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Contents

ICTs Help Citizens Voice Concerns over Water – Or Do They?

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Abstract Information and communications technologies (ICTs) are widely seen as a new avenue for citizens to hold service providers and government to account. But if citizens live in rural Africa, Asia or Latin America, are they able and willing to report on service delivery failures? And are service providers or government officials willing to listen and respond? We explore these questions using an analysis of recent ICT reporting initiatives to improve rural water sustainability. The findings demonstrate that models where a service provider is committed to responsiveness and designs an in-house fault-reporting and maintenance system show greater responsiveness and accountability to users than crowdsourcing models where users are encouraged to report faults. This raises the question of whether ICT is transformative, or whether service improvement simply hinges on making service provision designs more accountable.

1 Introduction

A key challenge in the rural water supply sector is to render existing water services more sustainable for citizens. Current data suggest that across sub-Saharan Africa, over a third of rural water supply systems are in disrepair. There have been many attempts to enhance sustainability through increased accountability. In the last decade, information and communications technologies (ICTs) have become more prominent as a way of encouraging citizens to report on broken-down water points, thereby increasing repair rates. While some of these initiatives are well documented, there has not yet been a systematic analysis of the potential role of ICTs in enhancing service sustainability, or of the specific factors that inhibit or facilitate such changes. This article, based on research funded under Making All Voices Count (MAVC)[1] and carried out by WaterAid, the International Water and Sanitation Centre (IRC) and Itad, intends to contribute to closing this knowledge gap. We argue that ICTs do not necessarily increase accountability, but are rather a means to an end; whether accountability and sustainability are improved depends on who deploys ICTs, and how.

We review the literature on the potentials and pitfalls of ICTs in improving the accountability of service delivery in international

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development, before presenting the specific context of rural water supply, the problems of making services more sustainable, and the current enthusiasm for using ICTs to achieve this. Our key findings are based on a comparative analysis of eight ICT initiatives which shows what facilitates or inhibits successful repairs based on ICT reporting. These findings are complemented with in-depth analysis of one case study, the Mobile Phones for Water (M4W) initiative in Uganda, which examines how a newly introduced ICT-based reporting system changed local accountability dynamics. We conclude that crowdsourcing may not be the most appropriate route to social accountability in rural water supply, that social accountability mechanisms are unlikely to address flaws in existing service delivery models, and that ICTs may be overrated as a 'silver bullet' for increasing responsiveness and accountability in service delivery.

2 ICTs in the quest for improving social accountability in service delivery

In the area of service delivery, the 2004 World Development Report *Making Services Work for Poor People* (World Bank 2003) has shaped the way we frame accountability relations between citizens, service providers and policymakers. It suggests two avenues for increasing accountability in service delivery: the 'short route' of direct interaction between citizens and providers to improve services, and the 'long route' of citizens putting pressure on policymakers who influence service delivery. In this context, the term 'social accountability' refers to 'the set of tools that citizens can use to influence the quality of service delivery by holding providers accountable' (Ringold *et al.* 2012: 7), and the responsiveness of policymakers and providers towards citizens. It includes interventions to inform citizens about the services they are entitled to, and interventions to enable citizens to report and redress their grievances if things go wrong.

The use of ICTs has transformed communications. Between 2000 and 2012, mobile phone penetration has grown rapidly across the world, with the highest growth rate –from 1 per cent to 54 per cent – registered in sub-Saharan Africa, the region with the lowest penetration rate (GSMA 2012). This increase notwithstanding, mobile phone access varies widely between countries, and network connectivity remains problematic, particularly in remote, rural areas.

Scholars disagree over the potential for more accountable governance provided by new technological possibilities (Fung, Gilman and Shkabatur 2013). While technology-focused scientists highlight the transformative power of new technologies for democracy, political scientists are more sceptical, drawing attention to underlying incentive structures and the role of institutions in influencing how transformative ICT innovations can become in opening up existing social accountability mechanisms. Incremental models of ICT engagement are seen as more likely to lead to transformative changes in politics (Fung *et al.* 2013). In a similar vein, scholars who investigate the role of

ICTs in the governance of service delivery are cautious about equating technology with greater transparency and accountability (Avila *et al.* 2010), and call for a better analysis of the underlying factors affecting political changes (Bailur and Gigler 2014).

