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Connected Hand Pump Mechanics for Improved Service Delivery: A Case Study of District-Based Associations of Hand Pump Mechanics in Uganda as a Supporting Mechanism

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Abstract

The limited sustainability of rural water supply in Sub-Saharan Africa is undermining the targets set in the Millennium Development Goals. As 36% of the rural water sources are non-functional in Sub-Saharan Africa, the community management used by the sector to sustain rural water is being questioned and needs rethinking. A shift from the project to a service approach is recommended, with supporting mechanisms in place to improve this situation.

As communities rely on hand pump mechanics to maintain and repair their water sources, the role of these hand pump mechanics seems crucial in the sustainability of rural water sources. Several gaps have been identified in the ability of the hand pump mechanics to fulfill their role and need to be addressed. As these hand pump mechanics work as individuals without any supporting mechanism, associations of hand pump mechanism at district level could be a modality which can facilitate supporting mechanisms to address these gaps.

This case study, focusing on five district-based hand pump mechanics associations in Uganda explores the ability of these associations to overcome their gaps in service delivery. The evidence shows that these associations increase the ability of these hand pump mechanics to address their problems: a) there has been an increase in working together and learning, b) increased information flow has been noted between water users, hand pump mechanics and district structures, c) the hand pump mechanics have indentified the access to spares and tools as their biggest challenge and are increasingly lobbying and planning to secure supply chains of spares and tools, and d) working together with the district water office in borehole rehabilitations has increased.

These elements seem to facilitate increased transparency in the costs of rural water supply maintenance and can provide a venue for cost reduction. The accountability mechanisms have been strengthened with the establishment of these associations, the increased information flow and working together. The increased dialogue and discussions have further exposed the

weaknesses in the current operation and maintenance framework in Uganda and provides a venue to strengthen this framework.

Keywords

Capacity Building, Hand Pump Mechanics, Private Sector, Operation and Maintenance, Rural Water Supply, Sustainability

Introduction:

"Access to safe water is a fundamental human need and, therefore, a basic human right. Contaminated water jeopardizes both the physical and social health of all people. It is an affront to human dignity."
Kofi Annan, United Nations Secretary-General[i].

According to UNICEF and the World Health Organisation, Sub-Saharan Africa is lagging behind in progress towards the MDG target, with only 60% of the population using improved sources of drinking-water despite an increase of 11 percentage points since 1990[1]. One of the main obstacles in achieving the MDGs is the limited sustainability of the constructed water points. According to the Rural Water Supply Network 36% of the hand pumps in Sub-Saharan Africa are not working[2].

Over the last two decades, the sector has promoted a community management model to ensure sustainability as the most appropriate management approach for rural water supply in developing countries. The 36% non-functionality seems to suggest that this approach has failed to achieve the ultimate goal of reliable and sustainable water supply. In many cases this approach leaves the community, and especially the water committee, isolated once the infrastructure is in place and the program implementers disappear. To improve the level of sustainability a shift from the project to a service delivery approach is required[3]. Elements such as costs, access and accountability of this service are being increasingly emphasized in the approaches to ensure the sustainability of this service of rural water supply.

Ugandan National Level Context

In Uganda the Ministry of Water and Environment reports that access to safe water in rural areas was 65% in 2009. This is a slight increase since 2005 when access was 61%, see Figure 3. The sector report notes that this increase is apparently due to updated population statistics from the Uganda Bureau of Statistics. The ministry concludes that the sector is just keeping up with population growth and that the national target of 77% by 2015 is not going to be met[4].

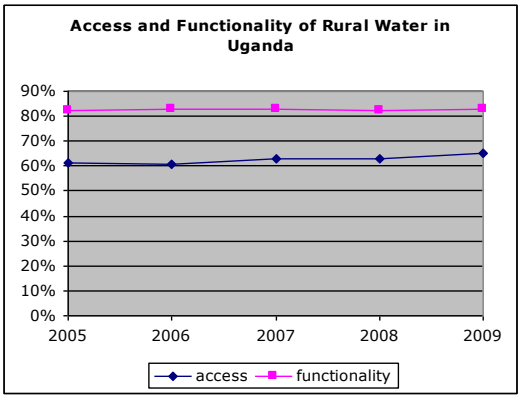

Figure 1; Access and Functionality Trends in Uganda

The ministry reports a functionality rate of 83%, which means that 17% of the safe water sources are not functioning. This figure has been constant since 2005, implying that 3.3

million people are deprived of access to safe water annually in Uganda[i].

