In this way the local councils certify the applicant and second him/her to get water. A NW&SC staff surveyor does a survey to establish the distance and length to be covered from the water main pipe to the consumers' point does a survey.

The customer has to meet all the costs of pipes, digging up the trough where the line is to be laid and the plumbing. This process has become a hindrance in a way that the land through which the pipe trough is dug has to be paid for. When the trough is dug through a public road some money has to be paid to the ministry of works or to the city council depending on who has the jurisdiction over it. That is ug. shs 400,000 for a loose surface road. These receipts have to accompany the application before a connection is done.

Local politics is involved in the area or land in which the pipe is to be laid. Sometimes the owners of these areas may benefit by connecting on the pipe line laid down by the first users. In case the Local council(LC) executives have to endorse the forms of application it gives them an opportunity to ask for favours so that he/she

can also connect on the pipe line, that is, if it goes through the neighbourhood. Otherwise any other user, who is not on LC, has to pay some amount of money in order to be allowed a connection on the formal water system.

The cost of pipes depends on how long the distance is to be covered and the size of a pipe. A connection fee of ug. shs 50,000 has to be paid to enable the consumer to be registered and given an account.

Because of the beauracracy involved in the connection procedure, most people are unwilling to follow and go through these tiring processes. So at times they decide to find mediators who are willing to do the running around and often speed up the process especially when the money is available.

The mediators also negotiate on behalf of their client with the landowners where the pipe is to be laid and a connection from another consumer. Never the less, big amounts of money are involved. Many consumers have at one time involved these people because they know some people in the corporation who make things move fast. And those who have not engaged them are often faced with delays.

Getting connected to the corporation makes a consumer to enter a legal contract with the provider and any misuse of their facilities can be tantamount to legal proceedings as proposed by the water statute 1995.

A water fee is charged according to the use, for example domestic use and standpipes are charged the lowest, but if one is connected to the main sewerage system is charged slightly higher. Industrial and any other productive use are charged second lowest, while a standpipe at a building site is charged highly. This unexplained situation makes consumers to complain thinking that are over priced.

Water Supply outside State Regulation

Lubaga division is a community where the informal provision system is important for direct supply and distribution of water to the consumers. This informality of supply is considered to be outside the state, so it is privately organised by the community based organisation (CBO's), the non-governmental organisation (NGO's), the philanthropists and reproducers like the small scale independent providers (SSIP's). The sources of water include the following;

Communal wells

Under this category are the natural open spring wells and the protected spring wells. These wells are common in the low-lying areas where one will find even the intermittent flowing streams. Some of the natural springs were protected under the PAPSCA project in 1989.

However, since then, most of them are in a sorry state and need desilting and an overall rehabilitation. This has caused a reduction in the rate of flow to the extent that people have to line up for water, filling up a jerry-can takes so long resulting into serious congestion at these wells. The wells get congested in the peak hours of the morning and late afternoons to the extent that armed persons have been put to these wells so as to keep the peace.

Those who cannot afford to buy water from the water vendors, draw from a standpipe and also those who cannot connect to NW&SC main system access these wells. 32.7% of the total sample in Lubaga, accessed water from spring wells.

The study found that, it was mainly the women and children from house holds that fetch water. Observation at the collection points revealed that those who collect

water were mainly the young children (4-14yrs). Such kids carry cans of 3, 5& 10 litre capacity. (*See photo below*).

Plate 7: Showing children who frequent wells and carry jerry- cans of varying capacity



The other category of collectors was men (19-35) who carry plastic cans (20-24 litres) capacity. These were mainly vendors who load these jerry-cans on bicycles and push carts. Their load consisted of 10 to 12 jerry-cans. These men could make about ten deliveries a day.

One elderly man of about 50 years, who was interviewed, had just started the activity after being retrenched as a teacher from Kisoro. He then decided to join a relative (Patrick) so that he could find some money for his survival. At the time of this discussion he had fears that as more standpipes are put in the area, he might be pushed

out of the job. Patrick was on the verge of leaving the activity because it was no longer profitable.

Women who are involved in the vending carry jerry-cans on their heads and supply water only to specific customers such as cooking places, or a neighbour. The assumption is that the activity is so masculine and women may not be able to push the carts nor the bicycles. During the survey women were more in the stationary re-selling as a form of vending.

The time of water collection from the wells was almost all day and busiest (peak) hours were 6.00 to 9.00a.m and 5.00 to 7.00p.m. Few people collect water during the 12.00 to 3.00 p.m. hours because the mid day sun makes it hot. Besides there is belief that during this time, ghosts and dangerous creatures have come to these sources to take water.

An interview with the local council chairman of Nakulabye parish revealed that their main source of water for the majority of the people in the area was the spring protected well. That only a few households had access to piped water. The area was being served by one protected spring well. The well is managed by an eleven member committee, of which two of them are paralegals. This committee has to ensure that the hygiene at the well is good and practised; it is responsible for the maintenance and does the repairs on the well. The committee collects money for such activities. This well like the others in the division have various problems such as the possible contamination (pollution) from the nearby latrines that have been constructed more or less in their catchments

From the study 7.7% of the people sampled thought their water sources were contaminated. While 65% believed the water was good. Some of the causes of contamination are the unfenced well catchments that allow animal to graze from there

and in the process they leave their droppings there. It is also common to find people washing from the same area. Another cause is storing water in open pots at home. Even touching taps and pipes, or even children putting their mouths when drinking from them is enough to cause contamination. *(See photo below).*

Plate 8: *Shows the possible ways of water contamination at the source.*



The other problem in the division is that wells are heavily silted, because they are not usually rehabilitated. Some of the wells in their catchments have buildings that are constructed, even banana plants are growing. This has affected the rate of water flow that it is so slow. *(See photo below).* It takes ten to twenty minutes to fill up a jerry-can. What the consumers do is to wake up so early and go to the well, so that they

can collect enough water before the other users turn up. Such reduced flow has led to congestion at particular hours.

Plate 9: Showing a Spring well characterised with reduced flow of water.



