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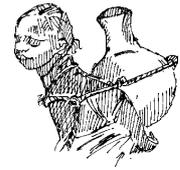
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Public water supply demand and resource management

Mieraf Shewaye and Adinew Adam, Ethiopia

A STUDY WAS conducted in 1996/97 to evaluate public water supply demand and resource management problems in Addis Ababa. A stratified sampling design has been adopted to classify the population into those “who have not” and “have” private water supply connection. Though, 97.5 per cent of the city dwellers use piped water, it is only 26.8 per cent who “have” private water connection. A sample size of 240 households have been decided to be taken from selected 10 Kebeles. Out of these, 60 per cent (144 households) were taken from those “who have not” and 40 per cent (96 households) from the “have” water supply connection. The study has also been substantiated by secondary data.

Introduction

Water is one of the most basic necessities for the existence of living things in general and human beings in particular, specially potable water in modern big cities like Addis Ababa, there is a need to properly manage the said vital scarce resource. However, for any metropolitan city, one of the basic and essential services by all standards is efficient service in water supply. Unless and until this demand of the city is efficiently met, the health of the community and developmental activities are highly affected. Since Ethiopia is categorised from among low-income economies in general and Addis Ababa, the capital, in particular faces the problem of resource management.

At present, the city has two conventional water treatment plants located along the two dams of Gefersa and Legedadi. However, the plants produce less than their capacities due to the safe yield of the dam (Legedadi) which cannot provide all the daily raw water requirements of the treatment plants. Therefore, the total water production of both treatment plants is far below their design capacities being only 150,000 m³ in 1995 versus the design capacity being 180,000 m³.

Objectives of the study

The basic objectives of the study are to: assess the affordability of the city dwellers to pay for new water connection; identify problem areas; and formulate improvement measures.

The Study results

Water demand, production and supply

Addis Ababa with its ever increasing population, has reached a state of critical water shortage. To satisfy the

rapidly increasing water demands of the city, the Addis Ababa Water and Sewerage Authority (AAWSA) has done major expansions of the water treatment plant, transmission and distribution facilities in the past, while successive works are continuing. Major water sources or combination of sources must have been urgently developed in order to overcome the current shortage as well as to meet the requirements of the growing population.

There are various projects undertaken by AAWSA out of which, in this paper only those projects which have significant contribution to the increase in water supply that are briefly discussed.

- *Addis Ababa Water Supply Project Stage IIIA*: is intended to have a final design and tender document preparation to satisfy the water supply demand up to 2020;
- *Emergency Dire Dam Project*: at the moment the city is facing water shortage up to 40 per cent. To cope up with this problem, two emergency projects are under implementation one of which is the construction of Emergency Dire Dam Project;
- *Emergency Ground Water Development (Akaki) Project*: is the second emergency project intended to alleviate the water shortage in the city. It is designed to provide 72,000 m³/day ground water from the southern part of the city up to the center of the city;
- *Akaki Water Supply Project*: is a project for the provision of water to Akaki town (which is now part of Addis Ababa as industrial zone) from 4 boreholes;
- *Water Leakage Control Study*: un-accounted for water in the city is estimated to be 36 per cent. It is believed to economically reduce this figure to about 20 per cent.

To conclude, despite the high coverage in the supply of water service on one hand and critical water shortage on the other, the current demand of the city is said to be 243,000 cubic meter per day (103 litres per capita per day-water III project, 1997) while the supply is about 140,983 cubic meter per day (60 litres per capita per day) for a total population of 2.34 million in 1997 (population and housing census, 1994) this shows that it is only 60 per cent of the demand of the city which is satisfied. To meet the wide imbalance of the water demand and supply, therefore, the Authority is now undertaking different water supply projects such as Emergency Dire Dam and Emergency Akaki projects with an estimated total supply capacity of 125,000 cubic meter of water per day are under construction while the Akaki Water Supply Stage III, the Gerbi and Sibilu Dam

Project with an estimated total production of 726,075 cubic meter of water per day (Water Supply Project Stage IIIA, 1997) are at their final design and tender document preparation stages.