There is a widespread concern within the sector about the reliability of these figures. The sector has commenced a water atlas which is planned to be presented during the next Joint Sector Review in October 2010. The functionality figure in Uganda is expected to be much lower in reality due to: the rating method, the lack of appropriate monitoring tools and systems and the implications on funding[5]. It is expected that more people are actually deprived from the access to safe water.

The ministry of Water and Environment identifies key elements to improve functionality as;

- *the supply of spare parts,*
- *the role of hand pumps Mechanics and*
- *the role of Water User Committees*

The ministry and development partners are increasingly concerned about the limited sustainability of the rural water points. They expressed their concerns about the increased expenditures and recommended more transparent and improved supervision of borehole rehabilitations[6]. Increasing functionality has become one of the six key undertakings by the Joint Sector Review. The target is set at improving the functionality rate of water points in 50% of the districts by at least 3 percentage points, by improving the management at the community and district level through the review and implementation of a revised O&M framework in 2010/2011[7].

Literature on Supply Chains and Private Sector Involvement

Literature and studies further highlight the aspects of supply chains and private sector involvement in relation to sustainability of rural water supply.

A. Oyo stresses the relationship between non-functional water sources in Africa and the difficulties in obtaining spare parts. The author explores the viability of supply chain types, as determined by the population density, the type of technology and the Gross National Income. It is suggested that self-supporting supply chains for spare parts driving on profit alone will not be viable in rural Africa. There might be potential to sustain private sector interests and develop markets using government initiatives[8].

"Hand pump installation is the most widespread solution for supplying water in Africa's rural setting… In some areas 50% or more are non-functional, due in part to difficulties in obtaining spare parts" *Oyo, A.*

L. Koestler emphasises the correlation between commercial activities in the community and the management systems of water supply schemes. The higher the level of economic activities and cash flow in the community, the higher the level of private sector management engagement compared to the community management system[9].

P.A. Harvey and R.A. Reed, mention that nowhere in rural Africa, supply chains are sustainable, driven by the private sector without supporting mechanisms. They recommend establishing support mechanisms and strengthening the supply chain links. Furthermore, they argue that the private sector provides opportunities linking sustainable economic growth with sustainable water provision[10].

Koestler et al states there is a general weakness in the current environment and project approach concerning the operation and maintenance framework. They argue that the private sector is more effective in providing services than the local government structures, because of their flexibility and adaptability to the user demands. The authors recommend a

[i] Currently 63% of the total 26 million of the population of Uganda is being served. If the functionality would be 100%, access would grow to 78%, increasing access by 3,3 million, from 17 million people up to 20,3 million people.

"water persons a year" tool to justify long term commitment for operation and maintenance from government, NGOs and developing partners. However more funding will not be sufficient, focus should be given to the establishment of systems, structures and institutions to ensure sustainability of rural water sources. These could be semi-autonomous maintenance units, private sector service contracts, water utilities or local community groups being contracted[5].

This review suggests that the private sector and supply chains are crucial in sustainable rural water supply. This private sector has a significant potential but can't be driven by profit mechanisms alone in rural Africa. There is a need for supporting mechanisms which should fit into the local socio-economic environment.

Ugandan District and Community Level Context

Figure 2; Non-functional water sources, reducing safe water coverage

An assessment to improve management structures in water supply by Youth Development Organisation (YODEO) on behalf of SNV in Adjumani district late 2007, revealed a functionality rate of 67% of the boreholes. This figure is much lower that the 90% functionality reported by the ministry in 2007. The report identified several causes of this low functionality. Some of these were related to the physical maintenance of boreholes such as: the lack of spare parts, inadequate repairs, high prices of repairs and difficulty to access a trained technician. Furthermore, the assessment identified that the hand pump mechanics in Adjumani didn't have a legal identity to represent them at the district; and, there was limited interaction between the hand pump mechanics and the district water office[11].

These key findings are supported by a discussion paper by WaterAid based on a review in Uganda in Tororo and Wakiso districts in 2004. The paper notes the limited availability of hand pump mechanics, due to migration and deaths of trained mechanics. This paper recommends regular training to hand pump mechanics and increased information about the hand pump mechanic's location to be made available to local communities[12].