The informality of water provisioning raises some conflicts as users' access water from the different sources. Problems like fights come about as people wait for so long and others become impatient.

One serious case was revealed by Ms. Rose a Para-legal of Nakulabye parish, who narrated an incident when a child playing near the well fell into some lady's water utensils. The lady beat up the boy to the extent of bleeding. She was called to the local council court where she was requested to pay the medical bills.

Conflicts of this nature are limiting the parents to send their children and other users from accessing water freely. Children are always a victim of such conflicts where as they constitute a big percentage of those who fetch water from the sources. The

consequence is that users do not get enough water for their daily use. The alternative is to cope by other means, hence provisioning.

Another interesting spring well is the one in Kabowa parish, known as 'Nnamabira' which is private but communal. It was dug up by Paulo Mbaziira Kawonawo in 1955 and has a fishpond around, which he constructed in 1962. He claims to have had a revelation that instructed him to construct a well in that place. Beside the well is a slab with Information inscribed on explaining how to maintain the well. He insists and people believe that these instructions came from God. Mr. Mbaziira takes care of the well, and any conflict that arises he is the final judge. Of late he has chosen leaders who can settle the fights immediately, these leaders also mobilise the people to contribute money for the up keep of the well.

Such a well has a number of implications. The people do not misuse the water source facility because the keeper is a no nonsense man. Secondly they see the well as something that came from above. So these instructions of the general hygienic pattern are taken up seriously or else God will reclaim the facility. Thirdly, the money that is collected though benefits the society by keeping the well in good condition is a payment to the caretaker. He actually does the maintenance with his wife.

However it was not possible to fully establish what happens to those users who do not contribute the money. There is a possibility that they are denied easy access to water source. Water being a basic need people always find a way of coping. Never the less the most users were the water vendors who easily contribute to the up keep of the well because they frequent the well more often the rest.

This situation raises the call for treating water as an economic good that is an object which can command a price in a market. This endorses the role of private water

providers and also questions the view that water should be provided as a 'social service'.

The politics of Mediators between formal supply and consumer: Tap operators, water vendors and small scale independent providers.

The need for a connecting distribution link from sources of all kinds is largely catered for by the informal sector. From NW&SC, stands pipes have been acquired by private operators who sell the water for a fee, while they also keep them operational by taking care of their maintenance.

Gunilla (2000) in her paper presented to the workshop 'people provisioning and places', notes that, "the tap operators must be identified as groups of agents in the provision game whose *raison d'être* rests on the absence of agents of connection from streets to compounds and houses. It is possible for individuals to buy water from these taps, but water vendors provide an important link from these taps as well as from the spring well sources. Majority of the people of Lubaga division depend on their services, for which they have to pay for.

The dynamics involved in the informal ways of access to water are not cumbersome, provided one has the money. The study found that 21.7% of the population in the study area buy water directly from water vendors. A discussion with one of the providers (Ishaka) revealed that vendors fetch water and sell it to the consumers at a fee of shs 100 per jerry-can of 20 litres.

It should be noted that the water vendors play some level of politics. There is a certain level of preferential treatment involved. The regular customer can be supplied with water of the required quantity at the desired time. These customers also benefit from credit facility. The treatment is different with the irregular consumers; they have

to fulfil their payments upon delivery. Further still the quantity of water required will only be provided if the vendor so wishes.

A water vendor in the area observed that although some of his customers were within easy reach of stand pipes preferred 'spring well water' for a number of reasons that:

- Consumers believe that spring well water is clean with less impurities, this is judged when one is washing some thing white.
- Consumers believe that tap water is a source of typhoid fever.
- The algae bloom that develops in jerry-cans used to store water is more prominent in those containers that keep piped water than one would find in spring well water containers. This scares away the consumers
- Lastly is the odour of the chemical (chlorine) also scares the consumers, that it shortens their lifetime.

This type of water provisioning must be assumed to be outside the state registration and regulation and to be closely related in its form to other types of informal street trade. There are neither licences nor any form of registration. But some vendors once had an association that was purely a financial saving scheme, every vendor contributed 1000 shilling per day.

Many vendors complained of non-payment by their water consumers who fail to pay promptly. In other instances the mobile vendors are competing with the sellers with standpipes, who offer three jerry-cans (approx.60 litres) for 100 shillings.

Kalebu limited has pioneered the development and management of private water systems in Uganda. He sells water through water kiosks and has one in Kibuye operated by a coin. They are hooked on to NWSC networks. Demand for Kalebu's

services is steadily growing. His system is currently operational in over seven locations, two of which are in Kampala. He is faced with the following problems;

- Equipment damage and disruption of water supply owing to high cost and erratic power supply.
- The historical social-economic circumstances have created low living standards, which tend to cause difficulties in affordability and delays in payment of water bills.

The water truck vendors are another group of mediators who are linking up consumers to suppliers. They are located in the city centre (Lugogo) and supply water to the urban and peri-urban area of the high-income people and institutions. Truck vendors access water mainly from NW&SC, water points. Payment is done before filling up the trucks that have a capacity of 8000 litres to 12000 litres. One of the truck vendors Semanda informed that they deliver water directly to consumers by filling their tanks and no middlemen are used to look for consumers.

Ntwatwa an informal provider of water is involved in the reproduction of this service in the parishes of Nateete, Lubaga and Busega. Presently he has established over 25 standpipes. People get water from the standpipes at a fee of shillings 50/=. From the sample of those who buy water in Lubaga division 78.3% bought water from a standpipe.

Unlike the cart-pushers and other vendors who have to carry to water to the customers. The stand pipe operators provide water at a particular point. At these stand pipes, water is paid for especially, where reproducers like Ntwatwa are involved, and water is not supplied on credit. In homes where yard pipes are found and people from the neighbourhood benefits from it, credit facilities are given. Some times even water is given away free of charge. For example if the neighbour has a function the yard pipe

owner can pledge to provide water for the function thus emphasising the principle of the good neighbourhood ness.

