Mobile for Development Utilities

Improving water service delivery through mobile data collection

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Mobile for Development Utilities

The Mobile for Development Utilities Programme promotes the use of mobile technology and infrastructure to improve or increase access to basic utility services for the underserved. Our programme focuses on any energy, water or sanitation services which include a mobile component such as mobile services (voice, data, SMS, USSD), mobile money, Machine to Machine (M2M) communication, or leverage a mobile operator's brand, marketing or infrastructure (distribution and agent networks, tower infrastructure). The Programme receives support from the UK Government.

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The Innovation Fund

The Mobile for Development Utilities Innovation Fund was launched in June 2013 to test and scale the use of mobile to improve or increase access to energy, water and sanitation services. In two phases of funding, grants were competitively awarded to 34 organisations across Asia and Africa. Seed grants were awarded for early stage trials, Market Validation grants for scaling or replication of business models, and Utility Partnership grants to foster partnerships between utility companies and innovators.

The specific objective of the Innovation Fund is to extract insights from the trial and scaling of these innovative models to inform three key questions for growing the sector:

- How can mobile support utility services?
- For a mobile-enabled solution to be adopted at scale, what building blocks are needed?
- What are the social and commercial impacts of delivering community services to underserved mobile subscribers?

These insights, as well as grant-specific learning objectives, are included in individual case studies such as this one, as well as thematic reports that will be published throughout 2015 and 2016.

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Executive Summary

In 2015, 663 million people worldwide still lacked access to improved drinking water[1], in the form of piped or non-piped improved sources. Nearly half of those without improved drinking water, relying instead on sources such as unprotected wells or surface water, live in sub-Saharan Africa, while one fifth live in Southern Asia.

Reliance on unimproved water sources stems from two main challenges: lack of safe water supply and inefficient delivery of services to consumers. While the issue of supply has historically received the most attention from Governments and International Institutions, poor service delivery, referred to as the hidden water crisis[2], is just as detrimental to consumers and water service providers (WSPs) both centralised urban utilities and decentralised rural providers. This crisis results in high financial losses and leaves WSPs with insufficient funds to maintain infrastructure or improve operations, further perpetuating the water access gap.

As poor water service delivery is caused, in part, by the limited amount of information collected and shared on the service between the various stakeholders, WSPs are testing the use of mobile-enabled data collection to improve the delivery of water services, with the support of technology companies and Mobile Network Operators (MNOs). These solutions are in line with the United Nations' Sustainable Development Goal 6 to ensure water access to all by 2030, focusing on improving the efficiency of water services through better monitoring and management[3]. In this light, there is a strong opportunity for water stakeholders and their partners to develop innovative mobile solutions to improve water service delivery and reduce WSPs' losses.

Between 2014 and 2015, the GSMA Mobile for Development (M4D) Utilities Innovation Fund, with the support of the UK Government, funded three innovative projects tackling the issue of water service delivery by developing effective ways to collect and share information on the functionality and use of water services, where it had never been done before: NextDrop[4] in urban areas of Bangalore, India; Development Workshop Angola (DWA) in partnership with their technology partner; SeeSaw, in peri-urban areas of Huambo, Angola and Portland State University (PSU), with their partners SweetSense Inc.[5] and Living Water International[6], in two rural districts of Rwanda, Ruhango and Karongi. Based on the results of these pilots, this report highlights the ways in which mobile technology can be used as an efficient and adaptive tool to collect information and drive water service improvement (Table 1).

1. Piped water on premises is when there is a water connection located inside a user's home. Non-piped water sources are water taps or standpipes, tube wells or boreholes, protected dug wells, protected springs and rainwater collection. World Bank Joint Monitoring Programme, 2015 update http://www.wssinfo.org/fileadmin/user_upload/resources/JMP-Update-report-2015_English.pdf
2. GSMA blog, Water Voices: Aswanet on the concept of poor water service delivery and information problems, April 2014 http://www.gsma.com/mobilefordevelopment/programme/m4dutilities/water-voices-aswanet-on-the-concept-of-poor-water-service-delivery-and-information-problems/
3. United Nations Sustainable Development Goals, http://www.un.org/sustainabledevelopment/water-and-sanitation/
4. GSMA Mobile for Development Utilities, NextDrop Water.Simplified, http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2016/01/NextDrop-Water-Simplified1.pdf, January 2016
5. SweetSense is a private spin-off company from Portland State University's SweetLab
6. Living Water International is a non-governmental organisation providing water, sanitation and hygiene infrastructure, maintenance and training and operates in Rwanda under the authority of the Government of Rwanda's Ministry of Natural Resources.

