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Full Length Research

Assessment of Cost Recovery Practices in Water Supply in Worabe Town, SNNPRS of Ethiopia

Abdulsemed Abdela Musein[1*], Abdurezak Bahiru[2], Temam Awol Bashir[3]

[1.] Silte zone plan office head, Silte zone, Worabe, Ethiopia
[2.] Investement Expansion office head, Silte zone, Worabe , Ethiopia
[3.] Urban Development and Construction Office head, Silte zone, Lera, Ethiopia

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Abstract

The policy for increasing the water coverage as well as the proper use and sustainability of the service requires implementation of a cost recovery system. Ethiopian water policy introduces full cost recovery program to provide improved water supply in urban areas of the country. Hence, the aim of this study was to assess the policy implementation of cost recovery practices in water supply in Worabe Town. Particularly, the study evaluated the level of cost recovery practices, analyzed the effect of cost recovery practices on water infrastructure and determined the challenges that affect implementation of cost recovery of water supply in the town. Regarding methodology of the study, the researcher used descriptive survey research method and employed qualitative and quantitative research approaches. In order to collect primary and secondary data the researcher used questionnaires, interview and documentation search. Regarding sampling design of the study, researcher was employing both probability and non-probability sampling techniques. The sample size of the study was 8 Employees of Water Service Provider Office, the Town Board of Director and 161 sample household respondents totally 170 sample individuals participated. The results of the study indicated that, the implementation of full cost recovery for water supply was quite poor in the town. The reasons for poor cost recovery were, inadequate tariff structure due to water tariffs being currently set at less than full-cost recovery levels and it was not revised for long period of time and also it was not incorporate separate tariff structure for industrial and commercial consumption in order to achieve cross subsidization in between non-domestic (industrial and commercial consumption) and domestic consumption; high rate of unaccounted for water through water leakage and unmetered connections; weak revenue collection capacities in Town Water Service Provider Office and low rate of private connections due to unaffordable connection charges for the poor in the town. In addition to this, the Town Water Board has a potential to cover only recurrent costs from user charge. These consequences for inadequate water service coverage and uneven water infrastructure distribution spatially in the new built up area of the town. Thus, continuing a cycle of inequitable access to water supplies in the town. Therefore, to improve the existing cost recovery practices the researcher draw possible solutions. Such as, the Town Water Board should be periodically revise and restructure the existing tariff rate and structure, reconciling cost recovery and affordability, aim for long-term sustainable cost recovery, improving commercial and technical efficiencies of water service provider office and should give emphases for continuous community awareness programme on the issue of cost recovery in water supply and services in the town.

Keywords: ***water coverage, water policy, cost recovery program, water supply***

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INTRODUCTION

The acceptance of water function as economic as well as social good became mainstreamed as the fourth guiding principle of the Dublin Statement on Water and Sustainable Development in 1992 (United Nations, 1992). After this international agreement many international organizations forward their viewpoints about cost recovery issues in the provision of water supply.

The AFDB produced IWRM policy statement for inspirational goals of full economic cost recovery, with pricing at the core of improving water resources management but notes that full financial cost recovery is an immediate goal, and lifeline supplies have to be available at minimal prices. The implications of the wide spectrum of national and local situations that the Bank faces and must take account of in its operations is clearly recognized (AFDB, 2010).

World Bank (2004) describes that water policy frameworks agreed at global and local-level meetings have identified the need to integrate cost recovery principles and mainstream in water sector reform, and are working to address the barriers and constraints to successful implementation at the program and system levels. Still, the truth remains that full cost recovery in water supply provision was not achieved. The reasons are low water tariffs; increasing operational costs; inadequate infrastructure development and weak management leads to inadequate service coverage in urban scenario in developing countries.

In Africa, about 38% (Meseret, 2008) of the population or 300 million (AWDR, 2006) people have no access to safe water supply. In Ethiopia, the overall water coverage is only 68.5%, specifically, 92% in urban area and 66 % in rural area (MoFED, 2010). In reality water is very important for socio-economic development with regard to poverty reduction and improvement of the quality of life. While additional financial resources will help to meet these challenges, funding from donors for water infrastructure investment alone does not ensure sustainability of water supply. Inadequate cost recovery is ranked as the top potential constraints to the development in every region in the world (WHO, 2000). Lower-income countries have traditionally supported their public water provision through budgetary grants (from taxes) and Overseas Development Assistance (external supports), not expecting or requiring full cost recovery. Hence, the result has usually been poor quality of service and the lack of sufficient revenue always impacts upon long-term capital maintenance such that the next generation of consumers will have to fund an even greater proportion of rehabilitation costs (AFDB, 2010).

Africa Development Bank Group (2006) assessment report indicates that Ethiopian Water Resources Management Policy (1998) includes pricing policy for the aim of full cost recovery in urban water supply. However, in practice water supply service units in the various towns in the regions are still weak. Because of, lack qualified labour and logistics to provide adequate services, poor planning for cost recovery and inadequate tariff rates, and the ability of the sector to recover costs is often limited even for routine operation and maintenance. This has led to problems in providing sustainable water supplies in urban areas. Most urban water supply service units operate and provide services are based on subsidy from other financially better units or from the government budget. Thus, the production and provision of clean water to consumers entails a cost of ingoing operation, maintenance, management and extension of services nonetheless, because of poor planning for cost recovery in urban water sector leads to inadequacy to meet the water demand of the towns. Therefore, this study tries to assess cost recovery practices in water supply in case of Worabe Town.

Full cost recovery through the levying and collection of user fees is strengthening internal generation of sufficient revenue to support continuing delivery of services to users over the long-term, including extension of water service coverage in urban area, particularly to low-income households, and improved service quality. Thus, Ethiopia Water Resource Management Policy (1998) incorporates pricing policy to provide a basis for developing a framework for financing and full cost recovery for urban water supply. Full cost recovery includes operation, maintenance and capital costs through ensuring affordable access for the poor through appropriate mechanism for cross subsidization. However, in practice full cost recovery for water is quite poor in urban areas because currently users pay just 2% of the capital costs of financing water in Ethiopia and subsidies for water are widespread, (Naomi, 2005). This reveals that, full cost recovery in water supply is quite poor in urban areas and has potential to contribute to a substantially higher proportion of recurrent costs.

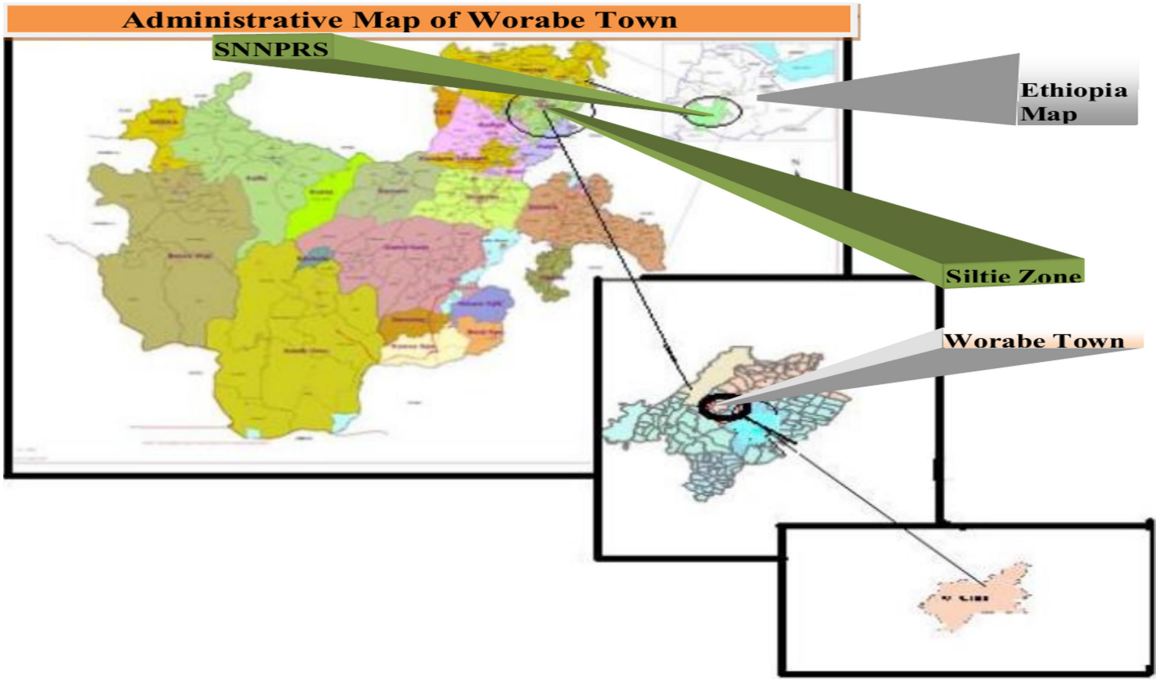
The capital cost for expansion of water infrastructure continuously subsidized by the government budget and this leads to unsustainable water supply and services in the urban areas. Thus, to fill the gaps in between policy objectives and practices this study tried to assess the implementation of cost recovery practices and its challenges in the provision of water supply in Worabe Town. Therefore, the study designed with the following objectives:

- ✓ To evaluate the level of existing cost recovery mechanisms and practices of water supply in the town;
- ✓ To analyse the effects of existing cost recovery practices on water infrastructure and community in the town;
- ✓ To determine the implementation challenges that affects cost recovery of water supply and services in the town;
- ✓ To suggest possible recommendations which are necessary for improving existing cost recovery practices in water supply in the town.