His customers are those who do not have water connections, in their houses. This type of provider once he has identified a potential area of consumers applies for water connections. He then gets a water attendant who is paid to manage the standpipe.

Ntwatwa as a producer is not licensed and not actually known as a reproducer but as a registered individual. He has to abide with the conditions set by the water board.

The community looks at the provider as some body who has come to do them a service. While a few look at him as a profiteer, and as such he has faced a number of problems. For example other people who would like to do the same kind of work are not allowing him to expand to the other areas.

He often gets interference from the local council officials who would wish to have a kick back before recommending the application forms to allow him get water connections done since his not a resident of those areas.

Relations and politics of water provisioning

This study draws a lot of insights from Gunilla Andrae's work in the marginal community of Kano. She analyses the relations around the forms of provisioning (formal/ informal) in order to deduce something on the consequences for politics of provisioning.

Gunilla urged that, relations based on direct state supply and on state licensing will give rise to pressures that we may call formal politics. The consequence of the areal nature of the dominating state supply is that are expecting the pressure for change to frequently take the form of community action against the state for improved allocation.

Such action can be directed at the state authorities from the local traditional structures or community based organisation or they may be channelled through the regular formal parliamentary system or individuals that operate privately may also lobby the state separately.

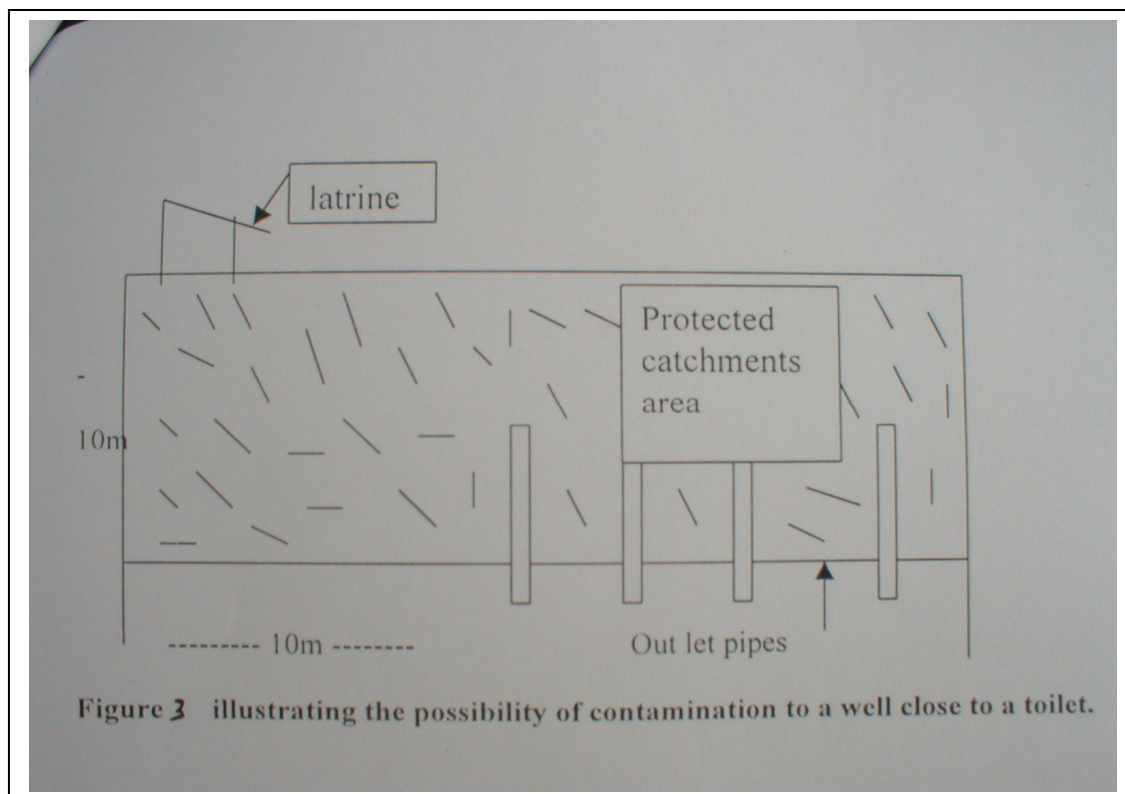
Like in Kano there is a range of relations that exist outside the realm regulated by the state (formal) in Rubaga division. They are relations of supply, mediation, competition or subordination.

There is competition for interest between tap operators and the water vendors. An interview with Ntwatwa, revealed that there are areas in the division like Nalukolongo, an area that has been demarcated as an industrial site, where he had his tap uprooted ten times as a means to stop his activities. But because of his persistence, and having been informed that his attendant was having an affair with some ones girlfriend, so it was the boyfriend who was trying to stop this attendant from operating in the area. To overcome this conflict he had to send away the boy.

Another case of competing interest was between the cart vendors and the operator. They would defecate by the standpipe creating unhygienic conditions. This is complemented by the ganda traditional belief that faeces excreted on some ones establishment were a taboo. The mere looking at it or even removing it was enough charm to put you off your goal. Such acts were done to intimidate him and push him out of their area of operation. He however persevered and has installed other pipes.

Unlike the situation in Kano, these relations in Lubaga have not generated serious social tensions, frustrations and conflicts that lead to constructive organisation for channelling of demands. This is because the setting of Lubaga favours it climatically. Besides, the valleys are occupied with permanent streams that can be used to supplement water demands.

The only incident where I was informed of serious demands that have been channelled to local authority were those of the "seventh day village" in Nakulabye parish. Above this well's catchments are developments that include a latrine that is located on a ground above the protected spring as shown below.



On suspecting that a toilet has been constructed, the project co-ordinator requested for a quality test to be done on the water. It was found that one of the outlet pipes was contaminated with faecal substances so it was closed off. This case was passed on to the city council law enforcement office but ever since no action has been done. And at the time of my second visit, another toilet had been dug up and was soon to be used. This kind of reluctance is common practice in many areas of the division.

