



## How can ICT initiatives be designed to improve rural water supply?

Around the world today, more and more people have access to water supplies. But making sure that these supplies are sustainable is still a problem. To try and solve this, some new initiatives are using information and communication technologies (ICTs) to try and improve the way that water supplies are monitored and maintained.

How well does using ICTs work? Making All Voices Count supported research into two water supply projects using ICTs. It found that using ICTs can make water supply more efficient, but that this only works well when ICT design takes local context and existing reporting systems into account. In Timor Leste, one factor in the success of the water monitoring system was that it integrated electronic and paper-based reporting. In Uganda, an ICT-based monitoring system was much less successful because it used a technology that local people were not comfortable with.

ICTs on their own are not enough to make water supplies more sustainable. This needs wider reform efforts that depend on the social, political and economic forces that shape the way services are provided.

## Research findings

### 1. The Mobile for Water (M4W) project in Uganda

The Mobile for Water (M4W) project was piloted in eight districts in Uganda between 2011 and 2014. It was implemented by a consortium of SNV, IRC/Triple-S, Makerere University, WaterAid and the Ministry of Water and Environment. M4W was designed to tackle the problems of poor communication and slow information flow between community and district stakeholders which leads to delays between the identification and repair of faulty water points. It aimed to provide an efficient mechanism for communities to report hand-pump breakdowns to their mechanics, and for local

governments to check that mechanics had responded and carried out repairs. This was intended to reduce the time for which water points were not functional.

M4W was designed so that, when there was a problem with a water point, the water user sent a text message to the M4W system to report it. This SMS was automatically sent to the relevant hand-pump mechanic's phone and to the District Water Office through an online system, accessed by computer. The hand-pump mechanic was responsible for the repair, and the District Water Officers were responsible for keeping track of the reports, using the M4W website to ensure that repairs were carried out.





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### Lessons from the M4W initiative

The M4W initiative, through the initial baseline study, enabled the District Water Office to identify 400 previously unknown water points in Kabarole district. Adding them to the 1,700 water points already registered helped the district government to **improve their information systems and their annual reporting of water coverage and functionality** to higher government administration. However, the M4W initiative did not succeed in increasing functionality or reducing downtime of water points in the district during the three-year pilot phase.

Key barriers to success included:

- **The design of the initiative was not well-tailored to the local context.** M4W's reliance on SMS turned out to significantly hinder uptake by local water users and user committees. Local people preferred a direct phone call to their hand-pump mechanic to report a breakdown over an SMS, because it was easier to explain the problem in detail, agree a convenient time and set out a programme of action for repair. Compared to making a call, SMS is not instantaneous. When water-user committees sent an SMS, they were not sure whether the hand-pump mechanic had received it, and then had to wait for the mechanic to call in order to agree next steps. Water-user committees therefore reported that M4W made contacting mechanics more complicated.
- **The initiative was not embedded in the district government's reporting systems** and staff lacked capacity to use it effectively. Hand-pump mechanics did report feeling a greater sense of accountability for responding quickly to breakdown reports because of their awareness that the District Water Officer could track their response times on the online system. But the District Water Officer stated that neither he nor his staff checked the M4W system regularly and were therefore not holding the mechanics to account for responding to reports.
- The Ministry of Water and Environment **had not integrated M4W into the national reporting system**, and hence

the District Water Office did not need to use it to report to the national level. Without instructions from the Ministry to use the M4W system, district staff could not allocate time or resources to prioritise it, even if they saw its potential benefits.

- If a required repair is considered to be major, then local government is supposed to provide financial support to carry it out. However, only 11% of the Ministry of Water and Environment's district funds were allocated to operation and maintenance in 2015, and these were reserved for specific repairs. This meant that the District Water Office could not **react quickly to major repair requirements identified through the M4W system**.

## 2. SIBS in Timor Leste

Sistema Informasaun Bee no Saneamentu (SIBS) is the national water and sanitation monitoring system in Timor Leste. It aims to improve water supply and sanitation monitoring and planning by sub-district, district and national government. Every three months, village-level data on water supply coverage and functionality are collected by district government staff. SIBS covers all rural villages in Timor Leste, including those not yet connected with water supply services.

SIBS was developed in 2010 and transitioned to full use of mobile phone technology in 2012. The data it collects are based on

consultation with local political leaders (Aldeia Chiefs) and sent using SMS via mobile phones to a central national database. Rather than enabling water users to report faults, as in the M4W case, the data collection system enables government staff to monitor the coverage and functionality of water services in rural areas, and to track this as it improves or worsens.

### Lessons from the SIBS initiative

- The initiative was **well-designed for the context, helping to reduce the burden of data collection**. All SIBS data are based on reports from the lowest administrative level, rather than the individual water point level, which sets the system apart from many other rural water supply monitoring systems. Often the procedures required to keep a database of individual water points up to date are beyond the capacities and resources of district governments. The SIBS approach of updating community profiles reduces the reporting burden, which may be a significant factor in sustaining data collection.
- The data collector position is an **established element of the sub-district governance structure, a salaried and secure job**, so data collection does not rely on voluntary reporting by community members or water-user committees. This may be a significant contributing factor to ongoing information updating; it may also create a sense of responsibility amongst data collectors and assures high-quality data.

