

# District hand pump mechanics associations in Uganda for improved operation and maintenance of rural water-supply systems

JACINTA NEKESA and RASHIDAH KULANYI

*In Uganda, functionality is still a challenge, with 19 per cent of water points not working. Though trained by local government and NGOs, hand pump mechanics (HPMs) are not recognized as local private sector players and are mostly segregated individuals, yet they are a key stakeholder in operation and maintenance (O&M) of rural water supply. HPMs find it hard to access spare parts and cannot benefit from economies of scale; nor are they involved in decision making in water source development and rehabilitation and cannot receive any formal government contracts for rehabilitation. This situation has resulted in a lack of adequate information around operation and maintenance such as costs, functionality, and consumer feedback loops. At community level, there are reported cases of difficulties to access reliable repairs with uniform prices. This evidence-based paper explores how mechanics have contributed to sustaining the flow of water through district-based HPMs associations in five districts in Uganda.*

**Keywords:** hand pumps, hand pump mechanics, Uganda, associations

OF UGANDA'S TOTAL POPULATION (estimated at around 31,783,300, Uganda Bureau of Statistics, as of July 2010), only approximately two-thirds is served by safe water supplies (WATSUP, 2010). Safe water coverage in the rural areas is 64 per cent and 75 per cent in urban areas. In the rural areas the access to safe water supplies varies from as low as 20 per cent in Kaabong District to 93 per cent in the north-eastern part of the country to 93 per cent in Rukungiri District in western Uganda. The average functionality for rural areas is around 82 per cent and 84 per cent in urban areas. The major causes for non-functionality are: technical breakdowns (45 per cent) and low yield (19 per cent); shallow wells have the lowest functionality rates (approximately 70 per cent) while protected springs have the highest functionality rate (approximately 88 per cent). As many as 2,303 point water sources (2.9 per cent) are considered abandoned, having been non-functional for five or more years. The functionality of Water Source Committees

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(WSCs) nationally is 47 per cent; 84 per cent of WSCs have women in key positions.

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Low levels of functionality of water facilities remain a concern to the government and development partners

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Low levels of functionality of water and sanitation facilities remain an area of concern to the government and development partners. While there has been improvement of functionality for urban water supplies, functionality for rural water systems remained static at around 80 per cent for the last five years. The Sector Performance Report (Ministry of Water and Environment, 2010) identifies issues affecting functionality to include poor O&M practices and overall functioning of the community-based operation and maintenance system. Other issues include dry/low yielding; water quality; poor and below standard installations of facilities; ageing systems beyond economic values needing total replacement; WSC not functioning; silt and leakages; vandalism; repairs beyond community capacity; and inadequate prioritization of community mobilization activities to ensure ownership and care by the communities. Given limited funds for new investments and replacements, the Ministry recommends that issues affecting O&M and functionality and, ultimately, sustainability be addressed, including through strengthening regulatory functions, at both central and local government levels, and compliance by districts with sector implementation guidelines.

### Ugandan district and community level context

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There is a limited availability of hand pump mechanics owing to migration and deaths of trained mechanics

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The main concerns at the district level are low access and low functionality levels. Table 1 highlights the scenario in five districts. An assessment to improve management structures in water supply by the Youth Development Organization (YODEO, 2008) on behalf of SNV in Adjumani district in late 2007, revealed a functionality rate of 67 per cent of the boreholes. This figure was much lower than the 94 per cent 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 accessing a trained technician. Furthermore, the assessment identified that the hand pump mechanics in Adjumani did not 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.

The Ministry of Water and Environment (2010) identifies key elements to improve functionality as:

- the supply of spare parts;
- the role of hand pump mechanics; and
- the role of water user committees.

**Table 1.** Access and functionality figures for five districts in Uganda

District	2007/08		2008/09		2009/10	
	Access %	Functionality %	Access %	Functionality %	Access %	Functionality %
Adjumani	68	94	67	95	49	75
Bundibugyo	77	71	79	74	69	79
Yumbe	43	78	38	70	32	75
Kyenjojo	68	85	70	57	73	81
Kasese	77	59	77	61	61	77

Source: Sector Performance Reports for Financial Years 2007/08, 2008/09 and 2009/10

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

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 was further confirmed by a functionality assessment carried out by Consultancy of Rural Enterprise Activities Management (CREAM, 2009a) on behalf of SNV, in Koboko District in 2009. The report states that around 50 per cent of the water users have difficulty accessing a hand pump mechanic. 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.

