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**ENSURING AVAILABILITY AND SUSTAINABLE MANAGEMENT
OF WATER AND SANITATION FOR ALL**

**Cost recovery for piped rural water supply systems
in developing countries: case studies from
Kenya, Rwanda and Uganda**

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A number of piped rural water supply systems in Africa are not functioning. One of the reasons attributed to this is poor cost recovery in these systems. The study was conducted to investigate and evaluate cost recovery using a case study approach covering six water supply schemes in Rwanda, Kenya and Uganda. Literature review, semi-structured interviews, focus group discussions, observation and document analysis were used to collect data. Findings showed that tariffs were set by water supply design consultants and operators in consultation with the community. Revenue collected in two systems recovered the operation and maintenance costs. The on-going use of alternative sources was found to undermine cost recovery and highlighted intermittent water supply and high tariffs. Users perceived good water supply service as a form of accountability for revenue as more important than the provision of information about revenue and expenditure.

Background

There has been tremendous effort across the globe to increase access to safe and clean water in the past two decades which has increased the coverage in rural areas to 82% (WHO/UNICEF 2014). This increased coverage has majorly been due to capital investment in water facilities. However, a number of systems broke down and remain non-functional because of insufficient funds to construct and at the same time maintain the systems.

Therefore, to ensure that water supply systems continue to function, demand responsive approaches were incorporated to ensure that beneficiaries are willing and able to pay for the systems as a means of sustainability. Users were to pay adequate water tariffs to be able to recover costs of the water supply service and ensure sustainability of the systems. However, due to water being a social and economic good, the tariffs charged for water supply service are usually low. This low tariff leads to insufficient revenue collected from users and water supply systems operating at low standards, eventually leading to non-functionality. The reliability of systems can be improved if users meet operation and maintenance (O&M) costs.

Research problem

Sustainability of water supply systems is greatly affected by how much revenue is collected for O&M (Wolfsbauer, 2014). However in order to analyse this further, there is need to determine how tariffs should be set, who should pay, how they should pay and how much (cost recovery). Therefore, there was need to explore how tariffs have been set, collected and managed in various types of rural water supply. This paper reports the findings of an MSc research dissertation carried out last academic year. The International Federation of Red Cross (IFRC) sponsored costs for travelling within Kenya, Uganda and Rwanda, to carry out fieldwork in piped rural water supply systems affiliated to the IFRC.

Research aims and objective

The main aim of the study was to determine how cost recovery can be improved to contribute to the sustainability of piped rural water supply systems. The objectives of the study were;

1. To investigate how recovery cost is applied to contribute to sustainability of piped rural water supply systems in developing countries.
2. To investigate and evaluate how cost recovery is currently applied for piped rural water supply systems in Kenya, Rwanda and Uganda.
3. To identify ways of improving cost recovery for more sustainable piped rural water supply systems in Kenya, Rwanda and Uganda.

Literature review

Financial sustainability of water supply systems is one of the key dimensions of sustainability with a fundamental aim to operate and maintain, as well as expand the water systems throughout the design life. (DFID, 1998). Rural water systems are often characterised with poor levels of service leading users to resort to contaminated water sources. One way of improving the reliability of systems is for users to meet the O&M costs (cost recovery) (DFID, 1998). However, O&M costs may be met by users alone. Revenue from Taxes, Tariffs and Transfers can contribute to sustainable cost recovery which is considered more realistic and practical. (OECD, 2009).

The level of the tariff paid by users should be determined by the O&M requirements and the ability and willingness of the users to pay. ‘Tariffs should also be set in such a way that they are progressively adjusted to meet long term sustainability’ (Brikke and Rojas, 2001; Katko, 1990). However, caution needs to be taken when changing the tariff so that users are in agreement. This can be done by ensuring that users are aware of the reasons and objectives for cost recovery, from the start. The costs attached to collection of revenue should not be so high that more money is spent on billing and collection compared to revenue collected. (Harvey, 2007). Emphasis is also placed on holding operators or managers of water systems accountable to users regarding water sales. (Mandara et al., 2013)

Therefore, the field study was guided by these different aspects of cost recovery from the management side as well as the users’ side to determine the current state of cost recovery in order to determine ways of improvement.

Methodology

A case study strategy was used to carry out the study. The case study methodology used the mixed design which involved the use of quantitative and qualitative approaches.