3 Social accountability in rural water supply

A key challenge in rural water supply is the number of water points that quickly fall into disrepair. While access to water supply has increased considerably over the last 20 years, now covering 89 per cent of the world population (WHO/UNICEF 2014), approximately one third of rural water supply systems in sub-Saharan Africa are non-functional at any given moment (Foster 2013; Rural Water Supply Network 2009).[2] The reasons for this are manifold (Harvey and Reed 2004; WaterAid 2011), but a key factor is the prevailing service delivery model of community-based management, under which most rural water supply infrastructure is provided by national governments, donor organisations and non-governmental organisations (NGOs), but subsequent management is the primary responsibility of the users (Lockwood and Smits 2011).

The water sector, traditionally dominated by a focus on technical solutions, has witnessed growing concerns about governance as key to improving services (Plummer and Slaymaker 2007). While some early discussion of water sector governance did not progress beyond establishing basic principles (Rogers and Hall 2003), other contributors explicitly drew attention to unpacking the politics of service delivery (Cleaver and Franks 2008) and tabled the lack of accountability and responsiveness to citizens (Tropp 2005) as a key obstacle. Increased attention to water sector governance is reflected in the growing use of social accountability mechanisms[3] to hold governments to account (Velleman 2010) and the introduction of conceptual frameworks for analysing accountability relations and governance failures (Jacobsen *et al.* 2013; Plummer and Slaymaker 2007). Despite growing interest in social accountability tools, their impact is not yet well understood; Joshi's (2013) review of transparency and accountability across different service delivery sectors finds mixed success.

In the water sector, there is strong enthusiasm for using ICTs to facilitate a wide range of service-related activities. Innovations range from using ICTs for inventories and infrastructure monitoring, to monitoring and reporting on service provision, billing and payment systems (CoWater International and University of Cape Town iComms 2014); the potential for using ICTs to improve governance and accountability is also widely discussed (Dickinson and Bostoen 2013; Hutchings *et al.* 2012; Pearce, Dickinson and Welle 2015; Pearce, Welle and Dickinson 2013).

On the ground, ICTs are increasingly explored as an avenue for citizens to receive information about services and to report service delivery failures, using technologies including community radio, short message services (SMS), mobile-based calls, mobile phone applications, websites and interactive mapping. However, there are still technical barriers for

mobile network access in rural areas, meaning that mobile networks are periodically down, or that people need to travel to connect (Dickinson and Bostoen 2013). Furthermore, some caution that the political space provided for citizens to hold policymakers to account via ICTs may in reality be limited, and be strongly dependent on the wider political context (Wesselink, Hoppe and Lemmens 2015).

So what really is the potential of ICTs for improving social accountability between citizens, service providers and policymakers? To help answer this question, we present findings from comparative analysis of ICT-based reporting mechanisms in improving the sustainability of rural water services, and a case study that examines how the introduction of an ICT-based reporting system in Uganda affected social accountability dynamics between users, local handpump mechanics and government staff in Kabarole District.

4 Findings from comparing eight ICT initiatives

Our study compared eight ICT initiatives from an original list of over 50.[4] The eight cases, summarised in Table 1, all aim at improving water service sustainability. Two (Sistema Informasaun Bee no Saneamentu (SIBS) in Timor-Leste and Re-imagining Reporting in Bolivia) target sector budgeting and planning rather than specific water scheme repairs, while three others cover urban rather than rural users. The scope of the initiatives varies widely – from 50 water kiosks in one town, to a whole country. The initiatives also differ in their ICT-based reporting methods: while several rely predominantly on crowdsourcing – water users or their representatives sending failure reports – others rely on either the service provider, government or NGO staff collecting data on a regular basis.