GSMA M4D Utilities grantees

Over the period of their GSMA grant (2014-2015), NextDrop, DWA and PSU tested the use of mobile technology – from simple voice services to GSM-enabled sensors – to collect information in real (or near real) time on water consumption and water services' functionality in order to improve water delivery. Table 1 describes the actors directly involved in the grant, their solutions, the mobile technology used and the type of data they collected to inform service improvements.

TABLE 1

Mobile-enabled solutions to improve water service delivery

Water service provider	Technology provider	Country	Mobile technology used	Data collected	Purpose of data collection
Bangalore Water Supply and Sewerage Board (BWSSB)	**NextDrop (grant recipient)**	India	**Interactive Voice Response (IVR)[7]:** Valvemen report water supply time and valve ID to NextDrop. **Data:** Mobile application that detects location and valve status (open/closed). **SMS and voice calls:** To collect customer feedback on the service.	Water valve status: open/closed/broken Geolocation of consumers, linked to the stored map of valve areas	Ensure equitable distribution for a manually controlled, intermittent water supply through daily reporting by valvemen of the status of the water network. Notifying customers of water availability via SMS. Improve the reliability of water supply.
Development Workshop Angola (grant recipient)	**SeeSaw**	Angola	**SMS** to caretakers to prompt reporting, confirm received reports, and communicate about staff incentives. **Missed calls** to different numbers indicate variable water status of designated water point. **Mobile application** for DWA staff to review recent reports and update water point status while in the field.	Water point functionality Weather conditions: sunny, cloudy, rainy	Drive better water services in peri-urban and rural low income areas through caretakers' reporting on community water point functionality.
Living Water International	**Portland State University – SweetSense Lab (grant recipient)**	Rwanda	**Machine to machine communication:** 2G and 3G mobile network used to transmit sensor data.	Daily water pressure	Monitor remotely rural handpumps' functionality to alert maintenance staff in real-time of breakages and reduce downtime.

7. Interactive Voice Response (IVR) is a menu driven system that prompts and instructions are provided using recorded audio/voice clips. A user then responds as instructed in order to access further information. The final selection is either to listen to an audio recording or to receive an SMS.

Findings on mobile data collection for improved water service delivery

- The ubiquity of mobile coverage in the areas where the pilots were deployed made the use of mobile technology – from basic services (e.g. IVR) to more sophisticated GSM-enabled sensors – an attractive and available solution to collect information for data-driven operations;

- Manual mobile collection (e.g. WSP staff collecting information with a mobile app) will be cheaper in the short run, yet it involves substantial staff training and incentives to ensure data collection is timely and accurate. Remote mobile data collection (e.g. an infrastructure sensor sending data via mobile networks) may be more costly in the short run but could be a preferred choice depending on the context, notably in remote areas, to provide a system level view of operations, identify customer consumption trends and make predictions;

- While water service providers have been testing and deploying mobile solutions to improve the delivery of their services since the early 2000s[8], Mobile Network Operators are recent partners in the sector and both parties are identifying how to best work together; and

- As the sector matures, GSM-enabled sensors may be a gateway to a suite of mobile-enabled solutions and lead to broader partnerships between MNOs and WSPs.

8. GSMA Mobile for Development Utilities, The synergies between mobile, energy and water access: Africa http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2014/04/MECS_Synergies-between-Mobile-Energy-and-Water-Access_Africa.pdf, March 2014

1. Water value chain: Key stakeholders and new technology partners

The water value chain is complex, composed of several public and private-sector actors. Furthermore, every country has its own governance and institutional structures[9]. This complexity often leads to a lack of transparency and poor information transfer between stakeholders. Technology providers and MNOs are recent partners in the water sector, providing mobile services to improve data collection and analysis.

The State, responsible for setting the policies to ensure the delivery of general water services

The primary responsibility for the allocation and provision of water to the public, as a basic service and as a human right, lies with the State[10]. Its primary role is to set up local regulations, to decide on policy, to fix targets, budgets and priorities and to ensure that these services are delivered effectively to consumers[11].

Water service providers, public or private, responsible for delivering water services to the public[12]

While the State holds ultimate responsibility for the sustained provision of water and sanitation services, a number of stakeholders can take part in the implementation[13]. There are many different types of water service providers, public (from ministries to local government and municipalities) and private, or non-governmental, organisations. Often, the public gets services through several of these providers at the same time, for example when a public utility mandates another private provider to undertake part of the service. Private water service providers that are mandated by central and local governments serve less than 4% of the population in developing countries[14].

New partners: Technology providers and Mobile Network Operators, responsible for providing technology solutions to improve service delivery

Currently playing a small but growing role in the water value chain, technology providers and MNOs are just discovering the opportunity to support the delivery of water services. They could prove strong partners in the longer term, providing their expertise to develop smart, context-specific technology and help water service providers reduce their operational inefficiencies through advanced billing and customer relationship management services.

