COST ANALYSIS OF RURAL WATER SUPPLIES IN KABAROLE DISTRICT

BRIEFING NOTE APRIL 2013

Introduction

Triple-S is a six year learning initiative that aims to carry out research on how to make rural water supplies sustainable at scale. Triple-S is a project under the IRC International Water and Sanitation Centre, which has also implemented the WASHCost project[1], a programme promoting the Life-Cycle-Cost Approach (LCCA). IRC Uganda started the process of introducing the LCCA in the Ugandan water and sanitation sector in 2011, and has since carried out an information scan[2] on funding in the Uganda WASH sector. The next step is to carry out the cost analysis on district basis, as well as working towards an integration of the LCCA into the local monitoring, budgeting and planning framework.

The Life-Cycle Cost Approach

Life-Cycle Costing is a common approach, used by water utilities in developed countries to calculate and monitor the renewal of assets as well as optimising spending on operations and maintenance of water systems. Life-cycle costs (LCC) "represent the aggregate cost of ensuring delivery of adequate, equitable and sustainable water, sanitation and hygiene (WASH) services to a population in a specified area"[3]. The Life-Cycle Cost Approach "seeks to raise awareness of the importance of LCC in achieving adequate, equitable and sustainable WASH services, to make reliable cost information readily available and to mainstream the use of LCC in WASH governance processes at every level"[4].A methodology adapted to the developing country context was developed by WASHCost, and detailed studies have been carried out in Ghana, Burkina Faso, Mozambique and India[5].

Cost Categories

The approach uses the following categories for the collection of data and analysis:

- Capital expenditure (CapEx)
- Operations expenditure (OpEx)
- Capital maintenance expenditure (CapManEx)
- Expenditure on direct support (ExpDS)
- Expenditure on indirect support (ExpIS)
- Cost of capital (CoC)

Capital expenditures include both software and hardware costs, as well as extensions to existing schemes. Operations are regular expenses of smaller value, whereas CapManEx are expenditures on major repairs and replacements. Direct support refers to the support given to community and local actors through capacity building, follow up and monitoring and evaluation at local level such as at district level. Indirect support comprises the activities at central level, such as policy formulation, advocacy and creating an enabling environment. Cost of capital is the cost of servicing loans[6].

The Kabarole Study

Triple-S Uganda contracted Fontes Uganda Ltd to carry out a cost analysis study in Kabarole district in Western

[1] See washcost.info for more information

[2] Biteete and Jangeyanga (2013) *Information scan on WASH unit costs and financial planning and budgeting of the Water and Sanitation Sector in Uganda,* IRC Uganda

[3] Fonseca et al (2010) *Life-Cycle Costs Approach- Glossary and cost components,* Briefing Note 1, WASHCost, IRC

[4] Fonseca et al 2010, *Op.cit.*

[5] Burr, P. and Fonseca, C. (2013) *Applying a life-cycle costs approach to water – costs and service levels in rural and small town areas in Andhra Pradesh (India), Burkina Faso, Ghana and Mozambique,* Working Paper 8, IRC

[6] Fonseca et al (2011) *Briefing Note 1a, Life Cycle Costs Approach – Costing Sustainable Services,* WASHCost, IRC

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Uganda. The study was carried out between February and May 2013.

Methodology

The study covered the last three financial years (2009/10, 2010/11 and 2011/12), and considered both point rural water sources as well as piped schemes in rural growth centres. In total, the consultants collected data from two stakeholders at central level, and 17 stakeholders at district level through semi-structured interviews and focus group discussions. Three sub-counties were visited (Buheesi, Hakibaale and Kasenda) and water sources of different technology types surveyed. In order to get an overview over the total district spending, an effort was made to talk to every stakeholder and capture every expense, and for community expenditures where records are difficult to obtain, informed estimates were made. The resulting study gives a relatively complete picture of all expenditures on rural water in Kabarole district over the last three years.

After the data collection, preliminary findings were discussed at a stakeholder workshop in Kabarole, in order to test assumptions and estimates as well as getting feed-back from the participants. This briefing note is only a short summary of the findings of the study, and details on the methodology, assumptions, calculation methods and more findings can be found in the final report.

Findings

The study used the official rural water coverage figure for Kabarole from the Sector Performance Reports[7], which was 90% in 2009/10 and remained unchanged over the three years. For the number of water sources, the study relied on the latest overview provided by the District Water Office (DWO) (see Table 1).

Technology	Number	% of total	Non-functional
Borehole	88	6.69%	53
Spring	562	42.73%	110
GFS*	6	0.46%	
Shallow Well	658	50%	189
Pumped Scheme	1	0.07%	

Table 1 Distribution of technologies in Kabarole as per February 2013. * Gravity Flow Schemes, do not involve any pumping cycle such as pumped schemes

The percentages were used to allocate general expenditures such as direct support and indirect support.