Table 1 Key characteristics of ICT initiatives

Initiative	Rural/urban	Crowdsourcing or led by government, NGO or service provider	Data collected periodically or related to specific incidents	Scope
M4W, Uganda	Rural	Crowdsourcing	Specific incidents	Eight districts
MajiVoice, Kenya	Urban	Crowdsourcing	Specific incidents	Two cities
Maji Matone, Tanzania	Rural	Crowdsourcing	Specific incidents	Three districts
Next Drop, India	Urban	Crowdsourcing	Specific incidents	Three cities
SIBS, Timor-Leste	Rural	Government-led	Periodically	National
Re-imagining Reporting, Bolivia	Rural	NGO-led	Periodically	Six municipalities
Human Sensor Web, Zanzibar	Urban	Crowdsourcing	Specific incidents	50 water kiosks in one town
Smart Handpumps, Kenya	Rural	Service provider-led	Periodically	66 handpumps in one district

Source Welle *et al.* (2015).

Table 2 Scoring outcomes of the ICT initiatives

	Smart Handpumps	M4W	Maji Matone	MajiVoice	SIBS	Re-imagining Reporting	Next Drop	Human Sensor Web
Outcome 1: Successful ICT reporting	1	0[6]	0	1	1	1	1	0
Outcome 2: Successful ICT report processing	1	1	0	1	1	0	1	0
Outcome 3: Successful service improvements	1	0	1	1	0	1	1	0

Source Welle *et al.* (2015).

We investigated three related outcomes that we saw as essential building blocks to achieving water service sustainability: successful ICT reporting, successful ICT report processing, and successful service improvements through water scheme repairs. Table 2 shows the patterns of success (marked as '1') and failure (marked as '0') for each outcome across all eight initiatives. Below, we discuss some of the key factors for success or failure that also provide insights on social accountability relations.[5]

The results for successful ICT reporting show that three of the five initiatives based on crowdsourcing were not successful in reporting, and that only two crowdsourcing urban initiatives were judged successful in reporting. Key factors preventing successful reporting among the unsuccessful crowdsourcing initiatives included contextual factors such as poor internet connection and problems with charging phones, as well as factors directly linked to the design of the initiative, such as citizens preferring alternative ways of reporting a problem to the proposed mechanism of sending a relatively costly SMS. In the case of the Human Sensor Web, which operated in the urban environment of Zanzibar town, mobile phone reception and charging phones was not a problem. Instead, the initiative was hampered by low levels of trust and low expectation, based on previous experience, that the service provider would make improvements, which proved a disincentive to sending text messages (McCall, Martinez and Verplanke 2013). This was mirrored by supporting NGO Daraja's analysis of the reasons for the failure of Maji Matone in Tanzania, which shows that low expectations and prevailing apathy – as well as worries over being identified when reporting failures – were key obstacles to sending mobile-based failure reports (Daraja 2012). All initiatives that were unsuccessful in ICT reporting experienced challenges with the 'social design' – the consideration of social context when designing an ICT mechanism (Hutchings *et al.* 2012) – of their crowdsourcing. While changing from

SMS to mobile-based calls would overcome some of the social design challenges, lack of trust, prevailing apathy and fear of identification are harder to overcome, because they emanate from the wider cultural context in which these initiatives operate. Holding service providers or government to account via failure reports may not be appropriate in such contexts; instead of being transformative, the use of crowdsourcing as a reporting mechanism for rural water supply breakdowns may ultimately be counter-productive.

When comparing the results for successful ICT report processing, a key difference between the successful and unsuccessful initiatives was whether the operational costs were largely met by the service provider or government agency, or by a third party such as the NGO or research project supporting the initiative. We interpreted the incorporation of report processing costs by the provider or relevant government agency as a proxy indicator for the agency's ownership of the initiative. In relation to social accountability, this provides an indication of the service provider or government agency's commitment being responsive to citizens.

