

SCHAUB-JONES, BEILHARZ &amp; NASH

---

**36th WEDC International Conference, Nakuru, Kenya, 2013****DELIVERING WATER, SANITATION AND HYGIENE SERVICES  
IN AN UNCERTAIN ENVIRONMENT****Applying ICT to solve complex WASH challenges: insights  
and early lessons from the water and health sectors***D. Schaub-Jones, J. Beilharz & A. Nash, South Africa***BRIEFING PAPER 1808**

---

*There are growing expectations that harnessing ICT intelligently can bring about radical improvements in the way that health, education and other sectors function, particularly in developing countries. There is also quite some interest in the water sector, which until now has been more conservative in its innovation, with a growing recognition that these new tools can perhaps help with the institutional challenges that bedevil the water and sanitation sector. To examine experience to date – and to help the water sector learn from other sectors – two South African-based organisations active in this sphere, SeeSaw and iComms, convened a multi-disciplinary learning and sharing workshop in Cape Town in 2012. This paper summarises the background to those discussions, gives an overview of the open sharing of experience that took place, and provides some early lessons for those in the WASH sector that plan to harness some of the emerging ICT tools.*

---

**Introduction**

One of the hallmarks of our time is the rapid spread of mobile phones and the explosion in communications and information sharing that they have permitted. Whilst much of this activity is limited to the social sphere, one of the early trends of this decade is how ICT (Information and Communications Technology) tools are changing the way that other fields work, including public services. Indeed there are hopes that harnessing ICT intelligently can bring about radical improvements in the way that health, education and other sectors function, particularly in developing countries.

The water sector has not been as quick as some others to take up these new tools, but as the field matures somewhat, interest is growing. In urban areas, the use of cellphones to read water meters, to allow customers to pay bills and to help different groups to report faults is of great interest to water utilities. In rural areas there is significant interest in using mobile phones (and particularly the GPS and camera functions on smartphones) to map existing infrastructure and its functionality and to leverage the widespread availability of cellphones to help keep this information updated. Across both sectors, including for sanitation and health practitioners, regulators, governments, donors and NGOs are all interested in how ICT can help them better understand what is happening on the ground, react to changing situations, to plan and invest better.

To explore these issues and capitalise on experience, an event was hosted at the University of Cape Town in 2012, bringing together 30+ practitioners in this field. Water sector professionals from across Southern Africa were joined by their colleagues in health – a sector that has been quick to innovate, try different approaches and learn lessons. The event was co-convened by two organisations with a keen interest in the topic: SeeSaw, a social enterprise that customises ICT to support sanitation and water providers and iComms, a University of Cape Town research unit (Information for Community Oriented Municipal Services).<sup>1</sup>

## ICT systems in the water sector

There is a wide range of ways that ICT is being applied in the water sector, in both rural and urban settings. Yet some patterns are clearly discernible and some of the main ways that ICT is being used are to:

- Streamline and improve the collection of field data;
- Strengthen revenue collection;
- Manage assets more productively;
- Build more productive relationships with customers;
- Measure and report on technical performance;
- Allow for improved or more effective regulation of the sector; and
- Report in ways that create new opportunities for financing (e.g. Output-Based Aid)

It's application in the sanitation and hygiene sectors is often a little different, but there is also large potential for disruptive innovations there too.

## Objectives

The event - called 'But does it Float?' - had three objectives.

1. The first was to help practitioners and policymakers better understand the circumstances in which ICT usage can be effective in supporting public service delivery (and highlight when they are not).
2. The second was to get practitioners from different organisations (civil society, government, private sector, academia) and different sectors (health, water, education, etc) to talk through real-life case studies involving ICT tools to examine the impact that they have had and to unpack the incentives and disincentives to adopting such systems.
3. The third was to help practitioners cut through much of the complexity and hype surrounding ICT usage, giving them a robust set of principles with which to plan and negotiate partnerships and projects.

The event was designed to cater for all perspectives, from those experienced in technology solutions with valuable experience to share, to recent users who needed to troubleshoot, through to those keen to utilise the technology but still needing to learn more about ICT and its potential.

## The main drivers of innovation – some patterns emerging

Whilst the range of tools that are available is growing by the day, there is some consistency in how these are being used so far. Tools such as SMS are speeding up communications between different groups, making it easier to source information from the general public. Information tools such as Google Maps are helping organisations map their operations and identify patterns of activity. The growth of 'mobile-money' is bringing more people into the formal banking system and helping to digitalise the system of water payments.

All of these systems allow stakeholders to collect, transmit and analyse information of increased quantity and quality within a shorter period of time. SeeSaw has scanned the range of innovations taking place, revealing what appears to be an underlying pattern. This suggests that there are three main drivers for stakeholders to adopt ICT in their operations:

- It improves access to information,
- It can bring immediate and long-term financial benefits; and
- It allows confidence-building between stakeholders, which contributes to greater responsiveness, mutual accountability and trust.