9. UNICEF, Accountability in WASH: Explaining the Concept, http://www.unicef.org/wash/files/Accountability_in_WASH_Explaining_the_Concept.pdf, January 2015
10. Ibid
11. AquaFed, Private Water Operators contribute to making the Right to Water & Sanitation real, http://www.aquafed.org/pages/fr/admin/UserFiles/pdf/2010%20CDA_RTWS_Aquafed-3.pdf, March 2010
12. Ibid
13. UNICEF, Accountability in WASH: Explaining the Concept, http://www.unicef.org/wash/files/Accountability_in_WASH_Explaining_the_Concept.pdf, January 2015
14. AquaFed, Private Water Operators contribute to making the Right to Water & Sanitation real. http://www.aquafed.org/pages/fr/admin/UserFiles/pdf/2010%20CDA_RTWS_Aquafed-3.pdf, March 2010

2. Access challenges and benefits of mobile data collection for improved water service delivery

Water stakeholders face various challenges, including non-revenue water (NRW), poor network maintenance and a culture not driven by performance; all of which can be addressed, at least in part, by the collection and analysis of data for better operations and data-driven decision making. Table 2 provides a detailed list of the challenges faced by stakeholders as well as the benefits of collecting data to best address these challenges.

Technology providers and MNOs are new partners in the sector and have their own stake in developing mobile tools to efficiently collect data for the benefit of WSPs, Government and consumers.

TABLE 2

Water access challenges and benefits of data to address these challenges, per stakeholders

Main stakeholders	Challenges	Benefits of data collection and analysis
Water Service Provider	• High non-revenue water levels, due to low visibility into the performance of the network; • Poor revenue collection due to poor billing processes and water users' unwillingness to pay for an unsatisfying service; • Ineffective or absent monitoring: ad-hoc approach with irregular visits and regular breakage with no repair; and • Weak local capacity to finance and implement repairs.	• Improved monitoring, reducing human error, reduced opportunity for fraud by collectors, preventing incomplete data collection[15]; • Cost savings in transportation and staff time; • WSP receives actionable data, in real or near real-time, and can as a result improve operations; and • Increased willingness of consumers to pay for an improved service.
Government	• Poor accountability on the use of funds by WSPs; and • Weak capacity to finance new infrastructure.	• Increased visibility on the use of their funds, through better monitoring of water services.
End user	• Due to unreliable service and intermittent supply, consumers revert to expensive or unsafe private water vendors; • Regular breakage with no repair; and • Inequitable distribution of water.	• More reliable service to consumers reducing need to rely on unsafe water sources.
New partners	**Challenges in creating a solution to respond to water access challenges**	**Benefits of providing data collection and analysis services**
Technology provider	• Manual data collection requires high level of agent training, buy-in and support from the government; and • Remote data collection requires robust technology, good mobile coverage and high level of technical specifications.	• Providing actionable data to WSPs and establish long-term contracts.
MNO	• To find new revenue streams, MNOs are looking at sectors that will benefit from their services, from simple voice to more revenue-generating M2M services.	• MNOs position themselves on a critical service for their consumers who will more likely be loyal to the MNO and potentially increase mobile usage; • New revenue-generating partnerships with water service providers; and • In the long run, there are further benefits as MNOs can provide more advanced solutions including mobile billing and open new revenue opportunities.

15. Plan International, Digital Data Collection In Plan: A review of current practice and lessons learnt, http://www.poimapper.com/assets/Digital-Data-Collection-in-Plan-A-review-of-current-practice-and-lessons-learned-web.pdf, March 2016

Benefits of data for improved water service delivery

NextDrop, PSU and DWA's pilots demonstrated the benefits of collecting and analysing data on network functionality and overall operations of water services for each actor of the value chain.

Benefits to water service providers: Timely and accurate data
Near real-time information on network functionality provides WSPs the visibility into operations needed to make data-driven decisions and reduce non-revenue water. As a result, both the service's quality and the customer's willingness to pay improves. As NextDrop's pilot highlighted, providing near real-time information of water valves' status to BWSSB and to consumers led to a stabilisation of supply timings and to a 90% reduction in complaints[16]. BWSSB was also able to better manage their staff through the monitoring of valve operations.

Benefits to the Government: Greater awareness and accountability
The ability for the Government to access information on WSPs' operations increases accountability of how public funds are spent, ensuring that the right services are being delivered with the public money invested. Moreover, as suggested by DWA's grant, by providing a better service to more consumers and earning more revenues, WSPs can become more financially sustainable and less dependent on national government subsidies.

Benefits to consumers: Improved and reliable service
Access to timely information on the status of water services (open, closed, broken) ensures a rapid response to technical issues and less downtime. In turn, consumers get informed rapidly of water availability. PSU's pilot project demonstrated that mobile-enabled sensors providing accurate and daily information on the functionality of water points led to a reduction of 64% in time to repair compared to the traditional model where water points were monitored randomly through car visits. Similarly, the NextDrop solution bridges the information gap by giving consumers 30 to 60-minute advance notice of water supply thus helping them better manage their daily routine.