The problem of silting and spring diversion creates problems such as inadequate flow, total disappearance of springs and subsequent shortage of water. Such

a situation can cause conflicts between the users when they are trying to get access to water and also over crowding at particular water points. On many occasions it is the strong people in this case who can get the water after a good fight. The weak especially the young, the women and the very old find it hard to get the water. So they go with out the adequate amounts of water needed for their use.

The only way they can get water is to visit the water sources at a time the crowds have lessened, that is either around noon to 2.00 o'clock or late in the night that is after 9.00 o'clock and beyond. Such hours of the night are of great risk to the user lives and can result into sexual abuse.

Such problems of water inadequacy are handled by the local council administration. It is very rare in the study area to find people publicly expressing their dissatisfaction concerning water supply. The only incident where the community conducted a demonstration was when a CBO (Kampala Integrated Community Development Programme) which was trying to rectify the problem of silting in Nakulabye, caused disappearance of the springs and the people were not happy, because this was a major source that supplied many people. However the situation was contained and the well is one of the best constructed and maintained in the division.

Conflict between Non-governmental Organisations in the provision of service is also evident in the area. Lubaga division as mentioned earlier was a recipient of the World Bank funded programme for the alleviation of poverty and the social cost adjustment (PAPSCA). The programme was meant to address the urgent social needs of some of Uganda's most vulnerable groups during 1989 to 1992 periods.

The main objective of the project was to improve the access of the urban poor to adequate water supply and sanitation facilities. After the implementation of the

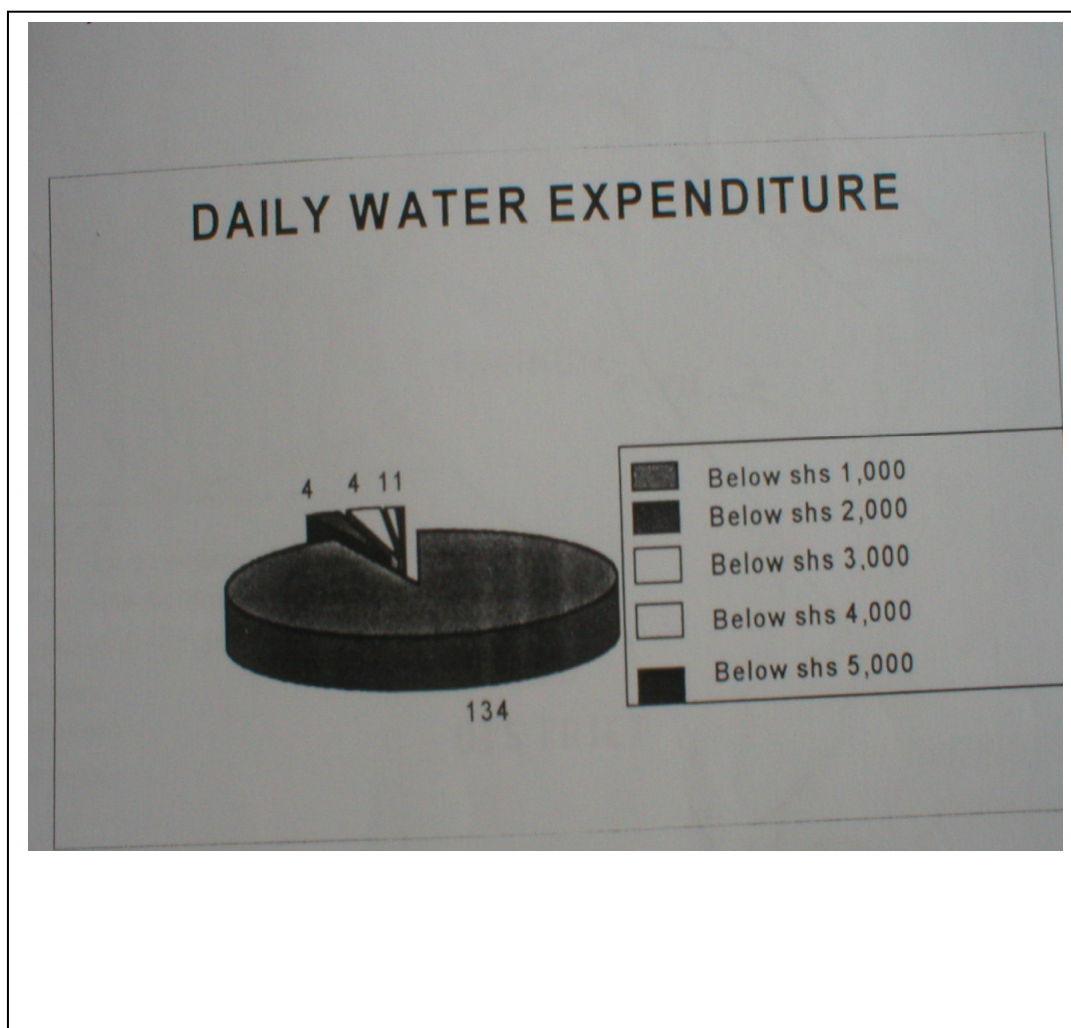
project at the cost of U.S.D 2.9 million, there was the question of who would take over. This was not well spelt out and so much of the project work has run down and the public standpipes that had been installed in area were shut down. Besides, the planning was wrong, where by the community was involved in the implementation level and not consulted on the project design and maintenance.

The NGO's and CBO's have played a big role in the provision of water with in Lubaga. These CBO's/NGO's have played a role in constructing wells, drainage channels, providing piped water, providing health services and general improvement in the sanitation. NGO's like KICDP, Slum Aid Project (SAP), Concern World Wide, have community based programmes in the study area. There operations (programmes) however are not well co-ordinated and they are doing the same activities. There is a problem that some of these NGO's have failed to execute their work, others have started on it but have abandoned it halfway. In the end, the community is progressively loosing trust in the work of NGO's.

The Challenges experienced while Accessing Water in Lubaga division.

There are various ways through which people get water in Lubaga division. These modes of access present challenges that can manifest themselves in similar neighbourhoods of the division.