Water connection

According to population and housing census of 1994, it is only 26.8 per cent of the households of Addis Ababa that have private water connection (inside house or in compounds) while 25.6 per cent fall under tap in compound (shared). However, 45.3 per cent of the households obtain water from tap outside the compound. In general, about 98.4 per cent of the households obtain safe water from tap and protected wells/springs where as the remaining 1.6 per cent use unprotected wells/springs and River/lake/pound as a source of drinking water. According to the result of the sample survey, in most household, fetching is the responsibility of mothers and daughters which accounts for almost 79 per cent.

Water vendors

Water vendors are those who sell water for their neighbours and nearby dwellers at a higher rate being they themselves registered as AAWSA's customers but generate income out of the sale of water even though illegal. However, they pay to AAWSA according to the tariff of the Authority. According to the result of the sample survey, even though the said vendors pay Birr 0.50/m³, they sell it at an average rate of Birr 5.60/m³. Of course, the rate varies from Birr 2.50/m³ to Birr 15.00/m³.

Water quality

Water quality and health are highly interrelated and hence the relationship between water quality and health occupies a niche of special importance in public perception. According to the result of the sample survey, about 11 per cent of the respondents' question the quality of piped water. In other words, they think the tap water they consume is not healthy specially for drinking. This particularly aggravates during the rainy season and a few of the respondents explained that they usually boil water for drinking purpose. On the other hand, the 1995/96 annual report of Central Laboratory Service of AAWSA on bacteriological examinations are certain that more than 99.5 per cent of the water supply was free from faecal contamination and considered safe and suitable for human consumption.

Efficiency in meter reading

"Meter" shall mean any apparatus for measuring the quantity or volume of water supplied by the authority, for use by the customer. Survey result shows 25 (26 per cent) of the respondent "the haves" reported that they were visited every 3-4 months while 6.3 per cent of them never see meter readers. However, 2.1 per cent of the respondents were visited whenever meter readers get convenient time. On the basis of the above fact, it can be concluded that there are dishonest meter readers who never visit customers, but

simply report a falsified figure to their bosses. An evidence for the above fact is that there are customers who pay the same amount of money from time to time.

Money collection

"Volume Charge" shall mean a bimonthly water supply charge paid by the customer to the authority. According to the result of the sample survey, meter readings were timely accomplished only for 63.6 per cent where as 36.4 per cent of the bill is assumed to be printed on the basis of false information or printed holding only charge of meter rent. Money collectors are assumed to stick on high value bill charge so as to gain a high and better collector's commission for the very fact that the higher the collection the greater the amount of money collectors gain. This would lead the low income group to suffer a lot.

With regard to the period of payment of water supply charges the sample survey has tried to collect opinions. Accordingly, 77.1 per cent of the respondent would prefer the payment charge to be collected every month.

Response to disruption in water service and maintenance

According to the result of the sample survey, 93 (38.8 per cent) of the respondent complain the disruption of water services. However, it is only 42 (18 per cent) who have positive attitude towards informing AAWSA, if there appears damage on pipelines due to poor performance of the Authority. Besides, nearly 49 per cent of AAWSA's customers complain for its poor response against disruption. Moreover 28 per cent of the sample surveyed have reported that they never let the Authority know the problem through any means, if they see any damage on the pipe line. Their point of argument is that, if AAWSA gets informed, it will immediately close the main network of the area and then disappear for a week or two, and during this period dwellers of the area suffer from shortage of water. But such coincidence is favoured by water vendors to sell water at more than cost.

The survey result shows that AAWSA is not as fast as may be required in the maintenance work. There are times even when the Authority doesn't receive message from customers because of irresponsible night shift workers who receive telephone call expressing damage of pipe lines never transfer the message for the concerned unit. During all these time the loss of water continues. This forces the customer to call for AAWSA more than once. Unless strict measure is taken against those irresponsible employees, no doubt that it will create a negative impact on customers against AAWSA not to let information on time.

Affordability of the city dwellers to pay for new water connection

If the connection to be made should necessarily cross either an asphalt or non-asphalt road, the customer need to pay additional Birr 600 for 6 meters; Birr 1200 for 12 meters

and Birr 1800 for 18 meters to repair an asphalt and Birr 180 for 6 meters, Birr 360 for 12 meters and Birr 540 for 18 meters to repair non-asphalt road. Hence, it is a charge to repair an asphalt and/or non-asphalt road that brought about the connection fee to the level of un-affordability since the incomes of the city dwellers is low. It is also evident that distribution networks are laid only in one side of the road which make crossing the road inevitable.