Benefits to technology providers: Developing a commercially viable solution
Innovative technology providers, such as NextDrop and SweetSense, are proving the viability of their business models, offering water service providers and governments a valuable service that they are ready to pay for. Providing a reliable service to consumers can trigger a virtuous cycle of better cost-recovery for WSPs, who are encouraged to further invest in monitoring and maintenance solutions.

Benefits to MNOs: Providing a relevant and innovative service to their customers
MNOs can position themselves as innovators, providing network and technology services to WSPs and helping improve consumers' access to essential daily water services[17]. In the medium to long term, MNOs can deliver a suite of more advanced services, such as mobile bill payment and develop new revenue streams through these partnerships.

16. GSMA Mobile for Development, NextDrop: Water Simplified, http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2016/01/NextDrop-Water-Simplified1.pdf, January 2016
17. University of Oxford, http://www.smithschool.ox.ac.uk/library/enterprise-management-strategy/Mobile%20Water%20Payment%20Innovations.pdf, 2012

3. The use of mobile: manual or remote mobile data collection

As outlined, access to data, such as information on functionality of the water pump or customers' geolocation, has widespread benefits for every stakeholder involved in the delivery of water services. The question that remains for WSPs interested in testing these mobile-enabled solutions is to decide how to collect the information: manually with a mobile device, using SMS, calls or mobile apps as done by NextDrop and SeeSaw, or remotely through GSM -enabled sensors, as done by PSU. Comparing these three projects provides insights into the advantages and disadvantages of both modes of data collection.

Manual mobile data collection: NextDrop and Development Workshop Angola

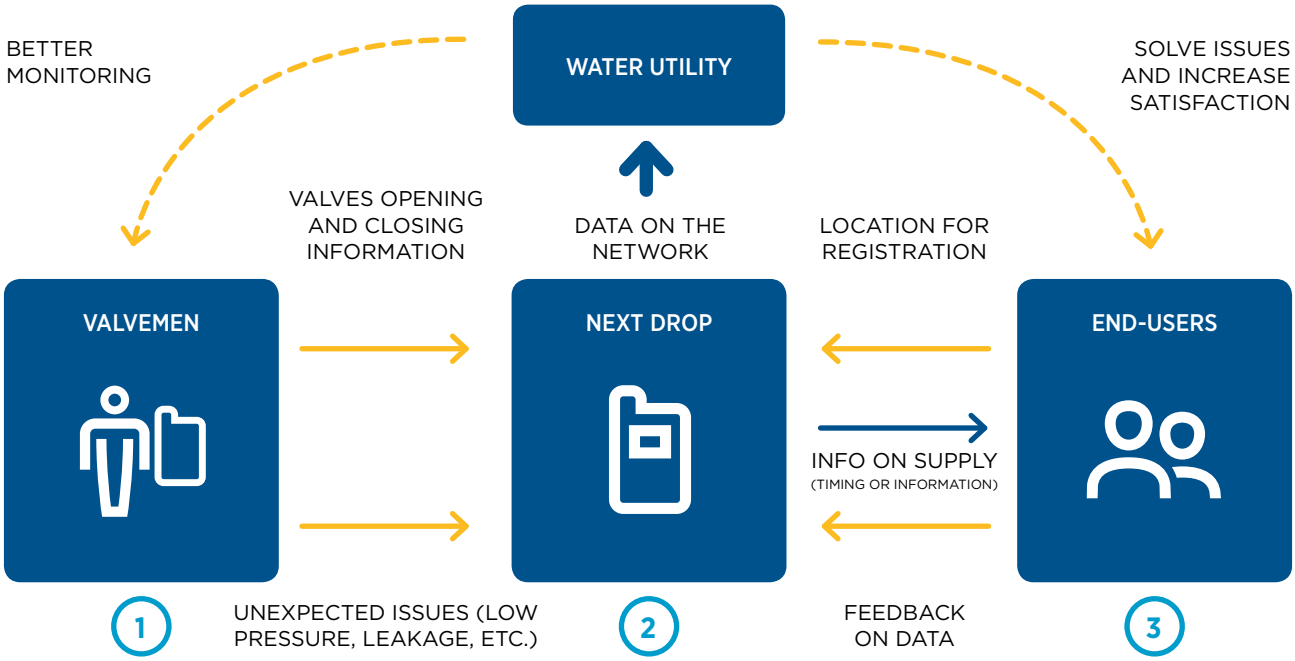
NextDrop and DWA used basic mobile services to collect geolocated data on the status of water points (open, closed, broken) respectively in urban areas of Bangalore, India and Huambo, Angola.