Overall District Expenditures

Figure 1 below shows the overall district expenditures with the distribution over the different cost categories.

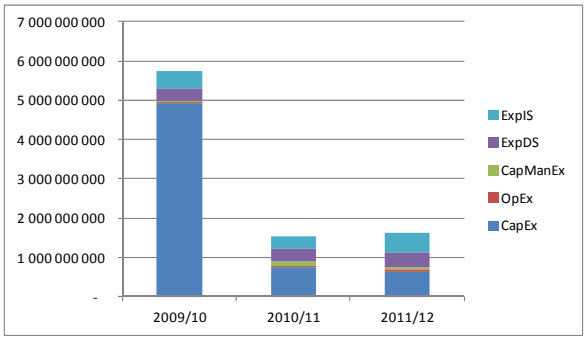


Figure 1 Overall district expenditures over three financial years in 2013 Uganda Shillings.

In 2010 a large gravity flow scheme that covers five small towns (three in Kabarole and two in Kasese districts) was completed with funding from the central government, therefore the capital expenditure is high in 2009/10. Otherwise, total expenditures in the district are around 1.5 billion per year.

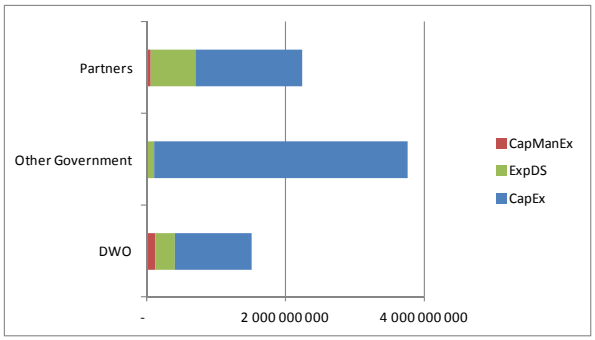


Figure 2 Expenditures over all three years. The DWO expenditures are mainly from the Conditional Grant. Other government sources include the Water and Sanitation Development Facility, the Umbrella Organisation and the Technical Support Unit (TSU). Partners include all NGOs and multilateral organisations such as UNICEF.

This is broken down according to the source of funding in Figure 2. The graph shows that partners spend more than the district on new sources (CapEx) and post-

[7] MWE 2010, 2011 and 2012, *Water and Environment Sector Performance Report*

construction software (ExpDS), whereas the district spends more on rehabilitation (CapManEx).

Investment Expenditures

Point sources in Kabarole are either boreholes or shallow wells with handpumps (mostly Mark II/U2 or Nira) or protected springs. Most common are springs and shallow wells (see Table 1). Between 2009 and 2012, 20 new boreholes, 88 new springs and 155 new shallow wells were constructed, whereas 29 boreholes, 66 springs and 74 shallow wells were rehabilitated.

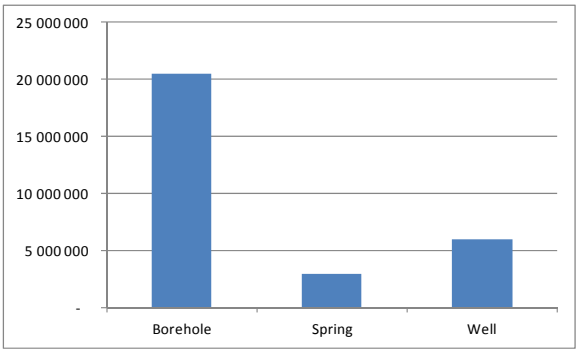
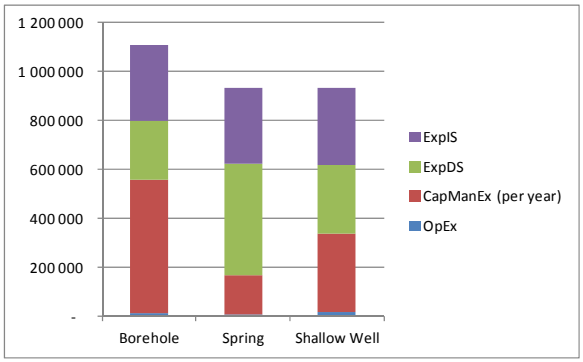


Figure 3 Average investment expenditures per source.