The most important of all is the challenge of expense that is to say the cost of water and the cost of getting connected to a water main system. It was also found out that 93.1% people spent less than Ug. Shs.1000 on water per day. This percentage greatly depends on the number of people found in the home. This is shown in the chart below.



Many of the households would have wished to be connected to a main water supply but because of the procedures involved and the purchase of piping material has prevented people from getting water freely. For example water pipes commonly used for domestic purposes range from a half-inch diameter to a two-inch diameter. The bigger the diameter of the pipe, the higher the cost.

For instance a '1/2' inch diameter pipe, is sold at shs.850 per meter, '1' inch diameter pipe is sold at shs.1800, while a '2' inch diameter pipe is sold at shs.6000 per meter. Most consumers have opted to use the small diameter pipes to carry water to their homes. These small pipes however have a great effect on the subsequent consumers. Such as, one is not advised to connect a big diameter pipe on a smaller one,

it greatly affects the amount of pressure at which water flows. The situation is made worse, if water has to be piped up hill. In the division, it is common to find that many water pipe lines are laid one after another.

This is further complicated by the tedious procedures of compensating the landlords for the space of land, through which a pipe has been laid. This may even necessitate paying up for the destruction that could have been made in the process, such as laying a pipe through a main road.

Majority of the people sampled in the area, 51% viewed water to be expensive. Some standpipe owners think that meters are faulty, which results in paying a lot of money. The established measurement for water is the twenty litres jerrican. When these are used over and over again they enlarge, such that a filled up jerrican would be weighing 22 to 24 litres and costs shs 50. Water vendors need to measure water in litres not as jerricans.

The people who have water piped to the houses are also reluctant to pay up their water bills such that by the time he/she is cut off from supply, that is when they look at the bill and often forget the period over which such a bill has been accumulated. In most times when consumers are faced with such a challenge they resort to the less expensive sources and those are spring wells, streams and ponds whose quality is highly doubted.

The other consequence is that people do not get enough water for their own use. For example 36% of the population sampled during the study did not get enough water for their own use, which leaves some domestic activities not attended to. This poses a threat of catching water related diseases not forgetting that the minimum requirement per capita use is 80 litres, which is not met.

The study further revealed that most people were using less water than required. On the average 16.3% of the homes were using five jerrican that is approximately 125 litres of water. And there were only 46% of the respondents who were using more than five jerrican.

When asked how they consider the sufficiency of water for the users present needs 74.3% reported that it is sufficient while 25.7% saw it as insufficient.

Table XV : Showing whether water was considered to be sufficient

Whether water is sufficient	Frequency	Percentage
Yes	191	74.3
No	66	25.7
Total	257	100

On the other hand when they consider the sufficiency of piped water for users' future needs, 23.3% anticipated that it will be enough, while 75.1% said that it will not be enough.

Table XVI Showing whether water would be enough for further use.

Enough for future use	Frequency	Percentage
Yes	60	23.0
No	193	73.9
Not sure	4	3.1
Total	257	100

Another challenge mentioned was that of long distance travelled to fetch water, especially for those living on the periphery of the division, and those people who live

on hills who have to walk down to the valley to collect water. 26% of the respondents travelled long distance to fetch water. They walk long distances of 500 meters to a kilometre and use up precious time and energy to carry and fetch water from traditional sources.

Water contamination is another serious challenge to the users of water in Lubaga. 14% of the people sampled thought that water was contaminated though they did not have valid parameter to show level of contamination and the rest may not be aware of the danger. This was in conformity with the health officers at the division who revealed that during rainy seasons, water from spring wells in densely settled area with pit latrines has faecal contamination. Such sources have led to infection and high rate of water related diseases. Treatment and prevention of such disease leads to increase on government's expenditure on medical facilities as well as on individuals. The residents have been advised to boil spring water before drinking it. The piped network quality was 100% compliant with 0fc/100ml and the pH compliance rate of 100%.

Standpipe operators also find challenges when providing water to users. The pipes are often vandalised during the nights by some people who fear competition and those people who want to steal the water from the pipes that are locked up. Such interruptions make the daily users to seek for alternative sources of water.

The consumers connected to NW&SC reported that the pipes get so rusty that water turns brown. The perception is that this is an indication of contaminated water provided by NW&SC. This has made many people to opt for spring water for drinking, cooking, and washing purposes.

The NW&SC as a provider is challenged by the incidences where pipes burst and water leaks out of the system as 'un-accounted for' water. On the other hand when water pressure reduces it fails to reach most users leading to shortages. The corporation has

always urged users to report leakage to reduce such losses. The situation is further complicated by the failure to pay up their water bills. When the water supply is cut off consumers cope by looking for water from the other sources. These problems do affect the community differently as individuals and as a group.

The Adaptive Strategies for sustainable water Requirements.

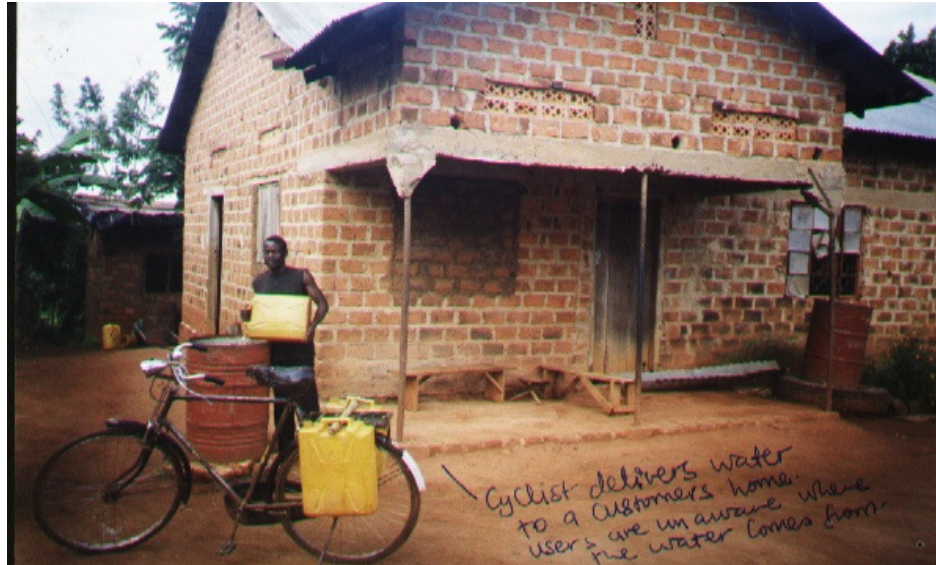
In light of the informal provision of water and the water situation in Lubaga division, my theoretical assumption is that people in the area devise various means to cope with various problems that affect their provisions.

