

# **Serving all urban consumers**

Book 5: Sample strategic marketing plan  
for Kampala City, Uganda

**A marketing approach to water services  
in low- and middle-income countries**

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# 1. INTRODUCTION AND BACKGROUND

## 1.1 INTRODUCTION

This sample strategic marketing plan (SMP) for Kampala in Uganda was completed as part of urban water sector marketing research that was led by Water and Engineering Development Centre (WEDC) and IWE, Cranfield University and funded by DFID (UK). The purpose of the Kampala urban water sector research was to test the strategic marketing framework outlined in Wilson and Gilligan, 1997. This publication was prepared based on data available in 2000/01.

This publication serves as an example to demonstrate strategic marketing approaches for the urban water sector that are set out in the following three guidance books that are published by WEDC:

*Serving All Urban Consumers*

A marketing approach to water services in low and middle-income countries

Book 1: Guidance for government's enabling role

*Serving All Urban Consumers*

A marketing approach to water services in low and middle-income countries

Book 2: Guidance notes for managers

*Serving All Urban Consumers*

A marketing approach to water services in low and middle-income countries

Book 3: PREPP – utility consultation with the urban poor

The books are available on the WEDC web-site

([www.lboro.ac.uk/wedc/projects/psd/](http://www.lboro.ac.uk/wedc/projects/psd/)).

The specific marketing research objectives were to consider:

1. How to adapt marketing techniques to meet the very particular needs of low income consumers in low income countries, and
2. How to introduce strategic marketing management to conventional water utility providers to enable them to segment their customer base and provide differentiated services and prices, resulting in financially viable utilities.

Desk research and fieldwork was carried out in Kampala in 2001. The Kampala SMP is structured as follows:

Chapter 2 gives a definition of marketing, justification for adaptation of marketing in water services, and briefly outlines principles of marketing that could be applied in management of urban water services.

Chapter 3 poses the question “Where is NWSC now?” In the chapter, the following results are presented: subjective indicators; objectively verifiable indicators; perceptions of customers; analysis of alternative water service

providers; and PEST analysis for NWSC. The chapter concludes with a SWOT analysis.

Chapter 4 looks at where NWSC would like to be as a customer oriented urban water utility. Particularly, the chapter seeks to converge the objectives of the organisation with those of other stakeholders, particularly customers, by providing services and management options while focusing on long-term profitability.

Chapter 5 spells out what infrastructure and management changes NWSC needs to make in order to fulfil the programs spelt out in Chapter 4.

Chapter 6 concludes the report by evaluating benefits and risks of adapting a marketing orientation to management of urban water utilities.

## **1.2 BACKGROUND**

National Water and Sewerage Corporation (NWSC) was formed in 1972 by Presidential Decree No 34, and was charged with the responsibility of providing water and sewerage services to the main urban centres of Uganda, on a financially sustainable basis. At its formation, NWSC started off with three major urban centres of Kampala, Jinja and Entebbe. Initially, NWSC was managed as an appendage to the Department of Water Development, banking the revenues into the government treasury, and receiving subvention from the Government for all its operational expenses.

Following an economic liberalisation drive by the Government in 1987, the water supply physical infrastructure was rehabilitated, NWSC management was strengthened through a management development program, and government subvention reduced, to cover only capital investments. Since 1988, the urban centres under the aegis of NWSC have increased from the original number of three to twelve. As of the year 2000, the total population living in the urban centres where NWSC has the responsibility to provide watsan services was estimated at of 2,035,000 (Uganda, Consult 4 [International] [Pty] Ltd et al, 1999).

The geographical expansion of the sphere of influence for NWSC provided opportunities and challenges for the organisation: First and foremost, it provided an opportunity for corporate growth. The growth, however, came at a higher rate than NWSC could build organisational capacity to manage the change. Furthermore, the geographical expansion of NWSC operations brought on board secondary towns with scarcely any industrial activity, and with the majority of residents engaged in subsistence farming. The average income level for residents in secondary towns is lower than those living in primary towns. The low affordability-to-pay for services in the secondary towns, coupled with the long history of receiving fully subsidised water services, resulted into a de-



pressed average willingness-to-pay for water services in secondary towns served by NWSC.

As a result of the factors discussed in the preceding paragraph, NWSC has been operating with high levels of unaccounted for water (UFW). For instance, NWSC 1996/97 Annual Report put UFW for that financial year at about 60%, which, even by the standards of low-income countries, is an indicator of low overall efficiency. The same annual report reported service coverage of 30% of the total population in NWSC service areas. Needless to say, the people not served by the utility are those who fall in the low-income bracket, and often live in informal settlements of the urban areas

## 2. MARKETING WATER SERVICES

### 2.1 WHAT IS MARKETING?

Many definitions of marketing exist with differing emphases on the process of marketing, the functional activities that constitute marketing, or the philosophy of marketing. The Chartered Institute of Marketing (in Wilson, and Gilligan 1997, p.1), in line with the managerial approach defined marketing as "...the management process for identifying, anticipating, and satisfying customer requirements profitably". Hullums (1994), on the other hand, adopts the following definition for appropriateness to health care services:

*Marketing is the means by which an organisation matches its resources (human, financial and physical) to the requirements of customers and consumers in order to meet its objects. (Hullums, 1994)*

The marketing concept, on which marketing orientation is based, can be traced in the management literature as far back as the 1950s. Peter Drucker, one of the concept's earliest proponents, wrote thus:

*There is only one valid definition of a business purpose: to create a customer. ...It is the customer who determines what a business is. ...What the customer thinks he [or she] is buying, what he [or she] considers 'value' is decisive-... (Drucker, 1955, p.29-30)*

Peter Drucker argued further that marketing is not at all a specialised activity, but encompasses the entire business, that is seen from the customer's point of view. The two basic entrepreneurial functions of any business enterprise (Drucker 1955, Drucker 1974) are marketing and innovation, which, according to Deshpande, Farley and Webster (1993), are the focus of business planning and strategy. Innovation, which Peter Drucker defined as the provision of better and more economic goods and services, is envisaged to cut across all phases of the business.

Felton (1959, p.55) defined the marketing concept as " a corporate state of mind that insists on the integration and co-ordination of all the marketing that, in turn, are melded with all other corporate functions, for the basic purpose of producing maximum long-range corporate profits". McNamara (1972) defined the marketing concept as a philosophy of business management that is based on an organisation-wide acceptance of the need for customer focus, profit orientation, and the recognition of the important role of marketing in communicating the needs of the customer to all major corporate departments. Both the above definitions emphasise the importance of profits, contrary to the marketing concept propounded by Drucker (1955, 1974), who pointed out that profit is a re-

sult of performance of the business in marketing, innovation and productivity, but not a cause of the business.

## 2.2 WHY MARKETING OF WATER SERVICES IN LOW-INCOME COUNTRIES?

The performance of many urban water utilities in low-income countries is unsatisfactory. Table 2.1 shows figures for Billing Efficiency and Collection Efficiency for seven selected urban utilities in Africa, while Table 2.2 shows access to drinking water and sanitation services to seven African cities.

**Table 2.1: Accounted-For-Water and Collection efficiency of selected African urban water utilities**

UTILITY	Accounted-For-Water (%)	Collection Efficiency (%)	PERIOD
Kaduna State Water Board, Nigeria	57	74	1996
Katsina State Water Board, Nigeria	65	69	1996
Ghana Water & Sewerage Corporation, Ghana	52	90	1996/7
National Water & Sewerage Corporation, Uganda	41	70	1997
Lusaka Water & Sewerage Company, Zambia	51	62	1996
Borno State Water Board, Nigeria	n/a	69	1996
Addis Ababa Water & Sewerage Authority, Ethiopia	58	n/a	1996/7

n/a – Data not available

*Source: The Water Utility Partnership (2000)*

**Table 2.2: Service levels of watsan utilities in selected African cities**

SERVICE LEVEL	Kampala (Uganda)	Dar Es Salaam (Tanzania)	Conakry (Guinea)	Nouakchott (Mauritania)	Continuo (Benin)	Ouagadougou (Burkina Faso)	Bamako (Mali)
Source of water for household use (Percentage of households)							
□ In-home connection	36	31	29	19	27	23	17
□ Standpipe water fetched by household	5	0	3	30	0	49	19
□ Independent providers/traditional sources	59	69	68	51	73	28	64
Means of disposal of household septic waste (Percentage of households)							
□ In-home connection to piped sewerage	6	3	10	4	1	0	2
□ Family labour or independent providers	94	97	90	96	99	100	98
□ Near network: connection feasible	(9)	(6)	(17)	(4)	(1)	(0)	(2)

*Source: Collignon and Vezina (2000)*

The data indicated in Tables 2.1 and 2.2 point to poor efficiency and low effectiveness of the selected water utilities, respectively. These indicators are testi-

mony to the unsatisfactory performance of many water utilities in low-income countries. This existing situation is despite the mandate of most urban water utilities to provide high quality services to all residents in their respective service areas. The existing situation in many cities of low-income countries provides an opportunity for applying marketing principles in fulfilling the key objectives of the water utilities.

There is empirical evidence that market orientation of public services has improved the organisation's performance (Hullums, 1994). Furthermore, a case study conducted in Uganda (Kayaga, 1997) showed that applying marketing principles to water utility management in NWSC has high prospects of improving the performance of the organisation.

## **2.3 HOW TO APPLY STRATEGIC MARKETING TO WATER UTILITY**

The prevailing situation as described in the Section 2.3 calls for application of strategic marketing planning in order to improve water service coverage to the urban centres of low-income countries. Strategic planning is principally concerned with overall long-term organisational direction, while marketing planning is concerned with day-to-day performance and results of an organisation (Wilson & Gilligan, 1997). Strategic Marketing Planning therefore seeks to answer the following question:

*Given a specific type of strategy, what marketing structures, policies, procedures, and programs are likely to deliver results according to the mission and objectives espoused by the organisation?*

Provision of water services to urban areas is a unique business. In most cases, water service provision is a natural monopoly. Furthermore, in economics terms, water services can be categorised as either public merit goods, or private goods. As a public good, it is able to meet basic needs with general benefits for all in terms of health requirements. As a private good, however, it provides excludable benefits desired for convenience and for commercial/industrial use as basic resource (Franceys, 1997). In the provision of water services to households, the dividing line between use of water for health benefits and for convenience, or commercial/industrial use is difficult to determine. In applying marketing principles to the water sector, these unique factors have to be put into consideration.

Wilson and Gilligan (1997) advocates looking at marketing as a management process. This involves the following steps:

- Investigating customer demand for different product options
- Identifying groups of customers whose requirements could be better satisfied

- Developing reliable products to meet changing demands
- Pricing the product at a level which the market will bear and which will meet its financial objective
- Making the product or service available through channels accessible to the customer
- Promoting the product or service so that a desired volume of demand or revenue is achieved.

Some principles of marketing easily adaptable to water utility management are discussed in Sections 2.3.1 to 2.3.3

### **2.3.1 Market Segmentation**

In many cities in developing countries, needs and conditions differ substantially from one neighbourhood to another. Market segmentation is a process of dividing consumers into viable portions for the purpose of providing services in an efficient and cost-effective manner. Common variables used for market segmentation in commercial marketing are geographic and geo-demographic; demographic; behavioural; and psychological. For urban water and sewerage services, the feasible variables for segmentation are:

- The type of dwelling and location, e.g. bungalows or flats; informal housing or mixed housing
- Housing densities, e.g. high medium or low density.
- Socio-economic, such as estimated income levels.

### **2.3.2 The Customer Value Chain**

The concept of customer value chain has been in use in commercial marketing for a long time. As water utilities become more commercial orientated, there is need to espouse similar ideals. The Customer Value Chain involves the following aspects:

1. *Know* and understand the different customer and potential customer groups, including their attitudes, practices, perceptions, preferences, and their willingness to sustain payment for improved services.
2. *Target* specific customer groups or market segments.
3. *Sell* options using suitable promotion techniques

4. Provide *High Quality Service* through a balance of people, processes, technology, and service by knowledgeable staff.

### **2.3.3 The Marketing Mix**

After an organisation has segmented the market, and known its customers and potential customers, the next step is to design the marketing mix. This involves selecting an optimum combination of products and services, which will satisfy the different market segments, using the following dimensions that are applicable to water supply services:

- **Product/Place:** Pressure of water service; Hours of flow; Reliability of service; Type of connection; Technology used
- **Price:** Connection fee; Requirements for joining system; Tariff structure; Willingness and ability to sustain payment;
- **Promotion:** Publicity, Information dissemination; Community meetings; Focus group discussions; Stakeholder meetings; Advertising; Personal selling through staff and customers;
- **People:** Customer care by staff; Two-way communication structures and mechanisms; Development of trust; Understanding perceptions and expectations; Technical capacity of staff; Capacity building of staff; Internal customer care;
- **Process:** Efficiency in repair of leaks and bursts; Quality control of the process; Customer complaints and feedback; New connection processing; re-connection process;
- **Presence:** Accessibility of offices in terms of location, atmosphere, physical accessibility, and ease of use, Physical appearance of premises and staff, Corporate Image; Corporate Identity.

### **3. WHERE IS NWSC NOW?**

#### **3.1 MANAGEMENT STRUCTURE OF NWSC**

As already pointed out in Chapter One, National Water and Sewerage Corporation (NWSC) is a public owned water utility whose status was recently strengthened by an Act of Parliament, the 1995 NWSC Statute. NWSC also operates under other legal instruments, namely:

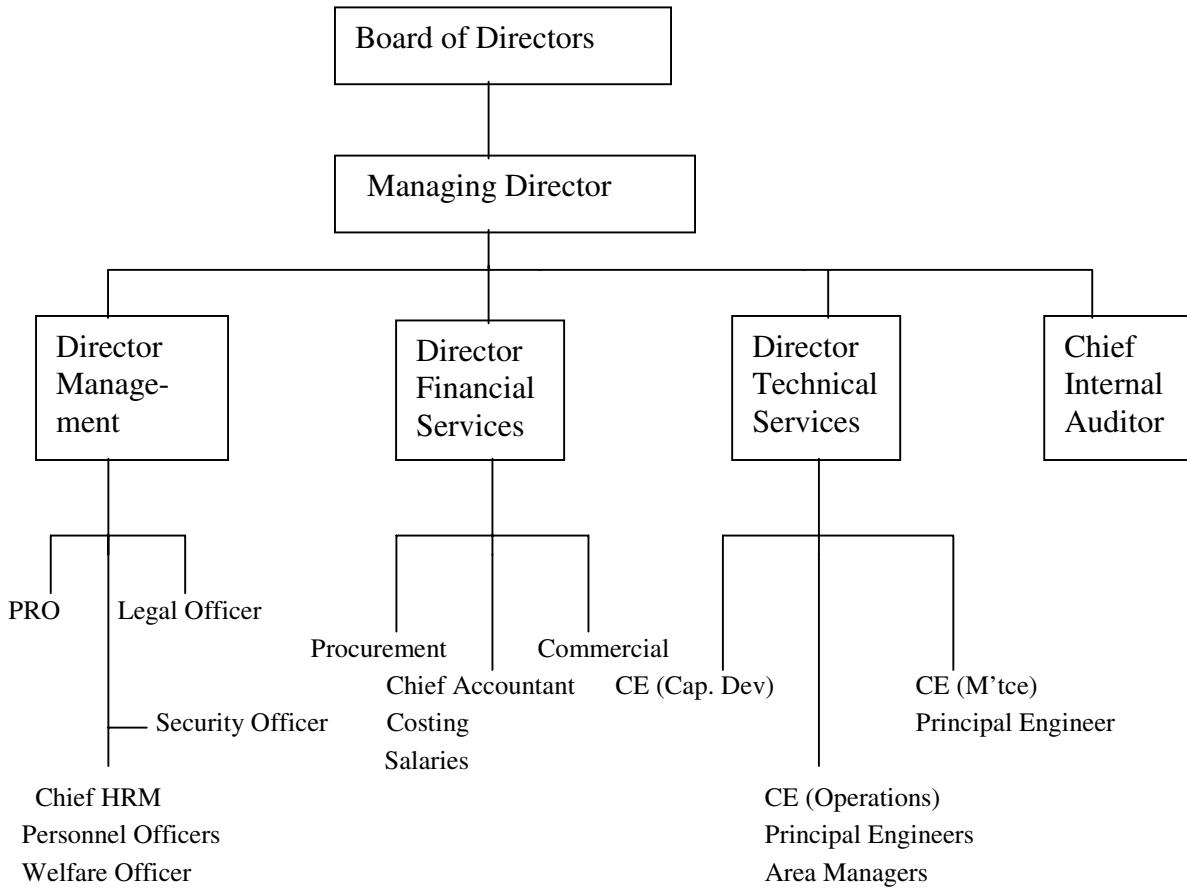
- The Water Statute, 1995
- The National Environmental Management Authority Statute
- The National Bureau of Standards Statute

NWSC currently operates piped water and sewerage services in twelve major towns of the country. The organisational structure of NWSC is line/staff type, with eight organisational levels (Odonga, 1997). The policy making body for NWSC is the Board of Directors, who are appointed by a Government minister. The Board delegates its authority to the Managing Director (MD) who is assisted by a top management team in the day-to-day running of the organisation. NWSC management is accountable to the Board and the Minister responsible for water affairs. Additionally, management is accountable to the public through a Parliamentary Committee on Natural Resources. Figure 3.1 shows the corporate organisation structure of NWSC.

The organisational structure has the following levels of authority:

- Board of Directors
- Managing Director
- Heads of Directorates
- Heads of Department
- Principal Officers/Area Managers/Heads of Sections
- Heads of Sub-Sections

**Figure 3.1: Current Organisational structure for NWSC**



This organisation structure is perceived to have too many layers for effective and efficient decision-making. There is a considerable level of decentralisation of authority and responsibility to the Area Management level, as far as technical and financial operational functions are concerned. However, NWSC top management still retains most authority in the personnel matters, as well as strategic issues concerning all functions. For Kampala, however, the biggest operational area accounting for about 70% of NWSC revenue base, the management arrangement is completely different. A three-year management contract, code-named Kampala Revenue Improvement Programme (KRIP) was entered into with a private operator to manage distribution operations, billing and revenue collection in Kampala Service Area since 1998. The contract for KRIP will expire in June 2001, and the procurement process is in progress for competitive selection of another operator for the management contract.<sup>1</sup>

<sup>1</sup> The KRIP management contract expired in June 2001. NWSC subsequently entered into a two-year management contract with ONDEO Services, which expired in mid February 2004. NWSC is in the process of taking over the management of Kampala Water Supply Service Area under an internal management delegated contract.



Other institution reform programmes through which NWSC is undergoing to bring in more private sector participation are:

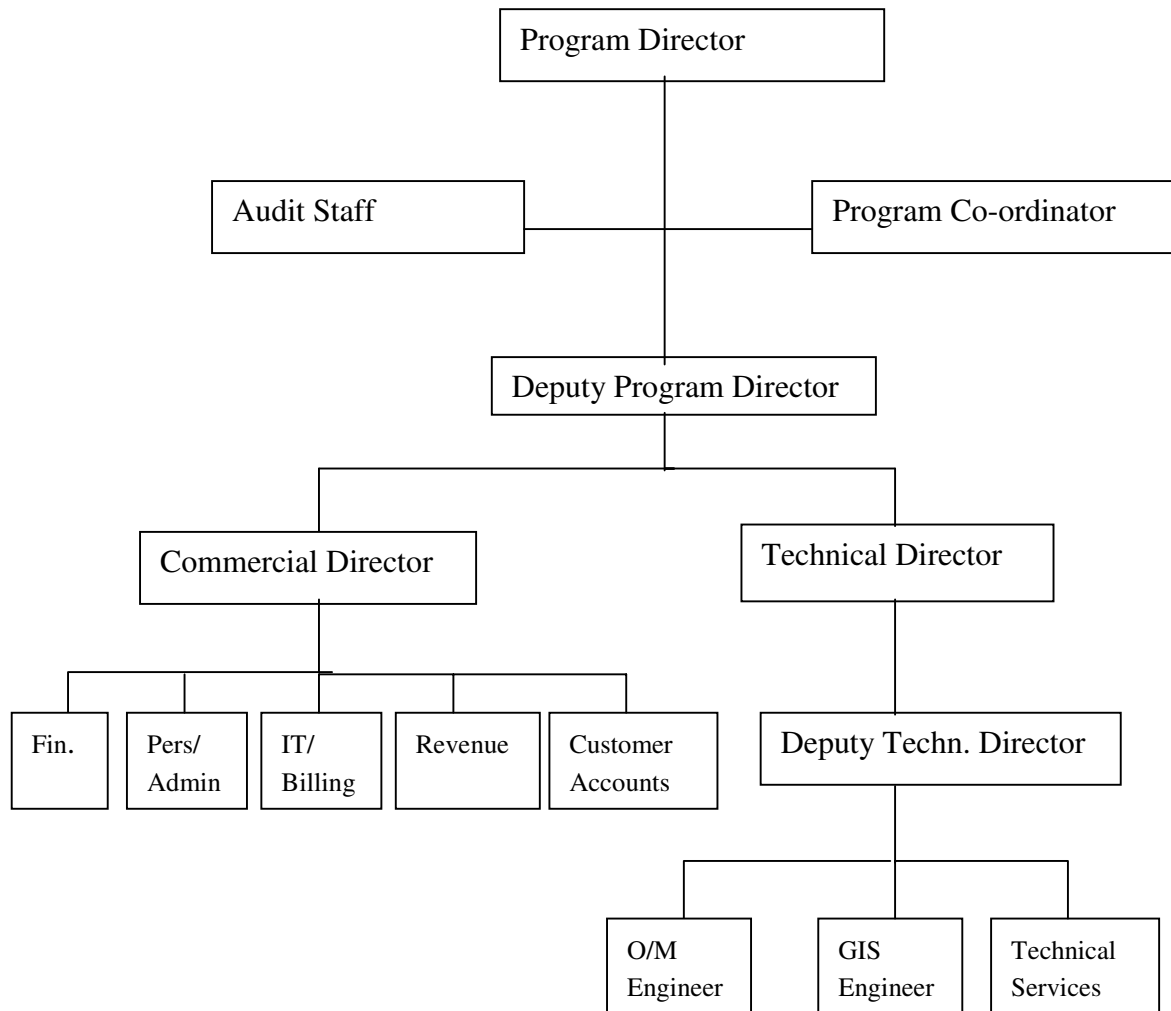
- A national sector reform study has been going on in the past one year to determine the most optimal private sector participation mode in urban water services in the country, and NWSC is envisaged to play a major role in this endeavour.
- A restructuring program has been on-going in the organisation to down size the organisation, which has enabled reduction of staff from 1850 in 1998 to the current number of 1196.
- Since September 2000, NWSC entered into a three-year performance contract with the Government of Uganda.
- In order to prepare other service areas for the impending reform, performance contracts have been negotiated between NWSC headquarters and service areas other than Kampala. These are one-year performance contracts that became effective from October 2000.<sup>2</sup>

Figure 3.2 shows the organisation structure for Kampala Area under the management contract code-named KRIP. A total of 206 staff from NWSC were seconded to work under the project. The terms and conditions of service for these seconded staff are similar to those applying to NWSC staff elsewhere. The top management staff under the project belong to the management-contracting firm. These staff, whose terms and conditions of service are different from those applying to the NWSC seconded staff, are the Program Director, Deputy Program Director, Technical Director, Commercial Director, Finance Manager, and Deputy Technical Director.

