

MAXIMIZING THE BENEFITS FROM WATER AND ENVIRONMENTAL SANITATION

Assessing distribution of impacts of improved water supply in Singida, Tanzania

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This study was carried out in five villages of Singida Town Council in September 2003. Its aim was to explore the distribution of WSS impacts. While a wide range of positive impacts are associated with improved water supply and sanitation (WSS) services, they do not happen automatically, and are not equally shared amongst members of a community. Therefore the intention was to determine factors that influence the distribution of the impacts to increase understanding of service-impacts links in order to facilitate maximization of WSS impacts on improving quality of life. The findings reinforces that the degree to which beneficiaries of a WSS services reap potential benefits is subject to the design, implementation and ongoing management of the services and highlight four practical areas for consideration.

A wide range of positive impacts are associated with improved WSS services as shown in Table 1. Not every water and sanitation project is able to deliver (or aspires to deliver) all of these impacts. Furthermore, the range of impacts do not happen automatically, and nor can it be guaranteed that every member of the community will reap the same benefits. This observation calls for a deeper analysis of the links between service delivery and impacts onground. This study is based on the same observation and aims to improve the understanding of how impacts are being channeled to beneficiaries, and hence inform strategies for maximizing benefits of WSS interventions.

(Only a section of the full study is presented. The full

report can be requested by email from the Author)

About the study

This study took place in five peri-urban villages of Singida Town Council in September 2003. These villages, Uhamaka, Mwankoko A, Mwankoko B, Kisasi and Kisasi, are amongst the 19 villages benefiting from a three-year (2002-2005) integrated water supply and sanitation programme. The programme was implemented by the Singida Town Council (STC), in collaboration with WaterAid Tanzania and other local partners. The 5 villages selected for the study were drawn randomly from the 19 programme villages. Within each village, 20 randomly selected households were interviewed and completed daily diaries of water collection and use over a period of two weeks. The researchers held focus group discussions with other members of the community. A total of 3288 water collection and 7214 water use events were recorded and analyzed.

Key findings

Quality of source: a significant part of the user experience

Not to be confused with water quality, the quality of water source refers to the user experience at the point of delivery and is a combination of the yield and reliability of the source.

- Is the time taken to fetch water related to the distance a household lives from the source? Not necessarily.

Figure 1 shows clearly that, with improved water sources in Mwankoko A, Kisasi and Kisasi, less time is taken to fetch water than in Uhamaka, where there are no improved sources, even though the water sources in Uhamaka are on average closer to the households using them. Considerable time savings are experienced even by simply improving existing sources. Yield and reliability of a source were shown

Table 1. Impacts of WSS Interventions

Theme	Associated Benefits
Health and Hygiene	Reduced incidence and prevalence of water and sanitation related diseases
Livelihoods and Income	Water purchase savings, time and energy saved from fetching water invested in production, increased agricultural production
Gender	Increased school attendance of girls, quality of life, increased women participation in development initiatives
Education	Increased school attendance
Community Management	Improved operation and maintenance efficiency, increased community capital
Psychological Benefits	Improved household relations, quality of life

Source: WaterAid, 2001

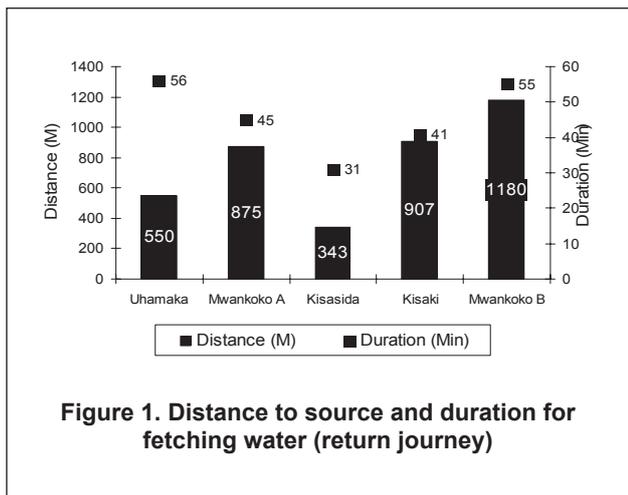


Figure 1. Distance to source and duration for fetching water (return journey)

to be as important to achieving time and energy savings as the distance of source from households.