Research Methodology

Description of the Study Area

The town is found in SNNPRS. It is one of the 22 reform cities found in the region, and it is the capital of Siltie Zone. Geographically, the town locates 173 km to south west of Addis Ababa and 175km North West of the regional capital city of Hawassa, and astronomically it is approximately found $70^0$45' N latitude and 38^0 8' E longitudes. The town is positioned in between 2000 – 2250 metres above sea level and has average annual temperature of 20^0c. The total population in the town were estimated to be 18750 of which 9295 were male and 9407 were female (Worabe Town Finance and Economic Development Office, 2011).Regarding water supply and services, currently in the town distribution of water supply coverage is 69% through protected large spring (Worabe Town Water Board, 2011). However, because of urbanization growth the town is expanding horizontally. This type of town expansion brings a challenge for the provision of water supply in the new settlement area. Thus, the provision of sustainable water supply in urban areas requires charging customers in order to provide adequate water services. This study also aimed for assessing the implementation of cost recovery practices in the provision of water supply in the town.



***Source**: Worabe Town Finance and Economic Development Office, 2011*

Figure 1.

Research Approach

This study used both qualitative and quantitative approaches. The qualitative aspect deals with the interests, attitudes and efforts of different stakeholders in the provision of water supply in the town and quantitative approach deals with the quantitative information's of the primary and secondary data. The reason for the application of these mixed research approaches was, it often create a multi-faceted view of the research question, and potentially facilities the creation of stronger inferences than do single research approach.

Research Methods

This study employed descriptive survey methods to achieve the purpose of this study. Since the descriptive survey method is apply for fact-finding study with adequate and accurate interpretation of findings. So that, in order to assess the implementation of cost recovery practices the researcher used descriptive survey method. Because, it was important to know public opinion towards cost recovery system in the town and helps to describe the qualitative and quantitative information's of the primary data which gather through interview and questionnaires.

Research Techniques

Based on the nature, scope, objectives and required precision of the research time and resources available, the researcher used questionnaires, interview and documentary reviews in order to collect primary and secondary data. The questionnaires were involves both open and closed-ended questions that were prepared for sample households, conducted interview for Town Water Board of Director and Employees of Town Water Supply Provider Office. In addition the researcher used documentations that were available in the Town Water Supply Provider Office and Town Water Board.

Sampling Design

Kothari (2004) states that a sample design is a definite plan for obtaining a sample from a given target population and it refers to the techniques or procedures the researcher would adopt in selecting items for sample.

Population or Universe of the Study

The target populations of this research were Households, Employees of Town Water Supply Provider Office and Town Water Board of Director. The population size of Worabe Town was 18750 inhabitants (Worabe Town Finance and Economic Development Office, 2011). In Ethiopia the average household number in urban areas was four (ECSA, 2007). Therefore, the total number of households in the town is equal to the total population divided by the average households number four (i.e. 18750 / 4= 4687) as a result, 4687 households in two kebeles were considered as a target population from which the sample size of the study was selected. In addition to this, 16 employees with in the Town Water Supply Office and Town Water Board Director were taken us small target population of this study.

Sampling Frame

Sampling frame is consists of a list of items from which the sample is to be drawn. The sampling frame of this study was, the list of 4687 households from Kebele Office in two Kebeles such as, (01 and 02) Kebeles, 5 Town Water Board Members and 16 employees with in the Town Water Supply Provider Office.

Sampling Unit

The attributes that are the object of study are referred to as characteristics and the units possessing them are called elementary units. Sampling unit of this study was involves the town households from two Kebeles namely (01 and 02) Kebeles, Town Water Board Members and Employees Water Supply Office.

Sampling Techniques

Sampling is the way of drawing inference about a population without studying the entire population under study. There are two types of sampling techniques probability and non-probability sampling techniques. In this study the researcher applied both probability and non-probability sampling techniques. From the variety of probabilistic sampling techniques, the researcher used simple random sampling and cluster sampling methods for large target population of the study and also from non-probabilistic sampling techniques employed purposive sampling method for small target population of the study.

To select required sample size from the large target population of the study the researcher used cluster sampling method to categorize number of households based on residential location (Kebeles). After this, the researcher used the method of proportional allocation under which the sizes of the samples for both cluster was keeping proportional to the sizes of the clusters. Finally, after determining the number of households from two Kebeles, the researcher employed simple random sampling techniques to select required sample size of the study from the list of households.

On the other hand, to select required sample size from small target population of the study, from non-probabilistic sampling techniques the researcher used purposive sampling method for Town Water Board Members and Employees of Town Water Service Provider Office. This is because due to their importance of providing the required information for this study.

Sampling Size

Sample size is actually the total number of units which are to be selected for the analysis in the research study. The target populations of this study were the town households, all Employees of Town Water Service Provider Office and Town Water Board of Director. In order to determine the sample size from the large target population of households used the following formula:-

If N is greater than 10,000 **(N > 10,000)** using the formula of: - **n** = $\frac{Z^2 pq}{d^2}$ ....(Kothari, 2004)

Where, n= Desired sample size

N= Population size

Z = the standard normal variable at the required confidence level or Z statistic (93 %)

P= Estimated characteristics of target population

q =1- p, non estimated characteristics of the target population

d = Level of statistical significance or margin of error (7%)

The researcher used the above formula to get the desired sample size (n) when N > 10,000 with 93% confidence

level, if there is no estimated characteristic of target population, 50% used then, P= 0.5 and q = 1- p = 0.5. And the Z statistics is 1.81 (93% confidence level) and the desired accuracy at the 0.07 level of significance. Therefore, based on above explanation the sample size is computed as follows.

n **=**

$$\frac{Z^2 pq}{d^2} = \frac{(1.81)^2 (0.5)(0.5)}{(0.07)^2} = 167 \text{ housholds}$$

Since, in this study the target population of the study area was ≤10,000. So that, when target population (N≤ 10,000) the following formula used: -*f*n $= \frac{n}{1 + \frac{n}{N}}$ (**i.e.*f*n =desired sample size**)Hence, desired sample size of the study was, ***fn***=

$$\frac{167}{1 + \frac{167}{4687}} = 161 \text{ housholds}$$

To determine the number of households from the two Kebele, the data taken from each Kebele Administration Offices and employed proportional sampling from the two clusters 01 and 02 Kebele by using the formula of proportional allocation, that was, p* n, where, p = (A*n) |N where "A" represents number of households in the Kebeles, "n" represents sample size and "N" represents number of household in the town. After determining the required sample size in the two Kebele, to select required sample size the researcher arranged the household lists based on their alphabetical order and then used simple random sampling method to select desired sample size from two Kebeles.

Table 1. Sample Size of Each Kebele Households

Kebeles	Number of Household in the two Kebele	Required Sample Size from two Kebele
01	(2625×161)|4687 = 90	90
02	(2062×161)| 4687= 71	71
Total		**161**

Source: *Own Compilation, 2012*

On the other hand, the researcher used purposive sampling to select sample size from the total of 16 employees with in the Town Water Service Provider Office based on their importance of providing the required information for this study. From the total employees of Water Service Provider Office the researcher purposively selected 8 employees from different departments in the Office. 1 Manager of the Office, 2 officers from maintenance and operation department, 2 officers from budget and planning department, 1 officer from human resource department, 2 officer from water billing and charge collection department. In addition, from the Town Water Board Members the researcher purposively selected the Town Water Board Director based his importance in giving valuable and detail information for this study. Hence, the total of sample size of this study was 170 respondents.

Sample

Based on the above sampling estimation totally 170 sample respondents were selected. This sample size is the sum of 161 households taken from the two Kebeles such as, 90 households from 01 Kebele and 71 households from 02 kebele respectively, 8 Employees from Water Service Provider Offices and The Town Water Board Director.

Table 2. Summary of Sample Size

No	Sample Group	Sample Size
1	Worabe Town Water Board Director	1 (Purposive)
2	Employees of Worabe Town Water Service Provider Office	8 (Purposive)
3	Households	161(Cluster & Random)
Total Sample		**170**

Source, *Own Compilation, 2012*

Data Sources

In this study the researcher used primary and secondary data sources.

Primary Data Sources

The primary data sources were Employees of Water Service Provider Office, Town Water Board Director and Households. The data collected through questionnaires and semi-structured interview.