> "We actually do not have a pump mechanic at the sub county but we access services from the neighbouring sub county. The mechanic does not even have tools for working". *Water User Committee member in Koboko District*

The limited access of communities to hand pump mechanics is further being confirmed by a functionality assessment carried out by Consultancy of Rural Enterprise Activities Management (CREAM) on behalf of SNV, in Koboko District in 2009. The report states than around 50% of the water users have difficulty accessing a hand pump mechanic[13].

These findings suggest that the private sector can contribute to improved sustainability of water supply, but is being hindered by the lack of a supporting mechanism.

Methodology:

Conceptual Model

Based on the analysis, SNV concluded in 2008, that a district based association of hand pump mechanics can help provide these supporting mechanisms for the private sector mechanics to increase sustainability of safe water sources. This has been documented in the Conceptual framework in Figure 3.

As the hand pump mechanics work individually and are not or are weakly organised, there are several gaps and obstacles in their performance:

- They have limited awareness of each other's presence. They aren't working together and have a limited opportunity to learn from each other. It is believed that this reduces the availability of hand pump mechanics at district level and undermines the quality of repairs.

- They are not represented as a formal stakeholder at the district. There is limited information flow between the Water User Committees (WUC) and hand pump mechanics. WUCs find it difficult to contract a hand pump mechanic and hold hand pump mechanics accountable. There is also limited information flow between the hand pump and the government structures, which undermines the planning ability of the district water office. In turn, the hand pump mechanics are not involved in the plans of the district.

- They have limited bargaining position to access spare parts, tools and knowledge. As individuals, they rely on local shops with limited capacity to purchase their spare parts. They can't benefit from economies of scale, which increases the costs of these spare parts. Moreover, they have a limited ability to access tools, financial services, subsidies and knowledge. This increases the prices of repairs and reduces the quality of their work.

- As they don't have a legal identity, they can't obtain official contracts given out by the local government for rehabilitation of water sources. The districts contract companies to implement rehabilitations, usually from companies outside the district. This undermines the economic model for hand pump mechanics to operate and increases the costs of this rehabilitation as these contractors have to travel from outside the district. Moreover, the districts find it difficult to follow up incomplete repairs with these outside contractors, compared to a local organisation.

