

FundiFix: exploring a new model for maintenance of rural water supplies

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Abstract/Summary

A critical building block of sustainable rural water services in sub-Saharan Africa is achieving financial sustainability by blending flows of finance from users, governments and development partners. A model for maintenance service provision (the FundiFix model) is described, based on prepaid user contributions, performance-based contracts and remote monitoring, providing a professional and rapid maintenance service for community water supplies (initially serving handpumps). Results from the first year of operation show 30% sign-up and 81% collection efficiency of monthly service fees, suggesting that rural communities can and will pay regularly for reliable services which create value. Strengthening institutional coordination and scaling up the business model to include the full range of rural water supply technologies and increase service area are future steps towards financial sustainability. A Maintenance Trust Fund will coordinate financial flows from different sources and provide support to private service providers through results-based payments.

Introduction

Sustainable rural water services, (in particular financial sustainability) have become a ‘holy grail’ for national governments and the development community in sub-Saharan Africa in recent years. Carter et al (2010) highlighted the need for financial viability and the design of new cost-sharing arrangements in relation to handpump maintenance, and the same applies to all water supply infrastructure. A variety of management models are in use around the world from community management, through varying degrees of private and government/local authority involvement; however few have been able to deliver reliable and financially sustainable water services in rural areas. While full cost recovery remains the ideal endpoint, in reality a blend of tariffs, taxes and transfers will be necessary for financing operation and maintenance of water supply infrastructure. This briefing paper presents the initial results from a model of maintenance service provision, developed in Kenya (Oxford/RFL, 2015) with insights for policy-makers, enterprise, local government and development partners. The study area is in the semi-arid north of Kitui County, covering two wards with a population of 50,766 (surface area 2,466km²) where the main livelihoods are agro-pastoral. Over half of the 512 water points are unimproved and seasonal (streams, unprotected shallow wells, earth dams) while year-round sources include kiosks linked to a major pipeline, deep boreholes and handpumps. There is strong seasonal variation in water use, with high demand for and reliance on year-round sources in the dry season (July-Sept) while in the rainy season surface water and shallow wells are preferred.

Description of the Case Study – Approach or technology

The FundiFix model is premised on a local company improving the maintenance of rural water services financed through user payments and performance-based transfers linked to objective metrics of service delivery in a form of public-private partnership. A choice experiment carried out with water users in the study area showed that private sector and government were preferred over community management (Hope, 2015). The name ‘FundiFix’ pays homage to local and skilled mechanics (‘fundis’ in Swahili).

Key components of the model are:

- A local company acts as a **maintenance service provider** (MSP) as opposed to a water service provider such that they are not responsible for a legacy of poor installation or changing environmental conditions. MSPs can monitor water quality metrics as required but in cases of health risks

the burden for action would be with mandated government agencies.

- **Working at scale pools risk** across multiple systems, and is a core principle underlying the model. Water security risks to individual communities and households are reduced, and a high quality maintenance service becomes viable with pooling of revenue and costs.
- Regular **prepaid user contributions** are made through M-PESA (a **mobile money** service in Kenya), and registered users (up to ten community and committee members) are sent notifications of payment and reminders via SMS (text message). This provides an efficient and transparent mechanism for financial flows from rural water users to the maintenance service provider, one element of **sustainable finance (tariffs)**.
- **Affordable tariff** - Observed handpump usage data allow variable tariffs to be designed with provision for regular, low or special cases. Most communities fall in the former; low users are monitored with a reduced tariff; and ‘special’ cases, including schools, clinics or other facilities with handpumps benefit from a reduced rate. The latter provide a basis for government support through ‘taxes’.
- **Transfers** (the third element of sustainable finance) are also necessary to sustain water services to the rural poor and can feed into the model through performance-based payments from a coordinated financing mechanism (currently being set up as a Water Services Maintenance Trust Fund).
- Providing a professional service is linked to **performance-based contracts**. The service provider is responsible for providing repairs within an agreed timeframe. For example, if a handpump repair takes longer than three days, communities receive a free month of service, so building in penalties for poor performance.
- **Remote automated monitoring** occurs through transmitters fitted to pump handles that monitor movement (usage and functionality) and send data to a central server using the mobile phone network. The status of handpumps in the system can be remotely monitored via a web-based interface. This is essential for validation of repairs and information sharing in remote rural areas, keeping the service accountable to government (in this case County Governments and national regulator), donors and other stakeholders. A range of performance metrics are reported in the ‘Rights to Results’ report (Oxford/RFL, 2014), including unit cost of water produced, percentage downtime, operational efficiency etc.
- **Unit of analysis**. As each handpump is managed differently related to group size, water demand, access rules, alternative water sources and other factors, the decision was made to collect a ‘community payment’ per handpump rather than individual payments to reduce the complexity and transaction costs of cost recovery at scale.