Problems encountered

Un-accounted for water

Un-accounted for water, according to Leakage Detection Project is generally defined as the volume of water, expressed in per centage of the total volume of treated water production at the treatment plants, which is not billed to customers. In other words, it is the volume of water calculated as the difference between the water produced at the treatment plants and the amount of water legally consumed from the system for which corresponding billing has been performed through water meters or otherwise.

The necessity of replacement of Gefersa transmission lines

The existing Gefersa transmission lines (13kms) comprises two parallel 400mm diameter steel pipes. The system was built in two phases. Phase I in 1943 and Phase II in 1955. The system is thus more than 40 years old and the pipe line is leaking badly requiring frequent repair.

The necessity of replacement of old pipes in the city

The Addis Ababa Water and Sewerage Authority has compiled a record of stretches of pipe line throughout the city for various reasons are in urgent need of replacement. In water IIB project the problem was partially addressed when about 14.3 kms of old and leaking pipes with diameters greater than 100mm were replaced. Capacity limitation occurred then due to shortage of money.

The necessity of rehabilitation of Gefersa water treatment plant

The present Gefersa treatment plant was commissioned in 1960 and underwent remedial works as part of the Water Supply Stage IIA project including the insertion of valves and new meters on the delivery mains. It has a design capacity of 30,000m³/day but is at present producing about 25,000m³/day.

Inadequacy of trained and skilled manpower

AAWSA, being one of the governmental organizations ever found in the country, does require the skills and knowledges from among the educated citizens in the fulfilment of its mission. In other words, as it is not possible to drive a car without petrol nor does AAWSA bring about efficiency without giving attention in the increase of skilled manpower.

However, the number of employees which was 1,172 in 1987/88 has reached to 1,500 in 1994/95 which shows an increase of 28 per cent within 8 years. Nevertheless, within the same years the number of professionals remain unchanged. On the other hand, out of the total number of employees of AAWSA; 77 and 79 per cent has no any skill in 1987/88 and 1994/95 respectively. If one compares the unskilled labour of the above two years, no improvement has been registered as the later year shows an increase of unskilled labour by 2 per cent.

Recommendations

This paper has briefly indicated the major problem areas the Authority facing. The existence of these operational problems need remedies to be sought by the policy makers. From several points to be taken into account the following points are recommended:

- Large water consumers other than drinking need to be encouraged to dig wells of their own. The effect of which will help to reduce the shortage of water which exists currently.
- Increased siltation, high turbidity, high treatment cost and reduction in storage capacity of Legedadi and Gefersa raw water reservoirs should be avoided through integrated watershed management in collaboration with regional governments and the people in the catchment areas.
- Regarding the performance of AAWSA:-
 - AAWSA is advised to make strict follow-up and supervision on meter readers and money collectors to protect its customers;
 - The Authority is advised to give more attention to the complaints as well as information supplied from its customers so as to give efficient service; and
 - It is to the advantage of both to the customers as well as AAWSA if money collection is being done on monthly basis. However, it requires AAWSA to double the number of meter readers and money collectors.
- The remedy for unaffordable connection fee is to lay distribution networks in both sides of the road which avoids crossing fee in addition to creating guarantee to the system to serve for longer period.
- The Authority is strictly advised to give more attention to the type and origin of water meters to be purchased for their durability and accuracy rather than sticking on minimum cost.
- Whatsoever the use may be, it is recommended to meter any volume of water consumed so that the treated water losses be accurately known.
- It is recommendable that AAWSA give the public fountains to interested low income individuals to sell water on contractual basis with consideration of cost recovery.
- AAWSA should replace old pipes and rehabilitate the water treatment plants to minimize the unaccounted for water.

- AAWSA need to develop a relevant training programme so as to be efficient and fulfill its responsibilities to the desired level. Finally, it is hoped that this study will contribute to a better understanding of many problems associated with the supply of safe and adequate water in urban Ethiopia in general and to the city of Addis Ababa in particular in addition to scarce resources to be managed which will help for the improvement of the service and increase efficiency.

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