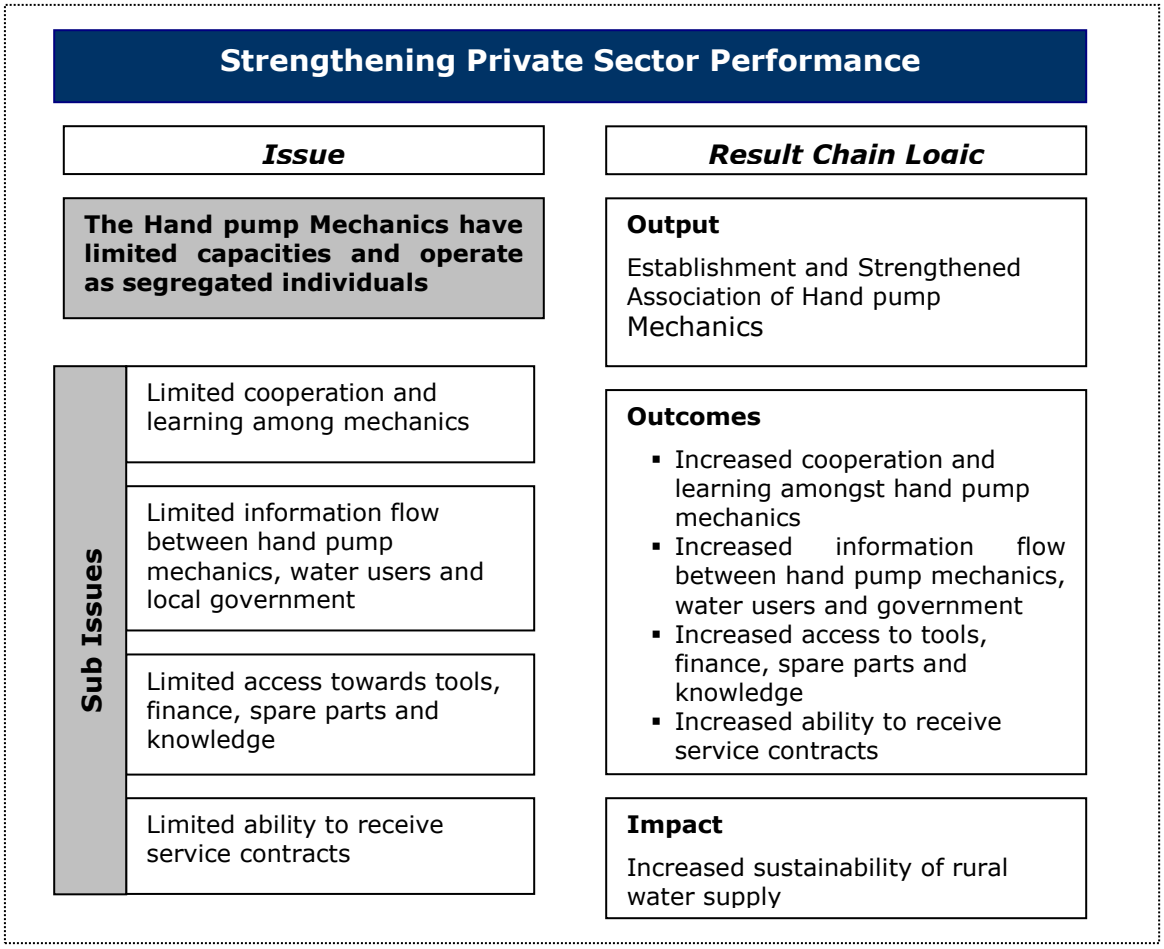

Figure 3; Conceptual Framework

It is conceptualised that facilitating the establishment of strong district-based associations of hand pump mechanics can improve this situation with the following outcomes;

- Getting connected can facilitate working together and learning. This should improve the availability of hand pump mechanics in the district and could improve the quality of their work.

- By becoming a formally-recognised stakeholder, information flow between WUC, Hand Pump Mechanics and the district water office can improve. It should be easier for communities to access services and hold the hand pump mechanic accountable. The association can provide up-to-date and in-depth information on functionality rates and the challenges in maintenance and repairs to the district water office. This information can be used for planning purposes. Additionally the hand pump mechanics become increasingly involved in the rehabilitation plans of the district, which improves accountability towards the district water office.

- Bringing them together as an association, they can increase their ability to access part, tools, financial services and knowledge. They have an increased opportunity to negotiate for better prices and ability to access spare parts. This should strengthen their service delivery which can improve quality and reduce the price and the duration of repairs.

- With a strong association, the hand pump mechanics can be contracted for rehabilitation by the district water office. This increases the incentive of this private sector player in the district to provide services for rural water supply. It can reduce the costs of these rehabilitations as it is a local service provider. Moreover it can improve the accountability for the rehabilitations, as these hand pump mechanics have a local presence.

Based on this conceptual model, it was concluded that a strong association of hand pump mechanics, should strengthen the hand pump mechanics in their service delivery. This improved service delivery should contribute to an increased sustainability of rural water supply.

Expected Implications on Costs and Accountability

It is foreseen that with the establishment of district-based associations, the costs of repairs could be reduced and accountability mechanisms strengthened, as is summarised in Table 1.

District Based Associations Outcomes	**Costs**	**Accountability**
Increased cooperation and learning among hand pump mechanics	Reduced prices of spare parts because of economies of scale	Increased accountability towards hand pump mechanics, by their members, WUC and district water office.
Increased information flow between hand pump mechanics, water users and government	Increased insights in the costs and ability to lobby for supporting mechanisms	Increased accountability of hand pump mechanics towards district water office
Increased access to tools, finance, spare parts and knowledge	Reduced costs on borehole rehabilitations by local service providers	
Increased ability to receive service contracts		Increased accountability mechanism towards borehole rehabilitations

Table 1; Costs and Accountability Implications

These associations can lobby for lower prices and strengthen the supply chains for spare parts by benefiting from economies of scale. Moreover with increased interaction with the district, it is foreseen that an increased insight in the real costs of operation and maintenance will be obtained. This creates further opportunities for supporting mechanisms such as on the access of tools and subsidies for spare parts. With the ability of the hand pump mechanics to implement rehabilitation contracts from the district water office, it is expected that these costs can reduce as it is a local service provider opposed to a contractor from outside the district.