- After development of new improved sources, why some villagers continue to use unimproved sources for domestic use?

Overall, there was a clear preference across all villages to choose protected water sources over unprotected sources for domestic use. However, villagers in Kisaki continue to use unimproved sources for domestic use, even after development of an improved source. Only 12% of domestic water use in this village was drawn from the improved source. Villagers associated this with limited flow of water during dry season where they were only able to draw water for a short period in the morning - from the water that had been left to percolate into the well overnight - and were therefore forced to revert back to unprotected sources. This reiterates the point that yield and reliability of a source are key determinants of the extent of benefits.

Water for Domestic and Productive Uses

Domestic Use¹

Quantities of domestic water were consistent across all

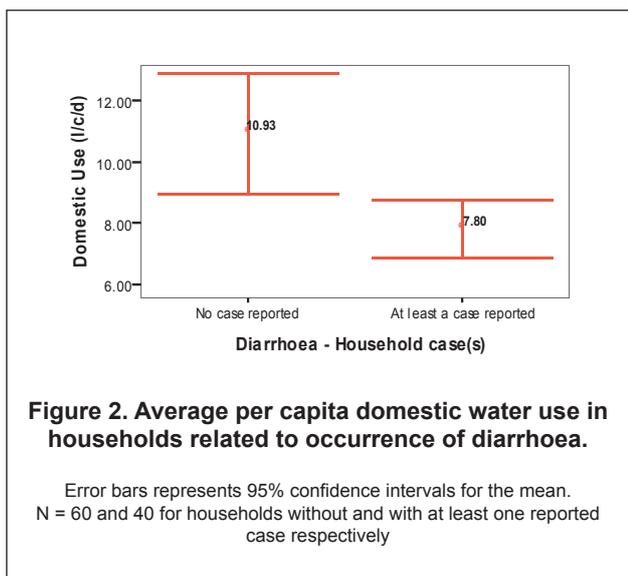


Figure 2. Average per capita domestic water use in households related to occurrence of diarrhoea.

Error bars represents 95% confidence intervals for the mean. N = 60 and 40 for households without and with at least one reported case respectively

villages at around 10 litres/capita/day despite differences in service levels and abundance of water resources. This value is well below the National Water Policy target of 25 litres/capita/day, and negatively impacts on the prevalence of water-related diseases such as diarrhoea, scabies and bilharzias. Figure 2 shows households that had no diarrhoea cases during the survey consumed on average 3 litres/capita/day more than those that reported diarrhoea cases.

Therefore water supply projects should be designed to deliver increased levels of domestic water use by households, in order to reduce vulnerability to diseases (Caincross and Feachem, 1993). In order to do this effectively, project implementers must be made aware of the determinants of water use in the villages; what explains the variations of water use amongst households?

In these villages the following factors were looked at; education of head of household, sex of the household head, family size, wealth ranking based on asset ownership², distance and duration. Only one factor, namely family size, was shown to vary with amount of domestic water used (see Figure 3). This is consistent with other studies, and shows that as families grow bigger, there is a slight reduction in average quantities of domestic water. It may imply that either household labour (for fetching water) is overstretched, or that household storage capacity is limited or simply limited awareness on the importance of using more water. The solution may seem straight, however, pooling labour depends on opportunity cost of time for other activities and intra-household decision making on the division of labour, and acquiring extra storage would usually also cost money. When and if households do decide to acquire extra storage, two further factors surface: increased storage requires good hygiene practices to prevent accidental contamination of stored water and in order to fill the additional storage, households would need to make more trips to fetch water which may in some cases undo the time savings gained.