The model has been trialled in Kenya with two private limited companies registered and operational (in Kitui County since January 2015, and Kwale County since January 2016), in collaboration with County Ministries responsible for water services. A free trial of the maintenance service built trust with potential customers before a contract was signed. A rapid maintenance service is offered to handpump users, for a fixed monthly tariff that is paid using mobile money services. A small office provides a physical presence and focal point for enquiries, and stores high quality spare parts. When a handpump breaks down, any user can call a hotline number to notify the company. A FundiFix mechanic, equipped with a motorbike and tools, responds as soon as possible to diagnose the problem and carry out the repair. Data collected during 2015 are analysed and presented here, including payment behaviour, operational performance, and enrolment/non-enrolment.

Main results and lessons learnt

Community enrolment

The likelihood of community enrolment was evaluated prior to implementing the model through focus group discussions. The majority of groups (89%) stated they would commit to a pre-payment maintenance service after the pilot, with willingness to pay at an average level of USD 250 per year per handpump, a 2.5-fold increase on pre-service payment levels (Oxford/RFL, 2014). Figure 1 shows the actual sign-up figures falling below pre-implementation optimism with just under one in three (30%) of the 66 communities registering.

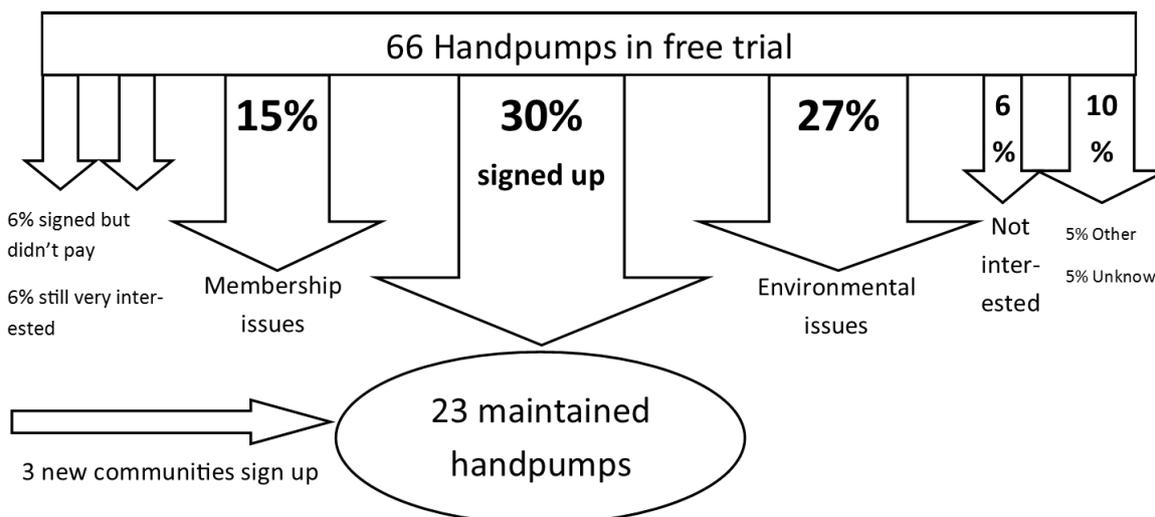


Figure 1 Evaluation of community enrolment for maintenance service (Feb-Dec 2015)

Environmental issues were the principal reason for non-enrolment (27%) with a quarter of these reporting high salinity, and three-quarters with low water levels and well-collapse, caused by poor construction and siting as (handpumps are often fitted to hand-dug shallow wells by seasonal riverbeds). Here, handpump maintenance is not the main concern, rather the water resource itself. Membership issues were the second major reason (15% of total) for non-enrolment. Interviews identified poor organisation, lack of agreement between members and leaders, or waiting for committee elections as constraints to enrolment.

This lower than predicted sign-up highlights the legacy of clustered and poor quality infrastructure with a lower proportion of handpumps that are “clustered” signing up than single or paired handpumps. It also has significance for model implementation, demonstrating that user tariffs from handpumps alone, and in a limited geographic area, will not sustain a viable business model. However, when combined with flows from taxes and transfers, the business case still makes economic sense as these additional inputs can be compared to the losses and wasted investment of infrastructure failing before the end of its design life due to a lack of maintenance.

Operational performance

In 2015, FundiFix made 98 repairs to 25 handpumps (per handpump, range: 0-25; mean = 3.9; median = 2). Five handpumps received no repairs, and in general groups with fewer repairs were more likely to be in arrears on their monthly payments, not being familiar with insurance models and feeling that they should not be paying for a service if they are not visibly benefitting. Implementing regular preventive maintenance visits addressed this to some extent, and cases where customers in arrears required a repair were handled on an individual basis. All but two repairs were made within three days, 40% on the same day as notification, 41% the following day and 16% on the second day, with an average repair time of 0.9 days, down from 27 days previously. Delays were caused by insecurity (livestock and human conflict) and waiting for water level to subside before the community could desilt a well, and were not outside of contractual obligations.