### Literature on supply chains and private sector involvement

Literature and studies highlight the relationships of supply chains and private sector involvement with sustainability of rural water supply. Oyo (2006) 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

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The private sector provides opportunities linking sustainable economic growth with sustainable water provision

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There is a relationship between non-functional water sources in Africa and the difficulties in obtaining spare parts

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income. It is suggested that self-supporting supply chains for spare parts driven by profit alone will not be viable in rural Africa. There might be potential to sustain private sector interests and develop markets using government initiatives. Koestler (2009) emphasizes 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 with the community management system. Harvey and Reed (2006) mention that nowhere in rural Africa are supply chains 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.

Hand pump installation is the most widespread solution for supplying water in Africa's rural setting ... In some areas 50 per cent or more are non-functional, due in part to difficulties in obtaining spare parts (Oyo, 2006).

Koestler (2009) states that there is a general weakness in the current environment and project approach concerning the operation and maintenance framework. The author argues that the private sector is more effective in providing services than the local government structures, because of their flexibility and adaptability to user demands. The author recommends a '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. This review suggests that the private sector and supply chains are crucial in sustainable rural water supply. This private sector has significant potential but cannot 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

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## Description of the case study: Methodology and approach

### *Conceptual model*

The assessment conducted by SNV at the end of 2007 revealed that as HPMS work individually and are not or are weakly organized, there are several gaps and obstacles in their performance:

- They have limited awareness of each other's presence; are not working together; and have limited opportunities to learn from each other. This reduces the availability of HPMS at district level and undermines the quality of repairs.
- HPMS do not have mechanisms to discipline members who misbehave; for example, some of the mechanics vandalize hand pumps for spares or cheat communities in terms of pricing.
- They are not represented as formal stakeholders at the district level. As a result, there is limited information flow between the Water Source Committees (WSCs) and HPMS. WSCs find it difficult to contract HPMS and hold them accountable. There is also limited information flow between the HPMS and the government structures, which undermines the planning ability of the district water office. In turn, the HPMS 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 cannot 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 do not have a legal identity, they cannot obtain official contracts given out by the local government for rehabilitation of water sources. The districts contract companies to implement rehabilitation, usually from outside the districts. This undermines the economic model for HPMS 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 with a local organization.

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District-based  
associations can  
help support hand  
pump mechanics

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Based on the assessment results, therefore, SNV concluded in 2008 that establishment of district-based associations of hand pump mechanics can help provide supporting mechanisms for the local private sector mechanics in order to increase sustainability of safe water sources. This has been documented in the conceptual framework in Figure 1.

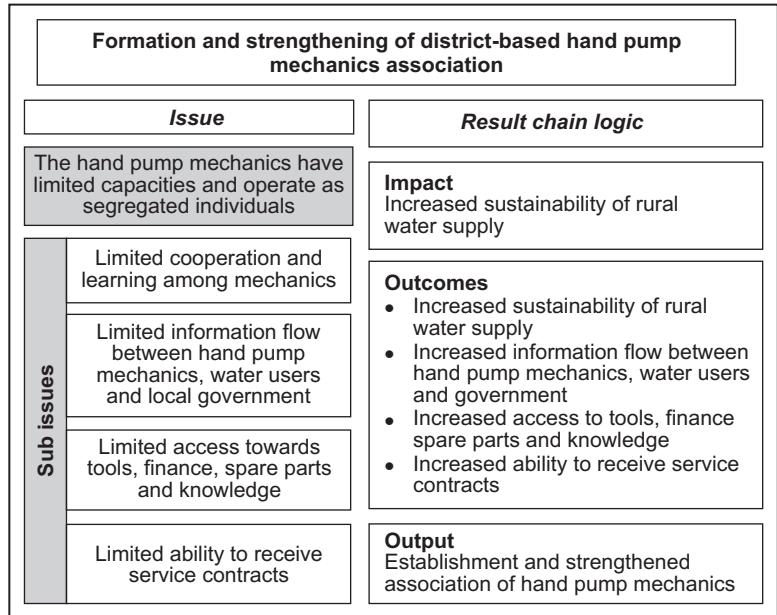


Figure 1. Formation and strengthening of district-based hand pump mechanics association

**Approach**

The conceptual model was first tested in a pilot in Adjumani district, in 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 and identification of the capacity gaps.
- Meeting with all hand pump mechanics about the potential benefits of an association, with the election of a democratic leadership.
- Development of a constitution and registration by the leadership.
- Approval of the constitution by members during an annual general meeting.
- Establishment of the association by the leadership: registration, opening bank account, and collecting membership fees.