Secondary Data Sources

In this study the secondary data sources used for background information about the study. It was gathered from Worabe Town Water Board such as annual reports, strategic plans and brochures. In addition the researcher used published books, websites, Government of Ethiopia Water Policy and Proclamation documents and research works in the subject of this study.

Data Collection Techniques
This study used survey techniques of questionnaires and interview guide in order to collect required data for the study.

Questionnaires

To collect the necessary data from the household respondents the researcher developed questionnaire based on the stated objective of the study. Questionnaire employed for households of the study area. In addition to this, the researcher translated the questionnaire in to local language to get reliable information.

Interview Guide

The researcher prepared semi-structured interview guide for the Town Water Board Director and Employees of Town Water Supply Provider Office .The reason for choosing this type of interview guide was to allow the possibility to be flexible and to adjust the question to each of information. In addition, it helps to obtain additional information which was related to study area.

Data Analysis and Presentation

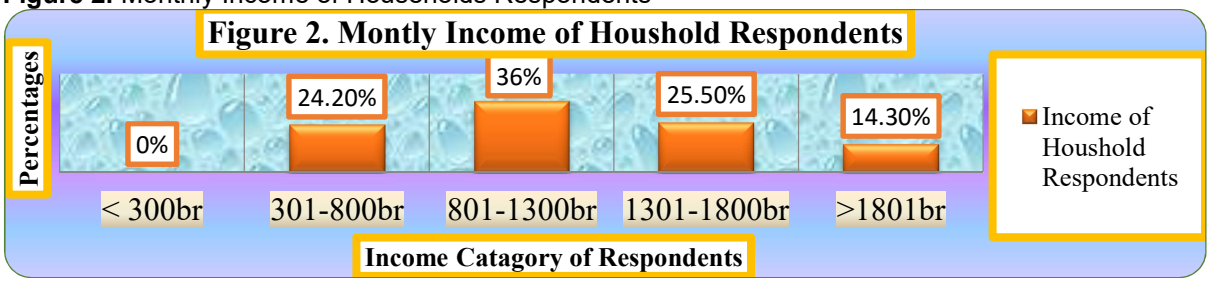
One of the most important elements of the research design is defining distinctly the unit of analysis as the research sample and instrument, cases selection and strategy of the data collection are determined and guided by the definite unit of analysis is correlated to the specified research question (Yin, 1994). In this study the data analyses part involves both qualitative and quantitative methods. After the data collected from primary and secondary sources through interview guide, questionnaires and documentation search were analysed through relevant statistical techniques of MS-EXCEL Computer Program. Finally, the data present through tables, percentage calculation, bar graphs, pie chart and line charts.

RESULTS AND DISCUSSIONS

Demographic Data of Respondents

This section describes the demographic information regarding to the sample of household respondents. In this study analysed only relevance information regard to the study.

Figure 2. Monthly Income of Households Respondents



***Source**: Field Survey, 2012*

Figure 2 indicates that, the monthly income of majority households which was (36%) of respondents were the range in between 801-1300 birr. (25.5%) of respondent's income was the range in between 1301-1800 birr. About (24.2%) of respondent's income was the range in between 301-800 birr and (14.3%) of respondent's income was 1801 birr and above. This implies that, the Mode of monthly income distribution of household respondents was within the range of 801-1300 birr. Therefore, the extent of cost-recovery water supply depends on ability and willingness to pay of households. The ability of consumers to pay tariffs influences the capacity of utilities to be financially capable of expanding access and ensuring service quality. The realization of idea of cost recovery of water services will result in rise of prices of these services, and, unfortunately, will encumbrance the household budgets. So that, the income level of household respondents was relevant for evaluating the equity of water tariff in Worabe Town.

Evaluation of Cost Recovery Mechanisms and Practices in Water Supply

Efficient cost recovery of water charges is an essential element for the efficient service delivery and sustainability. There are a number of ways in which cost can be recovered. Tariffs, subsidies and financial support mechanisms can all contribute towards sustained service delivery (Cardone and Fonseca, 2003). However, cost-reflective user fees for urban water services are vitally important for achieving financial sustainability in the urban sector because user fees are critical to ensure maintenance as well as extension and improvement of services of water.

Ethiopian National Water Policy (1998) calls for water pricing policy by promoting site-specific tariff setting along with full cost recovery for urban water supply while ensuring affordable access for the poor through appropriate mechanisms of cross subsidization. The tariffs determine the level of revenues that service providers receive from users to recover the cost of construction, operation and maintenance of providing water services in urban areas. Therefore, the implementation of full cost recovery policy in water supply was evaluated in terms of efficiency, equity and cost recovery targets in Worabe Town as follows.

Water Tariff Structure of Worabe Town

The current tariff structure of the Worabe Town is set by theSNNPRS Water and Energy Bureau with coordination of the Town Administration in the year of 2003 (See table 4.1).

Table 3. Water Tariff Structure of Worabe Town

Types of Water Line Connections	Types of fee				
	Connection pipe size	Estimated connection fee	Network charge per month	Tariff fee in terms of (m^3)	
				Customer blocks in (m^3)	Payment per (m^3) of water
Domestic	(1/2inch)	1,100.00 birr	5.00 birr	**1-5**	**2.50 birr**
Industrial	(1inch)	2,200.00 birr	15.00 birr	**6-10**	**2.75 birr**
Institution	(3/4 inch)	1,600.00 birr	10.00 birr	**11-15**	**3.00 birr**
Commercial	(3/4 inch)	1,600.00 birr	10.00 birr	**16 and above**	**3.50 birr**
Public Taps	(1.5 inch)	4,000.00 birr	----	**Unmetered**	**5.00 birr**

***Source**: Worabe Town Water Board, 2012*

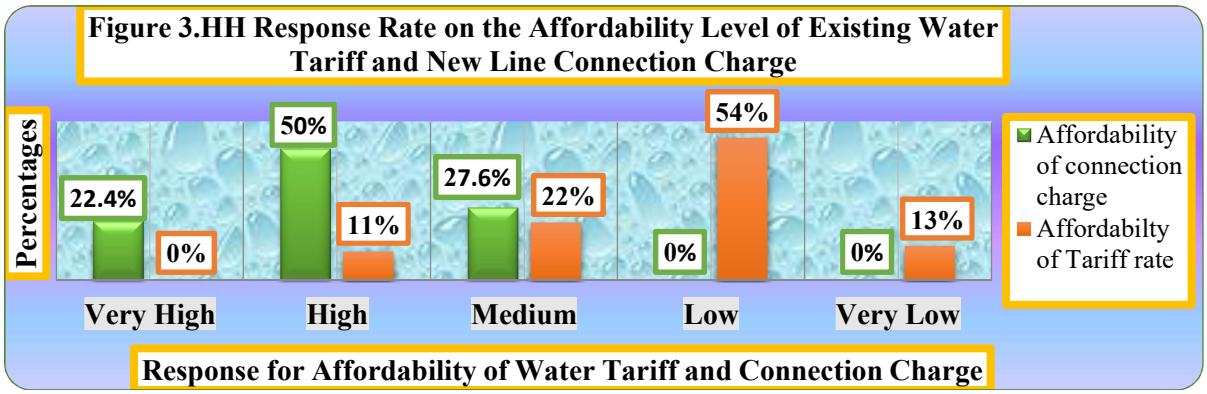
Table 3 indicates that, the town water tariff structure is based on increasing block tariff (IBT) structure system. In this type of tariff structure, the price for each additional unit consumed varies when the level of consumption reaches a certain threshold. This tariff structure was four customer blocks, the first customers block of water consumption from 1 to 5 m^3 tariff was 2.50 birr, the second customer block of water consumption from 6 to 10 m^3 tariff was 2.75 birr, the third customer block of water consumption from 11 to 15 m^3 tariff was 3.00 birr, and the fourth customer block of water consumption was 16 and above m^3 tariff was 3.50 birr. This tariff structure exercise cross-subsidies in which the higher consumers subsidize the lower. These high prices from the higher blocks of consumption of the increasing block tariff structure discourage wasteful water use in the town.

However, there were drawbacks in the current tariff structure of the town. Such as, the Town Water Board did not include separate tariff structure for industrial and commercial consumption to exercise cross-subsidization between domestic and non-domestic water consumptions in the town. This leads to inequitable tariff structure in the town. In addition the current tariff structure of the town was established in the year of 2003 and it was not revised for nine years. Determining cost-reflective user fees is an ongoing process that should be regular indexation of charges; there should be a mechanism for periodic reviews of the overall basis for charging, capturing the benefits for customers of increasing efficiency as well as sharing the costs of increasing quality improvements. But the town water tariff was not adjusted periodically this reveals that the town tariff system is inefficient. Hence, the above existing tariff drawbacks affect cost recovery in terms of metering; block tariff design and restructuring were present problems in terms of achieving efficiency, equity and cost recovery targets.