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<sup>2</sup> NWSC has since gone through a series of internally initiated performance enhancement programmes. The Area Performance Contracts have been transformed into Area Management Contracts, providing more autonomy to the service areas, with the objective of consolidating efficiency gains, performance improvements, and enhancing customer satisfaction.

**Figure 3.2: Current organisation structure for NWSC Kampala WSSA as of January 2001 (\*excludes water production)**



### 3.2 INSTITUTIONAL ASSESSMENT OF NWSC

Water and Sanitation for Health Project (WASH) produced guidelines for institutional assessment of water and wastewater institutions (WASH Technical Report No. 37). Since 1993 when NWSC started a management development program, the Wash guidelines have been used several times to assess subjective performance indicators. The performance categories assessed are leadership (14 variables), organisational autonomy (8 variables), management and administration (14 variables), commercial orientation (8 variables), consumer orientation (7 variables), legal framework (14 variables), and organisational and staff culture (7 variables). The most recent survey was carried out in October 1999, whereby 54 questionnaires were sent out to middle and senior managers

of NWSC. Of these, 14 questionnaires went to Kampala Area. Thirty-four useable responses were received back of which ten came from Kampala Area. Table 3.1 shows the results based on a score of 5 for the highest point and 1 for the lowest point.

**Table 3.1: Subjective Performance Indicators for NWSC**

	1993	1996	1997	1999	
	NWSC Overall Score			Kampala (10)	*NWSC (24)
Leadership	2.6	2.9	3.0	2.8	3.4
Organisational Autonomy	3.0	3.7	3.5	3.3	3.5
Management and organisation	2.4	2.9	3.0	2.8	3.1
Commercial Orientation	2.7	2.9	3.1	2.8	3.3
Consumer Orientation	2.5	2.4	3.1	3.0	3.0
Legal framework	2.8	3.0	3.5	3.4	3.4
Organisational and staff culture	2.6	2.8	3.4	2.7	2.9

[1 = Poor, 3 = Medium, 5 = Excellent]

\*NWSC indicators for 1999 exclude Kampala Area

Source: Mugisha, 2000

The results show that whereas there was a steady improvement in corporate performance indicators in terms of leadership skills, management and organisation, and commercial orientation, there was either a slight decline or a standstill for the remaining dimensions. The results for Kampala however indicate a decline in performance in 1999 across all dimensions. These responses could be an indicator of initial staff reaction to a dramatic change in organisational structure and management styles brought about by the private operator.

### **3.3 COST RECOVERY AND CURRENT FINANCIAL PERFORMANCE**

#### **3.3.1 Water Production**

Raw water for the water treatment works serving Kampala is drawn from Lake Victoria (with an area of 69,480 km<sup>2</sup>), the largest freshwater lake in Africa. Gaba Water Works Complex, with two intake points Gaba I and Gaba II, is located in Murchison Bay. Gaba I water works is the original waterworks that was rehabilitated in 1986 whose capacity was restored to about 50,000 m<sup>3</sup>/day. Gaba II is a newer water treatment plant that was commissioned at the beginning of 1993 and augmented the production capacity, bringing the installed capacity of both plants to 147,000 m<sup>3</sup>/day. Water treatment is accomplished by a

combination of processes of sedimentation, flocculation, rapid sand filtration and chlorination. The lake has experienced higher rates of nutrient loading following increased bush burning, deforestation and other activities associated with human population growth in the Lake Victoria’s catchment area (Tibatemwa, 2000). Consequently, massive blooms of water hyacinth have been noticed at the intake works since the early 1990s, sometimes to an extent of completely choking the intake cavity, and thereby adversely affecting water production processes. Furthermore, over the years, some of the civil structures and mechanical equipment at the two water treatment plants have deteriorated with no matching maintenance actions, reducing the practical plant capacity to about 117,000 m<sup>3</sup>/day. Table 3.2 shows water production trends for the period 1998 to 2000.

**Table 3.2: Water production trends for Kampala for period 1998 to 2000**

	1998	1999	2000
Water production in Gaba I (m <sup>3</sup> /year)	9,397,032	12,242,734	13,826,653
Water production in Gaba II (m <sup>3</sup> /year)	20,489,940	19,499,691	19,141,111
Total Kampala Production (m <sup>3</sup> /year)	29,887,114	31,742,425	32,967,764
Practical Capacity Utilization	70%	74%	77%
Theoretical Capacity utilization	55.7%	59.1%	61.4%

*Sources: Gauff Ingenieure (2001) and NWSC (1999)*

Table 3.2 shows that there exists untapped production capacity at the water treatment plant for Kampala WSSA.

### **3.3.2 Water Distribution and Consumption**

Treated water is pumped to two main reservoirs: Muyenga reservoir that distributes water to the high-pressure system, and Nakasero reservoir that distributes water to the low-pressure system. Potable water is then distributed to consumers through a series of water primary distribution mains, secondary distribution mains, tertiary mains and services pipes. The majority of consumers receive water through gravity mains, but a few consumers living on top of hills are supplied through seven booster stations.

The total number of water consumer accounts in Kampala Water Supply Service Area (Kampala WSSA) was 38,340 as February 2001. Of these, 33,540 accounts are fitted with consumption meters. These customers are served through a pipeline distribution network totaling to 866 kilometers. However, of these, 10,139 accounts were reported suppressed, mainly because the proper-

ties were disconnected due to non-payment of water rates. Currently, consumption in NWSC is categorized according to the use of water and size of the consumer. Table 3.3 shows water consumption according to the categories used, for the financial year starting July 1999 to June 2000.

**Table 3.3: Average water consumption in Kampala from July 00 to Jan 01.**

Category	Total Connections		Metered Connections		Mean Monthly Consumption	
	Number	%	Number	%	m <sup>3</sup>	%
Commercial/Ind.	6465	17.4	5556	85.9	399,735	20.3
Domestic	28464	76.7	25162	88.4	601,660	30.7
Institution	126	0.3	111	88	95,764	4.9
Local Authority	258	0.7	136	52.7	6,676	0.3
Ministries	507	1.7	416	82	480,411	24.6
Parastatal	1029	2.7	832	80.9	352,222	18
Foreign Missions	227	0.6	220	97	18,072	0.9
TOTAL	37076	100	32433		954	100

The table shows that although domestic customers are over 75% of the registered accounts, they consume only 30% of the total production. It is therefore no wonder that the per capita domestic consumption for all NWSC service areas was estimated at only 46 litres per day in 1998 (WUP, 2000).

### **3.3.3 Billing and Revenue Collection**

NWSC operates a national tariff that is applicable to all the services areas. Currently, NWSC uses a block increasing tariff structure. The power to adjust the tariff is the responsibility of the government minister in charge of water development in the country. Although a few aspects of the tariff were changed in November 2000, the water rates have not been increased since 1994. The basic features of this tariff are:

- Public standpipe – Shs. 400 per m<sup>3</sup>; a service charge of Shs. 2000 per month
- House connections - Shs. 616 per m<sup>3</sup>; a service charge of Shs. 1500 per month for a half inch diameter connection.
- Institutions and government - Shs. 760 per m<sup>3</sup>; a service charge of Shs. 2000 per month for a half inch diameter connection

- Industrial and commercial – stepped increasing tariff; for the first 500 m<sup>3</sup> per month, Shs. 1,056 per m<sup>3</sup>, with a service fee of Shs. 2000 for a half inch diameter connection.

The above rate exclude VAT, payable at a rate of 17.5%. Table 3.4 shows billing trends for Kampala Area for the period July 2000 to January 2001.

Table 3.4 shows NWSC service systems in Kampala have a high level of Un-accounted-For-Water of 48.3%. It is estimated that of this 25% are water losses due to an old reticulation network. The rest of the losses are due to administrative losses such as the following (Onek, 1997):

- Illegal connections
- Meter by-passes
- Inaccurate meter recording
- Inaccurate estimation for customers who are not metered
- Collusion between field staff and customers
- Inaccurate billing

**Table 3.4: Billing Efficiency for Kampala from July 00 to Jan 01**

	Water Produced (m <sup>3</sup> )	Water Billed (m <sup>3</sup> )	Billing Efficiency (%)
July 2000	2,965,226	1,410,729	48
August 2000	2,829,515	1,419,881	50
September 2000	2,738,078	1,464,026	53
October 2000	2,795,505	1,666,472	60
November 2000	2,717,689	1,223,445	45
December 2000	2,944,613	1,700,979	58
January 2000	2,885,884	1,395,402	48
July 00 – Jan 01	19,876,510	10,280,934	51.7

Source: Gauff Ingenieure (2001)

On top of the low billing efficiency, not all the money that is billed is collected. This phenomenon has led to an accumulation of arrears, amounting to Uganda Shs. 22,672,203,413 as of January 31, 2001. Of this amount, Uganda Shs 4,676,850,235 are arrears that are over three years old, in respect of 7099 water connection accounts, which have been disconnected for non-payment since 1

July 1998 (Gauff Ingenieure, 2001). The main causes of non-payment of water bills can be summarized as follows:

- Low affordability to pay on the part of some customers
- Low Willingness-To-Pay on part of customers caused by various factors such as perceived poor service levels, socio-cultural reasons (e.g. that water should be free) etc.
- Inaccurate billings that have been rejected by customers
- Inappropriate tariff provisions such as a high reconnection fee, and minimum charges (these provisions were revised in November 2000)

The bill collection efficiency has been on the upward trend the previous year. Table 3.5 shows the Bill Collection Efficiency for Kampala WSSA for the period July 2000 to January 2001.

**Table 3.5: Bill Collection Efficiency for Kampala from July 2000 to Jan 2001.**

	Billings (Million Ug-Shs) <sup>3</sup>	Collections (Million Ug-Shs)	Collection Efficiency (%)
July 2000	1,813	1,460.8	80.5
August 2000	1,747	1,723.4	98.6
September 2000	1,552	1,880.7	121
October 2000	1,890	1,520.1	80.4
November 2000	1,510	1,727	114.3
December 2000	2,087	4,005.5	192
January 2000	1,802	1,851.2	102.7
July 00 –Jan 01	12,401	14,168.7	114.2

*Source: Gauff Ingenieure (2001)*

The bill collection efficiency was over 100%, as arrears are also collected at the same time with current rates. There are no accounting procedures to separate arrears from current rates.

### **3.3.4 Summary of Vital Performance Indicators**

Table 3.6 shows a summary of vital performance indicators for NWSC Kampala WSSA.

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<sup>3</sup> 1 US\$ =1800 Ug. Shs

**Table 3.6: Summary of vital performance indicators**

Total Connections as of February 2001	38,340 No
Average Number of Active Connections (June 00 – Jan 01)	26,623 No
Average Number of Suppressed Connections (June 00 – Jan 01)	10,453 No
Number of Applications for new connections (June 00 – Jan 01)	6033
Number of New Applications connected (June 00-Jan 01)	3,760
Percentage Metered Accounts as of February 2001	87.4%
Average Monthly Water Production (June 00 –Jan 01)	2,839,501 m <sup>3</sup>
Average Monthly Billings (June 00 – Jan 01)	1,771.5 M Ug. Shs <sup>4</sup>
Average Monthly Water Billed (June 00 – Jan 01)	1,468,704 m <sup>3</sup>
Average Monthly Revenue Collection (June 00 – Jan 01)	1,771.5 M Ug. Shs
Average Accounted-For-Water (June 00 – Jan 01)	51.7%
Average Bill Collection Efficiency (June 00 – Jan 01) (NWSC Overall)**	76%
Accounts Receivable as of January 2001	12.8 months
Average Operating Ratio for period 1997 to 1999	0.54

As can be seen from the table, the accounts receivable is growing steadily, and is far well above the three months' period that is considered manageable. The number of suppressed accounts is about 27% of the total number of connections, a number that is considered unhealthy to the growth of the organisation, compared with the low level of new connections made. The operating ratio of 0.54 is good, and shows that under normal circumstances, NWSC Kampala Area would be in a position to invest in the infrastructure. However, at present, most of the surplus generated in Kampala is used to as a subsidy to the other secondary towns in Uganda that are unable to breakeven due to disadvantages of (dis)economies of scale.

### 3.4 PERCEPTIONS OF REGISTERED CUSTOMERS

A questionnaire was sent out to existing customers of NWSC in September 1999 to solicit for their perceptions on water services provided by the utility. This followed a pilot study that was done in March 1999, in which 244 questionnaires were sent out to randomly selected customers. The response rate for the pilot study was only 42%. Necessary changes were made in the questionnaire items and the mode of administration, in order to improve the response

<sup>4</sup> 1 US\$ =1800 Ug. Shs



rate. Using the SPSS program, a random sample of 439 customers was picked from the computerised customer database for Kampala Area. Two methods were used to administer the questionnaire: for respondents who chose to, they were given the liberty to self-administer the questionnaire; on the other hand, out of 225 customers who responded, 39 of them (17%) chose the alternative of having the questionnaire administered to them by enumerators. Third year social science university students were recruited and trained in the art of questionnaire administration, for a period of one week. Table 3.7 gives classification data of the respondents.

**Table 3.7: Classification data of respondents of a customer survey held in September 1999.**

Variable	Attribute	Frequency	Valid Percentage
Sex	Male	131	58%
	Female	94	42%
Education years for Head of Household	Less than 7 years	15	7%
	7-12 years	36	17%
	13-16 years	74	34%
	Over 16 years	19	42%
Occupation	Civil Servant	31	14
	Parastatal employed	51	23
	Housewife	18	8
	Professional services	28	13
	Businessman	71	32
	Other	23	10
Size of household	1-2 people	9	4
	3-5 people	98	44
	6-10 people	92	41
	Over 10 people	25	11
Type of premises occupied by household	Shared house	18	8
	Un-shared house	121	55
	Shared flats	13	6
	Semi-detached	54	24
	Single flats	10	4
	Other	6	3
Ownership status of premises	Personal	74	
	Gov./Company	7	
	Third person	17	
	Other	2	
Estimated household expenditure p.m. <sup>5</sup>	Below Shs. 300,000	4	3 %
	Shs. 300,001-900,000	113	69%
	Above Shs. 900,000	46	28%

Sub-sections 3.4.1 to 3.4.4 present data obtained from the survey, with regard of the registered customers' perceptions on NWSC delivered services.

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<sup>5</sup> 1 US\$ =1800 Ug. Shs

### 3.4.1 Existing Service Levels

Apart from segmenting the market according to usage of water, which was mentioned in Section 2.3.1, NWSC also classifies its customers according to the type of connection. The two types of connections recognised for domestic supplies by NWSC are house connections and public standpipes. Yard connection, which is fairly common in middle-income areas is considered by NWSC as a house connection.

The survey carried out found that of the total sample of 225, 16 respondents (7%) drew water from public standpipes, 94 households (42%) had only yard-tap connections, while the rest (51%) had house connections. The number for public standpipes users was low because this survey was specifically designed for direct customers of the utility. Although standpipes serve a large market segment, most users are not direct customers to the utility.

### 3.4.2 Customers' Perceptions of Household-Level Verifiable Indicators

Table 3.8 shows that most customers perceive household level indicators of services supplied by NWSC as having good quality. Most respondents receive over 12 hours' flow of water at the taps (85%), at a good pressure most of the time (81%). Furthermore, 75% of the respondents perceive the water supply to be reliable, while 86% are satisfied with the colour of the water. These results show that service level as perceived through household-level verifiable indicators is considered above average.

**Table 3.8: Customers' perceptions of household level variable indicators**

Question	Response	Frequency	Valid Percentage
Do you have enough pressure?	Never/Rarely	16	10%
	Half the time	15	9%
	Most times/Always	136	81%
How long does water flow at your tap?	Up to 4 hours daily	16	7%
	4-12 hours daily	17	8%
	Over 12 hours daily	189	85%
How regularly do you get interruptions?	Always	4	2%
	Regular/often	52	23%
	Rare/never	164	75%
How is the appearance of tap water?	Unclear all/most times	10	5%
	Clear half the time	20	9%
	Clear most/all the time	186	86%

### 3.4.3 Perceptions of Price Charged by NWSC

The questionnaire sent out to a sample of registered NWSC customers in September 1999 also solicited respondents' perceptions on the price decisions of the water utility. Respondents were asked whether they agree or disagree with statements concerning their feelings on cost recovery and other aspects on pricing of water services. Table 3.9 shows responses received from the customers.

**Table 3.9: Customers' Perceptions of price charged by NWSC**

Statement	Response	Frequency	Valid Percentage
Although water exists naturally, consumers should pay for costs of purifying it, storing it, and transporting it to their households	Disagree/Strongly disagree	17	8
	Undecided	5	2
	Agree/Strongly agree	204	90
Water is a limited resource, and it should therefore be paid for by the consumers, in order to preserve it	Disagree/Strongly disagree	50	22
	Undecided	28	13
	Agree/Strongly agree	145	65
Water supplied by NWSC is better quality than any other source, and is therefore value for money	Disagree/Strongly disagree	33	15
	Undecided	31	14
	Agree/Strongly agree	163	71
Most households are able to pay the connection fee charged by NWSC, and buy materials, in order to be connected onto NWSC network	Disagree/Strongly disagree	103	46
	Undecided	51	23
	Agree/Strongly agree	70	31
Water bills are affordable by most households	Disagree/Strongly disagree	94	42
	Undecided	51	23
	Agree/Strongly agree	78	35
Most households would be connected onto NWSC water supply network if connection fees were to be paid in instalments	Disagree/Strongly disagree	17	8
	Undecided	27	12
	Agree/Strongly agree	181	80
Water is a critical commodity in my household and water bills should be paid at the earliest opportunity to avoid disconnection	Disagree/Strongly disagree	15	7
	Undecided	7	3
	Agree/Strongly agree	202	90

Table 3.9 shows that most customers (90%) agree or strongly agree that water services should be paid for, but fewer customers (65%) subscribe to the fact that water should be charged an economic price. Most customers (71%) believe that water supplied by NWSC is better quality than any other source of water, and is worth the charges levied. However, only 46% of the respondents believe

that expenses for connecting onto the NWSC water supply network are affordable to households, and most respondents (80%) believe that more households would be connected onto the NWSC water supply network if total connection charges would be borne by NWSC and recovered from the customers in instalments. Additionally, few customers (35%) believe that the water rates are affordable to most households. However, most customers (90%) consider water as a critical commodity in the household and are willing to ensure payment for water bills at the earliest opportunity to avoid disconnection of water services from the household.

#### **3.4.4 Customer Satisfaction Perceptions**

Respondents were asked to indicate their levels of satisfaction with several aspects of customer service offered by NWSC. The level of satisfaction was pegged onto a 5-interval scale, 1 being very dissatisfied, while 5 being very satisfied. Table 3.10 shows a summary of responses.

**Table 3.10: Customer Satisfaction Perceptions**

Variable	Level of satisfaction	Frequency	Valid Percentage
Technical efficiency of staff/equipment	Not satisfied	17	8%
	Undecided	11	5%
	Satisfied	194	87%
Problem solving at customers' premises	Not satisfied	43	20%
	Undecided	49	23%
	Satisfied	112	67%
Response time to repairs of bursts/leaks	Not satisfied	68	32%
	Undecided	53	25%
	Satisfied	90	43%
Quality of water supplied	Not satisfied	15	7%
	Undecided	11	5%
	Satisfied	195	88%
Complaints monitoring	Not satisfied	53	25%
	Undecided	72	34%
	Satisfied	89	41%
Response time to bill complaints	Not satisfied	53	26%
	Undecided	66	32%
	Satisfied	85	42%
Overall accessibility to NWSC services	Not satisfied	37	17%
	Undecided	32	15%
	Satisfied	147	68%
Options for making bill payments	Not satisfied	23	10%
	Undecided	32	15%
	Satisfied	164	75%
Level of customer involvement	Not satisfied	70	32%
	Undecided	83	38%
	Satisfied	63	30%

Results displayed in Table 3.10 show that NWSC customers are generally satisfied with service variables concerned with technical capacity of NWSC such as perceived water quality (88%), technical efficiency of staff and equipment (87%), and problem solving at the customers' premises (68%). They are also generally satisfied with the physical accessibility of service points (68%), which to an extent correlates with availability of options for making water bills payment (75%). The only variable concerning technical capacity, which most customers are fairly dissatisfied with, is the response time to repair of bursts/leaks (43%). Customers have shown that they are generally not happy with the way NWSC frontline staff handle their complaints. Additionally, customers are dissatisfied with their level of involvement into the management of NWSC. All these variables that customers are not satisfied with relate to the 'software' aspects of service delivery.

### **3.5 PERCEPTIONS OF WATER USERS IN LOW-INCOME SETTLEMENTS**

Research was carried out in low-income areas in two of the five divisions of Kampala, i.e. Kawempe and Central Divisions. It is estimated that about 54% of the total population in Kampala live in low-income settlements. Data was collected through three methodologies:

1. Observations
2. Semi-structured household interviews
3. Focus Group Discussions

Sub-sections 3.5.1 to 3.5.3 give highlights of main findings.

#### **3.5.1 Observations in Low Income Settlements**

The field researcher carried out random walk observations in six wards where semi-structured interviews were conducted. The following major observations were noted:

- There are several springs in the areas where research was carried out. Some of the springs are well protected with a fence around to keep away animals.
- Most springs are about ½ to 1 kilometre from people's residences
- In some zones, for example Kibwa and Lufula zones in Kisenyi II, Central Division, pit latrines have been constructed upstream the springs. The springs are in valleys, which increases possibility of contamination.
- In addition to pit latrines, some of the protected water sources are re-contaminated by wastewater from the households such as kitchen and bathroom wastewater. This was specifically evident in Kibwa Zone in Kisenyi II, Central Division.
- There was stagnant water was seen around some protected water sources, where people were seen stepping in this stagnant water as they fetched water.
- In some zones, e.g. Lugobe Zone in Kawempe Division, the protected springs were discharging dirty water; reportedly since the 1998 El Nino rains.
- Drainage was noticed to be a critical problem in most zones. Stagnant dirty water was noticed in most locations visited.

- Many utility public taps were noticed to be non-functioning. It was reported that the public taps had been disconnected by the utility due to non-payment of water rates.
- A number of leaks were noticed in the informal settlements; some people were seen helping themselves to excessive leakages.

The observations listed above conform to a great extent to the responses received in the focus group discussions and semi-structured interviews.

### **3.5.2 Focus Group Discussions**

Eleven focus group discussions were held in six wards using the PREPP approach (Coates et al, 2004). Except for one ward, respondents were separated into groups of men and women. The Focus group discussions followed the following procedures:

- Group ranking of existing sources of water using a water ladder
- Indication of current use of water sources at household level through individual ranking
- Group discussions of reasons for the indicated preferences
- Discussions on aspects of service levels for the various water sources
- Respondents' perceptions of the Utility
- A Utility Engineer presented potential utility-based service options. These options were labelled with estimated costs based on realistic prices.
- Group costed option ranking
- Individual preference of the presented options basing on household preference and affordability. This was accomplished through pocket chart voting.
- Expenditure chart for the household
- Evaluation of the focus group discussion

Table 3.11 gives a summary of results of respondents' perceptions of existing water sources in their areas. Most people ranked utility taps as the best water source because it is perceived to be better quality since it is treated by chemicals. Others pointed out that taps are in closer proximity. Protected springs were ranked as second best because their quality is also thought to be fair in the dry season. However, most respondents doubted the quality of water from protected springs during the rainy seasons because of possible recontamination since the water table is shallow in the informal settlements.