Performance is skewed by nearly half of the repairs (45%) attending to three handpumps: one had not been part of the free trial, is deep and heavily-used and required replacement of several parts, and another had a rusted cylinder, which was causing rapid wearing-out of the U-seals. Pooling risk at scale underlies the economic logic of the FundiFix model and most insurance schemes. The flip-side is that a fifth of handpumps (20%) did not require any repairs during the time period, thus evening out costs. All repairs were carried out by one fundi (pump mechanic), using a motorbike provided by the Sub-County water office.

Financial performance

Affordable tariffs were set based on previous payment behaviour, willingness to pay surveys and volume usage data. This translates to USD¹ 0.38 per household per month (range USD 0.02-1.67), with an

average of 55 member households per handpump for those that signed-up, compared to an actual payment average of USD 0.2 per household before the trial and a willingness to pay of USD 1 per household for the service (Oxford/RFL 2014). The monthly willingness to pay per handpump was USD 21 (a 2.5-fold increase on pre-service levels) so a monthly tariff of USD 10 was considered a reasonable compromise and an attractive and affordable rate. Setting volumetric tariff levels was made possible because of the initial free trial period, during which transmitters monitored volumetric usage.

Tariff level	Monthly payment amount (USD)	Number of handpumps signed-up
Normal (>15m ³ /month)	10	12
Low (3-15m ³ /month)	5	7
Special (<3m ³ /month)	1	4

Income in the first year (2015) was USD 1,538 with 79 per cent in monthly payments, and 21 per cent in registration fees. This represents 81 per cent collection efficiency overall. There was a downward trend in collection efficiency, which merits further research. Some non-payments are due to personal circumstances; others are related to the the distance to access a mobile money agent or seasonal changes in handpump usage. Overdue payments are followed up using the FrontlineSMS software, allowing a number of community members to be reminded by SMS, as well as personal phone calls or visits where possible.

Expenditure over the first year of operation, including local costs of running the maintenance service (transport, labour, spare parts and information), office rental, utilities, support staff and consumables was around USD 7,700. With 6,000 people using the maintained handpumps, maintenance costs per capita were USD 1.28 per year. The translates to 20% of operating costs being covered by user payments, with 80% covered by transfers from research grants during the pilot phase, while in future the shortfall will be met by results-based payments from a Water Services Maintenance Trust Fund, coordinating taxes and transfers. A simple financial model projects that maintaining a portfolio of 100 handpumps with the same collection efficiency and tariff distribution, would increase cost coverage to 33%. Adding different technologies such as piped schemes, increasing the service area and service levels with higher tariffs would cover higher proportions of fixed costs, thereby paving the way to a sustainable business model.

¹ An exchange rate of 1 USD = 100 KES is used throughout.

Conclusions and Recommendations

Initial results from the FundiFix pilot have been promising, showing significant reductions in downtime and good payment rates linked to performance. Where environmental issues and legacy effects such as clustering of infrastructure are taken into account, rural handpump users can and will pre-pay for a quality maintenance service, which can be facilitated by mobile money services. The experience has highlighted various surmountable challenges such as using mobile money services in rural areas (access to agents and network, familiarity), the complexity of community management and the challenge of group decision-making (community coherence), and seasonality of income in rural areas. In addition, where water sources are unreliable (eg. seasonal), undesirable (eg. salty) or of poor construction quality users are unlikely to pay for maintenance, underlining the need for greater attention to assuring the quality of new developments. Allowing a model with private sector involvement in operation and maintenance enables governments and water departments to focus on developing quality new infrastructure, but requires detailed work on risk-sharing and contractual responsibilities between the management committee, the maintenance service provider, Government and regulator which is ongoing. FundiFix’s goal is to expand both geographically and by type of infrastructure maintained, and to continue to develop a sustainable business model. This is necessary to improve financial sustainability by spreading the fixed costs of the business across a wider portfolio of rural water supply infrastructure such as piped water schemes for communities, schools and clinics. Experience of the model demonstrates that rural water supplies can be repaired within performance benchmarks that satisfy users. It has the potential to be financially sustainable through operation at scale, and commitment and



recognition of the need for tariffs, taxes and transfers to facilitate the human right to water.

Interest from county government and private sector partners is leading into the next phase of work, supported by UNICEF, of establishing a Water Services Maintenance Trust Fund blending user, government and donor finance. The Fund provides a results-based framework to both expand and replicate the model to deliver universal drinking water security, and the potential to act as a mechanism to hold MSPs accountable to key performance indicators of service through results-based payments, alongside service users.

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