NextDrop

As Figure 2 shows, information is manually collected – either via IVR or a mobile application – and sent to the NextDrop server to create an SMS alert for registered customers.

FIGURE 2

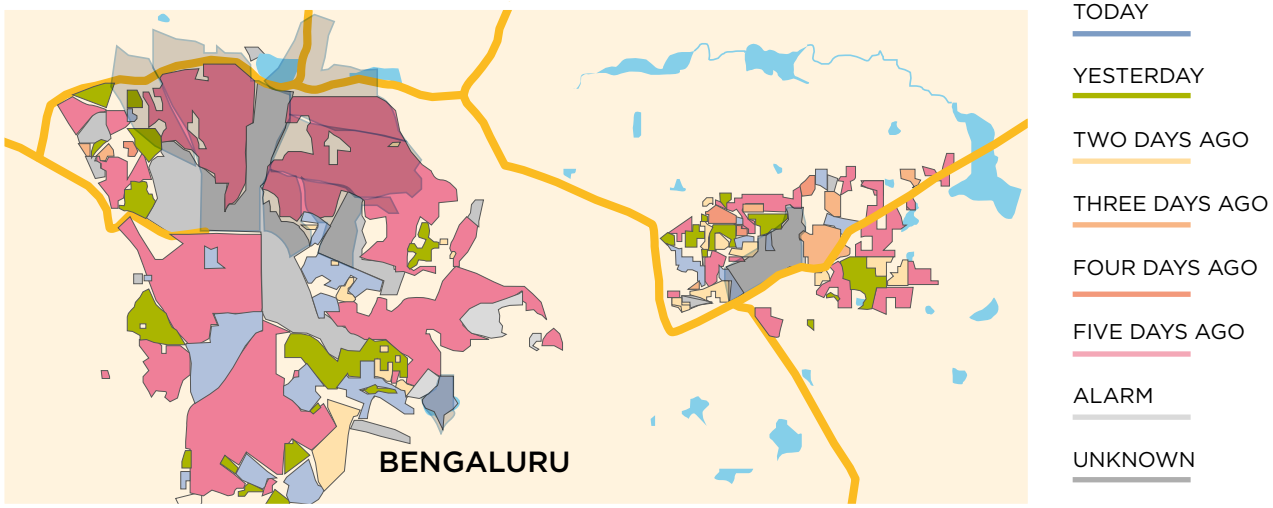
Data transferred through NextDrop's service



The NextDrop server uses a stored mapping of valve areas (Figure 3) to direct SMS alerts to the appropriate set of consumers. All the information that NextDrop gathers is aggregated, analysed and available near real-time through interactive maps and dashboards to BWSSB officials. Moreover, NextDrop presents the most important findings to BWSSB officials at monthly meetings.

FIGURE 3

Screenshot of a live water supply map



DWA – SeeSaw

Figure 5 illustrates SeeSaw's SeeTell and SeeView services provided to DWA. The SeeTell system enables community-nominated water point caretakers, equipped with a simple phone, to report on the status of the water point. The caretakers make missed calls to one of three unique phone numbers for their water point that correlate to the different status options: functioning, functioning but with some problems and not functioning. The SeeSawSend server analyses the missed calls to display the water point status so that DWA can make the necessary repairs and investments. SeeView is the mobile application that allows field staff, equipped with smartphones, to view and update the water point status in the database.

FIGURE 5

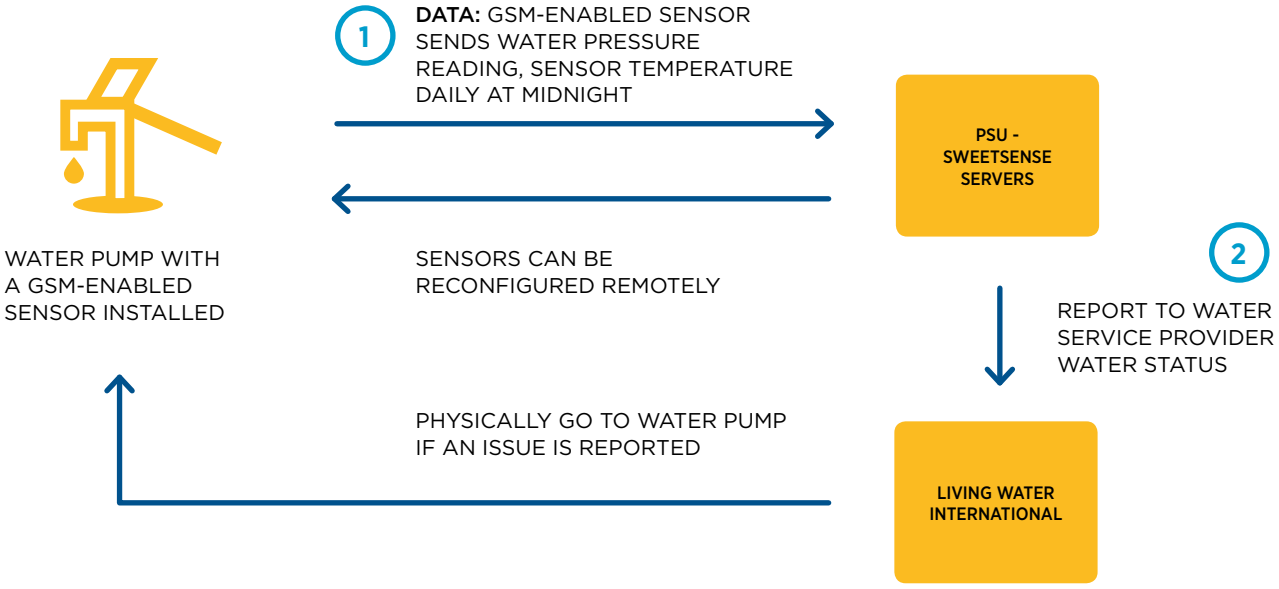
Data transferred through SeeSaw's service