Accountability mechanisms are being strengthened with the presence of a district based hand pump mechanic association. The WUC and the district water office have a legal identity available to hold the hand pump mechanics accountable as a group. As the association is membership based, the members can hold the association as well as their own members accountable. Visa-versa, a district based association can hold the district water office accountable for their rehabilitation plans and expenditures. Moreover with a legible local contractor present, the district would find it easier to follow up repairs than with an outside contractor.

Approach

This conceptual model was first tested in a pilot in Adjumani district, West Nile in 2008, with the establishment of an association of hand pump mechanics. The pilot included

- Assessment of all hand pump mechanics in the district & identification of the capacity gaps.
- Meeting with all hand pump mechanics about the potential benefits of an association, with the election of democratic leadership.
- Development of constitution and registration by leadership.
- Approval of constitution by members during an Annual General Meeting.
- Establishment of association by the leadership: registration, opening bank account and collecting memberships fee.

Further assistance was given by coaching and mentoring of the leadership of the association on aspects such as leadership, financial management, record keeping etc. In August 2009, 27 paid members were registered (36%) out of a total of 75 people involved in hand pump repairs[14].

The results were very promising and the pilot was up-scaled in Ruwenzori and West Nile. In Ruwenzori, two existing district based associations were identified in Kasese and Kyenjojo districts. As they had limited capacities they were supported by SNV starting from mid 2009. In West Nile, on the request of the district local governments of Yumbe and Arua, the facilitation of establishing district-based associations was further rolled out starting from the beginning of 2010.

During the implementation, a very vibrant association of hand pump mechanics was identified in Kibaale district. This association was established in 1996 and had established systems which addressed the issues earlier identified. The association consists of 42 paid members (32%) out of a total of 130 people involved in hand pump repairs in the district[ii]. Based on their achievements, our assumptions were strengthened that this model can improve service delivery. SNV used this association further as "consultant" to support the other associations (peer-to-peer learning), and documented this association for further learning and dissemination[15].

[ii] Statement given by Mr Kasumba Yusuf, chairman Kibaale hand pump mechanics association on 17/9/2010

Findings and discussion:

Increased cooperation and learning amongst hand pump mechanics

Increased learning and working together seems to be the first result obtained of having a district-based association. As several organisations (government and NGOs) train hand pump mechanics at different times and locations, they are not aware of each others' existence. There have been several cases reported of the hand pump mechanics increasing working together on complex repairs after getting to know each other through this association. As these complex repairs require two or more hand pump mechanics, collaboration is a key improvement in service delivery.

Figure 4; Hand Pump Mechanics working together in Yumbe district

The Kibaale case further strengthens collaboration into effective learning. They have also reported working closely together on complex repairs. This collaboration has facilitated a process of learning. Evidence is found in the fact that they have developed local tools, such as a tool for borehole fishing[iii]. This association has also expanded the products of the hand pump mechanics as they are also involved in repairs of piped water schemes and rainwater harvesting facilities.

Increased information flow between hand pump mechanics, water users and government

Improvements have been noticed on information flow between water users, the hand pump mechanics and the district water office within the target districts. The establishment of the associations in Adjumani and Yumbe facilitated the first interactions between the hand pump mechanics, civil servants and the political leadership at the district level. Issues like limited tools and the sub county responsibilities are being discussed for the first time at district coordination meetings because of the participation of the association. However, at this moment the hand pump mechanics in these districts are not reporting the status of the water sources adequately due to the limited capacities of the members.

The experience of the association in Kibaale shows that there are many opportunities related to reporting on water sources. This association reports regularly on the status on the boreholes in the district, which enables the district water office to plan adequately and informs the district on operation and maintenance issues within the district. Moreover there is also a strong communication flow between the water users and the hand pump mechanics. In collaboration with the water office, the association has set fixed prices and has radio announcements on tariffs and a contact phone number. The number can be called if a there are problems with the water source or with a hand pump mechanic who is overcharging. With assistance of the water office, a mobile unit can come to the source and provide assistance. If a hand pump mechanic has been found over charging the communities, the hand pump mechanics will be held accountable during a general meeting.

