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TRANSFORMATION TOWARDS SUSTAINABLE
AND RESILIENT WASH SERVICES

Mobile technology for improved governance, resilience and sustainability of water supplies in Ethiopia

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The non-functionality of water schemes remains a major factor preventing climate resilient development. Communities most at-risk to the effects of climate change often rely on deep groundwater sources during times of drought. These water schemes rely on complex technology to extract water from the deep groundwater sources. When the water schemes fail, support from external service providers, typically the Woreda, Zonal or Regional Water Officers, is necessary for repairs. This paper examines the multiple dimensions of sustainability in rural, drought-prone Ethiopia. It focusses in on the intersection of the institutional, social and economic sustainability dimensions and the information management system needed to ensure downward accountability of service providers towards communities. The innovative WaterReport technology is introduced as a mechanism for enhancing these three dimensions of sustainability.

Introduction

To ensure socio-economic development and resilient populations, it is essential to establish sustainable access to clean water. Non-existent or limited access to water can have a devastating impact on health and livelihoods in rural communities, and negatively influence the development of other sectors. Access to improved water supply remains a significant challenge in rural Ethiopia. It is estimated that across Africa, at any given time, 30-40% of rural water systems are non-functional (Moriarty et al., 2013). In Ethiopia we find that communities most at-risk to the effects of climate change often rely on deep ground water sources which are the most resilient sources in times of drought. Available studies claim that piped water supply systems with higher initial investment costs than HDWs are less expensive in terms of life cycle costs than point sources as they tend to break less and be more resilient to water table fluctuation (Godfrey and Hailemichael, 2017). However, these deep sources require complex water scheme technology (e.g. generators, transformers and electric pumps) to bring the water up to the surface. The repair of this technology is often above the capacity of the local WASH Committees (WASHCOs) and they have to rely on external support. This is recognised by the National Rural Water Supply Operation and Maintenance Management Strategic Framework which states that "there is also a need for external institutional support to sustainably maintain water scheme for their design period and even beyond that". While initial investment cost (CapEx or Capital expenditure) is often provided by government or external investor, operation (OpEx or Operational expenditure) is expected to be secured by local service provide and/or WASH committee. Ensuring the sustainability of water supply therefore relies both on the capacity of the WASHCOs and also the supporting governance structure. For this reason, it is essential to support lowest management bodies in operating water schemes.

Existing structures and policies

The water scheme management system and its key actors are summarized in Figure 1.

