



Financial Sustainability

SHEET 2

WATER TARIFF AND INCREASING WATER USAGE

Large-scale, community managed, gravity fed water supply, sanitation and hygiene promotion schemes are being implemented in Hitosa and Gonde-Itaya, Oromia Region, Ethiopia. The schemes have provided potable piped water issuing from springs to a total of 56 rural and small urban communities and a total population of around 1 million.

WaterAid, the funder of the projects, was concerned about the financial sustainability of the schemes and commissioned a report into this issue which was completed in April 2001.* The first issue sheet based on this study examined water consumption rates. This second issue sheet looks at the relationship between water consumption and tariff rates in order to highlight key points that need the attention of policy makers and implementers alike.

* Tekalign Tsige, *Evaluation of Financial Sustainability of Hitosa and Gonde-Itaya Water Supply Schemes*, April 2001.



Oromia is Ethiopia's largest region at 350,000m² and it's most populous at 24.3 million. Ninety percent of the population lives in rural areas. Hitosa is one of the 20 woredas of Arsi Zone of Oromia Region.

Introduction

The financial sustainability report indicated that the communities of Hitosa and Gonde-Itaya had low per capita water consumption levels. The daily per capita consumption rates of rural tap stand users, for example, were found to be twofold less than the rate anticipated during the design stage.

Socio-economic, cultural and natural factors were identified as the causes for the low level of water consumption in rural communities. While recognizing the need for these to be addressed, concerns about the long-term financial sustainability of the water schemes meant that it was also important to look at issues of tariff setting and economic forecasting.

Key Issues

Low consumption implies a low volume of water sold at the tap stands or paid for via private connections. The resulting low revenue from water is likely to be countered by an increase in tariff rates in order to cover the scheme running costs. However, an increase in tariff rates can, in turn, result in a further reduction in water consumption and a consequent further deterioration of revenue. Logically this kind of vicious circle can have a detrimental effect on the financial sustainability of water supply schemes.

In rural communities like Hitosa and Gonde-Iteya where per capita water consumptions levels are low, an increase in tariff rates is only likely to impede consumption, thus beginning the vicious circle. Another solution needs to be found.

The Hypothesis

This paper proposes that it is possible for water supply schemes to achieve financial sustainability by finding ways to increase the demand for water and through the development of affordable tariff structures, rather than through price increases alone.

Methodology & Approaches

Financial modeling is an important tool for estimating water tariff rates. The model includes both operational and financial forecasts. It provides a full view of the business potential, the profitability, cash requirements and financial risks of the water supply schemes.

In order to estimate tariff rates, financial models forecasting over a ten-year period were developed for the Hitosa and Gonde-Iteya water supply schemes.

Factors that influence water tariff include volume of water consumption and ability and willingness to pay. Accordingly these factors were taken into account during the design of data collection.

The study included a survey of nine rural villages and one small town (Iteya). The villages were selected on the basis of their agricultural production capacity and climatic conditions.

10 households from each of the 9 villages, and 24 households from Iteya town (12 tap-stand using and 12 private connections), were interviewed. Households were randomly selected from each village taking into consideration the condition of private dwellings, the distance from tap stands and the mode of transport used to fetch water.

A semi-structured questionnaire was designed to obtain information from households on their ability and willingness to pay for water. In addition, water consumption figures and operating revenue and costs were obtained from the Water Administration Offices.

The following inputs were used to develop the financial models

Planning Period

The planning period was defined as ten years starting from January 2000 and ending in October 2009.

Population (beneficiaries)

It was assumed that the target would increase by 3.4% per annum.

Per capita water consumption rates

Survey results showed that per capita water consumption rates are related to where people collect their water. Therefore, different per capita consumption rates were applied for tap stand users and privately connected customers.

Water leakage rate

The leakage rate was assumed to be low at the initial stage, but to increase gradually by a small percentage throughout the planning period.

Water costs

Costs included operation & maintenance costs and allowance for depreciation.

Subsidy for sanitation

In addition to water sales covering the cost of maintaining the water supply system, the idea that tariff rates should be sufficient to subsidise sanitation facilities had been discussed. Thus a subsidy for sanitation was included as one of the components in the financial model for tariff rates.

Tariff rates & cost coverage

The official water tariff policy of Ethiopia is part and parcel of the overall water resources management policy adopted in the country in 1998 and is an important element to be considered when setting tariff rates for water supply schemes.