[iii] "fishing" refers to retrieving of any obstructive/foreign objects from a borehole

Increased access to tools, finance, spare parts and knowledge

This assignment confirmed that access to tools and spare parts are the biggest challenge the hand pump mechanics face. The sub counties hold tools kits which can be used by hand pump mechanics, but the kits are often incomplete due to lack of ownership. Spare parts are only available on a limited basis in the towns and require long distance travel, and the prices are often high. In Adjumani there is a limited supply of spare parts in only few shops in the town, with selling prices about 40% above those in the capital. In Yumbe the people have to travel to 86km to Arua town to obtain spare parts.

The key activity planned by the associations is to address this issue of spares and tools. Lobbying for tools has started and they are planning to setting up their own stores or manage depots. In Kyenjojo the District Water Office acknowledged having a fund to store spare parts in the district and the association was asked to develop a concept. In Yumbe the District Water Officer has planned to establish a depot at the district, which can be managed by the association. The district water officer is however uncertain which budget line to allocate and needs to enquire with the ministry. In Adjumani, the issue of limited tool kits has been discussed in the district coordination meeting, whereby the district challenged the private sector as to why government property would be used for profit-making activities. This highlights the challenges of current guidelines of the ministry for supporting mechanisms to ensure supply chains for spare parts and tools.

> "When the International Refugee Council (IRC) phased out, they established a spare part depot in Yumbe. The depot was mismanaged by the sub county and has only very few parts available. Communities now have to travel long distance, to Arua Town, to access spare parts as they are not available in Yumbe district.
> *District Water Officer*

On various occasions these associations were able to access new knowledge through trainings from the government, as they have a budget line for training. For example, in Keynjojo, three members were trained on Iron Removal Plants. The association facilitated further learning for the members.

The Kibaale association has addressed capacity building by various means. The association raised money from their members and was able to set up a local store where spare parts are being stored. They supply their store directly from the manufacturer of spare parts in the capital with a 5% discount. Based on their performance and strengthened position, the district improved pump mechanics' access to tools by handing over tools to the association. Recently World Vision supplied tools to the members at the parish level to improve the access to tools at this level.

Increased ability to receive service contracts

"We are getting people from Rakai to repair our hand pumps, why can't you do it?" *Secretary of Works, Yumbe District*

As the hand pump mechanics form their associations, this gives an opportunity for them to receive contracts from the government for rehabilitations of pumps. This provides an incentive for these local entrepreneurs to work in rural water supply. It is expected that costs for rehabilitation will be reduced as these are local service providers, as opposed to the outside contractors used in the past.

Better accountability is another advantage of having local member-based service providers, as opposed to the outside contractors. This was confirmed by the secretary of works in Yumbe district who had several problems with these outside contractors. These contractors asked high rates for rehabilitation of pumps and the district found it difficult to follow up inadequate repairs. As the association is local, it is easier for the district to follow up incomplete repairs. Vise-versa, the association can hold the district accountable for their expenditures.

There is sufficient evidence that district water offices are now working more closely with the pump mechanics because of this association. During the first general meeting of hand pump mechanics in Yumbe the secretary works urged the hand pump mechanics to register so they could receive government contracts. The district water office of Yumbe has now planned and budgeted for the rehabilitation of 50 boreholes in close collaboration with the association. During the last follow up visit, the District Water Office was using the association to conduct an in-depth assessment of all the non-functional water sources. This trend has also been observed in Adjumani, Kejyojo and Kasese. In Kasese, the district has outsourced the rehabilitation of 12 boreholes to the association.

Figure 5; DWO and Hand pump mechanics working together

The Kibaale association shows a long standing relationship with the district and receives rehabilitation contracts each year. This relationship has supported the association in the development of the spare parts depot with the initial capital. Over time, the association also formed a company for legal and taxation reasons. This shows a further transition from the informal to the formal sector.

Accountability and Costs

Based on the experiences in the districts of Adjumani, Arua, Kasese, Kyenjojo and Yume and the case documentation of Kibaale association, there is substantial evidence that bringing

hand pump mechanics together into district-based association reduces the costs and strengthens accountability mechanisms.