In Singida, the project facilitation team decided to focus on awareness creation and also promoting improved 'means of

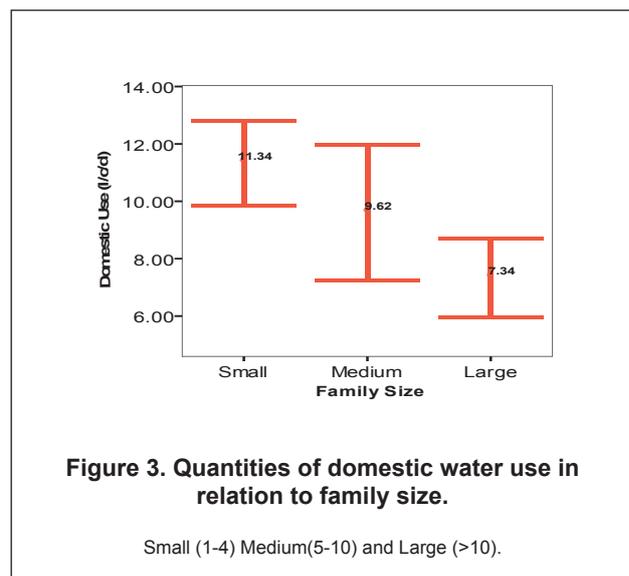


Figure 3. Quantities of domestic water use in relation to family size.

Small (1-4) Medium(5-10) and Large (>10).

transporting' water. This was because household data showed that as much as women are the principle water fetchers, the principle means of transportation is head carrying. Men in contrast, use livestock, push carts and bicycles, so carrying slightly higher volumes per trip (Table 2).

Productive Use³

There were marked differences between villages, as well as between households within each village, in average per capita water consumption for productive uses. Improving water sources contributed to more water being used for productive uses and contributed to increasing incomes of some households in the villages. Directly there are those who benefited in cash from selling brew or vegetable produce. And there are also those who benefited by buying vegetable produce at a cheaper price from their fellow villagers and those who used their own produce for consumption. Also there are those who leased their prime land to those who could effectively utilize it for gardening. In addition to the positives, additional productive uses increased competition among households and between uses which led to resource disputes and social tensions.

Conclusions

The results of the study confirmed that of six commonly claimed benefits of WSS projects four, namely health, income, gender and psychological benefits had been largely achieved in Singida. Although there was some evidence regarding educational benefits for pupils, there was insufficient data to confirm the link. The benefits of community management in terms of social cohesion were questionable, on the contrary intra-community relations actually got worse. Villagers competed aggressively over the additional water made available by the projects for their income generating activities.

Gender and psychological benefits determined by user experience

The user experience at the point of service delivery is a combination of the yield and reliability of the source. This yield and reliability of a source accounted for the time and energy savings recorded. These time and energy savings relieved women of drudgery and mental stress. The savings allowed them to plan their daily chores, improved productivity in their work increased the amount of free-time they had for themselves.

Health benefits related to increased water quantity and quality

Ill health was very costly to poor households. As indicated the costs of treating one episode of disease can set a household back by up to four days income for hospital treatment in addition to loss of production. With improved water sources households that used more water were able to reduce cases of diarrhea and therefore made savings on costs of treatment.

Income benefits

Improved water services facilitate or allow water to be used productively in gardening and brewing serving as a means of diversifying economic activities and supplementing subsistence farming thus resulting into increase in real incomes of villagers. The external environment strongly influenced the pattern of water demand for productive uses. The study has shown that availability and ability to access prime land, access to markets, and favorable environmental factors such as the absence of destructive animals, can determine what productive uses of water are possible within the villages. Analyzing these positive and negative drivers of demand during project design would help match supply with potential demand.