On the other hand, the Town Water Board of Director explained that the tariff structure for public taps is fixed rating system at a rate of 5.00 birr per m^3 of water. From this amount 3.00 birr per m^3 of water or (60%) shares of revenue for Kebele Water Committee and 2.00 birr per m^3 of water or (40%) share of revenue for the Town Water Board but the estimated connection charge amount of 4,000.00 birr per connection was totally covered by the Town Water Board. This implies that higher tariff rate for public tapsthan private connections charge and most of households who get water from public taps constitute the most disadvantaged group in the town. Therefore,the public taps tariff was higher than private connection and the town Water Board generates revenue from public taps consumptions only 40% per m^3 of water and this amount of revenue covered only operation costs whereas maintenance costs of water supply cross-subsidised through private connections in the town.

The average estimation connection fee for domestic consumptions of water was 1,100.00 birr, for industrial consumptions 2,200.00 birr, for government institutions and commercial enterprises the connection payment was 1,600.00 birr. This implies that, there was price differentiation in between connection charges based on types of customers and but the tariff structure was constant for all types of consumers. However, most of household respondents replied that the connection charge was not affordable in the town (See figure 2).

Affordability Level of Water Tariff Structure and Connection Charges

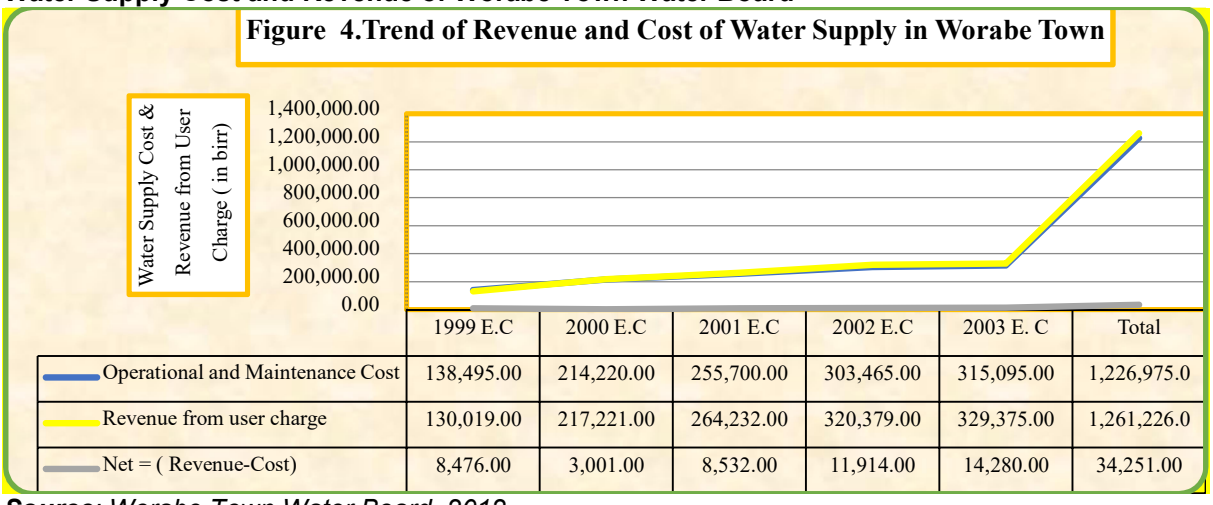


***Source**: Field Survey, 2012*

Figure 3 above shows that, 11% of respondents said that the rate of water tariff was high, 22% of respondents said medium, 54% and 13% of respondents answered that the rate of existing water tariff was low and very low respectively. This indicates that most of household respondents replied the current water tariff rate for private connections in the town was low. On the other hand, household respondent's response was approved by the Town Board of Director and Employees of Water Office as a rate of existing water tariff structure was low. Their reason for this low tariff rate was unwillingness to increase the tariff rate in the town.

Concerning the new line connection charges, the majority 50% of respondents replied that the level of affordability of connection charge for domestic consumption requires high price. About 27.60% and 22.4% of respondents said that, the affordability of connection charge was medium and very high respectively. This implies that most of household respondents were not satisfied with the rate of existing connection charge. The respondents mentioned as a reason for this was the connection charges as compared to their income was unaffordable. The realization of idea of cost recovery of water services will result in high rate of connection charge, and, unfortunately, will encumbrance the household budgets. This indicates that there is strong positive relation between the income of the household and the willingness to have private connection to the improved water service in the town.

Water Supply Cost and Revenue of Worabe Town Water Board



	1999 E.C	2000 E.C	2001 E.C	2002 E.C	2003 E. C	Total
Operational and Maintenance Cost	138,495.00	214,220.00	255,700.00	303,465.00	315,095.00	1,226,975.0
Revenue from user charge	130,019.00	217,221.00	264,232.00	320,379.00	329,375.00	1,261,226.0
Net = (Revenue-Cost)	8,476.00	3,001.00	8,532.00	11,914.00	14,280.00	34,251.00

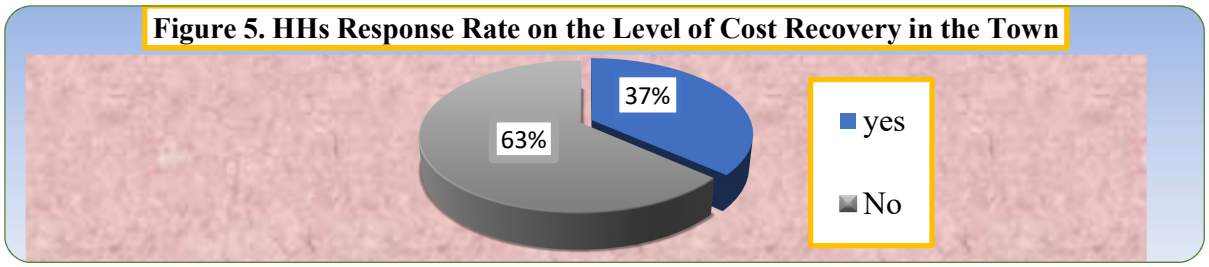
***Source**: Worabe Town Water Board, 2012*

Figure 4 above indicates that the trend of revenue and water supply cost in Worabe Town from the year of 1999 up to 2003 E.C. This trend shows that, the average ratio of operation and maintenance costs recovered from user charge was 97%of shares from the total costs. This reveals that in practice full cost recovery for water is quite poor in the town, because user charges targeted for only to cover operation and maintenance costs and financing for water expansions in the town subsidized through the town government budgets. Because the initial estimated amount of existing project was 12 million birr however recovered capital cost for further water infrastructure expansion in the town in five years was the

amount of 34,251.00 birr. Moreover as indicated in the figure 4.3 the revenue from user charges was at increasing trends in some amount of birr through years at the same time the operation and maintenance cost of water supply also at increasing trends. This reveals that the Water Board did not have cost reduction strategies in order to increase the amount of net revenue to meet water infrastructure expansion in the town. Hence, full cost recovery in water supply is quite poor in the town and has potential to contribute to a substantially higher proportion of recurrent costs.

The Worabe Town Water Board Director described that the water service delivery in the town was financed through NGO's supports, government subsidies and tariffs. The present tariff structure was not cover full cost recovery. It achieved only operation and maintenance costs recovery through user charges. The capital costs covered through subsidy provided by local general budget of the town administration and NGO's support. This indicates that, the Town Water Board rejected a policy of full cost recovery service charge, and expressly adopted a budget resolution from the town general budget to the Water Board. The reason for this was politically unwillingness to adjust the tariff rate periodically in the town. Therefore, this indicates that there was a gap in between policy objectives and implementation in the town.

On the other hand, most of household respondents replied that, the existing water tariff structure was not covered full cost of water supply in the town (See figure 4).



***Source**: Field Survey, 2012*

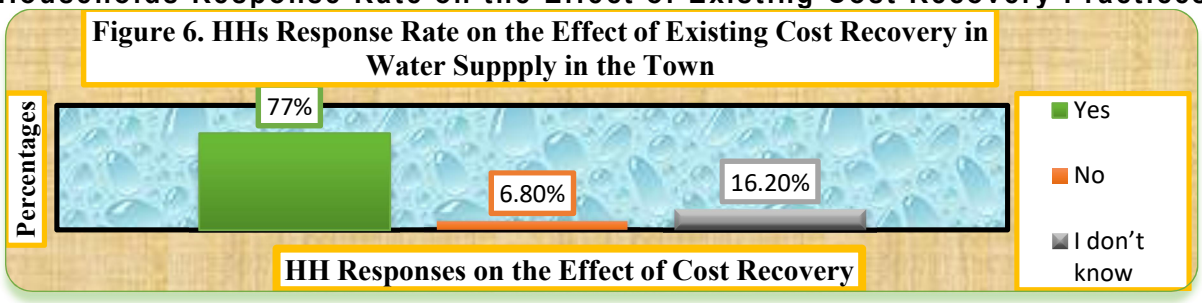
Figure 5 above shows that, the respondents were asked whether the existing water tariff of Worabe Town was adequate for full cost recovery or not. Based on this 102 (63%) of respondents said that the existing water tariff is not adequate for full cost recovery in the town, whereas 59(37%) of respondents said the existing water tariff was adequate for full cost recovery in the town. This implies that, most of respondents agree that the existing water tariff structure was not covered full costs of water supply. The reasons frequently mentioned by respondents is the rate of private connection and water tariff rate in the town was at low rate and also most of communities were got potable water through public taps.