Between 2008 and 2010, SNV has facilitated the formation of five district-based associations across the two regions of West Nile and Rwenzori in the districts of Kyenjojo, Kasese, Arua, Yumbe, and Adjumani. In order to achieve the set outputs, outcomes, and impact, the following broad steps were taken in each district:

The conceptual model was first tested in a pilot in West Nile in 2008

Between 2008 and 2010, SNV has facilitated the formation of five district-based associations

1. Conduct district-level consultative meetings, with the districts and leaders of the mechanics (where they existed) for buy-in.
2. Organize meetings with all the hand pump mechanics about the potential benefits of formation of associations.
3. Support with the establishment of the associations, including:
  - discussion on formation of association vs. private company, and registration both at the district and national levels;
  - election of democratic leadership (executive and the board);
  - development of the constitution by the executive; approval of constitution by members during an annual general meeting;
  - opening bank accounts;
  - discussion and agreement on membership and subscription fees as contribution by members.
4. Capacity needs assessment of the mechanics associations in the districts and identification of the capacity gaps.
5. Development of capacity building plans.
6. Provision of capacity building services, including strengthening the associations on, but not limited to, the following:
  - good leadership and management skills;
  - community mobilization skills;
  - financial management and reporting;
  - procurement and procurement procedures;
  - operation of NGOs vs. private companies;
  - contract administration, company management, including how to share profits and losses.
7. Organizing peer-to-peer learning from well-established hand pump mechanics association e.g. Kibaale Hand Pump Mechanics' Association in Kibaale district.
8. Documentation and sharing of experiences at international level (e.g. during the IRC-Netherlands WASH Symposium – 2010; summary of case study into Case Information Sheet in partnership with the Water Integrity Network), at national level (e.g. during the Sanitation and Water Alliance (SAWA) annual learning event 2010), and at regional level during the Rwenzori WASH learning event that was held in October 2010.

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Further assistance was given by coaching and mentoring the leadership of the association

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Further assistance was given by coaching and mentoring of the leadership of the association on aspects such as leadership, financial management, and record keeping. In August 2009, 27 paid members were registered (36 per cent) out of a total of 75 people involved in hand pump repairs. This led to organized service delivery in terms of repair of water sources; improved coordination amongst the mechanics; improved access to spares and tools; improved working relationships between the mechanics and the district water office; and improved functionality of hand pumps.

The results were very promising and the pilot was up-scaled in Rwenzori and West Nile. In Rwenzori, two existing district-based associations were identified in Kasese and Kyenjojo districts. Unregistered and with limited capacities, the two associations 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 in mid-western Uganda. This association was established in 1996 and had established systems which addressed the issues identified above. The association consists of 42 paid members (32 per cent) out of a total of 130 people involved in hand pump repairs in the district. 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 through peer-to-peer learning; a case about this association was documented for further learning and dissemination.

## **Discussion of main outcomes and results**

### ***Increased cooperation and learning amongst hand pump mechanics***

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Increased learning and working together is the first result of having a district-based association

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Increased learning and working together is the first result of having a district-based association. As several organizations (government and NGOs) train hand pump mechanics at different times and locations, they are not aware of each other's existence. All the five target districts of Yumbe, Adjumani, Arua, Kyenjojo, and Kasese have functional hand pump mechanics associations, which have improved the capability of the mechanics to relate (both within the associations and outside), to get connected, and to work and learn together. There have been several cases reported of the hand pump mechanics increasingly working together on complex repairs after getting to know each other through the associations. As these complex repairs require two or more hand pump mechanics, collaboration is a key improvement in service delivery. The associations have not only improved the relationships among members in each district but also improved the quality of their work. The associations also boast of exposure and linkage with other organizations.