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- **Data collection has continued even when ICT reporting methods fail.** The ICT component has been used to send information quickly from the districts to the national database, but technology failures – such as lost or broken phones not being replaced – often happen. The SIBS initiative therefore uses a combined approach in which paper reports are also sent to the national level. This has helped to ensure regular flow of information even when technology fails.
- However, the **design of the data collection system leads to questions about data accuracy and representativeness.** Information on water supply services is provided verbally from the lower government administrative levels and is recorded on paper at the sub-district level. The data collectors do not visit the communities to assess and record the status of services directly, but instead talk to the Aldeia Chiefs to complete the data collection forms. Data collectors do not undertake spot-checks to ensure the information provided by the Aldeia Chiefs is correct. Because all data collection relies on verbal communication with local political leaders, there is no way of knowing how fairly these reports represent all community members, so the accuracy of the SIBS data remains uncertain.
- **The SIBS monitoring data are sent back to districts in an inaccessible format.** The SIBS database is not available in the district. Instead, a CD is sent to each district containing a large amount of information (over 1,100 files) and maps in a software that none of the government staff interviewed were familiar with. This makes it hard for district government staff to access and use the monitoring data.
- The initiative **failed to link regular monitoring information to service improvements**, which hindered motivation amongst those involved. There is no formal mechanism for using the data at the district level, either for operation and maintenance or for extending services. This means that data collectors can find themselves repeatedly returning to the same areas to collect data about the same faulty water points. In such cases, where no improvements have been made to the services, there is little motivation to keep going back.

## Recommendations for governments and organisations planning to develop ICT initiatives to improve sustainability of rural water supply

From the two case studies above and the wider research carried out into ICT projects for improving the sustainability of rural water supply and beyond, we conclude that:

While ICTs can make a technical contribution to improving water supply breakdowns, their introduction seldom makes government representatives or service providers more accountable to water users. ICT initiatives in the sector should be designed and delivered to integrate with and support wider service delivery reforms for improving water supply functionality.

**1** **When designing an ICT initiative, it is crucial to extensively analyse the context in which it will be introduced, to ensure that the ICT is relevant.** Whilst initiatives that rely on user-led reporting may work in urban contexts with good mobile phone access, reliable network coverage and users who pay for their water service through billing, they are much less likely to work in remote, rural areas with less mobile

phone ownership, poorer network access and community-managed water points. It is also necessary to ensure that the ICT initiative is tackling an existing problem with the rural water supply system. In the case of M4W, community members did not perceive any prior problem in their communication with hand-pump mechanics about breakdowns, and hence did not see any added value in taking up the initiative.

**2** The design of the ICT system needs to be relevant to those who are managing the water system and the individual water points on a day-to-day basis. This includes ensuring that water users and the committees responsible for managing water points are not excluded or voiceless within the initiative. ICT initiatives should be designed to amplify and respond to the needs of water users, and to improve relationships of accountability between them, their local user committees and the authorities responsible for supporting them.

**3** The technology chosen and the method of reporting used should be appropriate to the local context and to those who are expected to use it. The design of the M4W initiative did not conform to the way local people communicate in rural Uganda. By using the unfamiliar format of an SMS, the M4W initiative hindered communication between water-user committees and mechanics, and excluded the most marginalised from reporting. Compared to that, in SIBS, the easy-to-use reporting formats on simple phones, and the integration of electronic and paper-based reporting, were key to its continued and widespread use.

**4** Whilst many ICT initiatives focus on data collection, it is important to remember this data needs to be processed, analysed and used in order to actually improve water service delivery. The designs of many ICT initiatives focus only on the technology, rather than looking at how the data collected through that technology will be used. In the case of SIBS, the data collected were not adequately linked to service improvements, which decreased stakeholder motivation. Similarly, the data collected through the M4W initiative were not being used by district governments for reporting to the higher government administration, or for planning and budgeting for rehabilitation at the district level.

**5** It is necessary to embed ICT initiatives into existing models or reform efforts for delivering and sustaining water supply services. The case studies show the importance of institutionalisation. Data collection has been more successfully sustained in the SIBS initiative because professional, paid government staff undertake data collection, rather than relying on hand-pump mechanics or citizens as is the case with M4W.

## Further reading

Welle, K.; Williams, J. and Pearce, J. (2016) 'ICTs Help Citizens Voice Concerns Over Water – Or Do They?' *IDS Bulletin* 47.1: 41-54

Welle, K.; Williams, J.; Pearce, J. and Befani, B. (2015) *Testing the Waters. A Qualitative Comparative Analysis of the Factors Affecting Success in Rendering Water Services More Sustainable Based on ICT Reporting*. Brighton: Making All Voices Count. <http://www.makingallvoicescount.org/project/closing-the-knowledge-gap-in-using-icts-to-improve-rural-water-supply-sustainability/> (accessed 4 March 2016)

Carlitz, R. and McGee, R. (2013) *Learning Study on 'The Users' in Technology for Transparency and Accountability Initiatives: Assumptions and Realities*. Brighton: Institute of Development Studies and The Hague: Hivos. <http://www.ids.ac.uk/publication/learning-study-on-the-users-in-technology-for-transparency-and-accountability-initiatives-assumptions-and-realities> (accessed 4 March 2016)

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