Figure 3 shows that the average expenditure per borehole was about 20 million, springs were about 2.5 million and wells about 6 million. These sums include software costs of establishing and giving initial training to the water committees, technical supervision and initial water quality testing. The study captured detailed information on each technology. Maximum and minimum averages per source were calculated and direct and indirect support costs were allocated to the different technologies using the percentages in Table 1 where detailed information did not exist. For example, the minimum average cost for a shallow well (software and hardware) was approximately 6 million, while the maximum was over 9 million. Software costs for the initial installation ranged between 1.2 million and 2.6 million for a shallow well. The average cost per source for the rehabilitation of a shallow well was 1.6 million. The study calculated that, if all non-functional sources (see Table 1) were to be rehabilitated, using the average rehabilitation cost per technology, it would cost the district approximately 530 million Uganda shillings. As a comparison, the entire conditional grant for 2012/13 is 465 million, out of which 70% should be used on new sources. In total, approximately 66 million was spent per year on major repairs and rehabilitation over the three-year period, and sources are continuously breaking down. Although not all sources are viable to rehabilitate; some are abandoned or replaced by new ones, the backlog in large repairs is still a pressing problem for the district water office. One of the participants in the workshop noted as a concluding remark that this shows clearly that the district needs more for rehabilitation than for new sources at the moment.

Recurrent costs

Recurrent costs consist of all expenditures related to a source over its lifetime except the initial investment. Recurrent costs include operations costs (often covered by the community), larger repairs and rehabilitations, support costs at local level and support costs at central level. They are normally expressed per year, and the major repairs (CapManEx) are distributed over the years with the assumptions that a major repair takes place every five years for a point source and every three years for a piped scheme. The relatively short period for piped schemes is based on historic data from Kabarole, where schemes often suffer damages due to heavy rains and landslides in the mountains where the source captures are normally located.



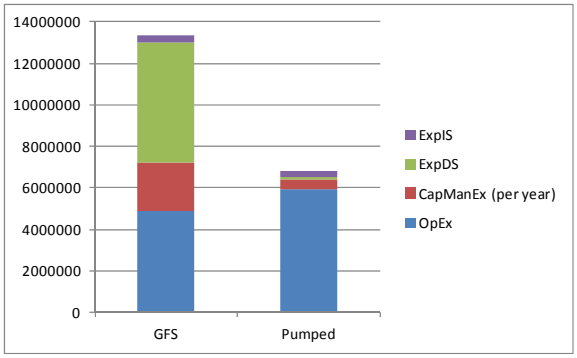


Figure 4 and Figure 5: Average recurrent expenditures per source per year for point sources (Figure 4) and piped schemes (Figure 5).

The graphs above express what is currently spent in Kabarole per year on the different technologies. They show that approximately 900,000 shillings in spent on average on every spring and shallow well, and slightly more on a borehole due to higher rehabilitation costs once it is due. The higher expenditure on direct support for springs is due to the fact that there are many NGOs active in Kabarole that conduct post-construction activities in areas where there are predominantly springs and some shallow wells. Figure 5 depicts the same as Figure 4, but for piped schemes. It shows that although operations expenses are higher for the pumped scheme, which is due to the need for fuel, they are still relatively high for GFS (about 5 million per scheme per year on average). CapManEx is high on GFS due to the reasons mentioned above with frequent major problems at the source. The increased direct support costs for GFS is due to the fact that the only pumped scheme in Kabarole is not yet a member of the Umbrella organisation, which primarily carries out post-construction support for piped schemes.

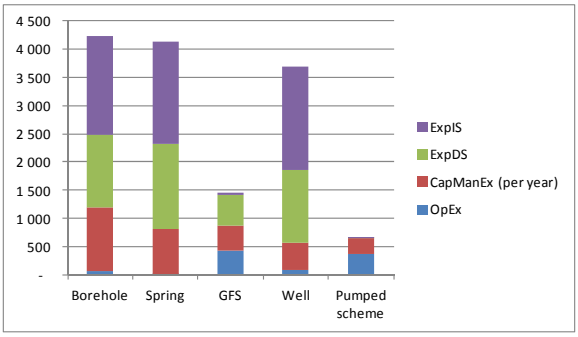


Figure 6 Recurrent expenditures per capita per year

Figure 6 shows recurrent expenditures per capita. For the calculations, the standard populations used by the Ministry of Water and Environment (MWE)[8] were used. Not surprisingly, piped schemes are significantly cheaper per person than point sources, merely because of the large number of people they supply. It is however generally accepted that whereas piped schemes are high in demand, they are not suited for all areas, especially areas with low population density.

Life-Cycle Costs

Recurrent costs per capita per year are useful when calculating the life-cycle costs of different technologies. Figure 7 shows that, every time a borehole is constructed, it will require another 10 million over its life-cycle at current expenditure levels, when the life-cycle is estimated to be 10 years.

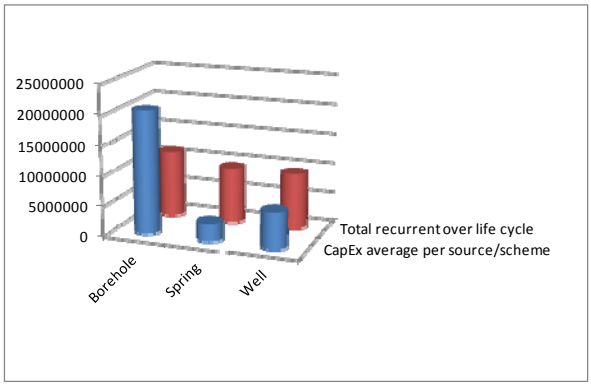


Figure 7 Investment expenditure compared to the total cost for the life cycle of the technology.