The urban poor have developed strong social net works based on ethnicity and similar working relations. For example through these social networks, a small percentage of 7.1% of the old and disabled are assisted to get water for their domestic use.

From the survey it was evident that, when an individual is unable to collect water from a water source or even lacks enough utensils to fetch enough water for storage, they ask for water from their neighbours.

Storage is another strong element, for coping with water provisioning in Lubaga. Water is harvested from rainstorms collected from water sources. It is stored in drums or jerrican. The high-income people store water in large tanks. Few of the households had underground tanks. 0.4% those sampled use jerrican, 74.0% use reserve tanks, while 11.2% use drums.

Consumers usually are unaware of the sources where the water is drawn. The picture below shows the storage drums that can be used for rain harvest.



The photograph below shows a place that serves as a car washing bay and a water selling point.



The plate below shows a water kiosk connected to the NW&SC mains. The tanks are used to keep water, so that in the times of scarcity, the suppliers can continue satisfying the users demands. The water price at this point varies from shs. 50 during

the period when the flow is uninterrupted to shs. 200 when there is a general shortage.

Operators here are referred to as reproducers.



The picture below shows the modern ways of keeping water safely. Such large tanks were put around large institutions of learning, hospitals, churches, during the times when water was very uncertain.



The people in Lubaga have taken measures to ensure water availability. For example, people reserve water in tanks, pay their bills in time or even buy water which is enough and store in drums supplemented by rain harvest.

There is certain degree of philanthropy, which is a specific feature of informal water supply in Rubaga. These are mainly helping groups (good Samaritans) from churches, schools like 'interact clubs' and women support groups. The support groups visit the disabled and the very poor that have no helpers and fetch water for them. Groups like Rotary have gone ahead to construct reserve tanks for the rain harvest, in other instances, connecting them to a water pipe source

It is worth noting that, the poor in Rubaga community have adapted to the re-using of water for more than one purpose. For example water used to rinse utensils, can be kept aside and be used the second time to clean a plate or a source pan. Water used for laundry, can be used to bathe small children, and also to mop the house. In one way or another there is a reduction in the cost, and the total amount of water used. Such practices are however not hygienic and can lead to transmission of disease.

Water rationing is also done in homes. Taps, are locked at certain times, overhead showers are restricted to few people. In instances where water is bought there is a proportion of money that has to be spent every day. Most households are left with shillings 200 to their housekeepers to buy water for the day. Information from the field revealed that 16.3% of the people sampled used five (5) jerrican approximately 100 litres per day. While on a cumulative level 74.0% used less than 150 litres per day.

Small groups of people, especially those working by washing cars, spraying in garages, metal fabrication, growing plants in nurseries are coping by resorting to the un-competitive informal ways of fetching from streams or ponds and the lake. The

washing bay in Ndeeba gets water from the lake, while children who cannot fight for water in Kitebi get water from streams.

The major problem mentioned in the field survey was that water was so expensive. At least 51% of the people found it had to pay their water bills. They cope by bypassing the metre with a tube that is fixed just before the meter, and lead it to the tank of 6000 litre capacity. When it is filled it can last the household a week.

There are other hindrances that limit free access to water such as the fear of accidents when people are crossing a road, the child abductions, and other forms of child abuse, so young children are not sent to wells or stand pipes, in the weird hours. In this case the households are coping by buying from vendors. And to sustain their water requirements they have to keep buying other than risking such situations. One parent explained that, "she would rather face up the cost of buying than sending my daughters to the wells".

Further still, in situations where the drawing of water is cumbersome, such as having to fight to get water, young ladies have to seek favours in return for a service. This involves acts like paying some money to the source guards or even getting some one powerful to access water for them. The powerful youth have done so for a prospective girlfriend or for the exchange of food from the housekeepers.

Dodging payments is another way people in this division survive. Water consumers keep buying from different vendors because of non-payment. Some of those who live near standpipes do promise to pay up at a later date, which commitments are not usually met. Big consumers avoid payments by issuing post-dated cheques to NW&SC so that they can continue using the water in spite of having accrued big debts.

Indicators that relate to failure of the poor to get access to water provided by the State

Domestic water supply in the developed world is in a fortunate position. The chief ground for its provision is related to be improvement of the public health, and people are prepared to pay an economic price for good water. So in the developed world, the health aspects are looked at critically from an economic viewpoint and water is provided of a quality such that risk of disease is minimal.

In the developing countries the position may be quite different in following ways:

People are often too poor to pay for a supply of safe water. Secondly the funds made available may be inadequate for an ideal water supply. So difficult choices have to be made between works that are incomplete or sorts of improvement have to be made on the existing works. If these decisions are not made consciously, the situation usually arises where very few people get clean and safe water supplies.

There is widespread access to informal sources of water in the study area, Some of which are feared to be contaminated and polluted. Such water sources have led to infection and high rate of water related diseases. Treatment and prevention of such disease leads to increase in government expenditure on medical facilities as well as on individuals. This calls for the understanding of health aspects of water supplies.

Series of epidemiological studies show that, the details of access to water determine the incidence of several infective diseases. Between 20 and 30 different infective diseases may be caused by changes in water supply. The most common diseases in the area resulting from the contamination of water or dirty water from wells and springs are cholera, dysentery and typhoid. These are more pronounced

during the rainy season. While diseases like scabies, trachoma and infantile diarrhoea prevail because water is not enough for washing and hygiene.