A high level of service provider responsiveness is demonstrated in the model used by the Smart Handpump initiative: a mobile phone chip built into the handpump handle sends regular reports about the level of pumping activity to a local maintenance provider. As soon as the data show an unexpected downtime, the maintenance provider can follow up with the responsible water user committee. This reporting model places the onus for action on the maintenance provider rather than on citizens. Importantly, the initiative includes an innovative maintenance model that facilitates swift follow-up of handpump breakdowns. The financial contributions from a number of water points are clustered to provide a sufficient level of funding, akin to an insurance where individual contributions are pooled to reduce individual risk. The maintenance provider can use these contributions to cover report processing and repair costs across the clustered water points (SSEE 2014).[7]

The achievement of successful rural water supply repairs[8] was linked to several of the classic factors in rural water supply sustainability: availability of sufficient funds, spare parts, access to a mechanic and clarity about operation and maintenance procedures among all actors (Harvey and Reed 2004; WaterAid 2011). For ICT initiatives that relied on the predominant sector model of community-based management, these were contextual factors, whereas for initiatives that included a maintenance model, they were factors directly under their control. The four successful initiatives were Smart Handpumps, Maji Matone, MajiVoice and Next Drop. A potential reason for Maji Matone's success in repairing schemes (two thirds of all reported breakdowns were repaired) was the close follow-up by district water engineers, who received a copy of each failure message. The other three successful initiatives – Smart Handpumps, MajiVoice and Next Drop – were also successful in ICT reporting and ICT report processing. The key characteristic that distinguishes these three initiatives from the rest is the leading role of the

service provider in all three of the outcome processes: ICT reporting, report processing and scheme repairs. This model relies on a high-level, demonstrated commitment to responsiveness from the service provider to its clients via better reporting and maintenance services. In comparison, the crowdsourcing initiatives – M4W, Maji Matone and Human Sensor Web (HSW) – all failed in successfully reporting failures via mobile phones. The social accountability model where citizens hold the service provider or policymaker to account via reporting water point breakdowns, service interruptions or poor quality, were not immediately successful. In the next section, we disentangle how ICT-based reporting impacted on accountability relations between water users, water user committees, handpump mechanics and district water offices for the case of M4W in Kabarole District, Uganda.

5 ICT reporting and social accountability dynamics under M4W in Kabarole, Uganda

The M4W initiative aimed to increase the functionality of rural drinking water supply through the reception of timely information. If a water supply system is broken down, a user sends a text message, which is forwarded to tell the relevant handpump mechanic to go to the site. The district water officer has access to the online database system and is responsible for keeping track of reports and associated repairs. Once a repair is completed, the officer marks the report as closed on the online database. The pilot project ran in eight districts in Uganda between 2011 and 2014 under a partnership between Triple-S, WaterAid, Makerere University and the Ministry of Water and Environment. According to an IRC policy brief (Abisa 2014) the M4W online database recorded 1,561 mobile phone-based failure reports between 2011 and 2014, of which 24 per cent resulted in repairs.[9]

The aim of the MAVC follow-up study was to investigate further the dynamics between users, water user committees, handpump mechanics and the district water officer that resulted in breakdowns being reported either via M4W, or through alternative means. Specifically, we wanted to understand the willingness and ability of citizens to report using M4W and the impact of the M4W reporting system on accountability relationships between these different stakeholders. The research team visited eight water points with reported breakdowns; five of them were reported through M4W (although only two reports could be found on the online database) and three were reported using alternative mechanisms. Our findings show similar results to an earlier research study of M4W conducted in Lira District (McGee and Carlitz 2013).

5.1 Accountability between water fetchers and water user committees

Under M4W's crowdsourcing reporting mechanism, any water fetcher or concerned citizen could, in theory, use their mobile phone to report a fault. But in practice this hardly happened. Instead, all four M4W reports that we investigated were made or initiated by a member of the water user committee or a local political leader. One hurdle was that an SMS to the M4W system needed to contain the identification code of the water

point, generally kept by the water user committee. Unique identification codes had originally been displayed on handpumps but many of them quickly peeled off. In addition, three of the eight visited communities had a strict process in place whereby individual water fetchers were not supposed to contact a handpump mechanic directly but to report to the water user committee, possibly reflecting a power imbalance between water fetchers and some committees that wish to maintain authority over reporting. In the other visited communities, water fetchers also generally preferred reporting to the committee for logistical reasons: water user committee members were more likely to have phones, were able to assess the water point breakdown further, could check about existing funds for repair and, based on this, call the handpump mechanic to negotiate about price. Our findings indicate that the M4W reporting system did not change the accountability relationships between water fetchers and their committees or introduce a new dynamic in the reporting process.