Remote mobile data collection: Portland State University

SweetSense Inc., PSU's partner, developed GSM-enabled sensors for Living Water International, an NGO and WSP, to remotely monitor their water handpumps in two rural districts of Rwanda. The sensors send data at midnight every day, through GPRS, on the functionality of the pump (e.g. water pressure) back to their server. There is no need for human interaction unless data reveals a fault in the pump that needs repair, in which case an alert is triggered for LWI to respond to. The sensors can also be reconfigured remotely via GPRS.

FIGURE 6

Data transferred remotely through PSU- SweetSense's service

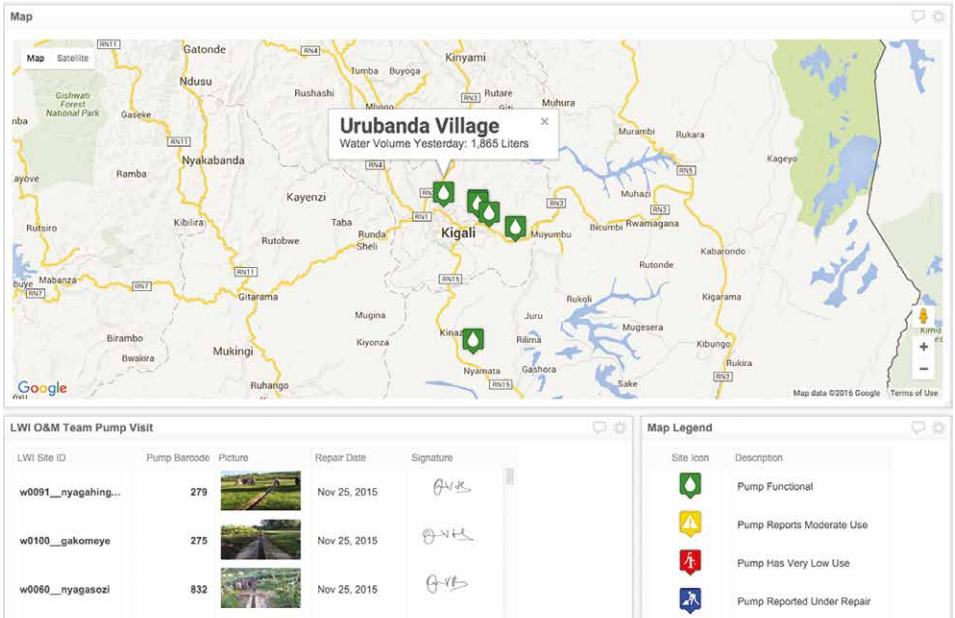


The dashboard (Figure 7) displays sensor status. If sensors do not report any data for seven days, the handpump is given a status "sensor fault" to indicate the sensor requires inspection and/or repair.

Data from pump and sensor maintenance teams is integrated such that any maintenance activities changes the pump status to "under repair".

FIGURE 7

Sensor dashboard displaying sensor status



Cost-benefit analysis of remote versus manual mobile data collection

Deciding on manual versus remote mobile technology to collect information requires a comprehensive assessment of the requirements of WSPs and the environment in which they operate. Therefore, the cost-benefit analysis of using one technology over the other must be done on a case by case basis. While they may not provide universal evidence, the three grant projects reviewed bring to light some of the elements to consider when making the decision of which technology to use.