**Table 3.11: Focus Group Participants’ Ranking of Existing Water Options**

Existing Water Source	Group Preference Ranking	Actual Household Use
Utility water	1	1
Protected spring	2	2
Rainwater	3	3
Vendor	5	4
Bend and Fetch	4	5
Unprotected spring	7	6
River/stream	6	7

Although some respondents use rainwater, it is not a major source of water due to the large capital costs required. The ‘Bend and Fetch’ water sources are water eyes prevalent in the wetlands that have been back-filled for human settlement. Water supplied by vendors was ranked as a poor source, because consumers are unsure of the source of water. The respondents pointed out in the discussion that they use other sources of water because of three main reasons:

- The distribution pipeline for NWSC is far away. It therefore requires the applicant to purchase many pipelines for the service line, which is not affordable to them.
- The connection fee charged by NWSC is high and the process undertaken to get the new connection takes a lot of time
- The minimum charge that was being charged at the time of the survey was deterrent. This is a tariff provision that requires a household to pay a certain flat charge every month, as the bare minimum, regardless of amount of water registered by a meter.
- The water rates being charged by NWSC are very high
- Crossing of pipelines across roads is very expensive and it is a complicated process
- The reconnection fee charged by NWSC is very high. After disconnection of services, respondents find it difficult to pay the bill and the reconnection fee at the same time.

- Some respondents complained about meter readers who threaten them with disconnections and in the process solicit for bribes. Later, task forces from NWSC or other staff come and disconnect services for non-payment.
- Accumulated bills that belonged to previous customers have been a hindrance to some respondents to use water services, as NWSC demands full payment of outstanding bills before reconnection.

It became clear from the discussions that most households use more than one source of water: tap water is used for drinking, and food preparation; other sources of water such as protected springs, 'bend-and-fetch' as used for body washing, clothes cleaning other similar household chores. Water vendors are mainly used when there is shortage of piped water supply caused by leaks/bursts, and power outages. During such water shortages, vendors take over all the protected springs, resulting into inaccessibility of household members to the previously free water sources.

Asked about the perceptions of the water utility, the common themes that cropped up in all the group discussions can be summarised as follows:

- Utility water rates are expensive.
- The utility charges a high connection fee.
- The utility water pipes are far away from the community areas or settlements.
- The utility contact staff provide poor customer service to community members.
- Procedures for new connection are unclear and too tedious.
- For the past few years the technical services have been improving.

Costs for water in the informal settlements depends on the source of water, and whether there is scarcity of piped water supply in the area. Table 3.12 shows the range of prices quoted in the focus group discussions

**Table 3.12: Water Price Range as Quoted by Focus Group Discussion Participants<sup>6</sup>**

Water Source	Normal Period		Periods of Piped Water Scarcity	
	Range of Costs	Most Common	Range of Costs	Most Common
Non-Utility				
• Protected Springs	Nil	Nil	Not readily available	
• Vended Water	Shs. 2500-5000 per Kl	Shs 2500 per Kl	Shs 10000-20000 per Kl	Shs. 10000 per Kl
Utility – Indirect				
• Vended Water	Shs.5000-10000 per Kl	Shs 5000 per Kl	Shs 10000-20000 per Kl	Shs. 10000 per Kl
Utility Direct			Not applicable	
• Landlord supplied	Shs. 2500-5000 per Kl	Shs 2500 per Kl		
	Shs 5000-70000 pm	Shs 6000 pm		
• CBO/NGO tap	Shs. 1650-2500 per Kl	Shs 2500 per Kl		
• Public Standpipe	Shs. 2500-5000 per Kl	Shs 2500 per Kl		
• Direct Customer	Shs. 500-750 per Kl	Shs 750 per Kl		

The data displayed in Table 3.12 shows that normally, consumers in low income settlements who are not direct customers to NWSC pay between three to seven times more than what is paid by direct customers. However, during periods when there is scarcity of piped water in the area, the main source of water for dwellers of low-income settlements is vended water, and the price surges up to 13 times the price charged by NWSC for domestic customers.

### 3.5.3 Semi-Structured Interviews in Low Income Communities

To validate data obtained from focus group discussions, semi-structured interviews were conducted in six zones of Kawempe and Central Divisions of Kampala City. A total of 99 households were randomly selected using snow-ball sampling. The semi-structured interview schedules followed the structure of the focus group discussions as closely as possible as follows:

- Ranking of existing sources of water using a water ladder
- Indication of current use of water sources at household level through individual ranking
- Reasons for the indicated preferences

<sup>6</sup> 1 US\$ =1800 Ug. Shs

- Individual perceptions on aspects of service levels for the various water sources
- Respondents’ perceptions of the Utility
- Interviewer presented potential utility-based service options. These options were labelled with estimated costs based on realistic prices.
- Individual perceptions of what service options could be suitable for the community
- Individual preference of the presented options basing on household preference and affordability.
- Expenditure chart for the household
- Evaluation of the interview

Fifty-five of the respondents (55%) were female. The household size ranged from one to fifteen, with a mode of five, and a mean of five as well. Table 3.13 shows the ranking of water sources as elicited from semi-structured interviews.

**Table 3.13: Interview Respondents’ Ranking of Existing Water Service Option**

Existing Water Source	Group Preference Ranking	Actual Household Use
Utility water	1	1
Protected spring	2	2
Rainwater	3	3
Vendor	4	4
Bend and Fetch	5	5
Unprotected spring	6	
River/stream	7	

The findings from the semi-structured interviews closely collaborate with findings from focus group discussions as reported in Table 3.11. In both methods of fieldwork, respondents ranked utility tap water, protected spring, and rainwater as the best water sources, in that descending order. However, vended water, which was ranked fourth in semi-structured interviews, was ranked fifth in focus group discussions. This change could be attributed to discussions that ensued concerning the unconfirmed source of vended water. In both methods of fieldwork, the four most common uses of water in the household were utility tap water, protected springs, rainwater and vended water in descending order.

### 3.6 PERCEPTIONS OF POTENTIAL USERS IN NEW MIDDLE-INCOME AREAS

A household survey was conducted in new and planned development areas, which, according to the type of dwelling are characterised as middle and high-income areas. These areas are on the fringes of Kampala Water Supply Service Area. Sixteen of the respondents (11%) have extended water services to their houses; seven respondents (5%) have shared water connections, while two respondents (1%) use public kiosks provided by NWSC. Table 3.14 shows coping strategies adopted by respondents who do not have access to utility piped water.

**Table 3.14: Coping Strategies For Residents of Newly Constructed Middle Income Houses**

WATER SOURCE	FREQUENCY	PERCENTAGE
Roof catchment with portable storage	99	66%
Roof catchment with underground tank	4	3%
Protected Spring	104	70%
Water Vendors	20	13%
Open well	16	11%
Privately operated powered borehole, pre-paid	14	9%

Respondents were asked what their main source of water for the household is. Most respondents (64%) reported that they use protected spring as the main source of water; only 24 respondents (17%) chose NWSC tap water; while open wells and privately operated powered boreholes attracted a total of 25 respondents (17%). All respondents who use NWSC tap water reported that they use water from other sources too. The alternative water sources are managed either by a community-based organisation (68%), a private vendor (26%) or, in the case of hand-dug wells, by the household (6%). For 50 of the respondents (39%), members of their households fetch the water. A third party delivers water to the household for 37 respondents (29%). This could either be water vendors who sell water as a ready commodity, or some labourers specifically hired to carry the water from a water source to the household. Forty-two respondents (32%) said they used both methods of transporting water to their households, depending on the circumstances.

Respondents who draw water from non-utility water travel a range of distances to fetch water. Only 28 respondents (23%) travel less than 100 m to the water source. Forty-one respondents (34%) cover a distance between 100 m and 200 m to the water source, while 51 respondents (43%) travel distances greater than 200m to reach the water source. Thirty-eight respondents (32%) said it takes them less than 20 minutes to draw water from the source. Sixty-five respon-

dents (41%) take between 20 minutes and 60 minutes to draw water from the source, while 16 respondents (27%) spend over one hour to draw water at the non-utility water. Although 42 respondents (33%) find the time for drawing water from these non-utility sources inconvenient, 85 respondents (67%) find the timing convenient. Table 3.15 shows respondents' perceptions of other key characteristics of water drawn from non-utility water sources.

**Table 3.15: Perceptions of respondents in Middle Income Areas on Alternative Sources of Water**

		FREQUENCY
Number of times water can be drawn from this source	Continuous	45 (39%)
	Twice a day	35 (29%)
	Once a day	26 (22%)
	Less than daily	5 (4%)
Can water be drawn from the source reliably at these times?	Yes	105 (84%)
	No	20 (16%)
Do you receive as much quantity as you desire?	Yes	104 (82%)
	No	23 (18%)
How do you rate the quality of water drawn from the source?	Good	112 (87%)
	Poor	10 (11%)
<sup>7</sup> Cost of water per 20-litre jerry can during normal times	Shs 25-50/=	10 (11%)
	Shs 100/=	32 (36%)
	Shs 150/=	17 (19%)
	Shs 200/=	28 (31%)
	Over Shs 200/=	3 (3%)
Cost of water per 20-litre jerry can during water shortages	Shs 25-50/=	9 (10%)
	Shs 100/=	23 (26%)
	Shs 150/=	17 (20%)
	Shs 200/=	26 (30%)
	Shs 250/=	3 (3%)
	Over Shs 250/=	9 (10%)
Are you satisfied with water supply from this source?	Yes	51 (40%)
	No	77 (60%)

Table 3.15 shows that residents in newly developed middle-income residential areas receive a good level of service in terms of reliability, quantity, and perceived quality. The price of non-utility water is however on the higher side, compared with the price of piped utility water. The price of non-utility water

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<sup>7</sup> 1 US\$ =1800 Ug. Shs

increases during water shortage periods. Overall, many respondents were not satisfied with the water supply from the non-utility water sources. The reasons cited by respondents who were not satisfied with the non-utility sources are:

- Congestion at the protected spring (19%)
- The distance to the water source (4%)
- The water is expensive (51%)
- The source is unreliable (5%)
- Water is not safe for health (11%)
- It is an inconvenience (8%)
- There is insecurity during evening hours (3%)

When asked why the respondents had not been connected to NWSC network, the following answers were received:

- No network in the area (96%)
- High cost to connect onto the NWSC network (4%)

It is not surprising that most respondents (93%) pointed out that they would prefer obtaining water from public kiosks if NWSC could install them in the area.

### 3.7 ANALYSIS OF ALTERNATIVE WATER SERVICES PROVIDERS

As of 1999, about half of the population living in urban areas of Africa were not served by piped water supply (Collignon & Vezina, 2000). The gap created by the low service coverage is often filled by small-scale independent water service providers. In Kampala, it was estimated that by 1999, NWSC served only 36% of the population through house connection, and 5% through public standpipes. The rest of the population in Kampala relies on small-scale independent service providers or traditional water sources for the household water requirements (Collignon & Vezina, 2000). The situation is worse for sewerage services where only 6% of the population in Kampala are served by the central sewerage network. It is reported that 90% of the residents in Kampala are served by sanitation small-scale service independent providers (World Bank Water & Sanitation Program – East & Southern Africa Region, Field Note No. 5, 1999). Table 3.16 shows an estimated market share of water small-scale service providers in Kampala in 1999.

**Table 3.16: Estimated market share of water small-scale service providers in Kampala**

	Water Kiosks /Standpipes	Handcart Operators	Water Tankers	Borehole/ Well Operators
Volume handled ( m3/day)	1,010	n/a	160	n/a
Number of water points/operators	Over 3,000	n/a	8	n/a
Market share (population %age)	5%	n/a	negligible	about 50%
<sup>8</sup> Cost of water per m3 (US\$)	0.36	0.36	1.1	n/a
Price charged per m3 (US\$)	3.6	4 – normal time* 6-11 – scarce*	4	n/a
Ratio of price charged to utility tariff	10	11 – normal time* 16-30 –scarce*	4	n/a
Investment Cost (US\$)	290	n/a	7,250	n/a
Total Sales per day (US\$)	7.5	n/a	87	

n/a – data not available.

\*The price charged by water vendors changes when there is a general piped water scarcity in an area.

*Source: Adapted from Field Note Number 5, UNDP-World Bank Water and Sanitation Program, East and Southern Africa Region*

Since the early 1990s, a private water company, owned by an indigenous Ugandan Engineer was incorporated. It has installed water points in a few places in the outskirts of Kampala City. Box 3.1 is a brief description of the company.

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<sup>8</sup> 1 US\$ =1800 Ug. Shs



**Box 3.1: The case of a private water company in Kampala City**

INDEPENDENT PRIMARY OPERATOR IN KAMPALA (A PRIVATE WATER COMPANY)

- This Small Scale Provider is independent of municipal or utility infrastructure.
- One Entrepreneur manages five private water systems, two of which are in Kampala.
- In Kampala, these water points serve 600 people
- The private operator has a system of coin-operated water kiosk, normal water kiosks and in-house water connection service.
- Entrepreneur realised a pre-tax profit of US\$ 1,200,000 in 1998.

*Source: Field Note Number 5, UNDP-World Bank Water and Sanitation Program, East and Southern Africa Region*

Some of the reasons as to why alternative water service providers command large market shares in some of the cities are illustrated in Box 3.2 .

**Box 3.2: Why Small Scale Independent Service Providers make a difference in East African Cities**

SMALL SERVICE PROVIDERS MAKE A DIFFERENCE

Studies conducted in four East African cities of Dar Es Salaam, Kampala, Mombasa and Nairobi in 1998 and 1999 listed the following success factors of Small Scale Independent Providers (SSIP) in the water supply and sanitation services:

- Inability of the monopolistic public enterprises to respond to the dynamics of market demand
- SSIP have the ability to access peri-urban areas not covered by the public enterprise
- SSIP are commercially oriented
- SSIP respond to the needs of the market by accessing high population density communities through provision of standpipes and water kiosks
- SSIP operate other business in addition to provision of urban environmental services

*Source: Field Note Number 5, UNDP-World Bank Water and Sanitation Program, East and Southern Africa Region*

Improvement of service levels to the existing customers, and extension of services to potential customers in the urban areas require colossal sums of money in terms of capital expenditure. Currently, many utilities in low-income coun-

tries do not have the capacity to carry out huge expansion projects. Similarly, alternative water service suppliers in these cities do not have the capacity, on their own, to close the whole gap created by low service levels provided by the water utilities. Some of the constraints faced by independent water service providers are:

- Inadequate financing by small-scale independent service providers.
- For water vendors, there is lack of trust by the consumers concerning the source, and therefore the quality of the product.
- High capital costs experienced by kiosk operators situated in areas where utility water main pipes are distant.
- The kiosk operators cited lack of co-operation with utility officials concerning meter reading frequencies, bill delivery periods, leakage repair periods, and other service-related problems.
- Lack of skills in book-keeping practices

It is therefore recommended that in order to fulfil the mandate of serving all residents in their areas of jurisdiction, water utilities need, in the short term, to treat alternative water service providers as partners. Table 3.16 illustrates the need for the utility to change its philosophy towards alternative water service providers. The survey out in Kampala in September 1999 showed that what is perceived to be competition is actually a manifestation of clear inadequate service quality. Customers use ‘alternative services’, many of which are different service levels of the utility’s offering that are *undeveloped*, as a coping strategy. When asked if customers use other sources of water to supplement pipe water services from NWSC, 130 respondents (61%) responded in the negative. Table 3.16 shows alternative sources of water used by 84 customers who supplement NWSC tap water from their connection.

**Table 3.16: Use of Alternative Water Sources by Registered Customers of NWSC**

	FREQUENCY	PERCENTAGE
Small-scale water vendors	21	25%
Protected Spring/Borehole	39	46%
Tankered water	10	12%
NWSC tap water elsewhere	15	18%
Other sources	3	4%

Table 3.16 shows that 25% of the customers who supplement NWSC tap water use small-scale water vendors, while 12% use tankered water. Since small-scale water vendors and tanker drivers in most cases sell utility tap water, it is the view of the authors that these service providers are erroneously referred to

as competitors to the water utility. They are better termed as *distributors* whose roles have not been fully taken advantage of by the water utility. The table also shows that 18% of the respondents use NWSC tap water elsewhere, probably during disconnection due to non-payment, through a cheaper source, or through an illegal connection elsewhere.

### **3.8 PEST ANALYSIS**

The macro-environment is key in making strategic marketing decisions. It is important to take stock of the nature of the organisation's environment in terms of how uncertain it is. It is necessary to determine whether the environment is simple or complex; and whether it is relatively static or dynamic. This analysis briefly looks at the political, governmental and legal forces; economic forces; social, cultural, and demographic forces; as well as the technological and environmental forces.

#### **3.8.1 Political, Governmental and Legal Forces**

Issues noteworthy in the political, governmental and legal framework are:

- Uganda has in the past been ruled under a military dictatorship. Its people have witnessed a series of civil wars, and they are currently experimenting a no-party type of democracy, where leaders are periodically elected on an individual merit. However, disagreements on type of governance have resulted into rebels groups operating in several parts of the country, causing insecurity in these areas.
- The long years of civil strife dealt a blow to infrastructure, and the government has put a lot of effort to reconstruct and rehabilitate it.
- There is a sprouting free press in form of several independent print media and many more FM radios. Whereas the FM radios cover most of the country, the newspapers circulate mainly in the urban centres.
- The current government has put a lot of emphasis on public private partnerships to improve efficiency and effectiveness in provision of services.
- The current government has gained goodwill from international donors to provide soft loans and grants in infrastructure improvement.
- The government minister responsible for water appoints the Board of Directors for NWSC, who in turn appoint the Managing Director and other senior officers of NWSC.

- The government ministries of water and justice are responsible for legislation procedures for water services.
- The government is responsible for approval of tariff.

### **3.8.2 Economic forces**

On the economic front, the following points are worthy pointing out:

- Uganda is classified as least developed country with per capita GNP of less than US\$ 400. Therefore the household expenditure is low, estimated at an average of Uganda Shs 167,900 (equivalent to US\$ 167) per month in the urban areas in 1995/96 (Uganda Statistics Department, 1998).
- There is a high disparity in income levels in Uganda, and this is also reflected along the rural/urban areas. For example the household expenditure in the rural areas was estimated at Uganda Shs 71,700 (equivalent to US\$ 71) per month in 1995/96 (Uganda Statistics Department, 1998), a figure that is comparatively lower than that for urban centres. This calls for customer segmentation and service differentiation.
- The taxation rates in the country are low, currently running at about 12% of GNP. This points to a poor culture of payment of rates for social services.
- About 50% of the national GDP is composed of, and about 90% of the population derives their income from, the agricultural sector.
- The inflation rates have been held at less than 10% for the past 10 years.
- Commercial interest rates are high ranging between 15-30%.
- When Government obtains a loan for utilities, it on-lends it to the utility at rates slightly higher than the prevailing rate of treasury bills.

### **3.8.3 Social, Cultural and Demographic Forces**

A survey carried out in 1996 revealed that Uganda's household population was 19,335,000 million people, of which 2,673,000 (13.8%) lived in the urban centres (Uganda Statistics Department, 1998). The average population growth rates in Kampala and other urban areas are 4.9% and 3.6% respectively. Table 3.17 shows key socio-economic characteristics of the urban population in Uganda.

**Table 3.17: Key socio-demographic characteristics of the urban population in Uganda**

ATTRIBUTE	VARIABLE	PERCENTAGE
Gender	Male	48.5
	Female	51.5
Age structure	Less than 20 years old	60.9
	Between 20-50 years old	33.9
	Over 50 years old	5.2
Household size	1-2 people	27.9
	3-5 people	38.5
	6-10 people	29.7
	Over 10 people	3.9
Access to education	Literate, aged 10 years and above	81.4
	Aged 15 years or more, completed primary school	56.8*
	Aged 20 years or more, completed Ordinary Level education	27.1*
Household expenditure (Mean monthly expend. = U-Shs 167,900)	Expenditure on food, drink, tobacco	43
	Expenditure on clothing, footwear, and h/hold equipment	11
	Expenditure on rent, fuel, and power	19
	Expenditure on transport, health care and education	17
	Expenditure on others	10
Type of dwellings	Independent house	37
	Tenement ( <i>Muzigo</i> )	51
	Others	12
Type of tenure	Owned by household	36
	Rented by household	53
	Others	11
Water supply	Households that use piped water as main source	36*
	Households that use boreholes as main source	10.4*
	Households that use protected wells/tube wells as main source	26.9*
	Households that use unprotected wells/springs as main source	19*
Toilet facility	Flush toilet	9.2
	Pit latrine	87.7
	Others	3.7

*Sources: Uganda Statistics Department (1994\*; 1998)*

### **3.8.4 Technological and Environmental Forces**

- No figures are available for expenditure on research in Uganda. However, the level of research, which was low over ten years ago, is increasing with a lot of participation of Non-Governmental organisations.
- Technologies utilised in NWSC and other similar institutions are normally imported from overseas.
- Communication technology is on the upward trend, with the liberalisation of the communication space, and subsequent licensing of three mobile telephone companies.

- Information technology is on the upward trend with many people becoming computer literate and getting introduced to the Internet.
- The raw water sources used by NWSC are continuously being polluted by both point and non-point sources.
- Waste management in the urban centres is not yet a priority for the relevant institutions.
- An environmental watchdog, the National Environmental Management Agency was set up and environmental laws enacted. However, these laws are not yet fully in operation.

### **3.9 SWOT ANALYSIS**

A research carried out on organisational behaviour of NWSC in 1999 came up with a SWOT analysis displayed in Table 3.18.

**Table 3.18: SWOT analysis of NWSC, November 1999.**

<b>STRENGTHS</b>	<b>WEAKNESSES</b>
Well Knowledgeable and learned HR	Lack of adequate management skills
Good objectives oriented planning	Tribalism & patronage
Willingness to change by senior management	High Unaccounted For Water
Willingness to involve PSP where necessary	Reactive approach
Willingness to balance management /commercial/tech. orientations	Inadequate performance measurement
Willingness and ability to curb corruption	De-motivated staff because of low pay
Better public image than other utilities	Corruption
Mindset to achieving corporation goals	Over emphasis on technical orientation
	Imported technology
	Poor maintenance culture
	Low service coverage, especially to the poor
	Inadequate customer services
<b>OPPORTUNITIES</b>	<b>THREATS</b>
Abundant raw water sources	Increasing pollution rates of raw water source
Limited political interference	Relatively poor clientele (low ability to pay)
Good and enabling water legislation	Corrupt operating environment
Relatively stable economy (low inflation rates)	Stringent environmental discharge laws that have been recently introduced.
More donor confidence than other utilities	Corporation tax recently introduced.
Population increase, hence services expansion opportunities	Lack of in-country manufacturing of hardware inputs
Monopolistic status of NWSC	Low technological and innovative capacity
Economic liberalisation allows PSP involvement	Political obligation to take on un-viable towns without accompanying subsidies
Government preferential support for the water sector	Large external debt burden
Communication technology growing	

*Adapted from Mugisha (2000)*

### **3.10 Conclusion**

An audit of the existing situation in NWSC Kampala shows important findings. On the external environment, the following important findings are worth being highlighted:

- NWSC has got access to a raw water source in form of one of the largest fresh water lakes in the water, although the bay of water abstraction is prone to increased point and non-point pollution owing to increased human and industrial activities around the bay.
- The high population growth in the service areas is an opportunity for NWSC.
- The depressed affordability to pay for services for most of the consumers poses financial and economic threats to sustainability.
- The monopolistic legal framework under which NWSC operates is a great opportunity to NWSC. However, the semi-autonomous status granted to the organisation makes it dependent on the government on major decisions.
- The goodwill portrayed by the international donor community toward water and sanitation project is an opportunity for NWSC to obtain capital funding for infrastructure improvements.
- The dependence of NWSC on imported technology is a threat to innovative capacity of the organisation.
- The liberalisation of the national economy is more of an opportunity than a threat to NWSC, as it simplifies procedures for importation of technology and other supplies. However, the liberalisation policy of the national economy has paved way for private sector participation in the water sector.