Figure 1. Water scheme management structure

Source: People In Need
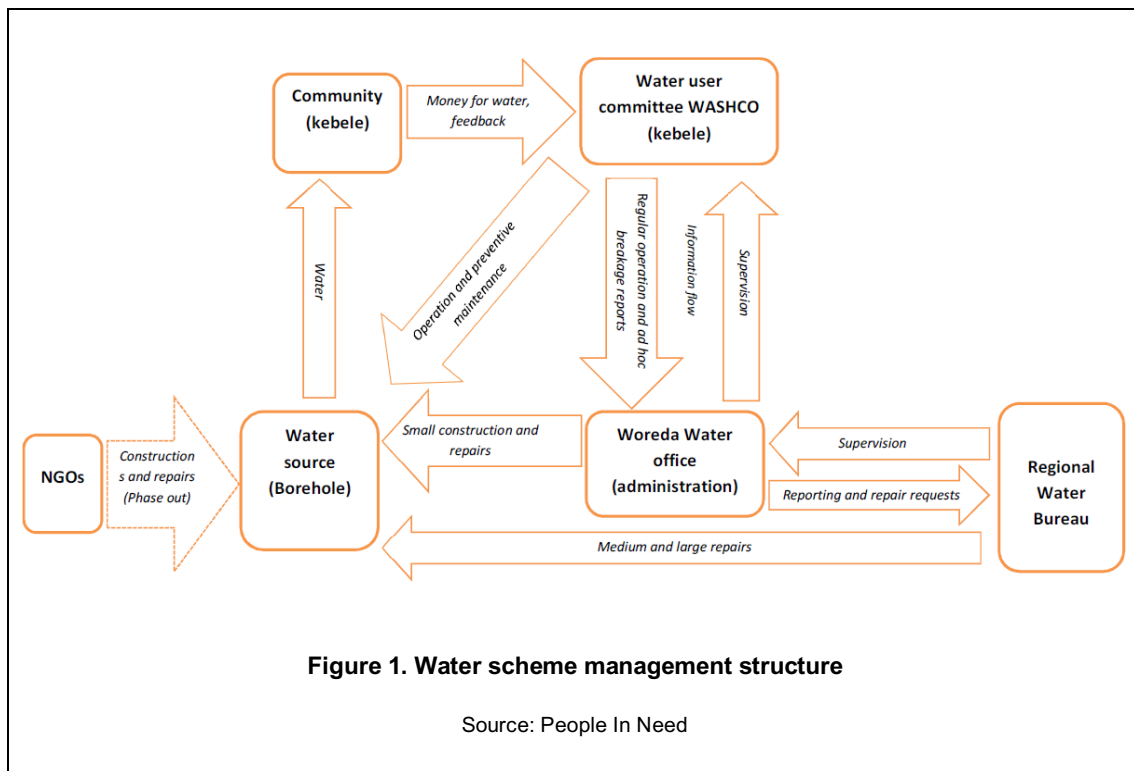
WASHCOs are nominated by the community to operate and maintain local water systems and carry out minor repairs. They communicate with official bodies, typically the Kebele Administration and Woreda Water Office, resolve water related disagreements among community establish and collect tariffs. WASHCOs do not have legal status and are currently being transformed into Water User Associations (legal bodies registered with Woreda Water office)

Woreda Water, Mines and Energy Office (also referred to as the Woreda Water Office) is responsible for planning, budgetting, implementing and monitoring water construction and programs. Monitors the Operation & Maintenance of infrastructures, verifies water quality, follows up the operations of the WASHCOs and conducts water scheme repairs.

Zonal Water, Mine and Energy Department exists in most, but not all, cases between the Woreda and Regional levels. They supervise and provide technical support to the Woreda Water Office.

The Regional Water Bureau is responsible for program planning, management, coordination, supervision, receiving repair report, responding, and capacity building at regional scale and provides trainings and technical assistance to Zonal and Woreda Water offices. It is worth noting that the National Rural Water Supply Operation and Maintenance Management Strategic Framework states that *"The regional water bureau and its subordinates shall play a role that goes beyond direct intervention to encompass monitoring of systems, coordination and facilitation of the activities of other key organizations, and provision of reliable information and advice for communities."*

Challenges for the multi-dimensional sustainability of water supplies

The sustainability of water schemes can be described as having five dimensions: technical, social, financial, institutional, and environmental. Within each of these dimensions of sustainability there can be a plurality of challenges and for the context of rural Ethiopia, these are well elaborated in *"Achieving Water Security: Lessons from research in water supply, sanitation and hygiene in Ethiopia"* (Calow et al., 2013).
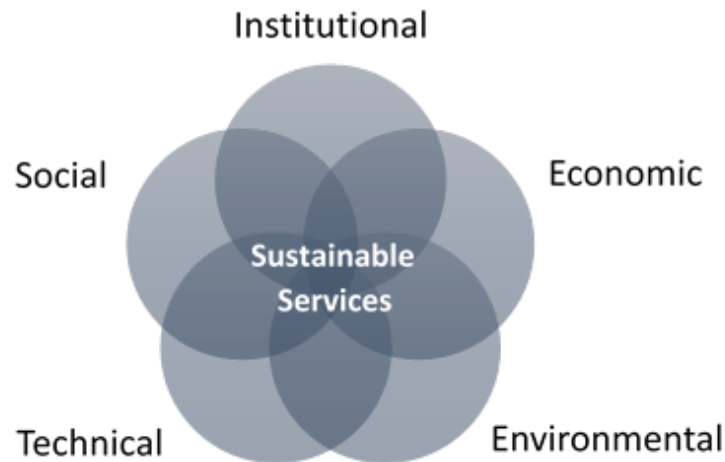
Figure 2. Conceptual framework for the sustainability of water sources