Therefore, because of inadequate cost recovery system the Town Water Board did not obtained sufficient revenues to cover capital expenditures (investment) for expansion of water in the town. This, in turn, was due to water tariffs being currently set at less than full-cost recovery levels and was not revised for nine years. In addition there was low level of private connection because of high rate connection charges and this leads to high rate of unmetered connections or public taps in the town. Consequently, this affects cost recovery in terms of metering; block tariff design and restructuring were present problems for achieving efficiency, equity and cost recovery targets in the town.

The Effects of Existing Cost Recovery Practice in Worabe Town

Efficient cost recovery of water charges is an essential element for the efficient service delivery and sustainability. The low cost recovery is affects the financial viability of water supply sectors and also it has an effect on the operation and maintenance and will also result in an inability to extend water supplies to unserved areas (Cardone and Fonseca, 2003).

Households Response Rate on the Effect of Existing Cost Recovery Practices



***Source**: Field Survey, 2012*

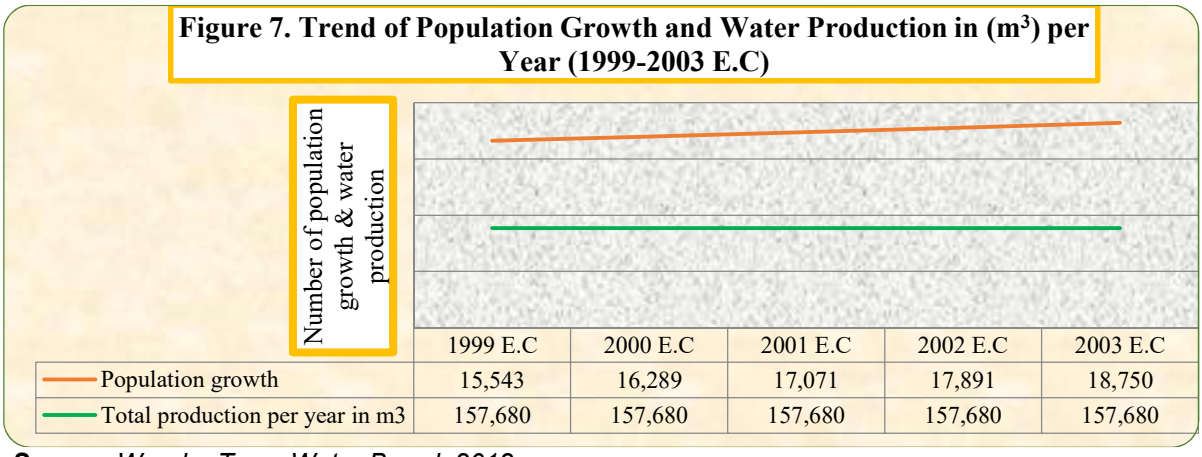
Figure 6 above reveals that, the household respondents were asked whether the effect of existing cost recovery practice in Worabe Town was negative effect on water supply or not. Based on this 124 (77%) of respondents said that, the existing cost recovery of water supply has affected the water coverage in the town. 11(6.8%) of respondents said that, the existing cost recovery of water supply did not affect the water coverage in the town. Whereas 26 (16.2%) of respondents said that, they do not know about the effect of existing water cost recovery in the town. This implies that, most of respondents agree that low cost recovery affected the water service coverage in the town. The respondent's reason for this was, the level of water infrastructure in the town did not accessible as compared to spatial expansion and population growth in the town. Therefore, the low level of cost recovery practices in water supply was affects the water infrastructure expansion and services in the town.

Demand Efficiency of Water Supply and Services in the Town

According to Johnson (p.32, 2006), "Cost recovery matters because of population growth, high rates of urbanization and sustaining existing water services alone poses a daunting financial task. The numbers needing to be served to meet the 2015 Millennium Development Goals related with water in Africa the target of number of people served by water supply must increase by 1.6 billion". Hence, the water infrastructure extension should consider the rate of population growth and urban expansion.

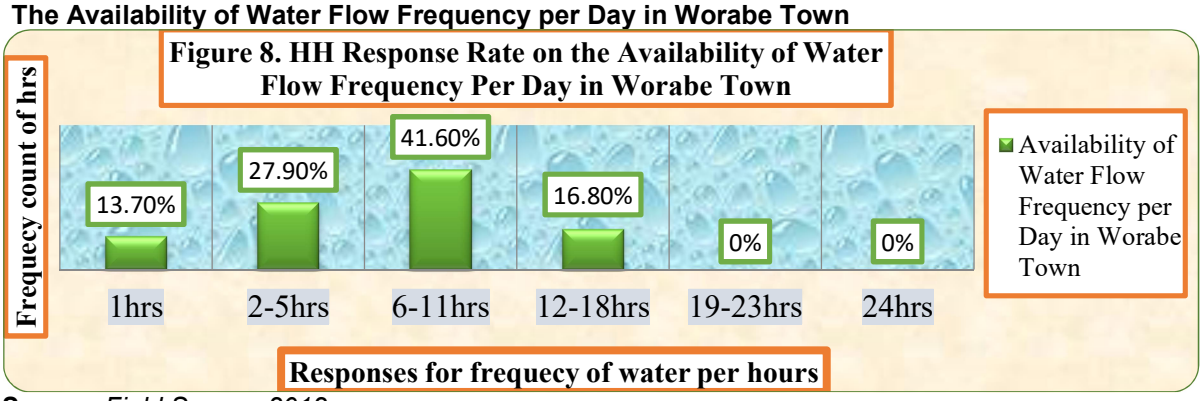
Worabe Town Water Board Director and Employees of Town Water Service provider office described that, the water demand in the town was the production capacity of 20 litres per second but the town water sector achieved only 5 litres per second. In addition they agree on the household responses as the low rate of water coverage in the town. The reasons for this were as frequently mentioned by respondents the low water infrastructure. The town expands spatially and demographically but the production of water per year has been constant due to shortages of budget to expand water infrastructure in the town (See figure 6).

Figure below indicates that the trend of annual water production per (m^3) and the rate of population growth in the town. As observed from figure the annual production of water in the town was 5 litres per second that means the annual production of water in (m^3) was 157,680 m^3 per year. On the other hand the population increased at a rate of 1.048 per year in the town. This revealed that the town population growth continually but the rate of water production growth was still constant. Hence, there was inadequate cost-recovery in the town and this cause for inability to expand water supplies with regard to population growth, thus continuing a cycle of inequitable access to water supplies in the town.



***Source**: Worabe Town Water Board, 2012*

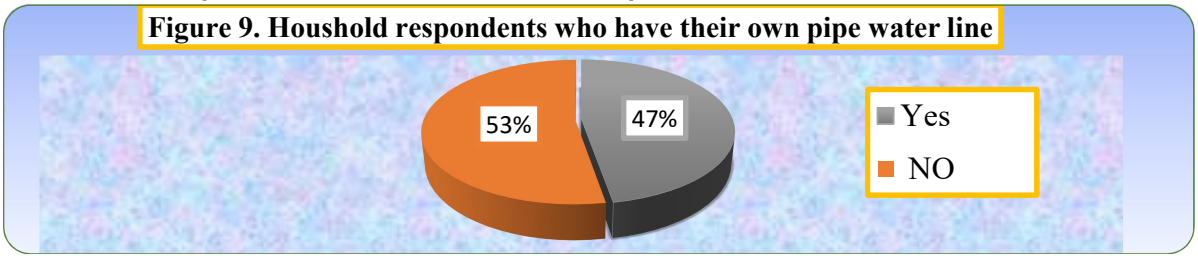
The Availability of Water Flow Frequency per Day in Worabe Town



***Source**: Field Survey, 2012*

Figure above reveals that the household respondent's response on the availability of water flow frequency per day in the town. As observed from the above figure, 67 (41.60%) of respondents said that, the flow frequency of water per day in the town was the range in between 6 up to 11 hours. 27(16.8%) of respondents answered that, the flow frequency of water in the town was the range in between 12 up to 18 hours. About 45(27.9%) of respondents said that, the flow frequency of water in the town per day was the range in between 2 up to 5 hours. 22(13.7%) of respondents said that, the flow frequency of water in the town per day was for 1 hour. This implies most of respondents replied that flow frequency in the town was in the range in between 6 up to 11 hours. The reasons for this as most of respondentsthe existing water supply system cannot satisfy the existing demand, which lead to the availability of water only for some hours per day or makes the availability unpredictable and most of new settlement area has not accessed for water supply in the town. Thus the level of cost recovery in the town affected the availability of water flow frequency per day in the town.