### ***Increased access to tools, finance, spare parts, and knowledge***

This assignment confirmed that access to tools and spare parts is the biggest challenge the hand pump mechanics face. The sub-counties



hold tool kits which can be used by hand pump mechanics, but the kits are often incomplete because of 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 district, for example, there is a limited supply of spare parts in only a few shops in the town, with selling prices about 40 per cent above those in the capital city. In Yumbe, people have to travel to 86 km to Arua town to obtain spare parts.

Through formation of district-based associations, the HPMS are able to address this issue of spares and tools. In Kibaale district, for example, the association raised funds from their members and were 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, Kampala, with a 5 per cent discount. Payments for spares are made through mobile phone money transfers before the spares are loaded onto buses and delivered to the HPMS. Based on their performance and strengthened position, the district improved pump mechanics' access to tools by handing over tools to the association. The mechanics also lobby for tools from development partners. For example, World Vision International supplied Kibaale HPMA members with tools up to the parish level in order to improve access to tools at this level. In Yumbe, the District Water Officer planned to establish a depot at the district, which can be managed by the association. The district water officer was, however, uncertain which budget line to allocate and needed to enquire with the Ministry. In Adjumani, the issue of limited tool kits was discussed in one of the district coordination meetings, whereby the district challenged the private sector about why government property could 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.

On various occasions these associations were able to access new knowledge through training from the government with a budget line for training, and other development partners. For example, in Kyenjojo district, three members were trained on iron removal plants and the association facilitated further learning for the members. SNV has also organized several peer-to-peer learning sessions between Kibaale HPMA and the HPMS of Arua, Adjumani, Yumbe, Kyenjojo, and Kasese.

#### ***Increased ability to receive service contracts***

The capability of the associations to generate development results has improved with the formation of hand pump mechanics associations as they can now be contracted for rehabilitation of boreholes and

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shallow wells by the district water offices. For example, Kasese hand pump mechanics association has since 2008/09 won two contracts from the District Water Office to rehabilitate 24 boreholes and from the communities to repair four boreholes. This has increased the motivation and incentive of this private sector player to provide services. 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. Additionally, the mechanics have become increasingly involved in the rehabilitation plans of the district, which has also improved accountability towards the district water office. The mechanics also urge the communities to form Water User Committees (WUCs) as a prerequisite for rehabilitation of water-supply systems.

***Improved coordination and accountability with the district water offices***

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District water offices are now working more closely with the hand pump mechanics because of these associations

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There is sufficient evidence that district water offices are now working more closely with the hand pump mechanics because of these associations. By becoming formally recognized stakeholders, coordination and information flow between the three key stakeholders – the WUCs, HPMS, and the district water offices – have improved. Representatives of the associations participate in stakeholder coordination and advocacy meetings at district level. They also provide up-to-date and in-depth information on functionality rates and the challenges in maintenance and repairs to the district water offices; this information is used for planning purposes.

During the first general meeting of hand pump mechanics in Yumbe the secretary of works urged the hand pump mechanics to register so they could receive government contracts. The district water office of Yumbe planned and budgeted for the rehabilitation of 50 boreholes in close collaboration with the association. During follow-up visits, 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, Kyenjojo, and Kasese. In Kasese, the district outsourced the rehabilitation of 24 boreholes to the association in the last two financial years.

The Kibaale Hand Pump Mechanics 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.

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The issue of limited supply chains is the main priority these associations have given themselves to address

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***Improved accountability, reduced costs, and access to spares***

Based on the experiences in the districts of Adjumani, Arua, Kasese, Kyenjojo, and Yumbe and the case documentation of the Kibaale association, there is substantial evidence that bringing hand pump mechanics together into district-based associations 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 supply chains can reduce the costs of repairs. The ability of the district to subcontract to local service providers is also expected to reduce the costs of well rehabilitation. Moreover, these contracts give an economic incentive for these private sector players to continue operating in this type of business. The Kibaale experience further shows that standardization of repairs can be achieved with such district-based associations.

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 the outside contractors. These contractors asked for 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. Conversely, the association can hold the district accountable for their expenditures.