Source: adapted from Achieving Water Security:
Lessons from Research in Water Supply Sanitation and Hygiene in Ethiopia, 2013)

People In Need's (PIN) research has found that, in its selected Woredas, the average time between a water schemes failure and its repair was 6 months. This is a significant gaps in access to safe water for local communities. PIN analyzed the reasons why: access to spare parts through the private sector, financial accounting, cash flow management and cost recovery, technical capacity and logistics were problematic but PIN also found that poor information management and lack of accountability of the WWO to the communities were critical factors (Faltus, 2016). This is the intersection between the social, institutional and economic dimensions.

Availability and management of data on water source functionality was poor. There was no system of regular updates of water source functionality and reporting was a manual, tedious process with incoherency of reports at the different administrative levels (Woreda, Zonal and Regional Water Offices). This means they do not have the data to plan time & resources effectively. Furthermore, the Regional Water Office could not monitor the performance of the WWO (how effectively the WWO repair water schemes) and therefore could not take action to target resources to improve their performance. To be able effectively manage rural water schemes service providers require more and finer detailed data than that used at regional and national levels for policy and planning decisions (Butterworth et al., 2013) and data must be available at the Woreda level (Welle, 2013).

Introducing Water Report

Water Report uses simple mobile phone and internet technology to improve information management and the communication between communities (represented by their WASH Committees), the WWO and Zonal and Regional Water Offices.

Social and institutional sustainability can be addressed by improving data and information flow between the offices and the communities is crucial. Without accurate and up-to-date data, the authority is unable to plan and react adequately to quickly changing water source functionality conditions. The local administration must have a water source database available containing accurate static data such as location, type or depth of the water source. Dynamic data such as functionality status must be updated regularly. This information will enable the administration to analyze, plan and budget investment into infrastructure maintenance and extension.
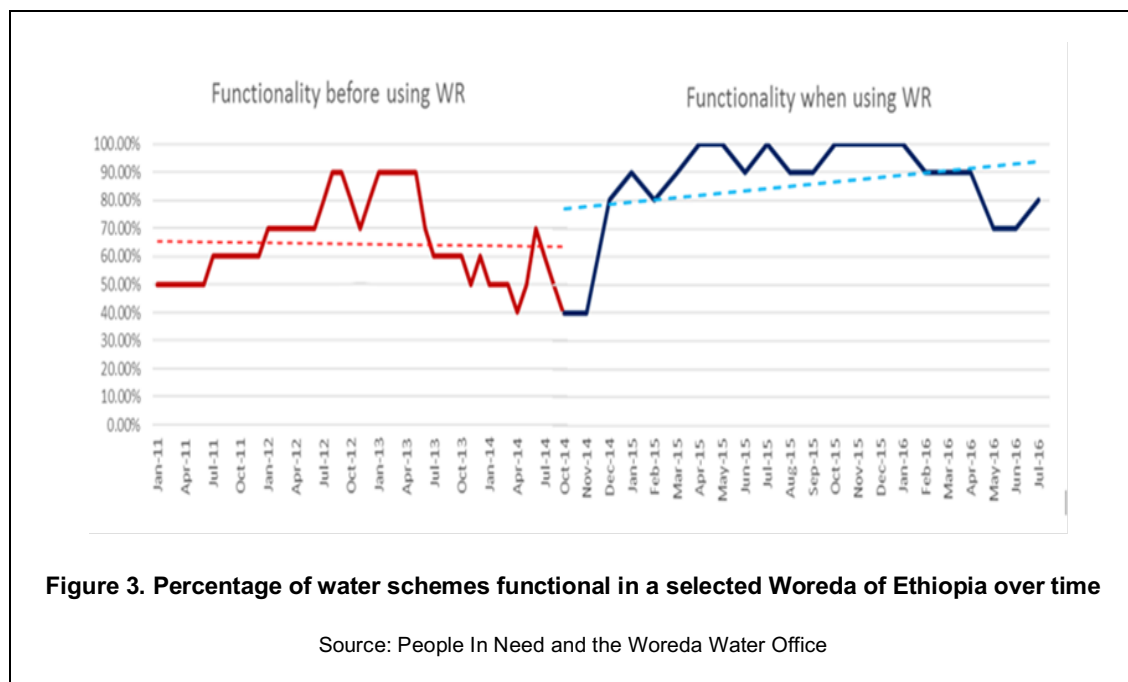
Economic sustainability can be enhanced by improving the monitoring of financial operations of the WASHCO. Financial management is an efficient way to determine the quality of WASHCO operations and ensuring that cash flows match the cost-recovery model.

