In collaboration with OXFAM

A new model to operate and maintain rural water infrastructure in the arid lands of Kenya

Summary of key findings

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Photo credit: LeFil Consulting

Background

In remote, arid areas of northern Kenya, almost all installed water infrastructure is fast deteriorating. One of the main reasons is the lack of appropriate operations and maintenance (O&M) services, as they are almost always left in the hands of local communities, which are simply not equipped nor resourced to perform those activities in the long term. In fact, an estimated two thirds of rural water systems in the arid areas of Kenya are severely dysfunctional within 3-5 years of construction, and about one third are non-functional at any point in time.[1] This results in a massive waste of investments and resources, and ultimately leads to catastrophic situations for populations living in these areas, as draught spells have been increasing in frequency and severity over the past years.

In light of this predicament, LeFil Consulting and Oxfam joined hands, with the support of many donors,[2] to try and test an alternative approach to leaving local communities to their own devices, and co-developed a new model, meant to be more financially viable and sustainable in the long run. The model was based on:

- hiring a professional and cost-effective private O&M operator, in charge of providing scheduled preventative and curative maintenance services to achieve the desired functionality levels
- establishing a minimum performance level for the O&M provider, and tying payments to specific outputs
- improving tariff collection, done by a community-appointed member and centrally managed by the pilot team, using mobile money (i.e. M-PESA) wherever possible
- enrolling local field staff, designated by the water users' committees (WUC), to oversee the functioning and manage the day-to-day operations of the water schemes.

1 Sources: Water supply and sanitation in Kenya, Water & Sanitation Program (World Bank), 2015; Water service delivery as a business: an approach to sustaining water services in rural areas, Tiwari, 2013.

2 The pilot was funded by Oxfam, LeFil Consulting, the Turkana County Government, Partnering for Green Growth (P4G), the Waterloo Foundation, the Swiss Agency for Development and Cooperation (SDC) and the German Federal Foreign Office (GFFO).

The hypothesis was that this model would:

1. help increase the lifecycle and improve the level of functionality of the installed water infrastructure
2. effectively leverage the private operator to deliver O&M services at the required level of standards and at scale
3. be less expensive to run in the short- to mid-term than replacing fast deteriorating water infrastructure
4. lead to more and better tariff payments by the communities, as they would be more satisfied with the service.

To assess the economic feasibility of this model, the pilot was conducted in 60 water systems located in remote, rural areas of Turkana County, and another 30 similar water systems were monitored as a control group. The pilot focused on borehole, overhead tank and solar pumped systems, albeit there were 10% of hybrid systems also using generators.

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Findings

After more than one year of running the pilot, this is how reality compared to our hypotheses:

1. **Improved lifecycle and functionality of the water infrastructure**: the overall state of the infrastructure at the beginning of the pilot was worse than anticipated, requiring a big push to bring the systems to a reasonable level of repair before starting to serve them. However, after this initial effort, the pilot succeeded in keeping a larger proportion of schemes fully functional in the target group than in the control group (47% vs. 14%). In addition, response times to a breakdown were shorter in the target group than in the control group (92 days on average, 1.19 times less than in control group). Lastly, better scheme management resulted in more secure infrastructure, with the target group reporting fewer hazardous incidents.
2. **Professional O&M provider:** the selected private operator delivered the per-contract preventative works and an average of 2 curative works per scheme (compared to no preventative and an average of 0.14 curative works in the control group). However, the level of performance was lower than expected, notably in terms of delays to perform the curative works (93% of the curative works requiring a quote were delayed). Additionally, the service provider, which was Nairobi-based, did not invest into a strong local operation and network, despite all financial incentives to do so provided by the pilot.
3. **Financial sustainability:** the pilot realized savings of up to USD 82k (or 30% of the total amount invested in the project by donors) on reconstruction expenses, by avoiding rapid deterioration of 7% of the water infrastructure. These savings, however, are not enough to cover the cost of O&M services, which still require subsidies (estimated at USD183k to replicate this pilot to another 60 similar schemes, assuming that tariff collected would be enough to cover local salaries and expenditures; or USD186k without any tariff collected).

4. **Improved tariff collection:** despite the fact that, on a factual basis, the target group's water infrastructure was in better conditions at the end of the pilot than at the beginning, and also in comparison to the control group, the proportion of households paying tariff in the target group decreased over time. Similarly, 72% of communities in the target group were "little satisfied" or "not satisfied at all" with the performance of their water schemes. This could be explained by a variety of reasons, such as: poorly aligned expectations, some free-riding behaviour, difficulties in transitioning to mobile money payments, or the need to involve local communities even more closely in the roll-out of the new approach.

In addition to the above, an unexpected, yet material benefit emerged during implementation, as the region faced one of the harshest droughts in decades: thanks to the pilot, emergency response donors knew exactly which schemes were most affected, in which way, and had an implementation arm ready to be deployed quickly where needed.

Furthermore, a number of learnings stemmed from the hurdles encountered during implementation:


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- the requirements of the mobile money service provider for account opening, management, auditing, and access resulted in costly and very complex workarounds; few alternatives exist
- any prior data about the schemes (including location, design, condition, ownership) was inexistent and/or inaccurate, resulting in ever increasing needs to capture information about the schemes – at the onset to map the systems, and over time to be able to more reactively address issues
- water quality was not a focus of the pilot at the onset, and this was a mistake: 26% of the schemes proved to be contaminated with the Escherichia coli bacteria
- the number of private sector actors operating or wanting to offer O&M services in northern Kenya long-term was extremely limited at the time of bidding. None of the applicants had previous experience providing such services on an ongoing basis across a large territory, resulting in having to develop new standard procedures for almost every aspect of the operation.
- payment modalities of the O&M operator by activity performed, either using a quote system for larger or unplanned tickets, or a standard fee for smaller or standard tickets, as well as a system of penalties for unachieved targets, proved very cumbersome to manage, as this was again not standard procedure for the operator.

Conclusions

Despite requiring further subsidies to scale, the pilot demonstrated that proactively maintaining water infrastructure over time yields significant savings and benefits compared with the status quo, since it prevented schemes from falling into (total) disrepair. This approach also brought considerable benefits in terms of resilience, intelligence and ability to react to shocks such as drought, as weak or broken systems can be immediately identified and targeted for remediation.
That said, many challenges remain, notably in terms of community engagement and O&M service delivery operationalization, which can however be acted upon, based on the detailed recommendations and learnings available with the full report.

Learn more at: **www.lefilconsulting.com/kenya-water**