Field work was carried out in six water supply schemes; Bomet water supply and Sergutiet water supply in Kenya, Nyamuringa and Cyong water supply systems in Rwanda and Butiaba and Kibibi water supply systems in June-July 2015. These water supply systems were selected because they had been supported or were to be supported by the Red Cross with the exception of Kibibi water supply. Data was collected using literature review, focus group discussions, semi-structured interviews, observation and document review and. Literature review was carried out to determine cost recovery in piped rural water supply systems developing countries and inform the selection and implementation of the methodology. Semi-structured interviews were carried out with key officers who have a good knowledge of rural water supply schemes due to their experience in implementation or management. Focus group discussions were held with users of the water supply schemes.

Quantitative data collected was analysed and used to evaluate the cost recovery using simple calculations and the qualitative data was analysed using coding into themes and simple statistical calculation.

Findings and discussion

The data was analysed and discussed in the following themes;

Enabling Environment

The communities are expected to meet the O&M costs as per the policies. In Kenya, there is a national regulator that approves and monitors the implementation of tariffs. Local (County) government is in charge of water service provision. In Rwanda, there is a national regulator that approves and monitors

implementation of tariffs. In Uganda, there is no national regulator but tariffs are approved by the central government (Ministry in charge of water) and monitored by local government.

Tariffs and cost coverage

In Kenya, the tariff for Bomet Water supply was inherited from the previous management of the system. A stepped tariff with a lifeline block was used. The revenue collected in 2014/15 was meeting only 22% of the O&M costs. In Sergutiet, a flat rate was used. The flat rate was agreed between the county government, community leaders and the operator. The study was not able to determine the level of cost recovery. In Rwanda, the tariff was calculated and set between the district leaders and operator to meet O&M costs. The study was not able to determine the level of cost recovery in the schemes in Rwanda. In Uganda, the tariff was revised by the operator and approved by community leaders due to increasing O&M costs. The revenue collected was meeting all operational costs with a surplus of 15%. In Butiaba, the tariff was calculated by the design consultant to meet the O&M costs. The tariff met all the operation and minor costs with a surplus of 39%. The revenue in the systems was collected using different methods door to door, payment using mobile money, payment in the bank, pay as you fetch and in the office and the users were aware of them.

Tariff and affordability

In all the systems, over 50% of the users stated that the tariff was high. This is the case in rural water supply systems and this may discourage consumption of water from an improved water supply system (Arouna and Dabbert, 2012; Gine and Perez-Foguet, 2008). The users also stated they used and paid for the water to facilitate O&M of the system and access good quality water. This emphasises the need for water supply users to understand the need to pay for water. This was the case in all the systems. However the tariff for water supply systems need to match the ability of users to pay otherwise they will resort to cheaper unsafe sources.

Subsidies

In Kenya, Bomet Water Company received subsidies from the county government for capital investments, electricity and staff salaries. In Rwanda, the systems received no subsidies. In Uganda, Kibibi water supply did not receive subsidies anymore. In Butiaba, the operator was part of central umbrella organisation, which was set up to enhance O&M of rural water supply systems through subsidies from government. Subsidies when planned well can contribute to the sustainability of the system. Subsidies are provided to meet financing gaps in revenue. It has been acknowledged that revenue from users is not enough to meet the costs of water supply (OECD, 2009).

Satisfaction

Some users stated they were satisfied with the water supply system because of the good water quality and convenience and was an improvement compared to the situation before the piped water supply. However dissatisfaction was due to the intermittent water supply. The systems provided water for less than 8 hours in a day with the exception of Cyong. Satisfaction of users affects their willingness to pay for the service. Therefore, the satisfaction of community needs to be sustained by improving the water supply to sustain their willingness to pay (Harvey, 2007).

Alternative sources

The users in all the water supply systems stated they used alternative water sources; rainwater, springs and boreholes. The use of these sources was due to the intermittent water supply and as a means to reduce the expenditure on water supply. The users in one system stated they preferred the taste of the spring water compared to the piped water. The use of alternative sources of water is a coping mechanism by consumers due to high tariffs of improved water supply (Arouna and Dabbert, 2012; Gine and Perez-Foguet, 2008). However some users were using alternative sources as a coping strategy to the intermittent water supply. This on-going use of alternative sources will compromise the sustainability of the systems due to reduced use of pipe water and hence reduced revenue collected.

Monitoring and evaluation

The users in the systems stated that they had community leaders carrying out monitoring of operators managing the systems. Therefore, the users stated all they needed was reliable water supply. One way suggested for accountability is for the operators to provide information to the users regarding revenue

collection and expenditure (Mandara et al., 2013). However, this was not the case in these water supply systems. The users perceive good water supply service as a form of accountability from the operators. The users stated that they paid per water consumed and revenue collected was used to carry out O&M in the system. The exception was in Sergutiet, where the users were paying a flat rate and felt they paid a higher amount of money compared to the amount of water consumed.