The issue of limited supply chains is the main priority these associations have given themselves to address. Strengthening these chains can reduce the costs of repairs. The of the district to sub contract to local service providers is also expected to reduce the of well rehabilitation. Moreover these contracts give an economic incentive for private sector player to continue operating in type business. The Kibaale experience shows that standardisation of repairs can be achieved with such district based associations.

> "If the association provides good service to the community, then it will be connected to people who can support the association; the association will not be facilitated for doing nothing. The association has to be keen on documenting and reporting to the district and sub county authorities as well as the District coordination meeting". *District Water Office, Kyenjojo*

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Figure 6; Functional Borehole in Dzaipi sub county, Adjumani district

There is substantial evidence that these associations strengthen accountability mechanisms. The water users in Kibaale can hold the association accountable for work carried out by hand pump mechanics in the district, with the radio announcements and a mobile unit. In all the districts evidence has been found on an increased demand for accountability from the district towards these hand pump mechanics. The districts mention that if the association is able to deliver, they will be supported.

The Kibaale experience shows that the association can also hold the district accountable. The chairman mentioned that during their first contracting process with the district they had been asked to pay "kickback"[iv]. They were not able to provide this as the association had to account to their members for this "kickback". They started a legal procedure against the district water office about this, which changed the attitude of the district water office which gave the contracts without the usual "kickback".

Conclusions:

The establishing and strengthening district-based associations of hand pump mechanics seems to be a suitable approach to strengthen their service delivery. The association can facilitate the required supporting mechanisms for sustainable rural water supply.

There is evidence that these associations stimulate a process of increasingly working together and mutual learning between hand pump mechanics. They also help increase the information flow between water users, hand pump mechanics and district water office. Associations have identified the lack of spare parts and tools as their main challenge and

[iv] "Kickback" refers to a term used in Uganda whereby the contractor has to pay about 10% of the contracting amount to the individual, to ensure that the contracts are being signed.

have started processes to address these issues. Because they are registered they are able to access government contracts, which provides an incentive for local entrepreneurship.

As this study is based on 5 district-based associations in Uganda, further studies are recommended to explore the full potential and provide additional insights on district / sub regional associations of hand pump mechanics in the rural African context.

The processes and mechanisms observed can increase transparency and reduce costs. There has been a shift observed from the informal to the formal sector. Benefiting from the economies of scale and having local service providers engaged in rehabilitations enables a reduction of the costs. There is evidence that accountability mechanisms have been strengthened, with the increased dialogue and clear systems being put in place. At this moment there is comprehensive data available, making it difficult to verify the benefits of associations. It is therefore recommended to have baselines in place measuring costs and accountability mechanisms at the district and national level.

These associations have allowed the hand pump mechanics to identify the biggest challenge they face as a group: the lack of tools and spare parts. All associations have planned to address this by lobbying the districts and setting up there own stores or depots. As much as these districts associations plan to address this problem, the role of the government is crucial. The investment capital required to purchase these parts and tools are too high for their members only. The district can provide the needed capital through borehole rehabilitations contracts, providing funds to purchase the initial stocks for tools and spare parts and possibly subsidise certain parts/ tools. The current operation and maintenance framework is not very clear on which modalities the district have in order to support these associations. It is therefore recommended that the revised framework will cater for these provisions.

The success of these district based hand pump mechanics associations are largely determined by "leadership" at the association and the district level.

Establishing meaningful associations require a strong driving force from the members and committed leadership. Visionary leadership is required to establish these associations and to forge targets which are implemented accordingly. If the leadership isn't strong, the association will not be able to fulfill its purpose and the leadership can easily be tempted to act on self interest rather than for the interest of the group. Peer-to-peer learning has been identified as one of the modalities to strengthen leadership and accountability by the members. We used the chairman of the Kibaale association to share his results with the members and leaders of the other associations. This successfully triggered the accountability of the members in one district; the established leadership was replaced by their members.

At the district, supporting leadership is crucial to allow this association to fulfill its potential. This supportive leadership is by no means guaranteed. Having a strong and vibrant association at the district, introduces an aspect of power sharing between a water office and the association. We have realized that not all district water offices are supportive, as a district water office may enjoy the status quo. A modality to overcome this resistance is to involve the political and technical leadership of the district. As the political leadership is being held accountable for access to safe water by the public, this leadership has an incentive to support associations for political gain.

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