Malaria, was the most occurring disease in Lubaga division. The division is characterised with impeded drainage, so mosquito breeding is common and this causes diseases. For example a survey in one of the clinic showed that at most 24.6% of the young ones (1-10 years), suffer from malaria often, while 17.9% were adults mainly from Nateete parish.

Water being a necessity when it is not readily available individuals will find away of getting it. In the process various ways of access are used as indicated, they can lead to widespread range of disease and conflict among communities. People and providers ought to look at water provision as an improvement of public health and people in return should be prepared to pay an economic price for good water.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

The research noted that, water provisioning in urban centres can be complicated. At a glance one can think that the urban people are well provided with water. But it is 62% or so of the total urban population who are provided with piped water. While the 38% get water from sources that are informal.

It is also clear that some residents of Rubaga are unable to meet the cost of extending water from NW&SC mains to consumption points. This cost is further inflated by cost of compensating landowners through which a pipe has to be laid. Furthermore, some of the local council executives ask for money to facilitate the endorsement of these application forms. Such procedures, not only make the whole process tedious but also expensive.

It should be noted that much of the spring water in the division is polluted. This is a result of the urban growth that has surpassed the water developments.

The lakes and rivers are also severely polluted whereas they are peoples alternative sources when there is a water shortage. Most of these sources have been polluted with human waste, petroleum wastes, and garbage. Hence, their use as much as it is on a small scale, is not a good alternative.

The "water policy" talks about user groups associations that are to manage and collectively plan for point source water supply systems in their area. (Water statute no.9 section 50, 1995). These user groups are non-existent in the division and not even conceptualised in most parts of the district. This therefore has led to misuse of water, water loss, and poor sanitation and hygiene in the area. For example a burst pipe was

left running for two months in Kabowa parish, without much concern being shown. But if these 'water user' groups were present they would take care of such incidents.

According to literature collected from other countries, that are experiencing water shortages like Ethiopia, Nigeria, Kenya, Pakistani, about the way they value water and how they respond to water supply, Lubaga division does not reflect any water stress. Residents are not collectively agitating for water improvements. Simply because, in much of the valleys that make up Kampala district are found flowing streams, that exist because of the wet climate the area experiences. And the few who have tried to agitate in Nakulabye parish lack the legal means and the knowledge of how to go about the whole issue. Besides the disparity in the modes of accessing water can not make them agitate collectively.

The people of the study area have devised coping methods, some of which are deliberate, while others are done unconsciously. Such coping techniques range from social networks, rationing to unethical practices of stealing.

The study also revealed that there are challenges or problems experienced when trying to get water. These problems can be avoided but expensively. Some of the residents like in Kitebi, have opted to buy water from a near by standpipe other than sending teenage girls to a nearby well. The mother not only thinks the daughters can be physically abused but also a source of immorality. Within the division the wells can be found after crossing a road, so one may not send young children through heavy traffic to fetch water from a well. Most of the problems can be avoided.

It is every Ugandan's right to have clean and safe water and it is the duty of the state to ensure that its nationals have good access to the same. However, most of the Ugandans are not aware of that. That is why the effects of water developments are not

felt. It is conceived in the people's minds that water is to be bought and if you can not, find somewhere to fetch it.

Another conclusive observation is that of the work of CBO'S and NGO'S. These organisations come in with well-dressed ideas that the people need. However, these days, people see them, but they know these organisations do not stay for long. Worst of all their plans are not drawn from what the people want rather their plans are those which the organisation can do. So much of these organisations' work has failed. Besides, many of them forget that they are working with a complex urban society where there are very many poor ones and very few who are rich.

The lack of participatory planning has created a gap between the planners and the implementers and also in relation to those who take over after the project. A good example is the PAPSCA project in Lubaga division.

The failure of the poor to get access to water provided by the government is reflected in the health aspects (consequences) involved. The water related diseases are prevalent in Lubaga division, and expenditure on medical treatment is quite high. A record from health centres showed that malaria a water associated disease was common.

Recommendations

In order to achieve the desired standards of water access, the research came up with a number of recommendations, which are presented below.

There is need to improve on the planning methods of water distribution bearing in mind the population growth, the investment in industrial and commercial and institutional activities which are exerting increasing pressure on existing utilities in Kampala district and consequently Lubaga division. The planning mechanism should

take care of the evolving land uses over time for example in Nalukolongo was declared an industrial area but water mains and other utilities have not been laid down.

Kampala district is a focal point of Uganda where water should be provided at a high level. Because the city forms a base for the stimulation of development for the other areas in the country. Therefore there should be effective departmental co-ordination. For instance the social service department in Kampala city council should know what the Rubaga division planning departments are planning to do. And at the same time closely monitor developments. For example the physical planner Lubaga division (architect by Profession) did not know the status of water development in the division.

The city engineers department, should participate in all studies related to water and sanitation and should present the priorities of the deficiencies of services to NW&SC.

The public health department of the city council should participate in health and hygienic intervention and general water conservation awareness.

Since Kampala City Council is responsible for approval of development plans, it should communicate to NWSC/DWD about the development taking place and proposed ones requiring piped water. The detailed building plans should be sent for comment. This will ensure that required regulatory and standards relating to the suitability of land, public access, adherence to plans and for the easement have been taken care of.

The NW&SC have undergone the process of decentralisation by establishing offices in each of the five administrative divisions of Kampala. The corporation should also work with in the local council committee and the water user committee as stipulated by the 'water policy'. The establishment of smaller administrative units can

facilitate the work of reading metres, reporting faults, payment of bills and reporting new consumer connections. The supply institutions will know the consumer's problems and understand them better.

User committees, Local councils should be among those to approve building plans. This will reduce on the constructions in water catchments areas that affects water flow and water quality.

Water providers should cultivate a good working relationship with local councils of the area so as to make the assessment of their consumers easy. New consumers should apply through councils for approval. And in case of default, letters of notice should be copied to the Local councils.