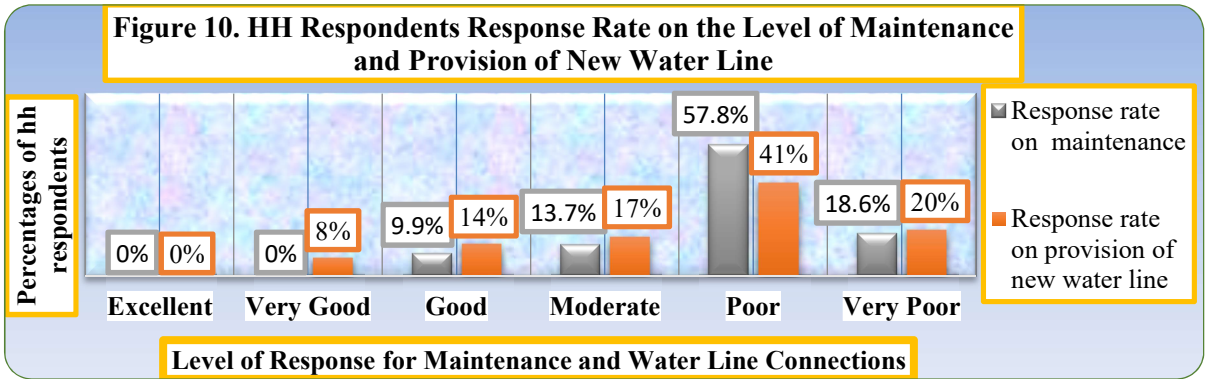
Household Respondents Who Have Their Own Pipe Water Line



***Source**: Field Survey, 2012*

Figure above indicates that the households who have their own pipe water or not. As observed from the respondents answer 85(53%) of respondents have not their own pipe water and 76(47%) of respondents have their own pipe water connection. This reveals that, most of respondents have not their own pipe water and they mostly used public taps to get potable water. The reasons for this as frequently mentioned by respondents were the connection charge being unaffordable in the town and the pipe water line does not cover their settlement area. The large percentages of households obliged to live without their own pipe water indicated that there was shortage of water infrastructure expansion in new settlement area and the rate of private connection charges did not affordable for most of households in the town.

Water Office Performance in the Provision of Maintenance and Water Connection



***Source**: Field Survey, 2012*

Figure above shows the level of satisfaction of households on water office response for maintenance and provision of new water connection in Worabe Town. Regarding the provision of maintenance, (76.4%) of household responded from poor to very poor. This implies that, most of household respondents replied the performance of Water Office in the provision of maintenance was poor. Therefore, poorly managed facilities lead to declining service levels. This in turn reduced the chances of good cost recovery in terms of both willingness-to-charge and willingness-to-pay and also the water investments in the town cannot keep pace with demand.

Concerning the provision of new water connection, (61%) of household responded from poor to very poor. This implies that most of respondents said that, the Water Office response for provision of new water line was poor. Because of unfair distribution of water infrastructure series issue in the periphery area, specifically, the household respondents lived in Duna Kebele expressed their feeling in great dissatisfaction.

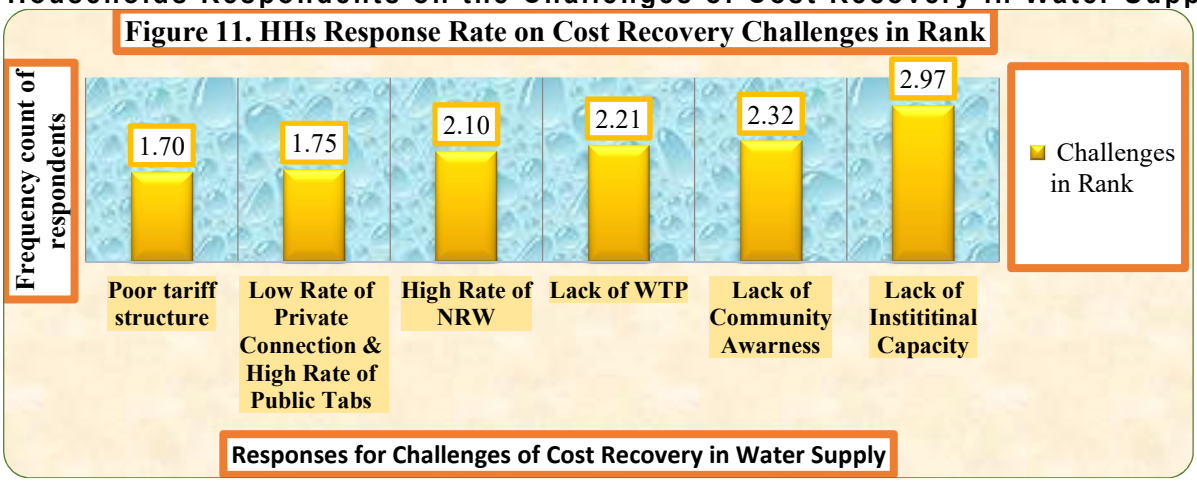
On the other hand, the response obtained from Town Water Board Director and Employees of Town Water Supply Office approved this fact as most of new settlement areas have not accesses to water supply. The reasons frequently mentioned by Board of Director and employees, the town water utilities faced a shortage of budget to expand water infrastructure in new settlement area and to hire adequate technical human resources in the provision of maintenance services. Therefore, due to shortages of budgets the town water utilities unable to extend water infrastructures for unserved areas, thus continuing a cycle of inequitable access to water supplies in the town.

Implementation Challenges that Affects Cost Recovery of Water Supply in the Town

African Development Bank (2010) states that, financial viability is an important issue in sustainability of Urban Local Government water supply provision. However, there are principal challenges to achieving FCR in urban water service provision that are related to tariff setting, human and institutional capacity, high level of UFW, lack of community awareness and participation ,operational inefficiencies, poor infrastructure and mismanagement.

According to household respondent's response, they identified the challenges that affect the implementation cost recovery in water supply in Worabe Town (See figure below).

Households Respondents on the Challenges of Cost Recovery in Water Supply



***Source**: Field Survey, 2012*

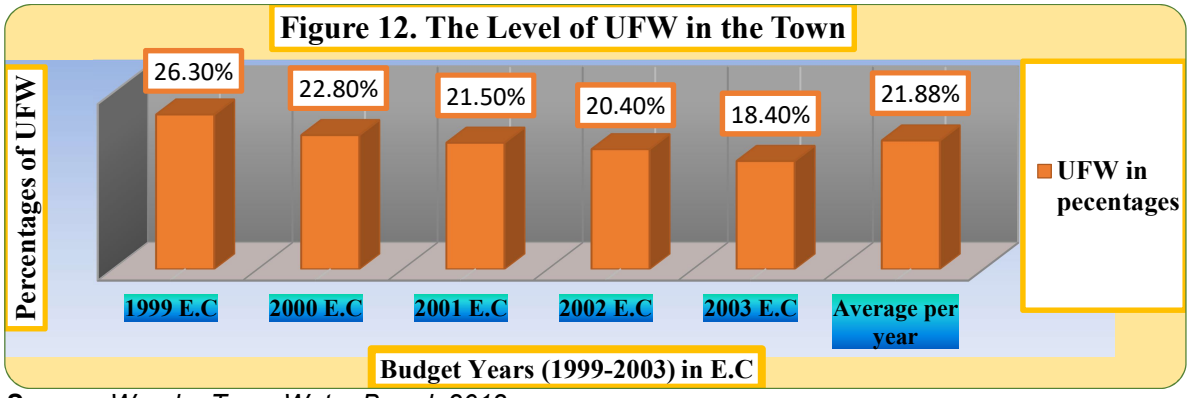
The above figure above indicates that the rank of cost recovery challenges set by household respondents. 2.97 (25%) of respondents put lack of institutional capacity in first place. 2.30 (19.5%) of respondents were set lack of community awareness on cost recovery of water issues in the second rank. 2.21 (18%) of respondents were set lack of willingness to pay in the third rank. 2.10 (16.5%) of respondents were set high rate of non revenue of water in the fourth rank. 1.75 (11%) of respondents were set low rate of private connection and high rate of public tabs in the fifth rank and 1.70 (10%) of respondents set poor tariff structure in the sixth rank. This reveals that all households' respondents agree on the identified challenges by researcher. However, the extent of each challenge up on cost recovery was different as indicated by households in the figure 4.10. On the other hand, the household respondents answer also approved by the Town Water Board of Director and Employees of Town Water service provider Office.

Institutional Challenges that affects Cost Recovery in Water Supply

AFDB (2010) describes that one of factor for institutional challenge in the provision of water supply was operational inefficiency. The causes for operational inefficiency in production of water in the town are UFW, collection inefficiencies, lack of service coverage and lack of qualified human resources in the water supply and service sector.