Among other things the policy proposes that tariff setting be site specific. It suggests that cost coverage principles vary between urban and rural communities. For urban water supplies, pricing is set with the stated aim of full cost recovery, while rural water supply pricing aims only for operation & maintenance cost recovery.

In this study, partial cost coverage level was defined as tariff rates based on operation and maintenance cost coverage. Full cost coverage was defined as tariff rates based on operation & maintenance costs, plus replacement reserves, and a subsidy for sanitation. To ensure financial sustainability this study based its projections on full cost recovery over the scheme as a whole.

Forecasts of income & expenditure of Hitosa and Gonde-Iteya water supply schemes were made through the development of financial models based on three scenarios. These projections calculated financially sustainable water tariffs that would cover the total costs of the scheme. The difference between the different financial scenarios is related to per capita consumption levels and profiles of connections.

- ▶ Scenario (1) assumed the prevailing per capita consumption levels and that the number of private connections would remain unchanged during the planning period.
- ▶ Scenario (2) assumed change in per capita consumption levels, but no change in the number of private connections.
- ▶ Scenario (3) assumed a change in per capita consumption level and an increase in the number of private connections.

The following table shows the tariff rates calculated in relation to these three alternatives. It considers Hitosa and Gonde-Iteya separately, and also differentiates between partial cost recovery and full cost recovery.

	Partial Cost Recovery Tariff Rate (Birr/m ³)		Full Cost Recovery Tariff Rate (birr/m ³)	
	Hitosa	Gonde Iteya	Hitosa	Gonde Iteya
Scenario(1)	2.06	2.72	3.34	5.56
Scenario(2)	1.30	1.25	2.08	2.55
Scenario(3)	1.16	1.02	1.85	2.09



Abaynesh Birkenesh, tap attendant, photographed selling water to a customer: Tap attendants have books containing vouchers that customers buy and present when they want to collect water. Each book is worth 100 birr contains 1000 vouchers.



The findings

Using figures for average household earnings and average water consumption from the Central Statistical Authority (CSA) the study calculated the maximum tariffs water customers could afford to pay. The results were 1.96 birr per m³ for tap stand users and 2.68 birr per m³ for privately connected domestic customers.

Based on these figures we can see from the table that, at desired full cost recovery, scenarios (1) and (2) will not be affordable for all customers. However, in scenario (3) the rates are affordable in every instance except for full cost recovery in Gonde-Iteya.

By observing that the tariff rates calculated based on the third scenario were the most affordable, as compared to other scenarios, the study revealed the fact that in rural communities where per capita consumption rates are low, affordable tariff rates can be attained through increases of either per capita consumption levels, or the number of private connections.

An increase in water consumption leads to an increase in sales volume of water. An increase in sales volume of water will result in the reduction of tariff rates. This relationship is observed from the financial models developed under the different scenarios. For example, the difference between the tariff rates of first (low level consumption) and third (improved level consumption) scenarios are 81% for Hitosa and 166% for Gonde Iteya.

The statistical modelling showed that lowering of tariff rates would not be an important solution to raising water consumption levels and likewise increasing tariff rates alone (without increasing water consumption) might not ensure revenue sufficiency of the water supply schemes.

The findings also showed that the low level of per capita consumption does not favour a traditional progressive tariff based on volume of water consumption. Instead, in order to bring the tariff rates of scenario 3 to affordable levels for each type of customer, while ensuring full cost recovery, a block tariff system based on type of customers was proposed. Different uniform volumetric tariff rates were recommended for the three types of customers - tap stand users, privately connected domestic customers and privately connected non-domestic customers. In order to address the grievance over differing tariff rates between Hitosa and Gonde-Iteya, further adjustments were made so that a uniform tariff was calculated to apply to both areas.

The recommended tariff rates for both Hitosa and Gonde-Iteya by type of customers are shown in the following table:

Customer Type	Birr/M ³
Tap stand users	1.50
Privately connected domestic customers	1.80
Privately connected non-domestic customers	2.00

As can be seen, better off customers are subsidising those who are less well off. By recognising the reality of different affordability rates this tariff structure differentiates between water consumers in order to maintain affordability while ensuring revenue sustainability.

Affordable tariff rates can encourage communities to use more water, which in turn will have a positive impact on revenue from water sales and on the health of the community. An increase in revenue implies financial sustainability of water supply schemes. Therefore, the relationship between water consumption levels and tariff rates is crucial to the sustainability of rural water supply schemes like Hitosa and Gonde-Iteya.