Summary and conclusions

Findings showed that tariffs were set by water supply design consultants and operators in consultation with the community. Revenue collected in two water supply schemes recovered the operation and maintenance (O&M) costs. The on-going use of alternative sources was found to undermine cost recovery and highlighted the intermittent water supply and high tariffs. It was also found that user satisfaction is affected by not only water availability but also water quality and convenience. Therefore, tariff needs to be set to meet O&M costs taking into account the user's willingness to pay. The tariff should be increased in a gradual manner matched by improved water supply. Meters need to be installed in a phased manner in the systems.

Recommendations

Table 2 shows specific recommendations for the schemes visited which can improve the cost recovery and water supply service.

Country	Recommendations
Kenya	<ul style="list-style-type: none"> • The operator needs to improve the water supply in the area. This will ensure that the users are accessing water for more than three hours a day. • The operator needs to meter all the connections in a phased manner to ensure their checks in the systems and also enable users pay for water consumed. • The initial connection fee needs to be reduced so that even low income earners can be able to access the water and benefit from the lifeline tariff block • There is need to finalise the change in tariff to meet at least the O&M costs. • In Sergutiet, the operator should install meters in a phased manner so that users are billed and pay for water as per consumption.
Rwanda	<ul style="list-style-type: none"> • There is need to provide good water quality to the users at an affordable cost so that users are satisfied with the water supply service. • The operator needs to repair the non-functioning taps so that users can access water at shorter distances.
Uganda	<ul style="list-style-type: none"> • In Kibibi, an alternative source of energy needs to be installed so that there is continuous supply of water. • In Butiaba, politicians need to be sensitised so that their statements do not compromise the sustainability of water supply systems but encourage users to pay for water.

Key lessons learnt

- Water service providers need to provide good water supply service to ensure users continue paying for the service. This is because users perceive a good water supply service a form of accountability for revenue as more important than the provision of information about revenue and expenditure.
- Tariffs should not be seen as the only means to meet the O&M costs but as one of the ways. They should also be calculated taking into account the users' willingness and ability to pay and the O&M costs.
- Tariffs should be calculated in a progressive manner to allow for their change when O&M costs change and users' economic status changes.

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References

- AROUNA, A. and DABBERT, S., 2012. Estimating Rural Households' Willingness to Pay for Water Supply Improvements: a Benin case study using a semi-nonparametric bivariate probit approach *Water International*, 37(3), pp. 293-304.
- BRIKKE, F. and ROJAS, J., 2001. Key Factors for Sustainable Cost Recovery in the Context of Community-Managed Water Supply. [online]. IRC International Water and Sanitation Centre. [Accessed on 10th May, 2015]. Available from: <http://www.ircwash.org/sites/default/files/Brikke-2001-Key.pdf>
- DFID, 1998. Guidance Manual on Water Supply and Sanitation. Loughborough, UK: Loughborough University: WEDC.
- GINE, R. and PEREZ-FOGUET, A., 2008. Sustainability assessment of national rural water supply program in Tanzania. *Natural Resources Forum*, 32(4), pp. 327-342.
- HARVEY, P.A., 2007. Cost Determination and Sustainable Financing for Rural Water Services in Sub-Saharan Africa. *Water Policy*, 9(4), pp. 373-391.
- KATKO, T.S., 1990. Cost Recovery in Water Supply in Developing Countries. *International Journal of Water Resources Development*, 6(2), pp. 86-94.
- MANDARA, C.G., BUTIJN, C. and NIEHOF, A., 2013. Community Management and Sustainability of Rural Water Facilities in Tanzania. *Water Policy*, 15, pp. 79-100.
- OECD, 2009. Managing Water For All: An OECD Perspective on Pricing and Financing. [online]. Organisation for Economic Co-Operation and Development (OECD). [Accessed on 12th August, 2015]. Available from: <http://www.oecd.org/tad/sustainable-agriculture/44476961.pdf>.
- WOLFSBAEUR, M., 2014. Evaluation Report: Quality and Sustainability of Two Rural Water Supply Services in the Districts of Nyanza and Gisigara, Rwanda. Prepared for the Norwegian Red Cross Society in support of a broader study on the sustainability of rural, small piped water systems in Rwanda.
- WHO/UNICEF, 2014. Progress on drinking water and sanitation, 2014 update. [online]. World Health Organisation/United Nations Children's Fund Joint Monitoring Programme for Water Supply and Sanitation. [Accessed on 12th May, 2015]. Available from: http://www.unicef.org/gambia/Progress_on_drinking_water_and_sanitation_2014_update.pdf.

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