High Rate of UFW in Water Production in the Town

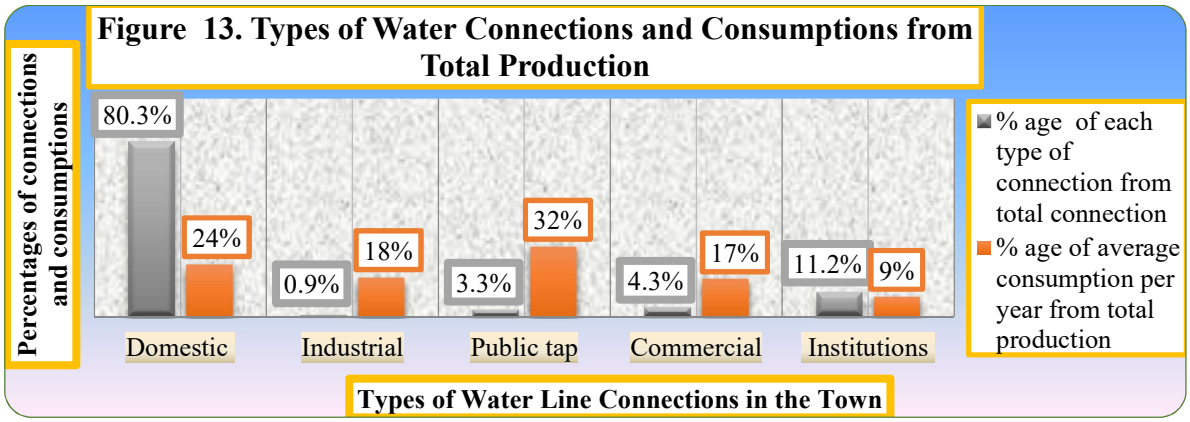
AFDB (2010) states that, UFW arises from technical losses occurring during transmission and distribution, water provided free through stand posts or under exemptions (often for the poor) refers to water that is produced but not sold to consumers. AWWA Leak Detection and Accountability Committee (1996) recommended 10% as a benchmark for UFW. However in Worabe Town, the level of UFW was on the average 21.88% (See figure below).



***Source**: Worabe Town Water Board, 2012*

Figure above indicates that, the level of UFW in the town on the average per year was 21.88%. The existing water project produced the amount of 157,680 m^3 of water per year and from total production of water 21.88% was unaccounted for water that means in terms of m^3 of water per year was 34,500.

According to the Town Board of Director water leakage during operation and unmetered tariff for stand post at fixed tariff rate were causes for unaccounted for water. And one of the causes for UFW in the town high consumption of water through public tabs (See figure 12).



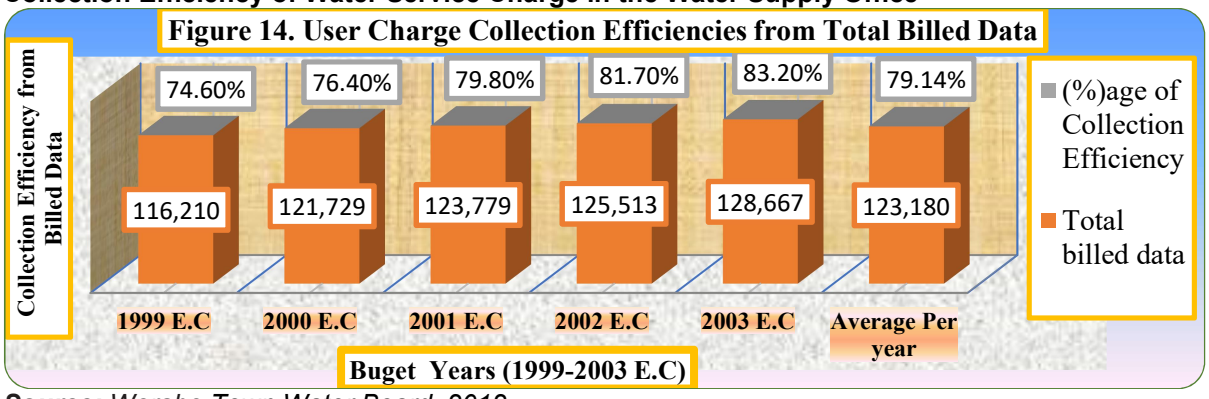
***Source**: Worabe Town Water Board, 2012*

Figure 13 indicates that, comparison in between type of connection based on number of connections and average share of consumption from total production of water in five years (1999 up to 2003 E.C). As observed from figure 4.12 the highest number of connection are domestic (80.3%) but the higher average consumption is from public taps (32%). This implies that most of consumption of water in the town through public tabs at a fixed tariff rating system.

Hence, the important aspects of metre connections are necessary to encourage water conservation and more customers (higher service coverage) mean a larger revenue base for the service provider and also significant potential market for utilities. However, in Worabe Town the level of water consumption through public taps from the total water production was (32%). This was consequences for production inefficiency in water supply in the town.

When there are enough private connections it becomes possible to finance the cost of public taps for the lowest income groups from a surplus of the rates paid by the private users (AFDB, 2010). But the number of connections in Worabe Town was 871 connections only and most of poor households currently depend on the limited public tabs. This indicates that there was low service coverage of private connection in the town and high rate of public tabs consumptions, which in turn results for higher operating cost ratios and less revenue in the town.

Collection Efficiency of Water Service Charge in the Water Supply Office

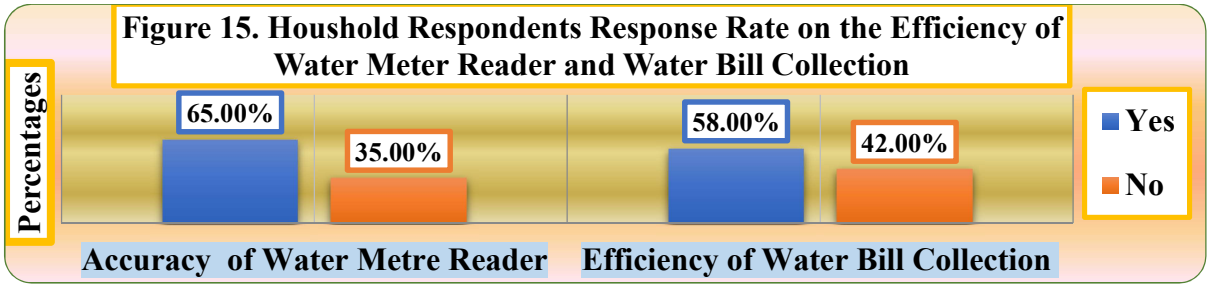


***Source:** Worabe Town Water Board, 2012*

Figure 14 indicates that, on the average from 133,618 billed data (79.14%) was actual collected revenue from user charges. The remaining (20.86%) was uncollected revenue per year from users and this shows there was collection inefficiency problems in revenue collection system in the Water Supply Office in the Town.

Employees of Town Water Supply and Service Office mentioned that, there was delay and inefficiency in preparing billing and collection system in the office. Because, the billing and collection system done by manual system and there is no computer-based record keeping system in the Water Office. This consequence for poor record keeping as service

provider in recording amount due and amount paid. On the other hand, most of household respondents were not satisfied on water metre reader and water bill collection system in the town (See figure 14).



***Source**: Field Survey, 2012*

Figure 15 indicates that, (65%) of respondents said the water meter reader properly read and (35%) of respondents replied that water meter reader does not properly read. On the other hand, (58%) of respondents said that the water bill collection was efficient and (42%) of respondents replied that the water bill collection was not efficient. The respondents reasons for inaccuracy of water metre reader and inefficiency of bill collection system were, the Water Supply Office used manual system for water meter recording system this condition raises compliances on water metre reader. Therefore, inaccuracy of water meter reader leads to inefficiencies of bill collection system and also affects the level of cost recovery in the town.

Lack of Human Resource Capacity of Water Sector in the Town

Appropriate staffing levels and efficient task allocation remain major challenges for water supply and service providers in the town. The Town Water Board Director states that, to improve cost recovery and service coverage of water supply in the town, SNNPRS of Water and Energy Bureau had been undertaken BPR study in the year of 2009.

Table 4. Human Resource Capacity of the Town Water Supply and Service Office

No	Name work process or departments	Required No of Qualified human resource	Existing human resource	% age of existing human resource based on BPR Study
1	**Core Process**			
1.1	Water Supply and Service	18	12	72.00%
2	**Support Process**			
2.1	Finance and property administration	3	3	100%
2.2	Human Resource	1	1	100%
Total		**22**	**16**	**72.80%**

***Source:** Worabe Town Water Board, 2012*

Table above indicates that, based on BPR study the Town Water Office fulfilled (72.80%) of human resources for implementation of the BPR study. However, the response obtained from interviewee, all staff members were not professional in urban water management. And also, from total employees, 8 employee's diploma holder, 4 employee's certificate and 4 employees 12th complete. This shows that in the water sector there was no higher qualified human resource and also the Water Office did not achieve requirement of professional human resources based BPR studies. Therefore, skilled man power is vital for urban water supply and services for proper management and maintenance of water infrastructure and for scientific management system of water. However, currently the Town Water Supply Office was not equipped with qualified water professionals.