This equals approximately 3.1 million per year over 10 years if the investment is included, or 1054 Uganda shillings per Water-Person-Year[9]. If the lifespan is extended to 20 years, it only comes to 402 Uganda shillings per Water-Person-Year.

Service Levels

When analysing expenditures it is important to compare with the service levels provided at these costs. For example, a piped scheme might cost more in operations but at the same time, it provides a higher level of service. Triple-S conducted a study based on household surveys to map service levels in Kabarole district, and found that 97% of the households surveyed were provided with services below "fair"[10]. Fair service levels are considered the benchmark based on national guidelines, and provides "Good quality water supply of at least 20 lppd[11] within a distance of 1 km from a water source that is reliable 95% of the time"[12]. However, this study covered more districts andonly included two sub-counties in Kabarole and none of the rural growth centres. It was not within the scope of the cost analysis study to collect detailed service level information, but stakeholders and water users at the sources were asked. It was found that whereas most stakeholders at

[8] MWE 2010, *Op.cit.*

[9] Water-person-years are costs per capita per year for a water service delivered. See Koestler et al (2010) *Improving sustainability using incentives for operation and maintenance; the concept of water-person-years,* Waterlines

[10] Triple-S (forthcoming) *Performance Analysis of Service Delivery Models (SDMs) in Uganda*

[11] Litres per person per day

[12] Triple-S, *Op.cit.*

district level considered the service level in the district as predominantly "fair", most users at source level considered it "low" (Users access a service that doesn't meet one or more of the following standards: quality, quantity and reliability)[13]. The lower service level was mostly due to unreliability (long down-times) and quantity, often due to hilly terrain. It is therefore safe to assume that what is currently spent in Kabarole is not sufficient to meet the minimum benchmark for fair services for the population.

Comparison with Benchmarks

WASHCost developed benchmarks of what should be spent on the different categories in order to achieve a "fair" level of service[14]. Table 2 shows that spending is way below benchmarks in all categories except investment expenditures per capita for piped schemes.

Comparison with benchmarks [USD per person, per year]		WASHCost Benchmark	Kabarole
CapEx [per capita]	Borehole with handpump	20-61	12,8
	Piped schemes*	30-131	85,8
Recurrent [per capita per year]	Borehole with handpump	3-6	1,6
	Piped schemes*	3-15	0,6

Table 2 Comparison with WASHCost benchmarks

The study calculated that, if Kabarole was to spend according to benchmarks, it should spend between 1.6 and 6.1 billion per year in recurrent costs. As a comparison, the government, partners and the community together only spend approximately 860 million on average per year currently.

Conclusions

This Briefing Note

The study highlights a number of important conclusions for the Ugandan water and sanitation sector as shown in this briefing note:

- Significant amounts go into initial software and post-construction support, yet results are not felt on the ground and functionality is a challenge
- Piped schemes are cheaper per capita and provide higher levels of service, however in Kabarole they are frequently down and people return to point sources
- Service levels are below the benchmark at current expenditure levels
- Expenditures on operations are almost non-existent for point sources, especially for springs. This points to poor contributions by water users.
- The district needs more for rehabilitation than for new sources, which is contrary to the conditional grant guidelines

Other Conclusions

Apart from the issues covered by this briefing note, other conclusions of the study are[15];

- National coverage figures do not change whereas a number of new sources are constructed each year and population growth is low (<1.53%)
- When direct and indirect support costs are high, they may outweigh gains made by long durability of systems
- Contributions by water users are extremely low in Kabarole, both for point sources and piped schemes. This leads to long down-times.

Discussion Points

The following discussion points were identified by the study and in particular at the stakeholder workshop:

- How can the conditional grant guidelines be adjusted to fit the needs of individual districts?
- How to deal with the transition in demand from point sources to piped schemes?
- Who should cover recurrent costs?
- We need to re-think the management model for point sources due to lack of availability of funds for operations and poor functionality
- How can the sub-county water supply and sanitation board model[16] increase spending on operations and rehabilitation?

Way Forward

The next step is to conduct a similar analysis for a different district, in order to allow for comparison. In addition, benchmarks, linking costs and service levels, for Kabarole orUganda could be developed, and the information used for budgeting and planning purposes.

[13] *Ibid.*
[14] Burr and Fonseca, *Op.cit.*
[15] Please refer to final report
[16] New management model discussed by government and piloted by Triple-S in Kabrole