In the internal environment, the following observations are evident:

- The organisational structure is thickly layered and still considerably centralised.
- Subjective performance indicators in Kampala Area using WASH guidelines for institutional assessment show poor indices (below a score of 3 out of a total of 5) for the constructs of leadership, management and organisation, commercial orientation and organisational and staff culture.
- Although NWSC is mandated to provide water and sewerage services to the urban populace in Kampala, only 41% and 6% of the population living in Kampala city receive water supply and sewerage services, respectively.
- As a coping strategy, the un-served residents of Kampala have got to rely on small scale independent service providers and traditional water sources such as springs and tube wells, the quality of which water is always difficult to quantify, and usually poor. Furthermore, the sources are often unreliable.
- NWSC has got some idle capacity at its water treatment plant in Kampala if maintenance activities are carried out effectively and efficiently.



- NWSC supplies water at a low efficiency, with a high figure of Unaccounted-For-Water. For example UFW was 49% during the period July 2000 to January 2001. This has improved from Unaccounted-For-Water of 51% in 1997.
- NWSC has the capacity to supply water services to more potential customers if plant utilisation is improved and the losses in the distribution network reduced.
- A customer survey sent to registered customers showed that most respondents were satisfied with the physical outcome of the water services. However, most respondents were not satisfied with the customer care provided by NWSC staff.
- Fieldwork carried out in low-income settlements of Kampala City showed that many residents in these areas use traditional sources of water for most household activities, as a coping strategy to the high costs of piped utility water. The biggest obstacle is the high costs of joining the water reticulation network.
- NWSC management has got enough autonomy to carry out internal reforms to improve efficiency and effectiveness, and become more market oriented.
- NWSC is currently undergoing restructuring in order to improve efficiency. These changes include increased private sector participation and regular performance based appraisals of various production units.

From the above observations, it is evident that the macro-environment is not only complex; it is also dynamic in nature. Clearly, the organisational strength of NWSC may not be good enough to cope with the trends for a lot longer. NWSC requires strengthening its strategic marketing planning process in order to adapt itself to the operating environment. Chapter Four looks at formulation of the core marketing strategy, i.e. market segmentation and optimising on the marketing mix.

## 4. WHERE DOES NWSC NEED TO BE?

### 4.1 REVIEW OF OBJECTIVES

NWSC was set up to “...operate and provide water and sewerage services in areas entrusted to it under the Water Statute, 1995” (Statute No. 8, The NWSC Statute, 1995, p5). The functions of NWSC as spelt out in the same statute are (ibid.):

1. To manage the water resources in ways which are most beneficial to the people of Uganda.
2. To provide (i) water supply services for domestic, stock, horticultural, industrial, commercial, recreational, environmental and other beneficial uses; (ii) sewerage services, in any area in which it may be appointed to do so under the NWSC statute or the Water Statute 1995; to the extent and standards, that may be determined by its corporate plan, any performance contract, and regulations made under the NWSC Statute or the Water Statute 1995.
3. To do anything connected or incidental to the above
4. To develop water and sewerage systems in urban centres and big national institutions throughout the country.

Furthermore, NWSC is required to carry out its functions with a view (NWSC Statute 1995, p6):

1. To providing its services efficiently and economically;
2. To exercising its powers in accordance with (i) any national action plan adopted under the Water Statute, 1995; and (ii) the economic, social and environmental policies of the Government.

NWSC is additionally required to operate on sound commercial practice, ensuring that the revenues are sufficient to provide for (i) all depreciation, amortisation and interest and interest costs; (ii) all operation and maintenance costs; and (iii) a reasonable return on investment.

The Government of Uganda furthermore emphasised the importance of provision of water and sanitation services to the populace, authored the 1999 National Water Policy based on the constitutional provision that “every person is entitled to clean and safe water” and the stated government target with regard to water and sanitation by the year 2015 as follows:

*“Sustainable provision of safe water within easy reach and hygienic facilities, based on management responsibility and ownership by the users, to 75% of the*

*population in rural areas and 100% of the urban population with an 80-90% effective use and functionality of facilities”.*

The guiding principles to the above policy fall under the primary theme of “some for all, rather than more for some” (Consult 4, 1999).

In accordance with the above objectives, and as a requirement under Statute No. 8, The NWSC Statute 1995, Section 20, NWSC prepared a three-year corporate plan that spelt out mission statements shown in Box 4.1

**Box 4.1: NWSC’s mission statements for the period 1998-2001**

<p>i)</p>	<p><b>NWSC as an infrastructure authority</b></p> <p>NWSC to be financially self-sufficient organisation developing and providing water supply and sewerage services to customers at an affordable price</p> <p>NWSC to have private sector participation in at least half of its water supply distribution and sewerage services</p>
<p>ii)</p>	<p><b>NWSC and its values and attitudes within management and the employees</b></p> <p>NWSC staff are customer oriented</p> <p>NWSC staff are well motivated and committed to work as a team in a transparent, accountable and efficient manner</p>
<p>iii)</p>	<p><b>NWSC as part of Ugandan Society</b></p> <p>Provide reliable water and sewerage services to enhance public health and environmental protection</p> <p>Contribute to national development by carrying out research and dissemination of results to the water sector</p>

Comparing the mandate of NWSC as spelt out by the above-mentioned legislation with the existing situation enumerated in Chapter Three, it is clear that NWSC is faced with a strategic gap, as specified in Section 3.10. **It is the view of the authors that adaptation of a marketing orientation will close this gap.** In the case of water utility management in low-income countries, it is anticipated that becoming market oriented entails taking the following actions:

- Segment the market according to suitable social-economic criteria.
- Differentiate service levels on a demand-driven approach, bearing in mind the technological suitability of each service level in the different segments.
- Carry out price differentiation for the various service levels.

- Carry out Willingness-To-Pay Studies to confirm demand-responsiveness.
- Promote the service levels to the corresponding market segments.
- Provide suitable customer service for each market segment

These activities should run hand in hand with investments in new infrastructure for bulk supply and distribution, as well pipeline renewal using asset management plans.

Sections 4.2 to 4.12 give proposals for strategic marketing of NWSC urban water services with an objective of providing services to all the residents of Kampala City.

## **4.2 PROPOSED PRICING POLICIES FOR NWSC**

In line with NWSC’s objective of being “...[a] financially self-sufficient organisation, developing and providing water supply and sewerage services to customers at an affordable price”, there is need for the pricing method to strike a balance between cost and market orientations. The prices need to be set to fulfil two objectives simultaneously:

- The tariff should be sufficient to cover operation and maintenance, as well as investment needs of the water utility
- The tariff should be within the range of willingness to pay for services by the consumer.

In order to satisfy the two conditions, it is recommended that:

1. The utility should segment the market according to results of a social map of the city and carry out a willingness-to-pay survey.
2. The appropriate cost for consumers to pay is the “The Long Run Marginal Economic Cost”, which includes both investment and O & M costs. This is approximated by the Average Incremental Cost (AIC) derived by least-cost method of supplying the water. The Average Incremental Cost (AIC) will be used for determining an average tariff that a utility should charge for meeting investment costs for improved services.
3. The tariff should encompass cross-subsidies whenever possible, in order to accommodate low-income consumers, given the high disparity in income levels in Uganda.

In the case of NWSC, substantial amounts of investments were carried out in the 1990s in water production and treatment as well as expansion of the reticulation network. NWSC has been paying interest accruing from these loans, and

is scheduled to commence loan repayment concerned with these projects in the year 2002. The expected loan repayments are too substantial to allow internal financing of capital expenses in the immediate future. However, if expansion of the infrastructure is not made, the revenue collections will stagnate. This situation will result into inability of NWSC to service the loans. A strategic decision has to be made by the sole shareholders, the Government of Uganda about the way forward.

This Strategic Market Plan considers three scenarios of the way forward for NWSC Kampala Water Supply Area:

- Option 1: Consider the historical costs as equity contributions by the Government of Uganda to NWSC, and use the accumulated earnings from Kampala Water Supply Area for the growth of service infrastructure for only Kampala Water Supply Service Area.
- Option 2: Consider the historical costs as equity contributions by the Government of Uganda to NWSC, and use the accumulated earnings from Kampala Water Supply Area for both internal capital expansion, and service extension to other service areas in the country.
- Option 3: Provide for repayments of historical loans, and concentrate on only internal growth of Kampala Water Service Area.

These options have been considered in calculation of tariff, details of which have been presented in Section 4.12.

### **4.3 PROPOSED MARKET SEGMENTATION**

In order to provide meaningful segmentation of the water users in Kampala City, the following factors were considered (Wilson and Gilligan, 1997):

- Is appropriate data available to render the segments measurable?
- Are the segments readily accessible to water utility field staff?
- Are the segments substantial enough to render efforts of differentiation cost effective?
- Are the segments unique so that they can be distinguished from each other?
- Are the segments appropriate to the water utility's objectives and resources?
- Are the segments stable, such that their behaviours in the future can be predicted with a sufficient degree of confidence?

On the basis of these factors, geo-demographic techniques of market segmentation were adopted for the Kampala water consumers. These techniques are based on the belief that "...people with broadly similar economic, social and lifestyle characteristics tend to congregate in particular neighbourhoods and exhibit similar patterns of purchasing behaviour and outlook..." (Wilson and Gilligan 1997, p.281).

It should be noted that it is practically difficult to have precise market segments for a city in low-income countries such as Kampala, with heterogeneous settlements. These segments can only be broad, meant to provide a guide for infrastructure development by the water utility. The segments, which were arrived at using a priori approach (i.e. thought of in advance), were suggested as follows:

1. *Low-income settlements.* These are areas with a high population density, devoid of infrastructure planning. There are no planned roads, with a poor drainage system. In many African countries, low-income settlements are generally located at the fringes of the city, where poor quality land is available. However in Kampala, due to a complex land tenure system, some of the low-income settlements are situated in the centre of the city. These places rarely have any water reticulation system, neither any off-sight sanitation facilities. The electricity grid will more often be poorly and dangerously wired. There are virtually no fixed telephone links. The housing materials used are temporary or semi-permanent, mainly with roofs made of old corrugated iron-sheets, old container sheets or papyrus reeds. The city authority has no control on the housing planning in the area.
2. *Middle Income Areas.* These areas have a medium population density, and may be composed of bungalows constructed on medium-sized plots of land, or housing estates, sometimes composed of blocks of flats. Other than the new houses sprouting in the peri-urban areas, many of such areas are reticulated with water supply. These areas will also be well served with electricity and fixed telephone grids. However, most of such areas will not have a sewerage system, but rely on septic tanks serving individual land plots. The houses will have roof made of either corrugated iron sheets or tiles. The City Council is in control of the physical planning in the area, although the road network may not be paved. Due to the complex land tenure system in the city, there could be a few isolated cases of poor housing structures, which are being gradually being phased out.
3. *High Income Areas.* These are areas with a sparse population, mainly situated near the civic centre of the city. The housing is composed of big bungalows situated on sparse plots of land, with large compounds. Such areas will normally be reticulated with both water supply and sewerage networks. These areas will also have both well-planned electricity and fixed telephone grids. They will also have good drainage and solid waste collection systems. The houses are normally roofed by tiles, and the road network will

normally be paved and well maintained, as well as well lit by security lights.

#### **4.4 PROPOSED SERVICE LEVELS**

After carrying out market segmentation, strategic decisions were made on how the segments will be served with services, a process called market positioning. The service levels were arrived at through carrying out fieldwork. Self-administered questionnaires were sent to high-income areas of Kampala in September 1999. Enumerators administered 149 questionnaires in newly constructed middle-income areas along Kampala-Entebbe Road in December 2000. For low-income settlements, focus group discussions, semi-structured interviews and observations were held during September and October 2000. This section presents results of the findings concerning respondents' preferences based on their capacity and willingness to pay for the services.

##### **4.4.1 High Income Areas**

Results of the customer questionnaire sent out in September 1999 indicate the following results:

- Forty six out of a total of 231 respondents came from areas segmented as high income, as per criteria spelt out in Section 4.3.
- All respondents from this market segment have house connections, 89% of which also have yard taps.
- Nearly all the respondents from this segment (96%) have overhead storage tanks. This is perceived to be a coping strategy against water supply interruptions
- Of the 46 respondents randomly selected from high-income areas, 70% are connected onto the sewerage network, while the remaining 30% use on-site septic tanks for wastewater disposal.
- All those who were not connected onto the sewerage network gave the reason of lack of a sewerage network in their area.
- All respondents from this market segment have flushing toilets in their houses
- Of the 45 people residing in high-income areas who responded on the question concerning pressure of water, 42 of them (93%) perceived the pressure to be adequate most of the time.

- Forty-two respondents from the high-income segment (91%) said there was flow of water at their premises for 24 hours.
- Thirty-seven respondents out of 46 in the high-income areas (80%) said that service interruptions were either never there, or very rare.
- Of the 46 respondents sampled from high-income areas, 43 of them said water was of good quality most of the time or all the time.
- Nearly all respondents from this segment (87%) perceived the water bills to be fair
- Nearly all respondents from this segment (96%) felt the connection fee to be affordable
- Forty respondents from this segment (89%) own their personal cars
- Forty respondents (89%) reported to have had at least university education

It is a fact that in order to boost willingness-to-pay for water services, service levels being suggested should not be poorer than what is currently being offered. From the above findings it is suggested that the high-income segment should be availed with water services with the following attributes:

1. Service through house connections, with yard taps for urban-gardening irrigation and car washing.
2. Enough pressure to carry out miscellaneous activities like urban-gardening irrigation, car wash spraying, and washing machines.
3. A continuous supply of service with minimal interruption.
4. Enough quantity for normal household cores, toilet flushing, and other miscellaneous activities like car washing and urban-gardening irrigation.
5. Good quality water that conforms to WHO standards, to satisfy the curiosity of the well-educated class.

It is therefore proposed to offer only one service level, hereafter referred to as Service Level 1 with the above attributes.

#### **4.4.2 Middle-Income Areas**

Following a customer service and willingness to pay survey carried out in middle-income areas with newly constructed houses in Kampala, the following service levels are being proposed:



Service Level 2: 12-hour water supply through individual household connection

This service level is suitable for newly constructed planned areas with bungalows or maisonettes or which are made of permanent building materials. These houses will most likely have internal plumbing, with internal flushing toilets. These houses will have storage tanks, large enough to absorb water supply interruptions of less than 12 hours a day.

The attributes for this service level are:

- Individual house connection piped water
- Semi-Pressure up to 15 m, able to reach a roof tank of a bungalow or maisonette
- Flow period of about 12 hours a day, supplied on a rationing basis, to be provided at suitable times in the morning and evening
- Good quality water

Service Level 3: 12-hour water supply through individual yard tap

This service level is suitable for old and newly constructed middle-income small bungalows, with no internal plumbing, and therefore served by a pit latrine. These houses may have elevated storage tanks outside the house to cope with water service interruptions.

The attributes of this service level are:

1. Individual Yard connection piped water
2. Semi-Pressure up to 10 m, able to reach a storage tank at the yard tap
3. Flow period of about 12 hours a day, supplied on a rationing basis, to be provided at suitable times in the morning and evening
4. Good quality water

Service Level 4: 12-hour water supply through shared house connection

This service level is suitable for tenement or shared type of houses (locally called 'muzigo') constructed of permanent building materials. Such houses will

normally have no internal plumbing, and will most likely be served by pit latrines.

The attributes for this service level are:

1. Formation of a ‘water neighbourhood co-operation’ by several households through a common need of acquiring a new water connection
2. Piped water supply through a group connection, located in the centre of the neighbourhood, such that members of all co-operating households do not travel more than 50 metres to come to the tap.
3. Contribution of the water bill is dependent on the water usage, and generally according to the size of the household.
4. Semi-Pressure up to 10 m, able to reach a storage tank at the yard tap
5. Flow period of about 12 hours a day, supplied on a rationing basis, to be provided at suitable times in the morning and evening.
6. The water neighbourhood co-operation may decide to improve reliability and construct an overhead storage tank.
7. Good quality water

A customer survey was conducted in the newly constructed middle income areas of South of Kampala to determine preference of the service levels enumerated above. The service levels were designed a priori and presented to the customers during a WTP bidding game. A total number of 95 people responded to the WTP bidding game. Table 4.1 shows the preferences of customers that responded.

**Table 4.1: Service level preferences by respondents in new middle-income housing estates**

Brief Description of Service Level	No of Respondents	Percentage
Service Level 1: Full Pressure House Connection, 24 hrs’ service	17	18%
Service Level 2: Semi Pressure House Connection, 12 hrs’ service	27	28%
Service Level 3: Semi Pressure Private Yard Connection, 12 hrs’ service	8	8%
Service Level 4: Semi Pressure Group Connection, 12 hrs’ service	43	45%

### 4.4.3 Low Income Areas

More fieldwork was carried out in low-income settlements to determine preferences for service delivery in low-income settlements, mainly because this is the stratum that has long been neglected by many water utilities. More often than not, water service delivery to low income areas has been left to the mercy of Non-Government organisations and Community Based Organisations. Individual household service level preferences were solicited through focus group discussions and the data triangulated through semi-structured interviews. Eleven focus group discussions were held in six different sample villages. The data was confirmed by results of semi-structured interviews carried out with 99 respondents, who were heads of households, in six villages.

Costed Option Ranking was used to solicit for respondents' preference. After discussions of advantages and disadvantages of the current service options available to the community, an engineer from the water utility introduces service options that are considered technically and financially optimal for low-income settlements. These service options are labelled with approximate prices, and the respondents are asked to choose in confidence what they think is preferable and affordable to their households. The service levels that were preferred by the communities are described below:

Service Level 5: Individual household connection through a fixed ground tank (trickle feed as used in Durban, South Africa)

The major attributes of this service level are:

1. The water utility appoints a community liaison officer to maintain contact with the low-income communities
2. The communities are mobilised to a point a water bailiff, a resident of the local area, who handles the interests of the utility in the area.
3. The utility extends water to the area through cost-effective low-pressure pipes, the security of which water points is the responsibility of the water bailiff.
4. Agreement is reached upon by community members on a suitable size of tank, whose volume should be enough for daily water requirements for an average household.
5. The utility makes bulk purchases for the tank whose design is such that no water can be drawn from it while it is being filled.
6. Community members make applications for ground tank connections. This is done with a cash deposit to show commitment of the household.

7. The utility makes installation for the committed household, and collects the installation charges from the household in several instalments.
8. The household is expected to pay for the water bills for the payment cycle agreed upon with community members (say one month), upfront. This money is payable to the Utility Cash Office, and a receipt or coupon is provided.
9. The coupon is presented to the bailiff at the beginning of the payment cycle. The bailiff has to open water to the households who have paid for the water, everyday, at an agreed time.
10. The bailiff receives a commission on all the payment made by members of his community.

Service Level 6: Community managed water kiosk

The major attributes of this service level are:

1. Community members come together for the sake of receiving water services from the water utility. They could form a water user committee or be led by an individual, such as a landlord
2. The utility makes a contract with a community representative for a new connection. The water bill would be sent to the community representative.
3. The community agrees on the mode of payment for individual households. The Utility's Community Liaison Officer should be at disposal to assist in coming to consensus between members of different community groups.
4. The community-managed standpipe should be registered as so, and differentiated from a privately operated public standpipe.
5. Payment could either be on a volume basis, or on periodic basis, depending on the size of the community.
6. The Utility representative should be aware how much each member of community group is paying for the water service.
7. In order to improve service reliability, the community could be encouraged to construct an overhead storage tank at the standpipe.

Service Level 7: Privately Operated Public Kiosk

The major attributes of this service level are:

1. NWSC should construct public kiosks in low-income settlements, on a demand responsive approach.
2. Local residents through meetings with a community liaison officer should vet prospective candidates for managing these kiosks.
3. The kiosks are then franchised to the successful candidates.
4. The price is regulated by the utility by displaying the price per jerry can of water.
5. Water is paid for at the time of fetching.
6. The Community Liaison Officer maintains contact with the residents to monitor the performance of the operator.

Service Level 8: Utility supported water vending

The attributes of this service level are:

1. The Utility's Community Liaison Officer initiates a meeting with current water vendors.
2. The vendors are trained and organised into a co-operative society to provide water services to low-income settlements mainly with no reticulation network.
3. The vendors are provided with loans from the utility to improve their working tools and environment. They should also be given a corporate identity of the utility to provide confidence to the water consumers.
4. The utility should construct special filling points for the vendors, which reduce possibility of re-contamination of the water.
5. The price at the end point should be regulated by the water utility.
6. Water vendors should be mobilised to fill the gap in areas where there are shortages due to various reasons.
7. The Utility's Community Liaison Officer should maintain contact with user communities in order to obtain feedback of the service levels being delivered by water vendors.

Service Level 9: Smart token operated water kiosks

The major attributes of this service level are:

1. On a demand-driven approach, and through liaison with community groups, the water utility should construct water kiosks.
2. Pre-paid meters are installed into these kiosks, ensuring that they are well secured.
3. Smart-token cards that operate the pre-paid meters are sold at NWSC cash offices in the different zones, and other designated points, like petrol stations and supermarkets.
4. These designated places will have facilities for reloading the smart-token cards.
5. The utility’s Community Liaison Officer should regular meetings to get feed-back from user communities

Respondents in low-income settlements were asked to make preferences for service levels that they thought could be used by their households, given the prices of the service options. As already mentioned, two research methodologies were used to solicit for this data: focus group discussions, and semi-structured interviews held with individual heads of households. Considering that usage of multiple sources was common in these settlements, respondents were asked to rank, in order of preference, three service options. During the focus group discussions, the respondents their choices privately, using pocket chart voting. Table 4.2 shows results of preferences chosen.

**Table 4.2: Service level preferences by respondents in low-income settlements**

	FOCUS GROUP DISCUSSION (12 discussions, 96 participants)			SEMI-STRUCTURED INTERVIEW (99 respondents)		
	Weighted Sum	% Preference	Rank	Weighted Sum	% Preference	Rank
Individual ground tank	274	33.5	1	374	44.5	1
Public kiosk	168	20.5	2	157	18.7	2
Communal yard tap	103	12.6	5	125	14.9	3
Utility supported vending	116	14.2	3	119	14.2	4
Pre-paid metered kiosk	108	13.2	4	65	7.7	5

Weight Scoring Used: 1<sup>st</sup> preference = 5 points; 2<sup>nd</sup> preference = 3; 3<sup>rd</sup> preference = 1 point.