TABLE 4

Manual or remote data collection: benefits and key challenges

	Manual data collection (SMS, IVR, voice, mobile app)	Remote data collection (mobile-enabled sensors)
Benefits	Less costly upfront technology than GSM-enabled sensors.	Reduce costs in terms of human error and need for agents to do readings and collect data.
		Improved monitoring and maintenance of infrastructure.
Key Challenges	Literacy and technical literacy of the agent.	High level of technical specifications.
	Consistency of data, human error.	Need for robust hardware to resist heat and water.
	Incentivising agents to learn how to collect data through the mobile phone and to do it regularly.	Added cost of smart technology, including the GSM modem as well as maintenance cost of having a local technical team available.

Manual mobile data collection

In the short term, it is cheaper to equip WSP agents with mobile phones than to use connected sensors to collect data. However, the experiences of DWA and NextDrop highlight that there are many challenges. Incentivising water agents to ensure they report information accurately and on time is one of the toughest challenges for WSPs that are upgrading their processes to include better monitoring solutions. For example, DWA's caretakers who reported regularly were rewarded with entry into a lottery for free airtime. However, only 15-22% reported regularly, up to 55% never reported, and the remainder reported intermittently. Beyond this challenge, agents need to be trained to ensure that they know how to collect the data and enter it on their phones.

While a simple reporting solution (such as a missed call) could imply a faster uptake and shorter training, the quality of the information can suffer. On the other hand, agents using smartphones might be doing so for the first time and may fear damaging or losing it, hindering its use as happened at the beginning of NextDrop's pilot.

Education, training and incentives are therefore crucial to ensure adoption of the mobile solution and regular reporting by the agents.

Remote mobile data collection

The cost of sensors is often higher than the labour costs in emerging markets; therefore, the benefits of using connected technology will be weighed against the costs of upgrading to and integrating this type of solution. PSU's analysis of the results of their pilot, deploying GSM-enabled sensors to improve water supply and maintenance of water pumps in rural areas of Rwanda, suggest that the cost of the technology (sensor hardware costs of USD 500 over 2 years) is equivalent to the cost of a traditional maintenance model when the resulting level of pump functionality is considered[18].

Moreover, in the medium term, PSU estimates that the costs of an automated model should eventually be less than a traditional one as costs of the hardware is likely to decrease and maintenance staff only go out in the field when needed[19].

18. 19. GSMA Mobile for Development Utilities, Portland State University: GSM-enabled sensors for monitoring handpumps to improve water services in Rwanda, http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2016/03/M4D-Utilities-Portland-State-University-Case-Study.pdf, March 2016

4. Lessons from partnerships

The Government, technology and financial partners are essential to help WSPs improve their operations. The Government is most often WSPs' main partner, if it is not leading the service itself. However, collaboration can prove difficult as these two actors move at different speeds and have distinct mind-sets. Partnerships with MNOs are currently less common, as the usage of mobile to improve delivery of services is more recent in the water sector, but can be very valuable.

Improving partnerships with the Government

Governments are essential partners, providing financial and regulatory support to water service providers in both centralised and decentralised models. Yet, working with them can prove difficult, due notably to slow processes and structures. For example, despite BWSSB initial eagerness to partner with NextDrop, the government of Bangalore's eligibility criteria to apply for government contracts were difficult for NextDrop to meet and slowed down the collaboration process. In view of the three grantees' experiences, it was apparent that the governments needed to shift toward a more performance-driven approach as well as learn how to incorporate data into their operations and planning.

Despite these challenges, NextDrop's project has been successfully extended through a commercial contract as the BWSSS embedded their service into their operations.

NextDrop is also evolving as a business to include new opportunities such as working directly with apartment complexes to help make sure they do not run out of water. Using GSM-enabled sensor technology, NextDrop will provide residents with water monitoring and alerting systems to avert water shortages in both short term and long term, eventually helping residents take control of their own water supply.

Partnering with Mobile Network Operators

When using basic mobile services to collect data – as done by DWA and NextDrop – technology providers did not enter into formal partnerships with Mobile Network Operators. PSU, on the other hand, developed a partnership with MTN Rwanda that provided SIM cards, at no cost, to enable M2M communication for the remote monitoring of handpumps. As technology providers develop more advanced mobile solutions for data collection, partnering with MNOs will facilitate technology upgrades in the long run.

The opportunity for partnership is strongest at the business-to-business levels, where MNOs can deliver a full end-to-end service to WSPs, bundling GSM-enabled data collection with other solutions such as bill payments through mobile money. As the use of mobile technology to improve efficiencies continues to be tested and proven, partnerships with MNOs have the potential to grow.

5. Funding innovative solutions for improved water service delivery

Testing innovative solutions requires initial funding in order to develop the proof of concept and commercial viability. The question of who pays for the service is critical, especially in the water sector, as consumers are not always accustomed to paying for water.