The study reinforces the fact that the degree to which beneficiaries of a WSS intervention can reap all potential benefits is subject to the design, implementation and ongoing management of the services as well as the relative resource endowments of individual beneficiaries. In order to improve this link, the study highlights the following:

Design for user experience and learn by monitoring time to fetch water

Even without a reduction in the distance to new and improved sources, there was a notable reduction in the average time taken to fetch water when compared to fetching water from traditional sources. The water supply components of projects should design around improving the user experience and in order to keep learning projects should monitor the time that households take to fetch water. It is clear that time to fetch water (go, collect and return) is a better indicator of WSS services than distance or coverage, as it better reflects user experience and the burden of fetching water.

Ensure increase in supply translates into an increase in demand especially for domestic use

Making more water available does not guarantee that more water will be used for either domestic or productive purposes. Even in villages with improved water supplies, villagers continued to use low quantities per capita for domestic use as in areas without improved water supplies. Level of domestic water consumption influenced prevalence of diarrhoea. Storage capacity and availability of labour for transporting water influenced per capita use but it was means of transporting water that offered the best hope for increasing levels of consumption. It has been shown that per capita consumption of water plateaus where households are more than 100 metres or five minutes from the source. Since most rural projects rarely meet the criteria, projects should monitor and discuss with communities the quantity of domestic water used by households and ways to increase it e.g. the links between means of transport and water used.

Carry out poverty analysis and tailor facilitation to the needs of poor households

Households which were better off benefited more from im-

Table 2. Summary of Water Fetching Incidences by Means of Transport and Corresponding Average Volume

		Recorded water fetching incidences					
		Female			Male		
Means of Transport	Counts	Counts	% of Total	Volume (Litres)	Counts	% of Total	Volume (Litres)
Head and hand	2842	2625	79.84	24	217	6.60	48
Push cart	43	3	0.09	32	40	1.22	39
Livestock	26	8	0.24	153	18	0.55	200
'mzega'	66	-	-	-	66	2.00	40
Bicycle	262	71	2.16	25	191	5.81	31
Not Identified	49	27	0.82	22	22	0.67	131
TOTAL	3288	2734	83.15		554	16.85	

* Mzega means carrying two containers/buckets of water, one on each end of a pole carried across the shoulders

proved water and sanitation services. Wealthier households were more likely to improve their latrines. For domestic water use, households that had access to a bicycle or cattle were able to utilise them to carry larger volumes of water and experienced better health outcomes. For productive water uses, households with access to land and funds to rent prime land had an advantage over other households. Projects should, therefore, target and tailor the soft components of projects such innovation, facilitation and promotion to the needs of poorer households to ensure that these households realise at least the basic benefits commonly expected from WSS interventions.

Plan to mitigate social tension and build demand management for productive water use

The WSS projects stimulated a diversification of livelihood activities. As with any finite resource, this diversification of water created competition among users, and increased economic inequality. The social tensions brought about by this competition add a dimension of difficulty to community water management, separate to the financial, maintenance, repair and security issues normally found in such projects. This potential for intra-community conflict can negate the positive changes expected from developing water management institutions and needs special attention throughout the project cycle. Use of water, beyond domestic use, such as water for gardening and brewing bring substantial material gains to households, and, require additional cost recovery mechanisms. This would go some way to limit the degree to which wealthier households benefit disproportionately from better access to water for productive uses.

References

- Caincross, S. and Feachem, R.G. (1983) "Environmental Health Engineering in the Tropics: An Introductory Text". John Wiley, Chichester.
- WaterAid (2001) "Looking Back: The Long-term Impacts of Water and Sanitation Projects". WaterAid London.

Note/s

- ¹ Domestic use of water is defined to mean water used for drinking, cooking, dish washing, bathing, hand-washing, and laundry.
- ² Wealth ranking is based on the assets and other non durables belongings of the household. The non durables considered here are those that if sold (not necessarily all) can enable the owner to acquire some assets that are owned by others. The ranking is basing on the information collected by the survey in part III of the questionnaire plus housing characteristics.
- ³ Productive water use means water used for vegetable gardening, construction, livestock and brewing

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