The results of the focus group discussions and the semi-structured interviews give similar results for the first and second preferences. Perceptions on community yard tap, utility supported vending, and pre-paid metered kiosks vary between focus group discussions and semi-structured interviews. This could

mainly be due to the fact that focus group discussion participants had the benefit of detailed explanations from a utility engineer concerning the operationalisation of the service options. It could be that the three service options required a detailed explanation of management options, which the interviewers, who are non-technical persons, were not conversant with.

#### **4.4.4 Other Water Service Options Not Included in The Study**

Currently, research is going on amongst Development Agencies, Universities, Water Utilities, Research Organisations and other organisations in the water and sanitation sector to develop water service options that will enhance cost recovery, for the benefit of communities that are currently unserved, especially in low-income settlements. Other service options are being pilot tested. There is a need to map out and share experiences for the benefit of all stakeholders. For example, the following service options, which were not included in the scope of the research, could be tried out in Kampala:

- On-selling by private households: There is research evidence that many households on-sell water to their neighbours. This could be occasional, or on a routine basis. However, NWSC has never approved of this practice. It is recommended that this service option be institutionalised to enable extension of services to the unserved, who may be close to households that have house connections.
- House yard tap pre-paid metre: A prepaid metre is installed in the compound of the house, which may, or may not have internal plumbing. The family can then top up their credit using a token. When the credit is exhausted, water will not flow to the house.

### **4.5 WATER DEMAND PROJECTIONS**

In estimating the projected demand for water in Kampala, the following general assumptions on demographics in Kampala have been considered:

- The 1991 Uganda Census figures (Uganda, Statistics Department, Ministry of Finance and Economic Planning, 1994) provided information on urban household expenditure, which reflected the patterns of the income level structures of Kampala for the period up to 1990. The income structure was mapped out as follows:

- Low Income	26.1%
- Middle Income	55.4%
- High Income	18.5%

- Owing to the rural-urban migration that has taken place in the past ten years, it is believed that the social structure has tremendously changed. Therefore approximations for the income structure have been based on the survey carried out in September 1999, in which household expenditure<sup>9</sup> levels were used as a proxy for income structure, as follows:
  - Monthly Expenditure up to Ug. Shs. 500,000: Low Income - 53.7%
  - Monthly Expenditure of between Ug. Shs. 500,001-1,000,000: Middle Income - 35.2%
  - Monthly Expenditure of over Ug. Shs. 1,000,000: High Income - 11.1%
- Owing to the economic growth Uganda is currently experiencing, at an average rate of not less than 5% per annum, combined with Government policies of poverty reduction, it has been assumed that the proportion of high and medium income groups will grow at an annual rate of 2%. This means that the proportion of people in Kampala falling in the low-income bracket will decrease proportionately from 53.7% in Year 0 to 24% in Year 25.
- The average household size in urban areas of Uganda is 4.6 (Uganda, Statistics Department, 1998). However, in the urban areas, a water service line is normally used by people living in the main house as well as in the attached “Boys Quarters”. This phenomenon is tapped by a concept known as the occupancy rate. In the last census carried out in Uganda, the occupancy rate was found to be 1.4 (Uganda, Statistics Department, 1994). Putting the occupancy rate in consideration, a figure of a household size of seven has been used in high- and middle-income areas. This figure is verified by survey results that found a water connection line to have an average of 6.8 people in the high- and middle-income areas.
- The per capita domestic water demand is planned to grow at a rate of 1.25% per annum for house connections, to cater for increased level of affluence for all service levels.
- It is assumed that all water connections will be fitted with meters, which will be maintained properly so that all consumed volumes are measured, and billing done on volumetric rates.

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<sup>9</sup> 1 US\$ =1800 Ug. Shs



#### **4.5.1 Assumptions For High Income Residential Areas**

##### Service Level 1: Full Pressure House Connection

To work out demand projections for high-income residential customers, the following assumptions have been taken:

- One half of the existing house connections are situated in the high-income residential areas.
- All high-income households will prefer Service Level No 1 whereby house connections are offered full pressure for 24 hours a day.
- Demand for water for use by households is estimated using the most recent consumption rates obtained from Table 3.3. Given that between July 1999 and June 2000 the mean monthly consumption for domestic consumers was 60,1660m<sup>3</sup>, each household connection consumed an average of 21 m<sup>3</sup> per month. Therefore given that households have an average size of 7 persons, the average per capita daily consumption is 100 litres.

Details of demand projections are shown in Table A3 in the Annexes.

#### **4.5.2 Assumptions For Middle Income Residential Areas**

Assumptions for calculating demand projections for consumers residing in middle-income areas were:

- Half of the existing consumers with house connections are living in the middle-income areas, and already have a service that can be categorised as Service Level 1, i.e. full pressure house connection, with a 24-hour service.
- The consumers already with Service Level 1 will retain this level of service.
- New applicants in middle-income areas that already have capacity to provide Service Level 1 will continue having that level of service.
- Newly upcoming middle-income residential areas may, as a block, choose to have Service Levels 2, 3 and 4, on a demand-driven approach.
- For individual household connections, household size is approximated at an average of seven. This is the same as for a yard tap connection, since it is assumed one family will exclusively use the yard tap.
- For a shared connection, it is assumed that three families will use one yard tap, i.e. each shared connection will serve 21 people.

- Owing to convenience, water usage, water availability and affordability considerations, it is assumed that the daily per capita consumption will reduce proportionately from 100 litres for Service Level 1 (full pressure, 24 hours' house connection); 80 litres for Service Level 2 (semi-pressure, 12 hours' house connection); 50 litres for Service 3 (a yard tap connection); to 40 litres for an off-plot group connection.
- It is assumed that service levels that are not the conventional full service house connections will mainly be utilised in the newly upcoming residential areas where the reticulation network is still inadequate. As the utility extends services, these service levels will be upgraded to full service house connections.
- The initial proportions for preference of these service levels approximately correspond to the WTP survey results. However, as the reticulation network improves, the full service house connections will take precedence.

Details of demand projections are shown in in the Annexes.

#### **4.5.3 Low-Income residential Areas**

Assumptions for working out demand projections for low-income areas were as follows:

- Basing on the results of semi-structured interviews carried out in low-income areas of Kampala, the average household size has been put at five.
- According to the results of semi-structured interviews carried out in low-income areas of Kampala in October 2000, most of households use about 20 litres of water per person per day during normal periods when there is no water shortage at the piped water taps. This figure has been adopted for all service levels that require a pre-payment on the part of the consumers.
- Per capita consumption for a ground tank has been put at 40 litres per day, since individuals own the tanks, and they are installed at the household premises. This service level has more convenience and a better utility, hence more consumption.
- Per capita consumption for a community-managed kiosk is put at 30 litres per day. This service level has greater application in groups of semi-detached low-income (one or two-roomed) housing units. Because of the proximity of the water point to the family, it is anticipated that the benefits there from will result into higher levels of water consumption.
- It is assumed that a community-managed kiosk will serve about eight families of 5 persons per household.

- It is assumed that public kiosks, which are manned and those fitted with pre-paid, token operated water meters, will serve about 300 people. The number is expected to reduce at a rate of 2% per annum, as the water service coverage in low-income communities improves.
- For utility supported water vending, each vendor is assumed to serve at least 30 families, if their businesses have to remain viable. Therefore, as the service coverage in low-income communities improves, hopefully after Year 12, there will no longer be the need to licence any more water vendors.

Details of demand projections are shown in Table A3 in the Annexes.

#### **4.5.4 Non-domestic Water Demand**

Non-domestic demand is as a combination of water demand from the following categories:

1. Government Departmental Offices
2. Government Parastatal Offices
3. Local Authority offices
4. Private Company Offices
5. Government Institutions like army barracks, police barracks and schools
6. Commercial enterprises
7. Industrial enterprises
8. Other offices and properties like embassies

The assumptions made in estimating projected demand over the planning horizon are:

- Current data on demand for the non-domestic consumption is displayed in Table 3.3 in Chapter 3. Given that annual consumption for the year 1999/2000 was 16,439,877 m<sup>3</sup> for an average of 8612 connections, the average daily consumption is 5.23 m<sup>3</sup> per day. This daily consumption was maintained as a constant for the whole planning horizon.
- Owing to the economic growth rate the Ugandan economy is experiencing, and owing to the vigorous government policy of attracting investors, and liberalising the economy, a factor of 5% per annum has been used as a rate for increase in industrial, commercial enterprises, and other non-domestic consumers.

- Two types of service levels have been identified for commercial and industrial enterprises:
  - Enterprises who use water as a major production factor
  - Enterprises who use water for housekeeping for the staff working in the commercial or industrial enterprise.

The projections for non-domestic demand for a 25-year planning horizon are shown in a Spreadsheet in Table A3 in the Annexes.

## 4.6 INFRASTRUCTURE INVESTMENTS AND PROJECTED COSTS

As already stated in the SWOT analysis, in its endeavour to carry out capital development, NWSC has had tremendous goodwill from external funding agencies and Government of Uganda. Since 1987, the government has secured and guaranteed loans, as well as grants for improvement of infrastructure of NWSC. Government policy has been to secure the grants or loans at concessionary borrowing rates, and on lend them to NWSC at a higher interest rate. The Government has normally on lent the funds at the ruling Treasury bill rate plus 3%. The Treasury bill rate has fluctuated between 6 to 9%. Table 4.3 summarises the status of externally funded loans obtained for and used in Kampala Water Supply Service Area.

**Table 4.3: Loan Portfolio for NWSC Kampala Water Supply Area for the period 1992-1998.**

Source of Funding	<sup>10</sup> Total Loan Million US\$	Loan Date	Project Activity	Interest rate to NWSC	Repayment Period
IDA/WB	16.05	1995	Rehabilitation of distribution network	TB rate + 3%	30
EEC	22.8	1992	Construction of Gaba II Waterworks	TB rate + 3%	25
IDA/WB	2.48	1998	Kampala South Water Supply Project	TB rate + 3%	25
IDA/WB	1.88	1997	Repair of post stressed tanks and meter installation	TB rate + 3%	25
Austria	18.25	1997	Leak detection and repair	TB rate + 3	20
France	1.8	1995	Namasuba Hill water supply extension project	10	10

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<sup>10</sup> 1 US\$ =1800 Ug. Shs

Despite the heavy investment carried out by NWSC, the current population coverage by piped water supply systems in Kampala is estimated at 30%. In order to improve coverage, substantial investments have to be done in water supply capacity. A 10-year master plan availed from NWSC Economist/Planner showed investment plans for Kampala Water Supply Area in various aspects of the water supply system. These include:

- Rehabilitation of the Gaba I Treatment Plant to restore production and treatment to the original capacity, an increment of 30,000 m<sup>3</sup>/day. This project will start this year.
- Expansion of water treatment plant
- Augmentation of transmission mains
- Extension of primary, secondary and tertiary distribution mains
- Augmentation of storage capacity
- Domestic connections
- Non-domestic connections
- Construction of Public standpipes

This Strategic Market Plan has catered for all these projects not only for the ten-year period, but covering the planning horizon of 25 years. In addition, provision has been made for renewing old distribution pipelines. Costs associated with infrastructure investments are categorised into four sections, whose details are enumerated below.

#### 1. Augmentation of Water Production Capacity

- A project funded by EU is currently in progress to rehabilitate Gaba I water treatment plant so as to restore capacity to the design capacity, and this will boost production by 30,000 m<sup>3</sup> per day. This project will be completed by the end of this year.<sup>11</sup> The extra capacity will be available by the beginning of next year, which has been labelled as Year 1 of the planning horizon. This extra capacity is projected to cover 59% of the population by the end of the fourth year of the project.
- A project to expand the production capacity by an extra 50,000 m<sup>3</sup> of water per day is planned in the sixth year of the project. The added production capacity is projected to be sufficient up to Year 11 of the project period.
- The next expansion phase is projected to start in Year 10, when the capacity will be augmented by 240,000 m<sup>3</sup>/day. This capacity is expected to pro-

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<sup>11</sup> This project was completed on schedule by the end of 2002

vide enough water supply for full coverage of the needs of Kampala by the end of Year 17.

- The next expansion phase is projected to start in Year 16, when the capacity will be augmented by 300,000 m<sup>3</sup>/day. This capacity is expected to provide enough water supply for full coverage of the needs of Kampala by the end of the planning period of 25 years.
- The real cost for rehabilitating Gaba I is as per the bids received for the work and is US\$ 2 million. For subsequent plant expansions, estimates for costs were based on cost functions produced by Water Research Centre and presented in their Technical Report TR61 on “Cost Information for Water Supply and Sewage Disposal”, and Cost Index Value dated June 1995. The estimates for total costs of a pumping plant is given by the cost function, (basing on the 1976 real values) shown in Box 4.2 :

**Box 4.2: Estimation of Water Treatment Plant**

$$\text{Total Cost of Installation ('000 British £)} = 0.160 * \text{NORMCAP}^{0.77}$$

Where NORMCAP is the normal total installed capacity in m<sup>3</sup>/hour.

*Source: Water Research Centre (1977, page 116)*

- The cost in the above cost function is then multiplied by a suitable index as provided for by Water Research Centre. After multiplication with the recommended index value, the cost compares favourably with the investment costs incurred on Gaba II construction in 1992.

Table 4.4 shows the projected capital expenditure on improvement of water production capacity.

**Table 4.4 : Projected Capital Expenditure on Water Treatment Plant for the 25 Year Planning Horizon**

DETAILS	TOTAL AMOUNT (Million US \$)	YEAR (S) OF EXPENDITURE
Rehabilitation of Gaba I to restore capacity by an extra 30,000 m <sup>3</sup> /day	2.0	Year 1
Expansion of treatment capacity by 50,000 m <sup>3</sup> /day	29.5	Year 6
Expansion of treatment capacity by 240,000 m <sup>3</sup> /day	63	Years 10 and 11
Expansion of treatment capacity by 300,000 m <sup>3</sup> /day	101.6	Years 16 and 17

**2. Transmission Mains**

- A provision has been made for laying an extra transmission line from Gaba to the Muyenga High Level Reservoir, during the sixth year of the project period. This new pipeline is to account for the increase in production capacity at the end of Year 6.
- It is planned to augment transmission mains from the treatment plant, and between reservoirs in Year 17.
- The costs for laying the transmission mains were estimated using the cost function obtained from Water Research Centre Technical Report No. TR61 on “Cost Information for Water Supply and Sewage Disposal”. The costs are based on the cost function displayed in Box 4.3:

**Box 4.3: Estimation for Transmission Mains**

$$\text{Total Cost ('000 British £)} = 0.0702 * \text{LEN}^{0.73} * \text{DIAM}^{0.91 * (\text{DIAM} / (1000 + \text{DIAM}))}$$

Where LEN is total length of pipe network in meters

DIAM is mean diameter of pipe work in millimetres

*Source: Water Research Centre (1977, page 90)*

- The cost estimates obtained using the cost function shown above are accordingly corrected for inflation. The projected capital costs on transmission mains for the entire planning period are indicated in Table 4.5

**Table 4.5: Projected Capital Expenditure on Transmission Mains for the 25-Year Planning Horizon**

DETAILS	TOTAL AMOUNT (Million US \$)	YEAR (S) OF EXPENDITURE
Laying of transmission main pipe, equivalent to 800mm mean diameter, 10 kilometre long	6.55	Year 6
Laying of transmission main pipe, equivalent to 800mm diameter, 25 kilometre long	12.78	Year 17

### 3. Storage Tanks

- Currently, Kampala Water Supply Service Area has a reservoir capacity totalling to 73,000 m<sup>3</sup>. This storage can last for about 18 hours of the current day's supply requirements. It is not possible to augment the storage capacity in the first five years due to financial constraints.
- Storage capacities can be augmented in Year Six, Seven, Thirteen and Nineteen, as and when financial funds are available. The target is to have at least one day's storage capacity by the end of the project (Year 25)
- To estimate the costs of installation of the new reservoirs, the following cost function from Water Research Centre Technical Report No. TR61 was adopted, as shown in Box 4.4

**Box 4.4.: Estimation of construction costs of concrete reservoir tanks**

$$\text{Total Cost of Concrete Covered Tank (million UK £)} = 0.0726 * \text{CAP}^{0.62}$$

Where CAP is the capacity of tank in thousands of cubic meters.

*Source: Water Research Centre (1977, page 353)*

- Using the Cost Index Values provided, by Water Research Centre, the cost estimates obtained using the above expression are then corrected for inflation. Table 4.6 shows projected capital costs on storage reservoirs.



**Table 4.6 Projected Capital Expenditure on Reservoirs for the 25-Year Planning Horizon**

DETAILS	TOTAL AMOUNT (Million US \$)	YEAR (S) OF EXPENDITURE
Construction of a concrete reservoir of capacity 36,000 m <sup>3</sup>	3.36	Year 6
Construction of a concrete reservoir of capacity 36,000 m <sup>3</sup>	3,36	Year 7
Construction of a concrete reservoir of capacity 224,000 m <sup>3</sup>	5.77	Year 13
Construction of a concrete reservoir of capacity 262,000 m <sup>3</sup>	11.47	Year 19

#### 4. Distribution Costs

Costs connected with distribution of supply to customers were characterised as follows:

- Extension of primary distribution mains to green field areas - These extensions have been done on an annual basis the length thereof is directly proportional to the number of new connections planned for. For the purpose of estimating the projected costs, the length of primary distribution mains are half the length of the secondary/tertiary mains. The projected cost is estimated using a similar cost function used for estimating the cost of transmission pipes, as shown in Box 4.3.
- For primary distribution mains, a mean diameter of 250 mm has been used. The cost obtained using the above cost function was corrected to cater for inflation, as per indices provided by Water Research Centre.
- Requirements for extension of secondary and tertiary distribution mains were estimated basing on British water supply services data. According to Twort, Ratnayaka & Brandt (2000), a built up urban area with a gross density of 40-60 people per hectare has an average of 150-170 number of connections per kilometre of pipeline. For Kampala, a factor to correct for a higher household size (seven as compared to less than three in the UK), a less spacious average plot size, as well a smaller average per capita demand (150 litres/day compared to 288 litres/day, including water losses). After working out the lengths of extensions required for targeted annual increases in new connections, the cost of secondary and tertiary mains was estimated using the cost function reproduced in the previous paragraph. The mean diameter used for secondary/tertiary distribution mains is 150 mm.

- In order to improve reliability of supply, and reduce unaccounted-for-water due to physical losses, a provision has been made to renew aged pipelines. Although NWSC has been using Accounting procedures that provide for depreciation, the funds have not been re-invested into systematic renewal of pipelines. This is especially so prior to 1987, as there was virtually no renewal or extension of pipeline in Kampala. The total number of pipeline in the Kampala Water Supply Area was approximately 500 kilometres as of 1987. Assuming that all pipes that existed prior to 1987 have to be replaced in the 25 years of the project horizon, an average of 20 kilometres of pipe length have to be replaced every year. The cost for each year has been estimated using the same method as for extending services to green field areas. A mean diameter of 150mm was used for working out costs of renew of pipes. This provision will ensure that pipes of diameter of less than 75mm diameter are not re-laid.
  
- In order to ‘market’ the water services effectively, NWSC is required to not only make the procedures for joining the water supply network easier, but to also provide incentives for joining customers. This realisation has been taken on board by the new management, who have already put a provision in the NWSC 10 year master plan, for new connection expenses at an average of about 1million US\$ per year. For this project, a provision has been made as a contribution to new connections at a rate of US\$ 100 per connection.

Table 4.7 shows a summary of projected costs on distribution systems for the project period.

**Table 4.7: Projected Capital Expenditure on Reservoirs for the 25-Year Planning Horizon**

DETAILS	TOTAL AMOUNT (Million US \$)	YEAR (S) OF EXPENDITURE
Extension of primary distribution mains	20.4	Every year
Extension of secondary/tertiary mains	31.54	Every year
Rehabilitation of aged distribution pipelines	12.13	Every year
NWSC contribution to new connections	34.17	Every year

Details of proposed investment plan are shown in Table A3 in the Annexes.

## 4.7 OPERATION AND MAINTENANCE COSTS

Operation and Maintenance Costs used in the financial forecast were based on the most recent data provided by NWSC, valid for the financial years 1999 and 2000. The breakdown is shown in Table 4.8.

**Table 4.8: Breakdown of O & M Costs for NWSC Kampala Water Supply Service Area**

ITEM	<sup>12</sup> ANNUAL COSTS (Million Uganda Shs)	
	Year 2000	Year 1999
Production Costs for Gaba I & Gaba II Waterworks	3,174.7	4,381.2
Maintenance of transmission mains, reservoirs and distribution mains	1,002.8	1,204.5
Other operating costs	3,838.6	6,143.5
Depreciation	4,185.5	2,990.4
Contribution to Headquarters Expenses (73% of total)	3,946.9	3,664.9
<b>TOTAL</b>	<b>16,148.5</b>	<b>18,384.5</b>

Contribution to NWSC Headquarters has been assumed to be proportional to the volume of water produced by the Water Supply Service Area. Kampala currently produces about 73% of the total water supplied by NWSC.

It is expected that efficiency of provision of services will improve following structural reforms NWSC is currently undertaking. However, since the service coverage is expected to improve, the Operation and Maintenance Cost have been left at the 2000 constant figures.

## 4.8 ABILITY TO PAY FOR WATER SERVICES

The Strategic Marketing Plan hinges on the assumption that consumers have an effective demand for the water supplied. Effective demand for water is defined as the quantity of water demanded of a given quality at a specific price. In order for consumers to have an effective demand for the supplied water, they must in the first place be able to pay for it. The ability to pay of the potential consumers was assessed by estimating the total expenditure for the household, as reported by the head of the household. Using the rule of thumb figure of 5%

<sup>12</sup> 1 US\$ =1800 Ug. Shs

of the total household expenditure as an indicator of the maximum ability to pay for water services, an “affordability tariff” (Asian Development Bank, 1999), based on the minimum consumption, was calculated for the three income level groups. Table 4.9 shows the computation for the so-called “Affordability Tariff”.

**Table 4.9: Estimation of Affordability-To-Pay for Water Services in Kampala**

	High Income	Middle Income	Low Income
Average Monthly Expenditure (Uganda Shs.) <sup>13</sup>	1,330,000	793,000	368,900
Minimum expenditure on water (5% of Exp.)	66,500	39,650	18,445
Minimum consumption (Lt per capita per day)	100	60	25
Average Household Size	7.3	7.5	5.4
Affordability Tariff (Uganda Shs./per m3)	3,030	2,937	4,554

The figures for Average Monthly Expenditure, and Average Household size were obtained from the cross-sectional survey carried in September 1999 for respondents living in middle and high-income areas. Data for people living in low-income settlements of Kampala was obtained through focus group discussions and semi-structured interviews held in September and October 2000. The minimum consumption levels stated are estimated on the basis of water borne faucets typically found in houses in different levels of income brackets. A house in a high-income area will have several flushing toilets, and probably built on a large plot with gardens of flowers that require watering. A house in a medium-income area will have one or two flushing toilets, situated on a smaller plot of land, with no demand for garden watering. The house in a low-income settlement will neither have flushing toilets, nor bathrooms or showers that require more per capita consumption.