5.2 Accountability between water user committees and handpump mechanics

All water user committees visited reported good relationships with their handpump mechanics, and that there had been no problems in responding to breakdowns prior to the introduction of M4W. The handpump mechanics were well known in the area, with several also holding local political leadership positions. Most water user committees preferred calling or visiting the handpump mechanic to sending an SMS via M4W, which they saw as introducing some insecurity and delay to getting a response. In comparison, calling or visiting the handpump mechanic enabled the committee chair to further explain the problem, get potential cost estimates and agree a time for a follow-up visit. This was confirmed by the fact that several water user committees followed up with phone calls to the mechanics after an SMS had been sent. One committee chairman also stated that he would not use M4W again in the future, even though he understood how it worked, because it was more costly to send an SMS, as well as lengthening the mechanic's response time. From this perspective, the introduction of a non-instantaneous communication method between water user committees and handpump mechanics made communication between them less dependable, and did not aid accountability; it could also be argued that accountability relations between water user committees and handpump mechanics were already good, and did not need strengthening.

5.3 Accountability between water user committees and local government

Five of the eight water user committees interviewed were aware that they could call on the sub-county government (and via this route, the district water officer) to hold the mechanic to account if he did not respond, or if the repair was beyond his capacity. However, due to limited resource availability for repair works at district level and a large backlog of major repair works, the district water office needed to prioritise borehole rehabilitations that were part of the district work plan, and thus did not have any capacity to spontaneously respond to major repair requests identified through the M4W reporting system. While the majority of the interviewed committees assumed that the

sub-district government or district water office would be able to assist with major repairs following up on an M4W report, this was unlikely to be the case. It appears therefore that M4W did not facilitate a greater accountability relationship between the district water office and water user committees, as the budgeting process for water point repairs was not aligned with M4W. This was confirmed when examining the relationship between handpump mechanics and the district water office.

5.4 Accountability between handpump mechanics and the district water office

The handpump mechanics generally took the M4W system very seriously. Three out of the four mechanics interviewed believed that the district water officer would follow up with them if they did not respond quickly to an M4W report and mark the repair on the online database. This was confirmed by the handpump mechanics' encouragement of water user committees to log any breakdown report on the database system via an M4W report, and three of the four mechanics reporting that they had logged all completed repairs on the database. This strong accountability from the side of the handpump mechanics needs to be seen in relation to the local political context. Several mechanics, while not employees of the government, did hold local political leadership positions and/or were running as candidates for the upcoming elections; they were keen to demonstrate their value to the communities they served and to the district water office.

The district water officer, on his part, however, did not regularly check the M4W system to ensure that repairs were being made in response to M4W breakdown reports. For him, the ministry's reporting requirements – paper-based, and not aligned with M4W – were paramount.[10] At the same time, the district water officer also explained his reluctance to follow up M4W reports with handpump mechanics because of the lack of resources for fuel or allowances to support them in their work. So, while the responsiveness from the district water officer to the handpump mechanics based on M4W was weak, three out of the four interviewed handpump mechanics nonetheless felt that their accountability to the office had increased by using the M4W system. A hindrance to increasing accountability between handpump mechanics and the district water office was the lack of integration with the government's reporting and incentive system.

6 Conclusion

These findings indicate that crowdsourcing initiatives focused on supporting water fetchers and their representatives to hold service providers or policymakers to account, were not transformative. The comparative case study highlighted that ICT reporting via crowdsourcing in rural areas was hindered by contextual factors such as connectivity and mobile phone charging problems. But the success of these initiatives was also hindered by cultural barriers on the side of the users, including fear of identification and lack of confidence that service providers or government would respond to reports.