Throughout Ethiopia, wealth has always been closely linked to livestock. Where traditional water sources do not exist, households will share their tap water with their animals. Survey results indicate that about 70% of people with livestock give their animals tap water. However, WaterAid discovered that, irrespective of what they can afford to pay, people still tend to use traditional sources if they are easily accessible.

Discussion

As the survey findings indicate, the financial sustainability of the Hitosa and Gonde-Iteya water supply, sanitation and hygiene promotion schemes are under question because water consumption levels are very low. Therefore, in order to bring the schemes into a financially sustainable position an increase in water consumption is the most viable solution.

The survey suggested that the cost of water was not the reason for the low consumption levels, and that the way to increase water consumption is in fact to tackle the community's socio-cultural barriers to greater water use.

One option is to allow and actively encourage private connections, since this is a growing area of demand. Adopting an affordable payment system for the initial instalment and connection fees could encourage private connections and thereby increase water usage. Another option is to permit and facilitate livestock watering.

Moreover, a seasonal adjustment in the water payment system could also help increase water consumption levels. It was noted that the income of the rural communities has a seasonal character. With the livelihoods of rural households in Hitosa and Gonde-Iteya based on agriculture, people are

willing and able to pay more for water during the harvest season than the non-harvest season.

Another effective approach would be to increase hygiene awareness. This would create a greater demand for water, but importantly would also increase the impact of the scheme in terms of health benefits and a reduction in environmental pollution.

During discussions in a feedback workshop, it was observed that there was concern about the shortening of the design-life of the water supply schemes through the promotion of private connections and livestock watering. The forecast of revenue & expenditure using the financial model also revealed that an additional water supply is likely to be needed, starting from the sixth year of the planning period – this in the case of the second and third scenarios. However, the potential and most feasible means of generating sufficient revenue to cover the operation & maintenance costs, as well as the cost of expanding the system, would still depend on an increase in water consumption, rather than an increase of tariff rates.

Furthermore, it is clearly important to generate sufficient revenue at the early stages of a scheme (when the systems are new) and then, in due course, to invest in the development of new sources, to ensure coverage of the gap between demand and supply.

The Way Forward

Financial sustainability is a core issue for water supply schemes like Hitosa and Gonde-Iteya. The belief is that by evaluating financial sustainability key lessons and new options or approaches can be identified and the implementation of projects be improved in the future. The following recommendations should be considered:

- ▶ A wide gap was observed between the design assumptions and the actual consumption rates. This is mainly due to the adoption of generic parameters at the design stage. There is a need to adapt a project design approach that takes into consideration the specific socio-economic situation of project communities such as culture, behavior, past practices, attitude, affordability and willingness to pay for water.
- ▶ The gap between the assumptions and the actual consumption can be narrowed by increasing the number of private tap connections, increasing tap stands (particularly in scattered rural settlements), increasing the operation time of tap stands, facilitating livestock consumption, building clothes-washing areas and facilitating water transport systems.
- ▶ Other ideas include introducing a seasonal payment system that takes into account the ability and willingness to pay of the communities.
- ▶ Encourage both small and large private service providers to participate in the sector and – crucially - increase demand for water through sanitation and hvaiene promotion.

Conclusion

This issue sheet has highlighted the way in which the financial sustainability of water schemes is dependent on generating sufficient revenue through encouraging high levels of water consumption. To do this it is important that steps are taken to remove all barriers to increased water consumption. This involves taking into account the social, cultural and natural factors outlined, and promoting hygiene awareness, at the same time as fixing a suitable water tariff that is affordable for all and will not act as a deterrent to increased water use.

WaterAid – water for life

WaterAid is an international NGO dedicated exclusively to the provision of domestic water, sanitation and hygiene promotion to the world's poorest people.

Water Aid has been operational in Ethiopia since 1991 providing financial support and technical advice to local communities, governmental and non-governmental agencies involved in the provision of water supply and sanitation services.

WaterAid (Ethiopia) insists that local people undertake the necessary construction work and continue to service and manage new systems upon completion. All projects use technologies that are relatively low cost, practical and easy to operate. By improving not only the quality of water and access to it, but also the quantity, WaterAid seeks to enhance the health and socio-economic well being of communities it works with. In addition, water supply projects are coupled with health education programmes and improvements in sanitation coverage.

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