NextDrop experimented with having consumers pay for monthly subscriptions of INR 20 (or USD 0.32[20]) for water supply alerts but moved away from this model as the cost of collecting payments was higher than the revenues. NextDrop then looked into different revenue streams, such as having large corporations pay for co-branding rights and the centralised utility pay for the service. Similarly, DWA's business model proposes to have the Government pay a fee for their information service based on the number of stand pipes benefiting from it, however getting government funds committed to the maintenance of the service has proven a struggle.

PSU had originally envisioned that it would become a service provider to the Government of Rwanda, that would pay an annual USD 100 service fee to access the data and dashboard. While the Government has been very engaged and enthusiastic about this project, incorporating these services' fees into the national budget takes time.

As an alternative source of revenue, PSU also works with international development organisations, such as Mercy Corps and the Millennium Water Alliance, to replicate the service. As a result, they have altered their business model to focus on a "Sensors as a Service" offering and to prioritize programme design and decision aids over mass production of sensors. Subsidies from governments or donors for maintenance could also be disbursed based on proof of performance through sensor data on uptime. While PSU believes that consumers would be willing to pay for reliable services, user fees in rural areas are unlikely to cover the full maintenance cost.

20. Values in INR converted to USD using an exchange rate of INR 1= USD 0.0159, the average exchange rate for December 2014 obtained from the OANDA Online Currency Converter

The role of grant funding

Grants to fund projects that have not yet proven the commercial viability of their solutions provide a critical financial support to test the business models. This is particularly important in the water sector that is at an early stage when it comes to the use of mobile technology to improve supply and service delivery.

There are innovators in the sector who have taken on the challenge and are finding financing solutions to make the services affordable to their consumers, for example through micro mobile payments, but funding to support these pilots is necessary and lacking. The Stone Family Foundation that has dedicated a large amount of its funding to the water and sanitation (WASH) sector explains the challenges that the sector faces in its "10 lessons from funding market-based approaches in water, sanitation and hygiene"[21], comparing it to the more mature energy market: "Finance is needed for any enterprise or sector to grow—especially in capital intensive sectors such as water and sanitation.

However, social and commercial finance has been slow to take off in WASH compared to other sectors such as energy and agriculture. This is partly because many market-based approaches in WASH are at very early stages and are a long way from being able to deliver payback on investment.

The cost of building demand for WASH—and changing behaviour—is a particular challenge to reaching breakeven. As a result, many WASH enterprises do not look very attractive to investors—other than the most socially-motivated who are willing to take a high risk with their capital."

For the sector to flourish, there is a need for multiple sources of funding, especially those with fewer restrictions and higher risk appetite.

21. The Stone Family Foundation, "How to spend a penny: 10 lessons from funding market-based approaches in water, sanitation and hygiene". https://improveinternational.wordpress.com/2014/06/19/10-lessons-about-wash-from-the-stone-family-foundation/, June 2014

Conclusion

Accurate and timely information on water services' efficiency, infrastructure's functionality and consumers' water consumption is key for water providers to ensure a sustainable and efficient service. Following its grant, NextDrop won the tender to scale its service to all of Bangalore in 2015. PSU secured further funding from the Government of Rwanda to continue developing and testing their sensors in different areas of Rwanda. DWA is scaling their project from Huambo to the capital of Angola, Luanda. These three projects expanding to new areas is a testament to the importance of data to help improve water service delivery and efficiency.

While these projects present two different ways to collect data - manually or remotely - using mobile technology, the question that remains is whether automated remote collection is the way forward, as costs of connected sensors go down. The likely answer is that it will depend. There are various criteria to take into account, including the setting, urban or rural, to make sure the use of mobile is sustainable. Technology providers and MNOs will be critical partners as more advanced technology is trialled further and implemented by water service providers to address some of their service delivery inefficiencies.

In the long run, MNOs can become strong partners beyond the provision of technology, offering their expertise in terms of customer relationship management or mobile billing. In turn, these collaborations would ensure MNOs' relevance to their customers as well as give them a role to play in supporting national and worldwide objectives to improve access and delivery of water services.

For water service providers to effectively deliver, daily, their services to consumers, the broader ecosystem – starting with the Government but also private sector actors- need to come together to better serve consumers and reach half a billion more people who currently lack access to water services. In an effort to continue uncovering the opportunity for mobile to support the delivery of essential utility services to underserved populations, the GSMA Mobile for Development Utilities programme is currently funding seven projects focused on water access in Sub-Saharan Africa.[22] The lessons learnt will be shared as these funded projects come to a close in 2017.

22. GSMA Mobile for Development Utilities, Catalogue of Grantees, http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2015/12/GSMA_Mobile_for_Development_Utilities_Programme_Catalogue_of_Grantees.pdf, December 2015

For more information on the Mobile for Development Utilities programme visit:
www.gsma.com/mobilefordevelopment/programmes/m4dutilities

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