There is substantial evidence, therefore, that these associations strengthen accountability mechanisms. The water users in Kibaale, for example, can hold the association accountable for work carried out by hand pump mechanics in the districts, with the radio announcements and a mobile unit. In all the districts evidence has been found for an increased demand for accountability from the district towards these hand pump mechanics. 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 a 'kickback'. 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 to give contracts without the usual kickback.

In Kasese, the association has instituted a mechanism to deal with undisciplined members. Contact telephone numbers are left with communities to report cases of indiscipline, vandalism, and cheating by individual mechanics, who when found out face disciplinary actions. It has become easier for communities to access services and hold the hand pump mechanics accountable.

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The capacity development services provided to the mechanics associations has helped them to improve their skills

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There is interest in rolling out hand pump mechanics associations at regional and national levels

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### ***Other outcomes and impact realized***

The capacity development services provided to the mechanics associations in the different areas has helped them to improve their skills in management of the associations. Through learning and sharing information and results, there is increased interest in rolling out the experiences of hand pump mechanics associations both at regional and national levels by other districts, development partners (e.g. UNICEF), and government (e.g. Ministry of Water and Environment).

In terms of impact, the formation of associations has contributed to the improvement in functionality of rural water supply systems and hence improved access to safe water and improved livelihood for the rural communities. For example, functionality in Kasese district improved from 61 per cent in 2008/09 to 74 per cent in 2009/10.

### ***Lessons learnt***

- Formation of district-based hand pump mechanics associations provides the opportunity for the mechanics to offer better organized and regulated services to the sector and to communities.
- Associations of HPMS improve coordination and information flow between three key stakeholders in rural water service delivery: the district local governments (local authorities), the communities (consumers of services), and local private sector (service providers).
- Involvement and working closely with the districts provides adequate support to the district-based hand pump mechanics associations from the water offices, for example by participating in updating the functionality data (e.g. the Water Atlas) and contracts to carry out routine maintenance of systems.
- There is a need to link the associations with other organizations for support: for example with start-up capital to register; stock spares; and purchase of the necessary tools and equipment. There is also a need for a favourable working relationship between the associations and the WUCs.
- Up-scaling workable solutions can be achieved through documentation and sharing success stories about the innovations at the different levels.

### **Conclusions and recommendations**

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

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Associations stimulate a process of working together and mutual learning between hand pump mechanics

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There is evidence that these associations stimulate a process of 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 offices. Associations have identified the lack of spare parts and tools as their main challenge and have started processes to address these issues. Because they are registered they are able to access government contracts and this provides an incentive for local entrepreneurship.

As this case is based on five 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 increased dialogue and clear systems being put in place. In order to measure changes, there is a need for baseline studies to be conducted to measure costs and accountability mechanisms at the district and national levels for comparison purposes.

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 other development partners to set up their own stores or depots. As much as these district associations plan to address this problem, the role of the government is crucial. The investment capital required to purchase these parts and tools is too high for their members only. The districts can provide the needed capital through borehole rehabilitation contracts, providing funds to purchase the initial stocks for tools and spare parts, and possibly subsidizing certain parts/tools. The government could also consider that these associations become part and parcel of the Umbrella of Water and Sanitation projects that decentralizes O&M to the user levels. This will ensure the associations receive support from government and that they can access genuine spares at market prices. The current operation and maintenance framework is not very clear on which modalities the districts have in order to support these associations. It is therefore recommended that the revised framework will cater for these provisions.

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The success of district-based hand pump mechanics associations is largely determined by 'leadership'

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The success of these district-based hand pump mechanics associations is largely determined by 'leadership' at the association level. Establishing meaningful associations requires a strong driving force from the members and committed leadership. Visionary leadership

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Visionary leadership  
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is required to establish these associations and to forge targets which are implemented accordingly. If the leadership is not strong, the association will not be able to fulfil its purpose and the leadership can easily be tempted to act out of 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 Chairperson of the Kibaale Hand Pump Mechanics Association to share his experiences and results with the members and leaders of the other associations. This has successfully triggered the accountability of the members in other districts with similar interventions.

At the district level, supporting leadership is crucial to allow these associations to fulfil their potential. This supportive leadership is by no means guaranteed. Having strong and vibrant associations at the district level introduces an aspect of power sharing between a water office and the association. We have realized that all district water offices are supportive. However, there is the need to involve both the political and technical leadership of each 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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