It would be good for customers of water connected to NW&SC to be taught how to read metres and explain to them the billing system. People need to know why and how they are to spend their money. This will enhance a good relation between NW&SC and the customers.

To reduce antagonism with the consumers, consumers think that the providers overcharge them and are corrupt. There is need to use a persuasive approach other than the punitive way of demanding for payment. The advertisements on radios, reminding consumers of their prompt payments of bills is more convincing these days.

In order to solve the problem of the lack of up to date data there is need to set up a data resort and investigation team which could help in the design, planning management and development of an information system for each utility body. The team of each utility body should be commissioned to carry out regular surveys. The surveys can for example, provide constant knowledge on the use and misuse of utilities so that appropriate planning is carried out and controls, which regulate the provisions, are put in place.

Water vending, a popular way of providing piped water to consumers should be examined. This can be done to find the suitable means of providing support to vendors. Vending might produce a more rapid and replicable improvement in the standard of service especially to the urban poor. It is recommended that vendors are registered and have their operations formalised while leaders given some training.

In the future to avoid circumstance like those of the PAPSCA project, before a well is handed over for public use, it is important that arrangements are made for its future maintenance and hygienic use. Good maintenance depends on the designation of a person responsible for keeping the structures in good order. Hygienic use can only be achieved if those who will be drawing water from the well know the basic rules, appreciate the health implications for themselves and their neighbours, and actually want to keep their water source clean and whole some. Public opinion must be won, experience has shown that persuasion can achieve results that regulations cannot.

There are certain precautions that can be taken by the village authorities (user groups). They should ensure that privies(toilets) or other sources of contamination are kept at a proper distance from the well catchments. The well catchments area should be fenced to keep animals droppings away and washing facilities should be provided far enough to avoid drainage seeping back into the ground. This was a good practice in Nakulabye parish that needs to be adopted in other parishes.

It is also important to explain to users the importance of protecting their domestic water after it has been taken from the well or standpipe. Diseases can be spread with in a family through water stored in open pots in homes, especially if these are not protected from domestic animals, rodents or insects. Precautions against the breeding mosquito larvae in domestic pots storm tanks water drums are especially necessary. Filariasis may spread where spillage or sullage water is allowed to collect

into pools and the resulting infection is not confined to the households where the nuisance occurs.

Maintaining safe water supplies up to the taps is the job of trained operators, but keeping it safe after it leaves the tap is every body's responsibility. Water may become unsafe at any point between collection and use. The first area of risk is the tap or the stands post it self and the area around it. The following good practices need to be discussed and people should adopt them.

- handle taps with care
- Keep taps clean and prevent people, especially children from touching taps, or putting their mouths to them for drinking.
- Clean the area daily.
- Clean drains regularly to allow spilled water to escape.
- Prevent tap areas from getting muddy.
- Repair cracks in concrete and mortar
- Bathe and wash clothes away from drinking taps.
- Keep animals away from the tap.
- Collect, transport and store drinking water in a safe way.
- Draw drinking water safely from storage vessels.

Piped supplies will fail time to time, although effective maintenance should minimise this. While the taps are out of order it is important that the users are aware of safe ways of using other sources. Boiling polluted water for 10 minutes is a sure way of killing bacteria, but that can be expensive. A cheaper though less effective way is to store water for 24 hours before using it. In that time, many of the bacteria die or settle to the bottom together with the solid pollutants.

Even when water is bacteriologically acceptable, it can still be made undeniable by organic materials and minerals. The main problems are caused by excess amounts of iron, manganese, fluoride, nitrate, heavy metals, turbidity and colour. The WHO has guidelines for levels of compounds which can be accepted in drinking water (WHO,1982) although the water supply agency will be responsible for carrying out tests and designing treatment works ,final approval and control of drinking water quality should remain with the health authorities.

More standpipes and more taps at each standpipe means a better service but also greater cost. Stand posts should generally be located so that the maximum walking distance by any consumer is 200m, though in sparsely populated areas and with no competitive traditional sources, 500 might be acceptable. The required stand post discharge capacity for each tap is normally 14-18 litres/min. A single tap stand post should be used by no more than 40-70 people. There should be one tap for every 50 people served.

The reforms so far initiated and the private sector involvements already begun in the water supply are positive steps. However, these changes will not necessarily be sustainable unless certain complementary requirements are met.

To consolidate reforms, efforts must be accompanied by several conditions. Like a sustainable and favourable economic environment. High inflation, falling real incomes, unemployment and income inequality endanger sustainability.

Legitimate regulatory decisions and effective service provision. The results of private sector participation must be perceived as beneficial but a large proportion of the long term will depend critically on the delivery of promised services and benefits at reasonable cost also the improved design of projects and targets. Poorly designed

private sector arrangements can have serious consequences for other projects by eroding credibility deterring investors.

Complementary structural and institutional reforms are necessary as well. Private sector participation in and of it will not compensate for institutional and operational inefficiencies. Ineffective institutions endanger sustainability. Yet it is much more difficult to change institutions than to pass legislation, create new regulatory agencies or design better tariff regimes. The probability of institutional change increases when the collective perception of effectiveness and fairness in the distribution of resources increases.

Needed domestic reforms include macro-economic and structural reforms aimed at sustaining stable economic growth, combined with reforms to alleviate poverty and reduce inequality. Also crucial are reforms to the judiciary system that improve enforcement of regulatory frameworks. Reforms at the international level relate to the re orientation of multilateral organisation and better policy co-ordination between them and their clients.

With these reforms, the prospects for long-term sustainability of private sector participation in the water supply in developing countries will remain in doubt.

In conclusion therefore when preparing recommendations for future water programmes planners must at all times keep in mind the long term goals of improved health, time saving and convenience, achieved by ensuring the sustainability, maximum use and impact of new facilities and improved hygiene behaviour.

An opportunity for the community to become involved should also be encouraged. The partnership will encourage both sides to contribute information, energy and resources.

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