There are two types of reports that the community can send: 1) a problem report is sent in case of malfunction of any part of the system and 2) a monthly report is where WASHCOs send administrative data on a monthly basis such as water sales. The community send the reports by a simple SMS to an Ethiopian telephone number, this is very low cost and no smartphones are needed. This Ethiopian telephone number is linked to an internet-based platform. For example, if the community send a problem report SMS, this will immediately appear on the website which the WWO can immediately see and can plan their response. The Regional Water Office have access to the website so they can monitor financial flows, how quickly the scheme is repaired and how many are non-functional in the Woreda in real time. Water report serves as a platform where datasets are updated and shows real time information about functionality and performance of various water sources.

Water Report therefore address key social, institutional and economic challenges by:

- Speeds up reporting of repair issues and reduces non-functionality rates
- Increases downward accountability and empowers communities by creating a feedback mechanism where information can be accessed not only by service providers (e.g. the Woreda Water Office) but also by higher authorities & decision makers
- Standardizes communication between water committees (WASHCOs) and service providers
- Unifies monitoring systems and all financial, technical and functionality reports are in one database for easier analysis
- Easy to scale up and replicate once the system is established.

Although there may be confounding factors and causality cannot be assumed, Figure 3 shows a positive correlation between improved functionality of water schemes the introduction of Water Report.

Figure 3. Percentage of water schemes functional in a selected Woreda of Ethiopia over time

Source: People In Need and the Woreda Water Office

Lessons learnt

Usage of WaterReport in Halaba special woreda was piloted in 10 kebeles in 2014 - 2015. Even though WASHCOs need continuous assistance and follow up overall functionality of 10 targeted boreholes increased and downtime was reduced by almost 10 % (fig. 3). Even though data sent by the system are yet to be regular, systematic and free from mistakes, in general, WASHCOs have a sense of improved communication and higher involvement of Water Office. Problem reports enable the tracing of major type of the repair issues reported and can adapt mechanic training curriculum accordingly. Water Report proves itself as a useful accountability and transparency tool. It obliges the service provider to ensure timely and quality service to water schemes. Financial data such as income and expenditure are organized and visible and enable simple audit. From the available data it is possible to analyse which water resources are

overloaded with possibly long waiting times which indicates a need for other water source nearby. In 2016 Water Report was scaled up from 10 to 43 users (WASHCOs). Overall 345 performance reports and 100 problem reports were sent by the end of the year 2016. Overall functionality of Alaba boreholes increased from 67.5 % in 2011 to 81.4 % in 2016. Water Report keeps a history of repair issues, monitors water scheme functionality and volume of water distributed so the data management is systematized. Usually, there is no system of standardized written reports of repair issues therefore electronic problem reporting presents a traceable way of recording repair issues. It also saves time and energy by enabling distant supervision without necessity to travel to the location and submitting hard copy operation reports.

Next steps

An essential part of Water Report is cooperation with different levels of water authorities. The Regional Water Bureau supervises and monitors functionality, performance and efficiency of local authorities. The Regional Water Bureau then should have full ownership of the system, should cover operational costs and technical support. They also decides on new locations for the system's scale up.

A light version is being developed and it will enable inclusion of thousands of small water sources without necessity of lengthy trainings and extensive follow up in usage.

Funds to cover the costs come from external donors at the moment but in the future water sale revenues should be used instead. The easy scale up is one of the biggest advantages of WaterReport. The system has a potential to be used in other areas in Ethiopia and improve the sustainability and resilience of water schemes.

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