Data in Table 4.8 above show given the level of service desired, affordability to pay is the same for high- and middle-income categories of consumers. Because the low-income consumers use disproportionately lower amounts of water, their affordability to pay is apparently higher. This disparity is expected diminish as service coverage improves. Figures for the “Affordability tariff” should be used with caution for various reasons:

- It is difficult to estimate the household income, as many of the economic activities in low-income countries are largely informal
- The household sizes of families in urban areas of low-income countries are dynamic in nature

<sup>13</sup> 1 US\$ =1800 Ug. Shs

- There are so many factors that influence the willingness to pay for services, and use of a rule of thumb for a percentage of household income is rather simplistic and inaccurate (DFID, 1998).

The “Affordability Tariff” should be used only as a guide in design of the tariff, but not as an accurate indicator of ability to pay. Research has found that it is better to ask people what they are willing to pay, rather than what they are able to pay. Section 4.9 describes methods used to determine consumers’ willingness-to-pay for services on offer.

## **4.9 WILLINGNESS-TO-PAY(WTP) FOR THE SELECTED OPTIONS**

For effective demand, the water consumers must not only have affordability, but must also be willing to pay for the water services. Willingness-To-Pay for Services was assessed using three methods:

- Contingent Valuation Methods in middle income housing estates that are currently not served by piped water supply.
- Costed Option Ranking of Improved Service Options through Focus Group Discussions in Low Income Settlements that are minimally served by piped water, using the PREPP method (Coates et al, 2004).
- Costed Option Ranking of Improved Service Options semi-structured interviews with individual heads of households living in Low Income Settlements that are minimally served by piped water.

No Willingness-To-Pay surveys were carried out in high-income areas because they are all currently served with piped water services at adequate service levels, as per results obtained in the customer survey carried out in September 1999. A WTP survey will yield realistic results only when respondents are bidding for a service that they perceive will provide substantially higher benefits. Sub-sections 4.10.1 and 4.10.2 present results of the Willingness-To-Pay surveys carried out in Kampala in September to December 2000. It should be noted that the results of the survey might not be generalised beyond the areas in which the survey took place, because of the exploratory nature of the study. Convenience sampling, rather than random sampling was used in the case study areas. It is therefore recommended to carry out more scientific surveys, in order to get more accurate data.

### **4.9.1 WTP Study in middle income areas using contingent evaluation**

Service Levels 1, 2, 3, and 4, as described in Section 4.4.2 were presented to 149 respondents residing in newly constructed housing estates in the middle-income areas. Most of these houses had not been served with piped water by

the time the Willingness-To-Pay survey took place. The interviewer was provided with standard bidding prices based on a per capita water bill per month. The interviewer, having solicited the household size moments earlier, computed in order to mention a bidding price equivalent to a household bill per month. The bidding price steps were made easy multiples of 1000 or 500, to minimise errors in the computations. The results of the survey are tabulated in Table 4.10.

**Table 4.10: Results of the WTP Survey carried out in Middle Income Areas of Kampala.**

Service Level	Bid Price (Ug. Shs/m <sup>3</sup> ) <sup>14</sup>	No of respondents per bid price	No of respondents per Service Level	% for each Service Level	Weighted Mean WTP (Ug. Shs/m <sup>3</sup> )
Service Level 1: <i>24 –hour full pressure house connection with good quality</i>	4,000	1	18	22.5%	2822
	3428	1			
	3,333	5			
	3,000	7			
	*1,800	1			
	*1,500	2			
	*900	1			
Service Level 2: <i>12 –hour semi pressure house connection with good quality</i>	3,333	3	20	25%	2461
	3000	1			
	2,916	1			
	2,500	5			
	*2142	1			
	2,083	8			
	*2,000	1			
Service Level 3: <i>12-hour semi pressure yard tap with good quality</i>	2,500	1	8	10%	1806
	1,944	1			
	1,667	6			
Service Level 4: <i>12-hour semi-pressure group connection with good quality</i>	2000	2	34	42.5%	1058
	1,667	2			
	1,333	3			
	1,000	21			
	*889	1			
	*750	1			
	*667	1			
	*530	1			
	*444	1			
*370	1				
TOTAL			80	100%	

\*Prices offered by respondents as the maximum they could offer for given service level.

Out of 80 respondents who participated in the bidding game, 22.5% chose Service Level 1, and offered a weighted mean price of Uganda Shillings 2,822 per cubic meter. Twenty respondents (25%) opted for Service Level 2, while only 8 respondents (10%) chose Service Level 3, offering weighted mean prices of Uganda Shillings 2461 and 1806, respectively. The new service option of group connection (Service Level 4) attracted the highest number of respondents

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<sup>14</sup> 1 US\$ =1800 Ug. Shs

(42.5%), who offered a weighted mean price of Uganda Shillings 1052 per cubic meter.

At the end of the bidding game for each service level, respondents who had not chosen any marked price were asked to offer a price that they were prepared to pay for the given service level. In the results table, these prices have been distinguished with stars. These prices are lower than what the utility is offering for the given service level. When these offers are omitted, the average weighted WTP goes up to Uganda Shillings 3,221/=, 2842/=, and 1155/= for Service Levels 1, 2, and 4 respectively.

#### **4.9.2 WTP Study In Low-Income Areas Using Costed Option Ranking**

WTP for service levels suitable for low-income settlements was solicited using Costed Option Ranking. Focus group discussions were held with 98 residents of six low-income communities in Kampala, half the number of participants being women. Separate but simultaneous discussions were held for men and women. After the respondents agreed on the need to improve the level of service to the area, an engineer from the utility, with the help of artistic impressions, presented cost effective service options that were perceived to be suitable for providing better services to the community. These service options were arrived at following research carried out in Uganda and other countries faced with similar challenge of enhancing services to low-income communities. The service options were priced according to the current costs. Each of the five service options were discussed at lengths by the participants, highlighting perceived benefits, costs, advantages and disadvantages to both the individual households and the community as a whole. After the discussion, participants were asked to choose the service options that they perceived to be suitable for their individual households, considering the benefits vis-à-vis the households' affordability. The participants ranked three service options in order of preference, through confidential voting, using a pocket chart.

To validate results of the focus group discussions, semi-structured interviews were held in similar low-income settlements. Ninety-nine households were randomly chosen from six villages that are adjacent to villages in which focus group discussions were held. The interview schedule was built along the structure of the focus group discussion guide. Towards the end of the interviews, the respondents were shown pictures of the suggested new service options, and asked to choose three options that they perceived to be suitable for, and affordable to the households, given the price labels on each picture.

The WTP results from both the focus group discussions and the semi-structured interviews held in low-income communities are tabulated in Table 4.11.



**Table 4.11 : WTP results for residents of Low Income settlements**

	Focus Group Discussions		Household interviews		Labelled Price (Shs./m <sup>3</sup> ) <sup>15</sup>
	Weighted Preference	Equivalent % Preference	Weighted Preference	Equivalent % Preference	
Service Level 5: <i>Individual Household Ground Tank</i>	274	33.5%	374	44.5%	2,000
Service Level 6: <i>Community Managed Standpipe</i>	103	12.6%	125	14.9%	1,666
Service Level 7: <i>Utility Supported Vending</i>	116	14.2%	119	14.2%	2,500
Service Level 8: <i>Privately Managed Public Kiosk</i>	168	20.5%	157	18.7%	2,500
Service Level 9: <i>Smart Token Pre-paid Meter Operated Kiosk</i>	108	13.2%	65	7.7%	2,500

It should be noted that these labelled prices were what the engineer thought would be the prevailing market price for each service option. The pricing took into consideration costs of management options for delivery of services. For example where there is private sector involvement in the delivery of services, appropriate provision was made for the earnings of the third party dealer. The labelled price for the improved service options of the ground tank is lower than for the other options mainly because of higher per capita consumption.

#### **4.10 ESTIMATES FOR SERVICE OPTION TAKE UP**

Estimates for the proportion of households' take up of service options in the various income brackets were based on the following assumptions:

- People living in high-income areas will take on only Service Level 1, i.e. house connection with a good quality, 24-hour, highly reliable flow at full pressure.

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<sup>15</sup> 1 US\$ =1800 Ug. Shs

- Initially, the proportions of the service option take up in the other income groups will correlate highly with results of the willingness-to-pay studies. The patterns are expected to remain constant for as long as piped water service coverage in middle- and low-income areas remain far below the population requiring the services.
- It anticipated that when the production capacity is enhanced at the fifth year of the project, and as the water reticulation network is expanded, the water consumption patterns would change: households will demand for more quantity and better quality of water. This will result into take up of better service options, such as house connections. This phenomenon will depend on the rate of development of the physical planning of the city of Kampala.
- As the service levels of utility piped water supply improve, there will no longer be need to license more water vendors. This is anticipated to happen at about the 12<sup>th</sup> year of the project.

Based on these assumptions, service up take was worked out for the successive years in the whole planning period. Details of projected service option uptake are shown in a spreadsheet in Table A3 in the Annexes. Table 4.12 below shows a snapshot of the service level proportions in Year 3, and Year 25.

Table 4.11 shows that a systematic growth in connections of individual ground tank at the expense of privately managed kiosk, which is currently the service option predominantly available to the residents of low income settlements in Kampala. Other service options are also being promoted in order to provide a choice for consumers. It is clear from the table that, the main service option being promoted is a full pressure 24-hour flow service connection. All other service options are transitory in nature, meant to buttress any deficiencies either on the part of the utility, consumer, or both.

**Table 4.12 : Service Level Up Take Comparison for Year 3 and Year 25.**

Income Bracket	YEAR 3			YEAR 25		
	Target Population	Service Level	Market Segment	Target Population	Service Level	Market Segment
High Income	154,840 (11.8%)	Full Service H/Connection	108,220 (100%)	3,109,823 (18.2%)	Full Service H/Connection	582,820 (100%)
Medium Income	490,765 (37.4%)	Full Service H/Connection	127,120 (65%)	1,794,367 (57.7%)	Full Service H/Connection	1,312,20 (73%)
		Semi Service H/Connection	25,200 (13%)		Semi Service H/Connection	283,500 (16%)
		Semi Service Yard Connection	10,500 (5%)		Semi Service Yard Connection	56,000 (3%)
		Semi Service Group Connection	31,500 (16%)		Semi Service Group Connection	154,350 (9%)
Low Income	667,913 (50.9%)	Individual H/Hold Ground Tank	12,058 (4%)	746,357 (24%)	Individual H/Hold Ground Tank	97614 (14%)
		Community Managed Kiosk	12,058 (4%)		Community Managed Kiosk	106598 (15%)
		Privately Managed Public Kiosk	171,251 (60%)		Privately Managed Public Kiosk	344,930 (47%)
		Utility Managed Water Vending	29,550 (10%)		Utility Managed Water Vending	65,233 (9%)
		Prepaid Token Operated Kiosk	26,595 (9%)		Prepaid Token Operated Kiosk	106146 (15%)

#### 4.11 AVERAGE INCREMENTAL COSTS COMPUTATION

Findings of a marketing audit of NWSC Kampala Water Supply Area carried out in 1999 and 2000, and presented in Chapter 3 point to a service gap. As already pointed out in Section 4.2, in order to meet investment costs for improved service coverage, full cost recovery should espouse a tariff that is based on Average Incremental Costs (AIC). Spreadsheets were used to work out AIC for NWSC Kampala Water Supply Area for a planning horizon of 25 years. In order to work out AIC, the following steps were followed:

1. Estimating present and future population for each successive year of the project period. The 1996 Population Survey figures were used to derive population projection for the current year, which is labelled Year 0 in the Spreadsheets. Using a 4% population growth rate predicted by the 1996 Survey data, projected populations for Kampala City were worked out for

each successive year of the project horizon. Details are shown in Table A3 in the Annexes .

2. Establishing current service levels, together with the current production. Details of these computations were presented in Chapter 2, and Section 4.5.
3. Estimating the number of persons to be connected each year, basing on the various service option uptakes on a year-to-year basis. Further details have been presented in a spreadsheet shown in Table A3 in the Annex, and the results have been discussed in Sub-section 4.11.1.
4. Estimating domestic water consumption patterns, putting into consideration the water consumption before-project, and estimated incremental demand, created as a result of anticipated improved level of services in terms of increased flow time, reliability, pressure and customer service. The assumptions on which these estimates are based have been detailed in Section 4.5., in the Annexes, shows a spreadsheet where computation for domestic water consumption has been computed for the project period.
5. Estimating non-domestic water consumption, putting into consideration increase of economic activities due to national economic growth. Assumptions have been presented in Section 4.5, and computations shown on spreadsheet in Table A1, in the Annex .
6. Providing for realistic UFW rate in a demand estimate for Kampala Water Supply Area. This estimate relates to the existing UFW rate and realistic targets for UFW reduction. The current unaccounted-for-water figure is 49%. Given a program for replacing old mains at a rate of 2 kilometres per year, coupled with improvement of management of metering, meter reading, and billing processes, it is projected that UFW will be reduced at a rate of 5% per annum in the first five years, and a rate of 3% in the subsequent years.
7. Providing for non-payment of bills by some customers, which have to be written off eventually. Bill Collection Efficiency in Kampala Water Supply Service Area was at an average of over 100% for the period July 2000 to January 2001. However, for a more rigorous and realistic AIC, the Bill collection Efficiency has been fixed at 90% during the entire project period.
8. Providing for a peak day factor for the water production plant. Given that a target for storage capacity for one day's consumption requirements, a peak day factor of 1.2 has been adopted.
9. Working out what and when infrastructure investments are required. Assumptions for investment decisions are discussed in Section 4.7 and detailed computations are presented in a spreadsheet in Table A2, in the Annex .

10. Working out the operation and maintenance costs. Discussions on this aspect have been presented in Section 4.8.
11. Establishing the discount factor at which the AIC computations will be based. For the purpose of this Strategic Marketing Plan, a discount factor of 8% has been chosen to coincide with the social equity interest rate at which the Government of Uganda has been on lending internationally secured loans and grants to NWSC.
12. After obtaining all the required data, Excel spreadsheets were used to compute the Average Incremental Costs (AIC) as per formula shown in Box below.

**Box 4.5: Calculation of Average Incremental Cost**

$$AIC = \frac{\sum (\text{Present Value of Annual Total Costs in US\$})}{\sum (\text{Present Value of Total Annual Production in m}^3)}$$

A sample spreadsheets for computations of Average Incremental Costs for Kampala Water Supply Service Area (for a project period of 25 years) is shown in the Annex. Average Incremental Costs have been computed for several scenarios with different assumptions. Typical scenarios that will be considered in the Section 4.12 are:

1. When it is assumed that repayment of historical loans is catered for under the depreciation, or as an equity contribution by the Government, but Kampala Water Supply Service Area provides subsidies to other service areas – a sample computation is shown in Table A4, in the Annex.
2. When historical loan repayments are assumed to be a contribution to equity by the Government of Uganda, or it is assumed that they will be paid off by depreciation charges, and are not included in the computations.
3. When loan repayment requires being re-scheduled to enable freeing of fund for capital investments at the beginning of the project.
4. When both loan repayment and subsidies are included as distinct items in the AIC calculations.

## 4.12 TARIFF CALCULATIONS AND CASHFLOW PROJECTIONS

NWSC operates a block-increasing tariff that has an element of subsidisation embedded in it. One of the problems NWSC is faced with in its endeavour of optimising revenue collection is the complexity of the tariff structure, which is not backed by a billing management system. Additionally, many customers have expressed their dissatisfaction with the tariff structure. In the past, NWSC has commissioned consultants who have made recommendations for revising the tariff structure. In November 2000, some provisions of the tariff structure were revised through a government statute. However, provisions concerned with water rates were remained untouched. It is recommended that in designing a new tariff for Kampala Water supply Service Area, the following principles should be considered:

- The tariff should be *conserving*, by considering water as an economic good. The consumers who use more water should pay more.
- The tariff should generally be *adequate*, so that the Utility to carry out operation and maintenance of the systems, and be able to expand its services to the designated areas of service to the consumers and to the national economy
- The tariff should be *fair*, such that there is cross-subsidisation in favour of the socially disadvantaged in society, to enable them receive lifeline water supply for health benefits.
- The tariff structure should be *flexible* and responsive to changes in the water supply sector.
- The tariff should be *enforceable*, to make the role of the utility manageable
- *Simple* enough for the consumers to understand.

The current practice in NWSC is that the tariff for Kampala Water Supply Service Area is based on operations of NWSC nation-wide. Kampala is the largest water supply service area in the country, and therefore benefits from economies of scale, making operational costs lower than for the other service areas. Furthermore, Kampala being both the administrative and business capital city of Uganda, the customers therein are more affluent and have better incomes than their counterparts in other areas. Kampala therefore accounts for over 70% of NWSC's water consumption and revenue.

The proceeding sub-sections provide examples of setting tariffs based on three different scenarios that could apply to NWSC. It should be noted that the data used is mainly based on estimates. The tariff formulation is only to serve as an example of following certain principles.

#### **4.12.1 Scenario 1: No Repayment of Historical Loans; No Cross-Subsidies**

The main assumptions under this scenario are that the historical loans are taken on by the Central Government as their contribution of equity to the organisation. This action is necessary to enable NWSC carry out investments so that they can become self-sustaining. Table 4.13 presents vital features of the proposed tariff, and compares estimated monthly household bills with respondents willingness-to-pay for services as projected from the data presented in Section 4.9.

Table 4.13 shows that for all categories of domestic service options, household water bills based on the proposed tariff are lower than the estimated monthly willingness-to-pay for the services. The gap is higher for categories projected to take up Service Levels 1, 2, and 3, despite more benefits expected from higher consumption rates. This is a clear demonstration that the tariff could be modified to allow for further cross-subsidisation for the benefit of the poor members of society.

With the assumptions stated above, and charging tariffs shown in Table 4.13, there is a cumulated surplus every year all through the project period. All the infrastructure expansion projects can be financed from internal sources. Table 4.14 shows a cash flow projection for the project period, giving details at intervals of five years.

**Table 4.13: Scenario 1-Proposed Tariff vis-à-vis Household WTP (Without offering subsidies)**

Category of Consumer	Water consumption Details	Water Rates (US cents/m3)	Approximate H/H Monthly Bill (1 US\$ = 1800 Ug. Shs)	Estimated H/H monthly WTP (Ug. Shs)
High Income Domestic	SL 1:First 6 m3/month	30	18,500	38,900
	Consumption > 6m3	45		
Middle Income Domestic	SL 1:First 6 m3/month	30	18,500	38,900
	Consumption > 6m3	45		
	SL 2:First 6 m3/month	30	14,500	27,100
	Consumption > 6m3	45		
SL 3:First 6 m3/month	30	11,500	14,900	
Consumption > 6m3	45			
SL 4:First 6 m3/month	30	7,000	11,100	
Consumption > 6m3	45			
Low Income Domestic	SL 5: Ground Tank	30	3,500	12,000
	SL 6: Community Kiosk	25	2,500	9,900
	SL 7: PSP Kiosk	25	1,600	7,500
	SL 8: Utility water vendor	25	1,600	7,500
	SL 9: Prepaid token kiosk	25	1,600	7,500
Government Offices/Inst.	All consumption	55		
Educational Institutions	All consumption	55		
Other Office Premises	All consumption	55		
Commercial/Industrial Enterprises	First 30m3 per month	65		
	Consumption > 30 m3	80		

Using accumulated earnings, big infrastructure expansion projects are due for financing in phases during the sixth and seventh year; tenth and eleventh years; and sixteenth and seventeenth years. This will ensure that service coverage is enhanced, as shown in Table 4.14.



**Table 4.14 : Snapshot of Cash flow projections and service coverage (option of service expansion and O&M)**

	Year1	Year 5	Year 10	Year 15	Year 20	Year 25
Year's Earnings/Deficit (m US\$)	4.15	9.5	-16,01	19.54	19.54	63.57
Accumulated Earnings (m US\$)	5.7	35.37	26.77	68.67	85.50	352.18
Average Tariff (US\$/m3)	0.67	0.64	0.61	0.60	0.59	0.56
Service Coverage	36%	51%	62%	69%	87%	100%

#### **4.12.2 Scenario 2: Payment of either Historical Loans, or Cross-subsidies**

In this scenario, provision is made for payment of either historical loans, or cross subsidies to other service areas in the country. NWSC is expected to service the loans that were obtained in early 1990s for rehabilitation and expansion of the infrastructure. The details of these loans have been shown in Table 4.3. A copy of the loan repayment commitment availed from NWSC showed that following a loan reschedule provided by Government, NWSC committed itself to make repayments as follows:

- 13.5 billion Uganda Shillings in the financial year 2002/2003 (US\$ 7.5 million)
- 15 billion Uganda Shillings in the financial year 2003/2004 (US\$ 8.3 million)
- 16 billion Uganda Shillings in the financial year 2004/2005 (US\$ 8.8 million)

The balance carried forward in 2004/2005 would be 26 billion Uganda Shillings (14.45 million US\$). The debt repayment burden from historical loans is expected to go on for up to 25 years. From analysis done, it is not possible to conform to this loan repayment schedule, and be able to capitalise the infrastructure expansion projects are critical for growth of NWSC. It is therefore recommended that NWSC should seek for a debt repayment re-scheduling for at least 15 years. In the first fifteen years, NWSC could be servicing payments due from interest charged on the loans. Thereafter, principal payments could be accomplished for the remaining ten years of the project period. For example, if a provision is made for a payment of 3 million US\$ in the first 15 years, and repayments of equal instalments of 20 million US\$ in the subsequent 10 years, the AIC works out as 65 US cents per m3.

Currently NWSC Kampala Water Supply Service Area contributes about 6.5 million US\$ per year to the Headquarters poor, for financing deficits that occur in secondary towns run by NWSC. These towns include Mbale, Tororo, Masaka, Mbarara, Lira, Gulu, Kasese, Fort Portal, and Kabale. Furthermore, the

Government of Uganda would prefer that NWSC takes over more secondary towns. If, as an example, a provision is made for stepped annual subsidies of 8 US\$ in the first five years; 10 million US\$ in the next five years, 15 million in Year 11 to Year 15; 20 million in the next five years, and 25 million US\$ in the last five years of the project, the AIC is US cents 55 per m<sup>3</sup>.

Although the AIC for the option for offering subsidies is lower than AIC for repayment of historical loans, both options require tariffs as much similar water rates, in order to ensure a good cash flow trend. Table 4.15 shows vital features of an example of a tariff structure that could be set to accomplish one of the two options enumerated above: either repayment of historical loans, or offering subsidies to NWSC secondary towns.