Inappropriate Tariff Structure in the Town

Ethiopian National Water Policy call for full cost recovery through service charges in the urban water supply sector and tariffs determine the level of revenues that service providers receive from users. However, in the implementation full cost recovery in Worabe Town, there was potential conflicts between policy objectives, and local government perception with regard to full cost recovery. Because, to reach policy objectives, there is a need to consider three aspects of tariff setting: their average level, their structure and the process for setting and adjusting tariffs.

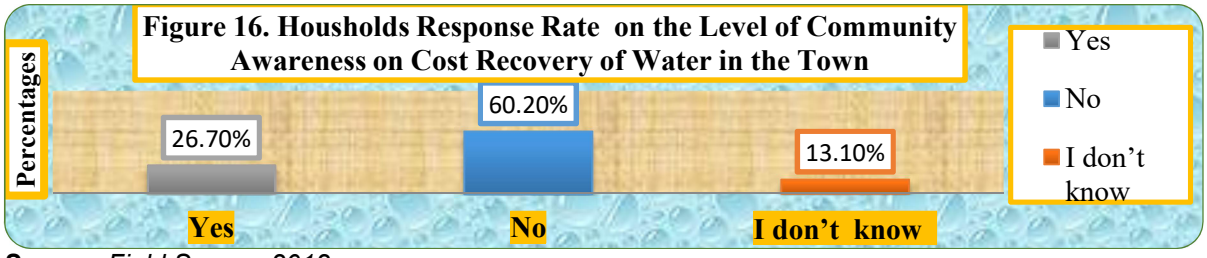
According to the town Board of Director, the level cost recovery in the town is targeted only to cover operation and maintenance costs only and the capital costs covered by the Town government subsidies. This indicates that there was a gap in between the implementation of policy and its objectives. The second aspect was the level of tariff structure, the current tariff structure of Worabe Town was based on increasing block tariff (IBT) structure system. However, there was no separate tariff structure for industrial and commercial consumption for cross subsidizations in between domestic and non domestic consumptions.

The third attribute of water tariff is the process for setting and adjusting tariffs, the current tariff structure of the town was established in the year of 2004. However, this tariff structure was still not revised with respect to inflation and capital asset depreciation value and also not targeted for full cost recovery. This affects cost recovery in terms of metering; block tariff design and restructuring were present problems in terms of achieving equity and cost recovery targets. Hence, keeping tariffs artificially low for all customers' results for vicious circle of underfunded service providers and insufficient investment in the town.

Lack of Community Awareness on Issue of Cost recovery in Water Supply

Cardone and Fonseca (2003) states that limited community awareness and participation in planning and management of urban water supply services are constrains in efficient cost recovery practices.

The findings of this study indicated that most of the household respondents replied that, the communities have not sufficient awareness about their contribution for cost recovery in water supply in the town

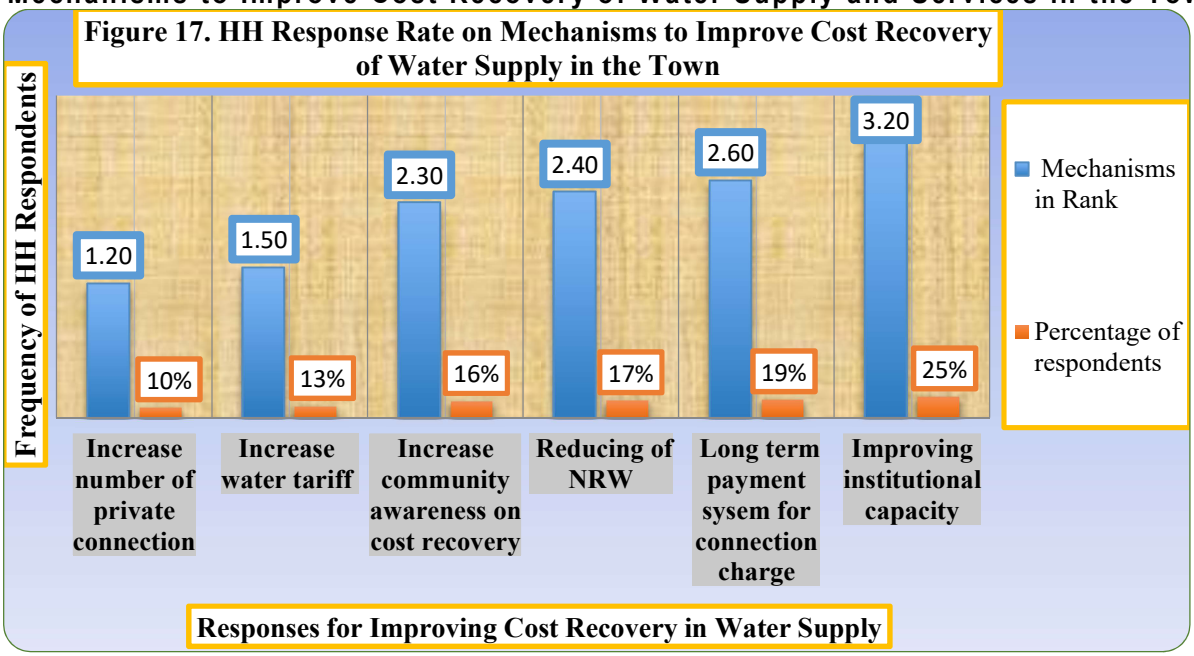


***Source**: Field Survey, 2012*

The above figure 16 indicates the level of community's awareness on the issue of cost recovery in water supply. 97(60.20%) of respondents said that the communities have not sufficient awareness about their contribution for cost recovery in water supply in the town. 43 (26.70%) of respondents said the communities have enough awareness about their contribution for cost recovery. 21 (13.10%) of respondents replied that, have not any idea on the level of communities awareness on contribution for cost recovery of water supply in the town. This implies that, most of communities have not sufficient awareness about their contribution for cost recovery in water supply in the town. The respondent reasons for this were, the Water Supply and Service Provider Office did not considered maintaining regular communication with communities on the issues of cost recovery in water supply service and potential problems. This indicates that, lack of initiation for public awareness campaigns or hearings education. This in turns the community's expectations that the town water sector operation and capital costs were covered by government budget.

Therefore, the main challenges that affects the implementation of cost recovery in water supply in the town were lack of institutional capacity, high rate of non revenue of water, lack of community awareness on cost recovery, lack of service coverage of water with respect to population growth, lack of willingness to pay on connection charge of water and availability of poor tariff structure in the town.

Mechanisms to Improve Cost Recovery of Water Supply and Services in the Town



Source: *Field Survey, 2012*

Figure 17 indicates that, rank of mechanisms set by households to improve cost recovery in Worabe Town. 1.20 (10%) of respondents said that increase water tariff, 3.20(25%) of respondents replied that improving institutional capacity, 2.40 (17%) of respondents said that reducing NRW, 2.21 (17.00%) of respondents replied that establishing long term payment system for connection charge to improve WTP of poor customers, 1.20 (10%) of respondents said that increase the number of private connection and finally 2.30 (16%) of respondents said that increase community awareness on cost recovery were mechanism for improving cost recovery of water supply in the town. On the other hand, the Town Water Board Director and Employees of Water Supply and Service Provider Office approved household respondent's mechanisms in improving cost recovery of water supply in the town.

CONCLUSIONS

The study results indicated that the existing level of cost recovery practice was quite poor in terms of efficiency, equity and cost recovery targets in the town. The major drawbacks of cost recovery mechanisms were the current tariff structure of the town was not revised for nine years and that was not incorporated separate tariff structure for industrial and commercial consumption in order to achieve cross subsidization in between non-domestic (industrial and commercial consumption) and domestic consumption. In addition the Town Water Board has a potential to cover only recurrent costs from user charge and the connection charges was unaffordable for many customers in the town. Therefore, these were an effect on cost recovery in terms of metering; block tariff design and restructuring were present problems in terms of achieving the expansion of water infrastructure and services in the town. Hence, to improve the existing cost recovery practices the Town Water Board should revising and restructuring the existing tariff rate structure, reconciling cost recovery and affordability, aim for long-term sustainable cost recovery, improving commercial and technical efficiencies and also give emphases for community awareness on the issue of cost recovery in water supply and services in the town.

Based on the result the following recommendation were forwarded:

- The Town Water Board should revise the tariff rate periodically
- The Town Water Board should implement innovative tariff systems by means of rationalizing the water tariff structure.
- The Town Water Board to be efficient in operation, it should demarcate between the commercial and technical losses of water. In order to resolve commercial losses the Board should introduce computerization billing system and monitor monthly costs at all cost centres, which are established based on service
- The Town Water Board should establish educational awareness programs through maintaining regular communication with communities on the issues of cost recovery in the provision of water supply and potential problems in the town.

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