Box 1 Findings from the Sensors, Empowerment, Accountability (SEMA) research project in Tanzania

In Tanzania, a research project led by the University of Twente developed an ICT-based failure report design where community water and sanitation committees would send water scheme status reports to district water offices, elected local councillors and civil society organisations. However, the sector government stakeholders at the other side of the negotiation table argued that these reports provide technical information that was not appropriate for stakeholders outside the administrative structure. The Ministry of Water reportedly also considered that reports should be provided by village executive officers rather than user committees, in order to integrate reporting with the lowest governmental administrative structure. This small insight into the negotiation process between the project researchers and government officials highlights that the introduction of a mobile app as part of an official reporting procedure is highly dependent on the wider political context. Introducing a reporting procedure with the potential to open up governance is subject to the political power holders who sit at the negotiation table. The mobile app itself becomes a means to an end, rather than being transformative in itself.

Closer investigation of the M4W initiative also showed that the idea that any concerned citizen could send a water point failure report did not really take hold among water fetchers, and accountability relationships between water fetchers and user committees remained unchanged. If anything, the M4W system made reporting to handpump mechanics more cumbersome, and might have alienated committees from mechanics, had existing relations not been strong.

The positive change that stands out is the increased feeling of accountability from the side of the handpump mechanics. But this was not replicated by stronger responsiveness from the side of the district water officer for whom the sector's paper-based reporting system remained more important than M4W.

These findings are reflected by a growing body of evidence from the sector which includes the Daraja blogs (2012), and more recently an action research project in Tanzania (see Box 1) which concluded that 'public crowdsourcing in the context of empowerment and accountability regarding public services is not a viable approach in Tanzania at the present time' (Wesselink *et al.* 2015: 72).

The findings from our studies also show, albeit in different ways, that ICT initiatives focused on tools to hold government to account encountered a number of obstacles that they could not overcome. In particular, the focus on the ICT-based reporting side did not manage

to overcome the lack of responsiveness from the side of the service provider or government. This lack of responsiveness needs to be interpreted with the wider sector context in mind: the predominant rural service delivery model gives water users the main responsibility for operating and maintaining their systems. Any ICT initiatives that aim to improve rural water supply sustainability also need to tackle the accountability relationships that underpin the model of community-based management. This finding is significant in that it is potentially applicable to social accountability mechanisms in service delivery more widely.

Finally, the three ICT initiatives that were successful in ICT reporting, report processing and water scheme repairs, showed a substantial increase in the service provider's commitment to being responsive to water users. Putting the two urban initiatives to one side, it is the Smart Handpump model that stands out as the most promising model in increasing rural water supply sustainability via ICT reporting. However, it is not the ICT mechanism that is key to the potential success of this initiative. Instead, it is the innovative maintenance model linked to the ICT reporting mechanism that gives this initiative a potentially transformative character. This is an important lesson for the designers of ICT-based social accountability mechanisms: putting the user's reporting preferences at the centre of the ICT design may be missing the point unless the wider design supports a more responsive service delivery model. In the case of the Smart Handpump initiative, this was a social accountability mechanism where the service provider takes overall responsibility for receiving failure reports *and* for ensuing repairs or service improvements.

Notes

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1 Making All Voices Count is supported by DFID, USAID, Sida and the Omidyar Network.

2 Region-wide figures on sustainability are not available for other parts of the world.

3 Popular tools include citizen and community score cards, and community and water point mapping.

4 Selection criteria: relevance of objectives to improving water service sustainability; availability of documentation or interview data on success and failure.

5 We cannot list here how we defined success and failure, and all the factors of success and failure that were considered, but they are in the full report of the research (Welle *et al.* 2015).

6 The M4W initiative was originally judged successful in ICT reporting because of project documentation that 1,561 SMS were received between 2011 and 2014. However, our follow-up study showed that the actual number of messages was substantially lower, and that some had been sent during training events. As a result, the outcome achievement was changed to '0' in this report.

7 The financial model was still being tested by the handpump initiative at the time of writing.
8 Re-imagining Reporting and SIBS were excluded from this analysis because they aimed at improved budgeting and planning for rural water supply rather than specific rural water scheme repairs.
9 However, field research revealed some inconsistencies between reports logged on the online database and reports from the field.
10 Handpump mechanics are also required to submit paper-based reports of completed repairs to the sub-county government every three months, leading to a duplication of efforts. The paper-based reports are passed on to the district water office as part of their reporting to the ministry.

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