**Table 4.15: Scenario 2 - Proposed Tariff vis-à-vis Household WTP (Provision for loan repayment)**

Category of Consumer	Water consumption Details	Water Rates (US cents per m <sup>3</sup> )	Approximate H/H Monthly Bill (1 US\$ =1800 Ug. Shs)	Estimated H/H monthly WTP (Uganda Shs)
High Income Domestic	SL 1:First 6 m <sup>3</sup> /month	30	22,000	38,900
	Consumption > 6m <sup>3</sup>	55		
Middle Income Domestic	SL 1:First 6 m <sup>3</sup> /month	30	22,000	38,900
	Consumption > 6m <sup>3</sup>	55		
	SL 2:First 6 m <sup>3</sup> /month	30	17,000	27,100
	Consumption > 6m <sup>3</sup>	55		
Low Income Domestic	SL 3:First 6 m <sup>3</sup> /month	30	12,000	14,900
	Consumption > 6m <sup>3</sup>	55		
	SL 4:First 6 m <sup>3</sup> /month	30	8,000	11,100
	Consumption > 6m <sup>3</sup>	55		
Government Offices/Inst.	SL 5: Ground Tank	30	4,000	12,000
	SL 6: Community Kiosk	30	3000	9,900
	SL 7: PSP Kiosk	30	2,000	7,500
	SL 8: Utility water vendor	30	2,000	7,500
	SL 9: Prepaid token kiosk	30	2,000	7,500
Government Offices/Inst.	All consumption	60		
Educational Institutions	All consumption	60		
Other Office Premises	All consumption	60		
Commercial/Industrial Enterprises	First 30m <sup>3</sup> per month	70		
	Consumption > 30 m <sup>3</sup>	90		

The tariff structure shows that all categories of consumers would be affected. However, all the new water rates are set to be lower than the estimated household willingness-to-pay for water services. Table 4.16 shows a snapshot of

cash flow projections and service coverage for the option of loan repayment, at intervals of five years.

**Table 4.16: Snapshot of Cash flow projections and service coverage (option including historical loan repayment)**

	Year1	Year 5	Year10	Year15	Year 20	Year 25
Year's Earnings/Deficit (m US\$)	3.56	9.74	-14.54	23.11	27.38	60.12
Accumulated Earnings (m US\$)	5.22	34.55	30.73	85.42	44.95	283.54
Average Tariff (US\$/m3)	0.76	0.73	0.70	0.69	0.67	0.66
Service Coverage	36%	51%	62%	69%	87%	100%

**4.12.3 Scenario 3: Payment of both Historical Loans, and Cross-subsidies**

This section deals with a third scenario whereby simultaneous provision is made for both payment of historical loans, as well as cross subsidies by Kampala Area to secondary towns. If both options follow assumptions outlined in Section 4.12.2, a tariff structure with vital features shown in Table 4.17 could financially sustain Kampala Water Supply Service Area.

Table 4.17 shows that bills for all categories of consumers would fall under the estimated WTP for water services as solicited in the survey carried out in September and October 2000. With the type of tariff shown in Table 4.17, the utility would be able to generate enough funds to capitalise the expansion projects. With matching improvements in institutional capacity, coupled with a marketing orientation, service coverage would be dramatically enhanced.

**Table 4.17: Scenario 3 - Proposed Tariff vis-à-vis Household WTP (Providing for historical loan repayment and cross-subsidies)**

Category of Con-	Water consumption Details	Water	Approximate H/H	Estimated
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sumer		Rates (US cents per m3)	Monthly Bill (1 US\$ = 1800 Ug. Shs)	H/H monthly WTP (Uganda Shs)
High Income Domestic	SL 1:First 6 m3/month	45	23,000	38,900
	Consumption > 6m3	55		
Middle Income Domestic	SL 1:First 6 m3/month	45	23,000	38,900
	Consumption > 6m3	55		
	SL 2:First 6 m3/month	45	18,000	27,100
	Consumption > 6m3	55		
SL 3:First 6 m3/month	45	13,000	14,900	
Consumption > 6m3	55			
SL 4:First 6 m3/month	45	9,000	11,100	
Consumption > 6m3	55			
Low Income Domestic	SL 5: Ground Tank	40	5,500	12,000
	SL 6: Community Kiosk	30	3000	9,900
	SL 7: PSP Kiosk	30	2000	7,500
	SL 8: Utility water vendor	30	2000	7,500
	SL 9: Prepaid token kiosk	30	2000	7,500
Government Offices/Inst.	All consumption	60		
Educational Institu- tions	All consumption	60		
Other Office Premises	All consumption	60		
Commercial/ Industrial Enter- prises	First 30m3 per month	70		
	Consumption > 30 m3	90		

Table 4.18 shows a snapshot of cash flow projections and service coverage at intervals of five years, for the option in which both historical loan repayment, and cross-subsidisation are provided for.

**Table 4.18: Snapshot of Cash flow projections and service coverage (option providing for both historical loan repayment and cross-subsidisation)**

	Year1	Year 5	Year10	Year15	Year 20	Year 25
Year's Earnings/Deficit (m US\$)	3.61	10.19	-13.78	24.27	29.39	63.07
Accumulated Earnings (m US\$)	5.47	36.29	35.61	95.12	62.68	314.23
Average Tariff (US\$/m <sup>3</sup> )	0.77	0.74	0.72	0.70	0.68	0.67
Service Coverage	36%	51%	62%	69%	87%	100%

## 4.13 CHAPTER CONCLUSION

Given the strategic gaps revealed in Chapter 4, this chapter has presented proposals that could use strategic marketing principles to improve efficiency and effectiveness of NWSC in Kampala Water Supply Area. Customer research using cross-sectional surveys and focus group discussions have shown that many potential consumers are able and willing to pay for water services if they participate in decision making.

Many urban water utilities are trapped in a vicious circle of poor revenue collection, leading to low investments, or vice versa. In order to break the circle, water managers, who are often engineers by profession, must step out of their drawing offices and get to the people. They must shake off their supply-driven approach that often focuses on various 'design criteria', and become demand responsive in order to maximise customer satisfaction and income. The people should be consulted about what they want, what they need, what they can afford, and how they can pay.

This approach requires a change in the organisational philosophy to become market oriented. Market orientation requires that an organisation get customer focused, while at the same time focusing on long-term profitability. Research has shown that market orientation of an organisation is highly positively correlated to its business performance, regardless of the market turbulence, competitive intensity, or technological turbulence of the operating environment (Jaworski and Kohli, 1993; Slater and Narver, 1994).

Although this project had a limited scope, it has been demonstrated in this chapter that a marketing approach can be followed in the development of water service provision. Preferences for service options were solicited from typical strata of consumers in Kampala City. Estimates for willingness-to-pay for the preferred service options were also obtained. Current billing was collaborated with self-reported consumption rates to estimate household consumption rates. Provision was made for infrastructure investments. Using AIC methods, a tariff structure was designed whose water charges compare favourably with Willingness-To-Pay figures for all segments of society. NWSC was basically formed with a primary objective of serving all people in the designated service areas. The presentation made in this chapter show that this objective could be fulfilled

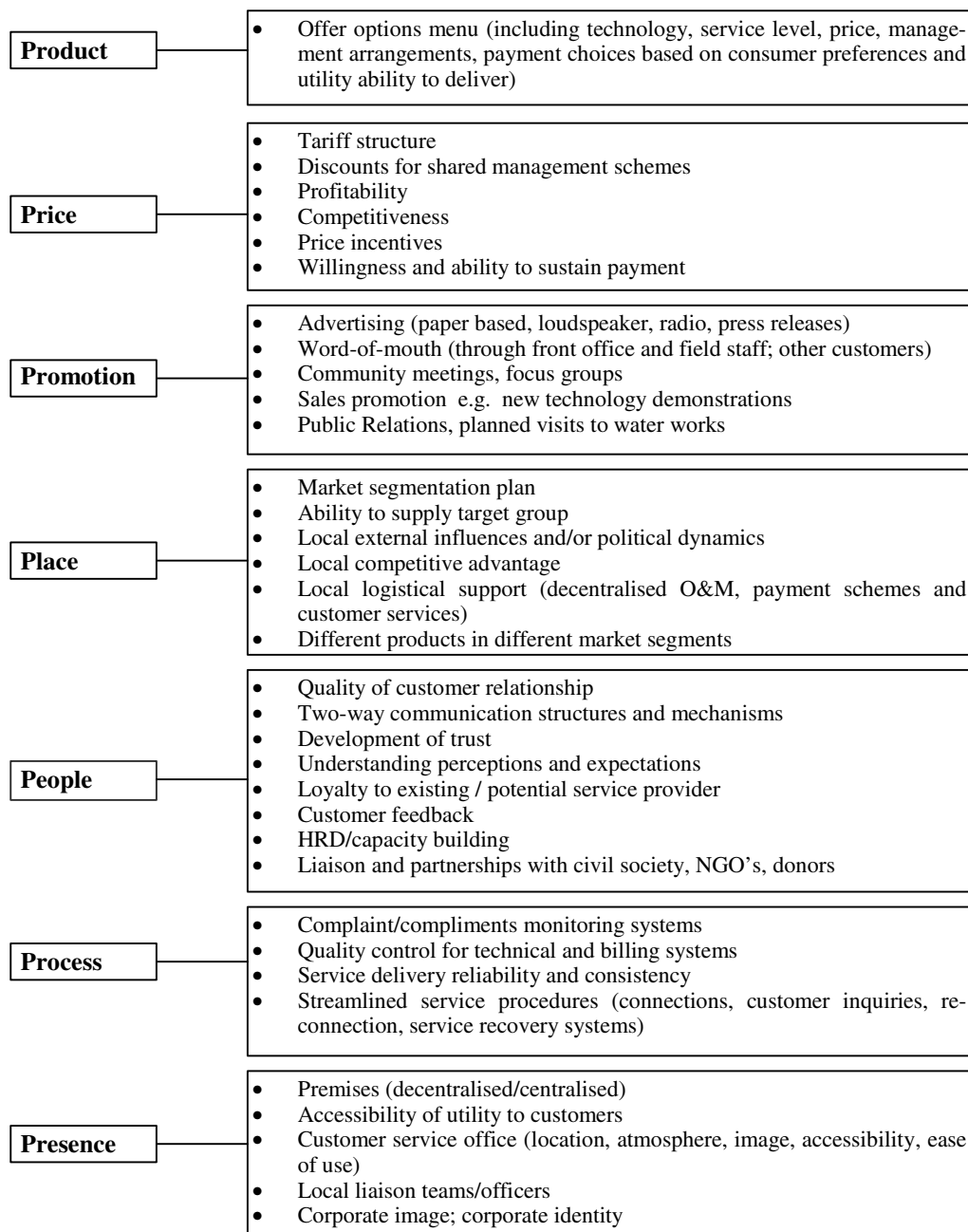
in the next 25 years, using strategic marketing principles. The next chapter will explore concrete measures that should be taken by NWSC reach this noble objective.

## 5. HOW MIGHT NWSC GET THERE?

### 5.1 MARKETING CHOICE: THE SEVEN Ps MARKETING MIX

After segmenting the market, the next task is to make an appropriate choice of marketing activities that actually deliver services perceived to be of value to the customers. The means by which such ideas are turned into reality is what is known as the marketing mix. Figure 5.1 shows a typical marketing mix.

**Figure 5.1: A typical 7Ps Marketing Mix** (Adapted from Brassington & Pettitt, 2000).



Implicit in strategic marketing is the satisfying of customer needs and demands. In the water and sanitation sector this concept is increasingly expressed as being 'demand responsive', which is a deliberate move away from the supply driven traditions of large scale water and sanitation projects that have often proved unsustainable. Being 'demand responsive' involves the development of a process approach to service delivery that is based on dialogue and trust between the supplier (the utility) and the consumer (the household and/or community). Because different segments have different needs and capacities, there is need for the utility to get the right 'marketing mix'.

The 'mix' in marketing is key because satisfying customers' needs is dependent on adequate attention to all the marketing mix elements. For example, the introduction of communal managed standposts or water kiosks that are supplied with water by a utility (*product*), will be more effective with good communication (*people and promotion*), in appropriate areas (*place*), at competitive and fair tariffs (*price*), through a *process* where trust between parties develop and a win-win outcome results. Adequate *presence* of the utility is also important in terms of accessibility to the utility for customers and other key stakeholders, as well as a positive image projected by the utility of itself as a capable organisation devoted to service improvement for all consumer groups (Sansom, Coates, Njiru & Franceys, 2000). The proceeding sections briefly discuss some of the prerequisites for achieving an optimum marketing mix.

## 5.2 INFRASTRUCTURE IMPROVEMENTS

Analysis of the existing situation carried out in NWSC and presented in Chapter Three showed that service coverage in Kampala is hampered by inadequate reticulation network. The places most hit by this problem are the low-income settlements, which have been neglected by service providers, partly due to poor physical planning. Currently, the water treatment plant is being operated at a practical capacity utilisation of 77%. In essence, there are limitations on how much water can be sold, caused by inadequate reticulation network. Furthermore, the high Unaccounted-For-Water rates of up to 50% translates into a potential availability of production capacity if efficiency could be enhanced by reducing both physical losses in the distribution network and billing management losses.

This Strategic Marketing Plan provides suggestions for infrastructure improvements in a planned and sustainable manner. Details of the suggested infrastructure improvements are presented in Section 4.7. In summary, the suggested infrastructure improvements involve the following items:

Rehabilitation of the Gaba I Treatment Plant to restore production and treatment to the original capacity, an increment of 30,000 m<sup>3</sup>/day. This project will start this year. This will ensure availability of water for an increase of service coverage from the current 31% of the people living in the service area, to 55%



of the projected population by the end of the third year of the project period. Harnessing the production capacity would double the population served to about 720,000 people by the end of the third year.

If the pace of service coverage has to be maintained, there is need for further expansion of water treatment plant by the beginning of the fourth and fifteenth years of the project period. This entails spending about US\$38.4 million in each of the second and third years, and US\$ 47.3 in each of the 13<sup>th</sup> and 14<sup>th</sup> years, respectively.

Once the production capacity is expanded, the carrying capacity of the transmission mains has to be increased in the same pace. Furthermore, new bulk supply mains interconnecting service reservoirs have to be installed as the geographical coverage expands. A provision has therefore been made to spend US\$ 6.55 million in the first year, US\$ 10.86 million in the third year, and US\$ 10.86 million in the 14<sup>th</sup> year of the project.

Normal practice recommends for having a storage capacity equivalent to about 24 hours' demand projections, depending on the operating circumstances (Twort et al, 2000). This storage is required for balancing fluctuating demand from the distribution system; providing suitable pressure and reducing pressure fluctuations; and providing water supply during failure of treatment plant or shut down for routine maintenance. Currently, NWSC Kampala Water Supply Area has got a total storage capacity of 72,000 m<sup>3</sup>. This capacity is equivalent to about 75% of the current production. Since it is planned that production will be increased in the first year of production, it is recommended that storage capacity be increased during the same period, to cater for storage requirements up to Year Five. Further augmentation of the storage capacity is recommended in Year 5, Year 10, and Year 17.

One of the most critical areas for attention is extension of primary, secondary and tertiary distribution mains to enable service coverage to areas that have not had supply in the past. NWSC management has acknowledged this shortcoming and substantial internal financial sources have been used in the recent past to cover some geographical extensions. However, the internal funding has been too inadequate to create an impact. There is therefore need to commit more funding on this important aspect of water supply management. Initially, depending on the production capacity available, it is projected to spend an average of US\$ 2 million on extension of primary, secondary and tertiary distribution mains. Investment on extension of distribution mains is expected to increase in the later part of the project period.

In order to reduce physical losses and avail more water in the distribution system, provisions have been made for asset management plan, whole main objective is replacement of non-economical existing distribution mains. An average of 10 kilometres has been earmarked for replacement every year of the project. This is projected to cost about US\$ 500,000 per annum.

When NWSC has got production and reticulation network capacity, the next action proposed is to promote the services. One of the recommended promotion tools is practically make the joining of the water reticulation network easy and affordable. NWSC already have highlighted this promotion tool in the “Greater Kampala Water Supply Master Plan”. It is proposed to provide an incentive to a consumer for joining the water supply system, in form of capital contribution to the connection charges. A nominal contribution of US\$ 100 per new connection has been proposed for the purpose of making calculations for the AIC. This contribution will make a big impact in service coverage, particularly in the low-income urban settlements, where lack of capital contribution has been cited as one of the obstacles to using utility piped water.

### **5.3 UTILITY INSTITUTIONAL IMPROVEMENTS**

As already presented in Chapter 3, NWSC management has realised the need for institutional strengthening and has instituted reforms to make NWSC commercial oriented. This process will make the organisation more efficient. It is recommended that NWSC management should espouse marketing orientation as the leading business philosophy, since commercial orientation is part and parcel of marketing orientation.

Research carried out in Strategic Management (e.g. Pearson, 1993; Fritz, 1996) has shown that no single orientation is sufficient for corporate success, and that the orientations are not mutually exclusive. On the other hand, a business orientation was posited to be the degree to which one functional orientation dominates the way of thinking in the organisation, and consequently how decisions are taken and implemented. Pearson (1989) underscored the importance of consistency between business orientation and strategic focus. (Pearson 1993) described strategic focus as the extent to which a business has a clear strategic direction that is known, understood and supported by all organisation members. If the business orientation does not tally with the strategic direction the organisation members will at best be confused and at worst cynical and alienated.

Research carried out among managers identified the following antecedents of market orientation (Jaworski and Kohli, 1993): (i) engendering the market orientation culture by top management; (ii) a level of risk taking by top management; (iii) interdepartmental connectedness; (iv) decentralised decision-making; (v) market-based staff reward systems. However, formalisation and departmentalisation do not bear any relationship with market orientation, while interdepartmental conflicts are negatively related to market orientation. Another study showed a strong correlation between market orientation and degree of job satisfaction, commitment to the organisation, and individual employees’ trust in management (Reukert, 1992).

It is therefore important that NWSC management should set the pace for strengthening the organisational culture that is customer responsive. The seed

of customer orientation has already been planted. However, more effort from the organisational leadership is required to create momentous impact that will overcome inertia of product/production orientation that is common in engineering-based public utilities. Some of the steps recommended are enumerated below:

- Basing recruitment of frontline staff on customer service orientation
- Basing rewards/disincentives criteria on customer service enhancement
- Training of staff in customer service
- Internal customer care should be enhanced, as the customer contact staff will provide the same type of care to customers as they have received from their fellow staff or superiors.
- Making the organisational structure leaner in order to make it more responsive to the needs of the market.
- Strengthening the management information system and enhancing inter-departmental connectedness for the benefit of smoothness of information flow about, from and to the market.
- Setting up a marketing information system that will provide information for taking strategic decisions. This includes routine customer surveys, focus group discussions, market intelligence systems, stakeholder perceptions and opinions, public image perceptions etc.
- In order to make rapid progress in service coverage of low-income settlements of the city, it is necessary to appoint person(s) with a relevant specialisation in the social dynamics of low-income communities. The officer(s) will be in charge of liaison of NWSC with the different communities, the city council officials, non-governmental organisations, community-based organisations, and any other relevant stakeholders.

#### **5.4 SERVICE & PRICING DIFFERENTIATION**

The cornerstone for the Strategic Marketing Plan is market segmentation, service and pricing differentiation. Chapter 4 provided an example of how this exercise can be accomplished. Research was carried out only in selected areas of the city. The villages and respondents were picked through convenient sampling. It may not be accurate to generalise the results of data obtained to the whole of the city. Market segmentation should be done with a view of optimising on service differentiation. The segments should not only be unique, but also substantial enough to render service differentiation cost effective. Each market segment could be provided with one service option, or several service options, depending on the targeting and positioning strategic decisions. In the water

supply services, every consumer in the long run strives for a service option that provides maximum benefits to the household, i.e. a 24-hour continuous, reliable flow; an optimum water pressure for the uses of water in the household on industry; and a good water quality. However, due to the prevailing economic conditions, these optimum conditions may not be available in many cities of the low-income countries, because of inadequacy on the part of either the water service provider, the consumer or both.

Service differentiation is a stopgap measure intended to bridge the gaps. Service differentiation requires the input of all the different disciplines in the organisation. The marketer, the social scientist, the engineer, the cost accountant and other experts in the organisation work in unison to come up with suitable service options. The service options should be acceptable to the consumers, but at the same time provide financial benefits to the organisation, in line with its strategic objectives. This is the bottom line of marketing orientation. Service differentiation is therefore a precursor to price differentiation. Price differentiation, which is accomplished through design of an optimum tariff structure, is a measure of fulfilling the objective of social equity that is paramount in urban areas of low-income countries.

Service provision to low-income settlements is a challenge to water utility managers. Because of lack of infrastructure development in such areas, conventional water supply systems may not be applicable. Furthermore, because of the low affordability-to-pay for services, cost recovery may be difficult to achieve in the low-income communities. It is therefore necessary for the utility to adopt innovative methods of providing services to these areas. Consequently, for the purpose of enhancing service coverage to low-income communities, it is prerequisite that the utility carries out the following tasks:

1. Develop partnerships with other stakeholders working in the low-income communities. Examples of necessary partners are non-governmental organisations, water vendors, community-based organisations, local administration structures, schools, and churches. These entities are already experienced in working with the urban poor.
2. Through partnerships, develop structures for suitable service, management and payment options in the low-income settlements.

## **5.5 IMPROVEMENT OF CUSTOMER SERVICE QUALITY**

Various customer surveys out in Kampala Water Supply Service Area have shown that most customers registered with NWSC are satisfied with the technical attributes of water services provided by the utility. For instance, results of a customer survey carried out in September 1999 and discussed in Section 3.4.2 show that most respondents received good pressure at their taps; had flow of at least 12 hours a day; the reliability of water supply was good; and the wa-

ter quality was perceived as good. However, as discussed in Section 3.4.4, most customers were dissatisfied with the complaint monitoring system at the NWSC headquarters; the high response time to bill complaints; and the level of customer involvement in the management of the utility.

As discussed in Section 5.3, service quality as perceived by customers is paramount in the utility's efforts to obtain an optimum balance of market segmentation, service and price differentiation, and financial sustainability of the utility's operations. NWSC's financial sustainability is heavily dependant on the customers' willingness to pay for the services delivered. Various studies conducted worldwide (e.g. Altaf et al., 1993; Whittington, Davis and McClelland, 1996;) show that households are willing to pay higher rates for water services if they perceive service quality of the services to be good. Research in services management has shown that in order to add value to engineering-based service offerings whose products are governed by fixed standards, the utility has to differentiate the products with functional quality attributes. For water utilities, such attributes include customer care by front desk staff and field staff; billing efficiency; complaints monitoring and rapid response; service recovery period after some service failure; and office physical environment.

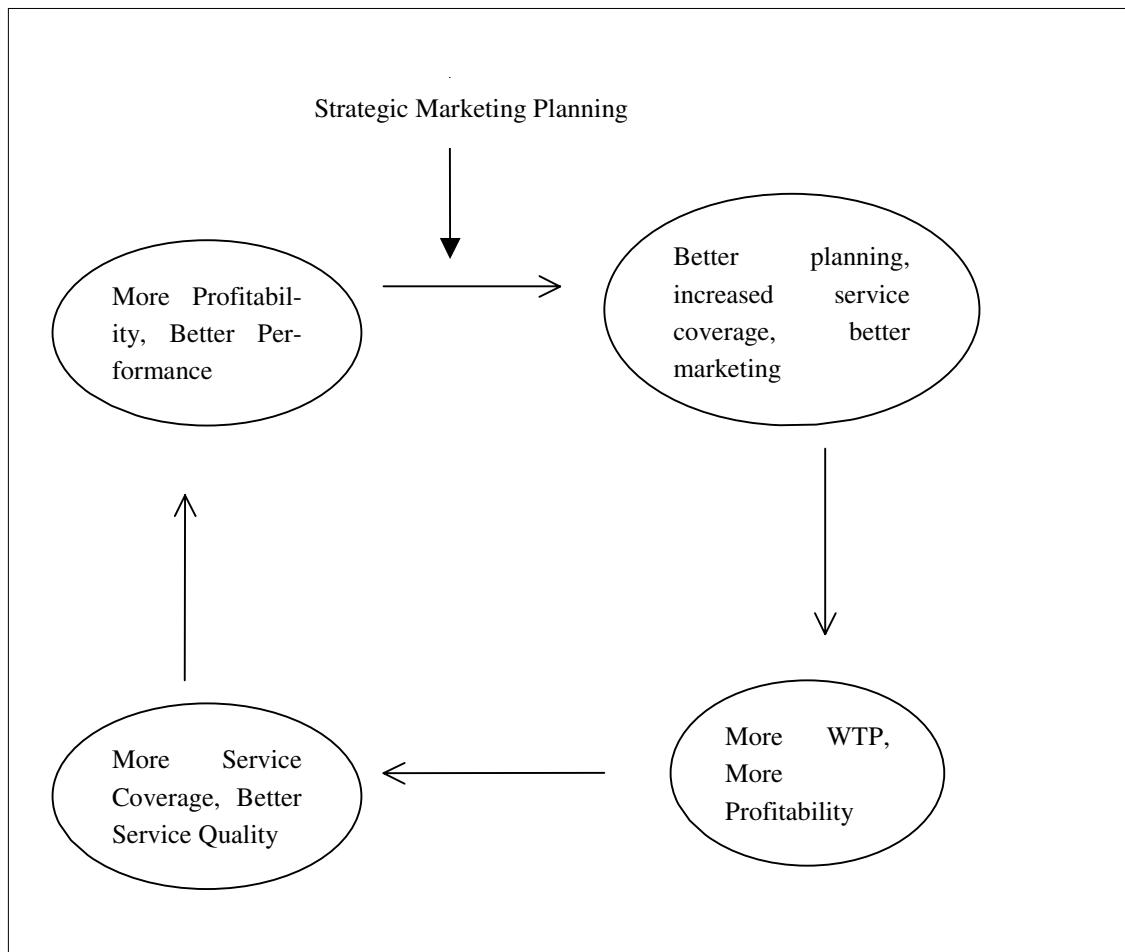
## **5.6 EVALUATION OF BENEFITS AND RISKS**

### **5.6.1 Benefits**

Benefits from improved service coverage can broadly be classified into two main categories: financial benefits, and economic benefits. Although these benefits can be quantified, the scope of this report is limited to carrying out a simple qualitative analysis of benefits.

The financial benefits from carrying out a strategic marketing planning are mainly connected with improved profitability. NWSC Kampala Area will have an improved cash flow situation, which will lead better performance in service delivery. The role of Strategic Marketing Plan can be illustrated using a flow diagram, as shown in Figure 5.2 .

**Figure 5.2 : A flow chart illustrating the benefits of Strategic Market Planning**



Source: Authors

The flow chart above shows that if there is an enabling institutional environment, Strategic Marketing Planning is a precursor to increased coverage and increased social equity through service and price differentiation. Improved service quality, coupled with suitable promotion strategies, will lead to higher willingness-to-pay for the services. This situation will in turn result into higher profitability for the service utility. More disposable income for the utility will lead to service expansion, and improved service quality through higher investment in ‘software’ matters. This phenomenon results into a virtuous circle of continuous improvement. Examples of various scenarios discussed in Section 5.12 vividly illustrate this phenomenon. In all the four scenarios considered, the accumulated earnings at the end of the project period is in excess of 250 million US dollars, *without* charging any of the household consumers more than their estimated willingness-to-pay.

Economic benefits from improved water service coverage can be summarised as follows:

- Benefits from saved time as a result of better accessibility to water services, especially for residents of low-income communities: The time that would otherwise be spent in collecting water from more distant water points is now used in other productive activities that promote the economy of the country.
- Health benefits from better quality water services as a result of reduced morbidity and mortality: Economic productivity of consumers of piped water is enhanced due to better health; and savings made from treatments and purchase of drugs as a result of better health.
- Higher water-related industrial activities leading to more economic benefits to the national economy. This includes the benefits in terms of increased tax benefits to the economy, as well as increased employment opportunities created by such industries.
- Creation of community-based employment as more people are employed in the various low-income community-based service options.
- Creation of community-based small-scale industries as a result of better service coverage in the low-income settlements.
- Reduction of Unaccounted-For-Water ensures more efficient economic use of water resources.
- More taxes will be paid by NWSC as more water is billed and more sold. The taxes are in the form of Value Added Tax and Corporation Tax.

### **5.6.2 Risks**

The Strategic Marketing Plan is based on forecasts of quantifiable variables such as demand, costs, water availability, institutional capacity, and enabling macro-environment. The values of variables in the strategic Marketing Plan are estimated based on the most probable forecasts that cover a long period of time. However, a great number of factors may act to influence the outcome scenario. This section discusses risks that are inherent in the implementation of the Strategic Marketing Planning, and which are critical to the project. Risk analysis, which considers the probability that changes in major quantifiable variables will actually, is beyond the scope of this report.

The variables that important for consideration in risk analysis are categorised as follows:

- Management risks. These risks include resistance to organisational cultural change to embrace a marketing orientation; non-supportive organisational structure, inadequate technical and financial management capacity to manage the strategic marketing planning project, etc.

- Financing risks, such as failure to re-schedule loan repayment, leading to failure to liberate funds to carry out investments early in the project life.
- Social risks, such as low level of embracing the project and poor participation by different market segments.
- Economic risks, such as low economic growth; deflated income levels of consumers; high inflation rates etc.
- Political risks; such as political instability; delay in legislation procedures; adverse changes in legal status of the utility.
- Construction risks, such as delays in construction periods.
- Environmental risks, such as increased pollution rates of the raw water source, leading to higher production costs; drying up of raw water sources.

During the implementation of the project, specific risks should be identified, and mitigation measures taken to reduce the extent of uncertainty surrounding these variables, wherever possible. This may require remedial action at the corporate, sector or national level.



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**TABLE A1: DEMAND PROJECTIONS FOR NWSC, KAMPALA FOR THE 25-YEAR PROJECT PERIOD**

Year	0	1	2	4	6	8	10	12	13	14	16	18	20	22	24	25
<b>Service Level 1: Full pressure</b>																
Total Number of Accounts	13960	14460	14960	15960	16960	18960	20960	22260	26260	29260	36260	44260	56260	68260	78260	83260
Consumption	3566780	3740712	3918434	4285524	4668603	5350440	6063927	6601710	7885351	8896018	11301581	14142067	18428554	22921756	26940864	29020381
<b>MIDDLE INCOME AREAS</b>																
Total Number of Accounts	13960	15160	16660	19660	22660	25660	28660	30460	36460	42460	55460	75460	115460	150460	172460	187460
Consumption	3566780	3921797.25	4363710.848	5273035.05	6237649.984	7241154.463	8291200.345	9033606.857	10948206.58	12909259.79	17285871.49	24111169.68	37820136.8	50524574.4	59389043.43	65339425.91
<b>Service Level 2: 12-hr household supply</b>																
Total Number of Accounts	0	1200	2400	4800	7200	9600	12000	13500	16500	18500	22500	26500	30500	34500	38500	40500
Consumption	0	251412	515394.6	102972.903	1706697.61	2390796.902	3139791.37	3711086.222	4649166.35	5343019.207	6827241.349	8448047.41	10215462.61	12140177.2	14233587.99	15347320.03
<b>Service Level 3: 12-hr yard tap supply</b>																
Total Number of Accounts	0	500	1000	2000	3000	4000	5000	5400	5600	5800	6200	6600	7000	7400	7800	8000
Consumption	0	65471.875	134217.3438	282024.1936	444452.5025	622603.8806	817654.0026	927771.5554	986186.8015	1046942.953	1175802.677	1315026.248	1465332.752	1627487.52	1802304.972	1894730.868
<b>Service Level 4: Shared connection</b>																
Total Number of Accounts	0	500	1000	2000	3000	4000	5000	5600	5900	6100	6500	6800	7000	7200	7300	7350
Consumption	0	157132.5	322121.625	676858.0645	1066686.006	1494249.314	1962369.806	2309120.316	2489843.769	2642628.418	2956471.251	3251701.267	3516798.604	3800403.29	4048254.246	4177881.565
<b>LOW INCOME AREAS</b>																
Total Number of Accounts	0	800	1600	3200	4800	6800	8800	9800	10300	10600	11100	11400	13400	15400	17400	18400
Consumption	0	58400	119428	249727	391642	579588	763841	914512	963665	1036587	1138333	1226726	1502045	1799916	2121628	2292290
<b>Service Level 6: Community kiosk</b>																
Total Number of Accounts	0	100	200	400	600	750	850	950	1000	1030	1090	1140	1540	1940	2340	2540
Consumption	0	43800	89571	187295	293731.5508	384316.9885	456246.3872	533937.1352	575060.0589	606434.5515	672591.4103	737396.8296	1030586.433	1348955.46	1694196.22	1877450.229
<b>Service Level 7: Public kiosk</b>																
Total Number of Accounts	545	595	645	745	845	945	1045	1105	1125	1145	1185	1225	1265	1305	1345	1365
Consumption	895163	1027042	1162174	1442525	1736892	2045985	2370548	2623042	2732208	2844086	3076250	3320097	3576218	3845235	4127800	4274377
<b>Service Level 8: Utility water vending</b>																
Total Number of Accounts	0	50	100	170	210	250	290	320	320	320	320	320	320	320	320	320
Consumption	0	73000	147795.8	259208.0684	331354.2853	407105.6738	486644.8045	555627.5814	569518.2709	583756.2277	613308.8867	644357.6491	676978.2551	711250.279	747257.3246	765938.7577
<b>Service Level 9: Prepaid metered kiosk</b>																
Total Number of Accounts	0	30	60	110	150	190	230	260	270	280	300	320	340	360	380	390
Consumption	0	65700	133016.22	250786.2639	352017.9997	458303.7777	569899.5154	665270.2538	703697.1211	743075.942	824785.2492	910595.8242	1000715.322	1095361.91	1194764.8	1246324.644
<b>TOTAL DOMESTIC DEMAND</b>	8028723	9404467	10905863	13995956	17229727	20974546	24941822	27875884	32526704	36651809	45874237	58107185	79232829	99815117	116279901	126236119
<b>NON-DOMESTIC DEMAND</b>	16439877	17261871.27	18124964.83	19982773.73	22031008.04	24289186.36	26778827.96	29523657.83	30999840.72	32549832.76	35886190.61	39564525.15	43619888.98	48090927.6	53020247.68	55671260.06
<b>NON-DOMESTIC CONNECTION</b>	8612	9043	9495	10468	11541	12724	14028	15466	16239	17051	18799	20726	22850	25192	27775	29163
<b>TOTAL DEMAND</b>	24468600	26666338	29030828	33978730	39260735	45263732	51720650	57399341	63526544	69201641	81760427	97671710	122852717	147906045	169300149	181907380
<b>UNACCOUNTED-FOR WATER</b>	49%	47%	44%	40%	37%	35%	33%	31%	30%	29%	27%	26%	24%	23%	21%	21%
<b>REQUIRED WATER PRODUCTION</b>	47977647	49890249	52047561	56547155	62099611	69215086	76600365	82749579	90385291	97226585	112186297	131134653	161669345	191070624	215000098	229154752
<b>PEAK PRODUCTION REQUIREMENT</b>	57573176	59868299	62457073	67895686	74519533	83058103	92028438	98299495	108462349	116971902	134623556	157361583	194003214	229284748	259000117	274985702
<b>Incremental Demand</b>	131445.6	6288	7093	7382	7982	10519	11787	12462	25104	22492	26226	31304	50567	45223	41227	46536
<b>Incremental Served Population</b>	76300	77720	79300	67930	66998	68603	63544	29710	108162	92221	105447	123184	218631	182338	154105	172542

**TABLE A2: SAMPLE INVESTMENT PLAN FOR NWSC, OVER THE 25-YEAR PROJECT PERIOD**

Year	0	1	4	5	9	10	13	15	18	19	20	24	25
Projected Population	1,166,547	1,213,209	1,364,695	1,419,283	1,660,360	1,726,775	1,942,387	2,100,885	2,363,210	2,457,739	2,556,048	2,990,215	3,109,823
Population Coverage	31%	36%	48%	51%	60%	62%	65%	69%	76%	82%	87%	98%	100%
<b>PRODUCTION</b>													
Required Production m3 pa	47977647	49890249	56547155	58900171	72899722	76690365	90385291	104209368	131134653	146282358	161669345	215000098	229154752
Current Capacity m3 pa	53655000	53655000	64605000	64605000	82855000	82855000	137605000	137605000	137605000	247105000	247105000	247105000	247105000
Incremental Capacity pa	10950000	0	0	0	0	0	0	0	109500000	0	0	0	0
Plant Const. Costs m US\$	0	0	0.0	0.0	0.0	31.5	0.0	0.0	0	0	0	0	0
<b>TRANSMISSION</b>													
Length of pipeline (km)	0	0	0	0	0	0	0	0	0	0	0	0	0
Mean pipeline diam (mm)	800	800	800	800	800	800	800	800	800	800	800	800	800
Transmission Costs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>STORAGE EXPANSION</b>													
Incr. Capacity '000 m3	0	0	0	0	0	0	224	0	0	262	0	0	0
Storage Costs ( m US\$)	0.00	0.00	0.00	0.00	0.00	0.00	10.41	0.00	0.00	11.47	0.00	0.00	0.00
<b>DISTRIBUTION MAINS</b>													
Primary (mean d=250mm)	10	10	10	10	10	10	10	10	10	10	10	10	10
Cost of Primary Mains	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Sec/Tert (mean d=150mm)	10.2	10.2	10.8	10.9	12.3	12.4	28.3	24.0	33.2	58.2	58.3	41.5	47.4
Cost of Sec/Tertiary Mains	0.50	0.50	0.53	0.53	0.60	0.60	1.37	1.17	1.61	2.82	2.83	2.01	2.30
Replaced pipes m d=150mm	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
Cost of replacement	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49
New Connections	5361	5361	5688	5713	6476	6508	14853	12613	17437	30566	30618	21803	24869
Contribution to New Conn.	0.54	0.54	0.57	0.57	0.65	0.65	1.49	1.26	1.74	3.06	3.06	2.18	2.49
Total Distribution Costs	2.33	2.33	2.40	2.40	2.55	2.55	4.16	3.73	4.66	7.18	7.19	5.50	6.09
<b>TOTAL INVESTMENTS</b>	2.33	2.33	2.40	2.40	2.55	34.07	14.57	3.73	4.66	18.66	7.19	5.50	6.09

**TABLE A3: PROJECTED SERVICE OPTION UPTAKE OVER  
25-YEARS**

**A. HOUSEHOLD DEMAND**

Year	0	2	4	8	10	12	14	18	20	24	25
Current Population	1,166,547										
Projected Pop. Growth Rate	0.04										
Projected Population	1,166,547	1,261,737	1,364,695	1,596,500	1,726,775	1,867,679	2,020,082	2,363,210	2,556,048	2,990,215	3,109,823
Current No. of House Connections	27920										
No of people served by house connection	7										
Current No. of Standpipes Connections	545										
No. of people served by standpipe	300										
Current Population Served	358940										

21382.189  
23364

<b>HIGH INCOME AREAS</b>											
Proportion of High Income Population	11.1%	11.5%	12.0%	13.0%	13.5%	14.1%	14.6%	15.9%	16.5%	17.9%	18.2%
Unservd population	31767	44491	55748	81912	93927	109202	112046	92832	69775	21043	18501
Target Population Coverage	97720	104720	111720	132720	146720	155820	204820	309820	393820	547820	582820
<b>Service Level 1:Full pressure</b>											
New House Connections	13960	500	500	1000	1000	300	3000	4000	6000	5000	5000
No. of people per connection	7	7	7	7	7	7	7	7	7	7	7
Per Capita Consumption (Litres per day)	100	103	105	110	113	116	119	125	128	135	136
Total consumption per year (m3)	3566780	3918434	4285524	5350440	6063627	6601710	8896018	14142067	18428554	26940864	29020381
<b>MIDDLE INCOME AREAS</b>											
Proportion of Middle Income Population	35.2%	36.6%	38.1%	41.2%	42.9%	44.6%	46.4%	50.3%	52.3%	56.6%	57.7%
Unservd population	312905	300654	292751	299615	320515	374851	349120	293767	127630	17800	1732
Target Population Coverage	97720	161420	227220	358820	420420	458920	589120	894320	1209320	1675170	1794170
<b>Service Level 1:Full pressure</b>											
New House Connections	13960	1500	1500	1500	1500	300	6000	10000	20000	12000	15000
No. of people per connection	7	7	7	7	7	7	7	7	7	7	7
Per Capita Consumption per day	100	103	105	110	113	116	119	125	128	135	136
Total consumption per year	3566780	4363711	5279035	7241154	8291200	9033607	12909260	24111170	37820137	59369043	65339426
<b>Service Level 2:12-hr household supply</b>											
New House Connections		1200	1200	1200	1200	300	2000	2000	2000	2000	2000
No. of people per connection	7	7	7	7	7	7	7	7	7	7	7
Per Capita Consumption per day	80	84	88	97	102	108	113	125	131	145	148
Total consumption per year		515394.6	1082973	2390799	3139791	3711086	5343019	8448047	10215463	14233588	15347320
<b>Service Level 3: 12-hr yard tap supply</b>											
New Yard Tap Connections		500	500	500	500	200	200	200	200	200	200
No. of people per connection	7	7	7	7	7	7	7	7	7	7	7
Per Capita Consumption per day	50	53	55	61	64	67	71	78	82	90	93
Total consumption per year		134217.3	282024.2	622603.9	817654	927771.6	1046943	1315026	1465333	1802305	1894730.9
<b>Service Level 4:Shared connection</b>											
New House Connections		500	500	500	500	300	200	100	100	50	50
No. of people per connection		21	21	21	21	21	21	21	21	21	21
Per Capita Consumption per day	40	42	44	49	51	54	57	62	66	72	74
Total consumption per year		322121.6	676858.1	1494249	1962370	2309120	2642628	3251701	3516799	4048254	4177881.6
<b>LOW INCOME AREAS</b>											
Proportion of Low Income Population	53.7%	51.8%	49.9%	45.8%	43.6%	41.3%	38.9%	33.9%	31.2%	25.5%	24.0%
Unservd population	462936	407132	361753	289924	255570	238628	232435	212202	170847	61404	27079
Target Population Coverage	163500	246820	319003.4	440509.8	496622.6	532357.2	553540.9	588268.8	626656.2	701978.6	720520.61
<b>Service Level 5:Ground tank</b>											
New House Connections		800	800	1000	1000	500	300	100	1000	1000	1000
No. of people per connection		5	5	5	5	5	5	5	5	5	5
Per Capita Consumption per day		41	42	46	48	50	52	56	58	63	64
Total consumption per year		119428	249726.9	579588.1	783840.9	914511.7	1036587	1226726	1502045	2121828	2292289.8
<b>Service Level 6:Community kiosk</b>											
New community kiosks		100	100	50	50	50	30	20	200	200	200
No. of people served by community kiosk		40	40	40	40	40	40	40	40	40	40
Per Capita Consumption per day		31	32	34	36	37	39	42	44	47	48
Total consumption per year		89571	187295.2	384317	456246.4	533937.1	606434.6	737396.8	1030586	1694196	1877450.2
<b>Service Level 7:Public Kiosk</b>											
New public kiosks	163500										
No of public kiosk	545	50	50	50	50	30	20	20	20	20	20
No of people served by public kiosk	300	294	282	260	250	240	231	213	204	189	185
Per Capita Consumption per day	15	20	21	23	24	25	26	28	29	32	32
Total consumption per year	895162.5	1162174	1442525	2045985	2370548	2623042	2844086	3320097	3576218	4127800	4274376.8
<b>Service Level 8:Utility water vending</b>											
Number of vendors commissioned		50	20	20	20	10					
No. of people served by a vendor		196	188	174	167	160	154	142	136	126	123
Per Capita Consumption per day		20	21	23	24	25	26	28	29	32	32
Total consumption per year		147795.8	259208.1	407105.7	486644.8	555627.6	583756.2	644357.6	676978.3	747257.3	765938.76
<b>Service Level 9:Prepaid metered kiosk</b>											
No of installed pre-paid metered kiosks		30	20	20	20	10	10	10	10	10	10
No. of people served by prepaid meter		294	282	260	250	240	231	213	204	189	185
Per Capita Consumption per day		20	21	23	24	25	26	28	29	32	32
Total consumption per year		133016.2	250786.3	458303.8	569899.5	665270.3	743075.9	910595.8	1000715	1194765	1246324.6

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Population Coverage 31% 41% 48% 58% 62% 61% 67% 76% 87% 98% 100%

**TABLE A4: SAMPLE AIC CALCULATIONS FOR KAMPALA ASSUMING NO LOAN REPAYMENT, BUT OFFERING SUBSIDIES TO OTHER AREAS**

Discount Rate	0	2	4	6	8	10	12	14	16	18	20	22	24	25
Year	0	2	4	6	8	10	12	14	16	18	20	22	24	25
Projected Population	1,166,547	1,261,737	1,364,695	1,476,054	1,596,500	1,726,775	1,867,679	2,020,082	2,184,921	2,363,210	2,556,048	2,764,622	2,990,215	3,109,823
Discount Factor	1	0.86	0.74	0.63	0.54	0.46	0.40	0.34	0.29	0.25	0.21	0.18	0.16	0.15
Historical Loan Repayment (m US\$)		3.00	3.00	3.00	3.00	3.00	3.00	3.00	20.00	20.00	20.00	20.00	20.00	20.00
CAPITAL COSTS M US\$	0	2.39	2.40	41.85	2.54	34.07	1.83	3.72	54.94	4.66	7.19	6.25	5.50	6.09
O & M COSTS (including Deprec.)	11.42	11.42	11.42	11.42	12.56	13.70	18.27	20.55	22.84	25.12	27.41	29.69	31.97	33.12
Subsidy to Other NWSC towns	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL COSTS (Million US\$)	11.42	16.81	16.81	56.27	18.10	50.77	23.10	27.27	97.78	49.78	54.60	55.94	57.47	59.20
<b>PV OF COSTS (M US\$)</b>	<b>11.42</b>	<b>14.41</b>	<b>12.36</b>	<b>35.46</b>	<b>9.78</b>	<b>23.52</b>	<b>9.17</b>	<b>9.29</b>	<b>28.54</b>	<b>12.46</b>	<b>11.71</b>	<b>10.29</b>	<b>9.06</b>	<b>8.64</b>
WATER PRODUCED (m3)	47977647	62457073	67856586	74519533	83058103	92028438	99299495	116671902	134623556	157361583	194003214	229284748	258000117	274985702
WATER PAID FOR (m3)	22021740	26127745	30580857	35334662	40737359	46548585	51659407	62281477	73584385	87904539	110567446	133115440	152370134	163716642
<b>PV OF WATER SOLD (M m3)</b>	<b>22.02</b>	<b>22.40</b>	<b>22.48</b>	<b>22.27</b>	<b>22.01</b>	<b>21.56</b>	<b>20.51</b>	<b>21.20</b>	<b>21.48</b>	<b>22.00</b>	<b>23.72</b>	<b>24.49</b>	<b>24.03</b>	<b>23.91</b>

Average Incremental Costs = **0.650**

**1090.73**

**378.45**

**581.99**