As in the diagram below, confidence-building tends to underlie the more tangible objectives of access to information and financial benefits. The boundaries between the categories are however not hard and fast and the usage of many ICT tools can be said to contribute to more than one of these at a time.



**Figure 1. Three main drivers for adopting ICT innovations in the WASH sector**

Source: Sattler & Schaub-Jones, 2012

## Objectives

‘But does it Float?’ took this premise (information, financial gain and confidence building) as its starting point. Alex Nash, SeeSaw co-founder, gave an introductory presentation that explained this in more detail and referred to some of the global trends taking place around the use of ICT in the water and sanitation sector. Professor Gary Marsden of UCT, delving into his two decade-long experience in the field, talked about the general role of ICT in service delivery, with specific reference to health-focussed projects in the Eastern and Western Cape.

This focus on concrete case studies continued, Professor Ulrike Rivett of iComms talking about the Aquatest experience where mobile phones were used to relay water quality data from often remote rural areas in six countries. Kieran Sharpey-Schafer, now of Dimagi South Africa, shared his experience in working with Unicef to harness ICT tools to improve primary healthcare, including tracking drug stocks in Malawi and empowering frontline health workers in Zambia.

The event was also designed to give those at the beginning of the journey into ICT an opportunity to share their perspectives, hopes and concerns. Two members of Mozambique’s water regulatory commission were present; Clara dos Santos asking participants how “*an ICT system could help them regulate water and sanitation in Mozambican small towns*”. Zekarias Asfaw, of World Vision Zimbabwe followed this by giving an overview of Bulawayo’s Water Supply & Sanitation Emergency Response project, describing a nascent partnership with eThekwini in South Africa to promote citizen engagement into service delivery. Teddy Gounden, representing eThekwini Water & Sanitation, spoke of their interest in getting the public engaged in reporting on sanitation and river quality.

The event also focused on some of the technical & programming challenges that arise in such schemes, a topic ably discussed by Tim Nichols of Mothers2Mothers, Kieran Sharpey-Schafer of Dimagi and Michael Champanis of iComms, all based in Cape Town.

A particular focus for many participants (including the South African Department of Water Affairs and the South African Water Research Commission) was how to institutionalise such systems into government processes. The event addressed this by looking separately at the perspectives of three different groups; i) field-agents; ii) the public, and iii) managers and decision-makers. This allowed the differing incentives and barriers of these groups to be discussed, revealing that there are often contradictory pressures on any new system that is introduced.

The message that you cannot just transplant a working ICT system from one context to another was reinforced during these discussions – there are clearly many specific factors that dictate whether the system will reap the benefits envisioned. Invaluable here was the University of Cape Town’s experience in looking at how to ‘intelligently design’ systems to build on local assets and information flows, to cater to the needs of different stakeholders, innovating in a way that enables later mainstreaming and scaling-up.

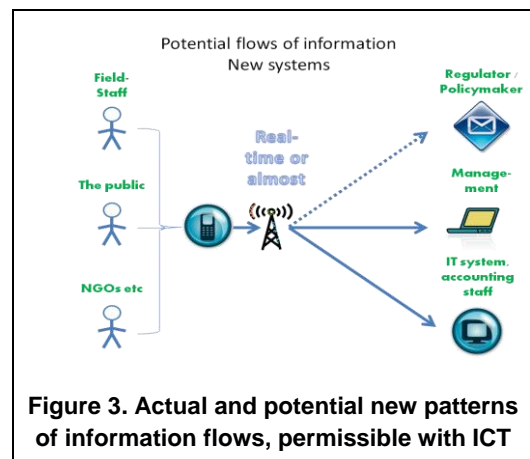
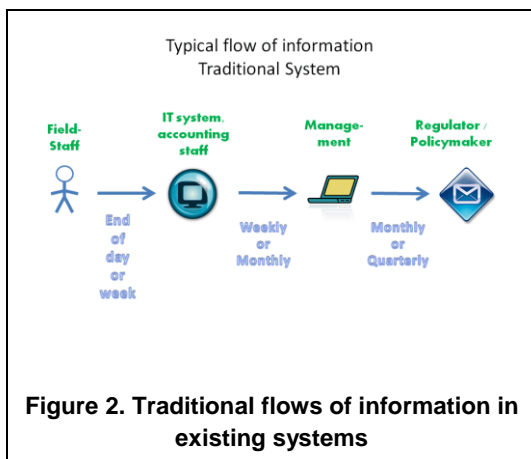
A key issue raised repeatedly was that any information system (whether oral, paper-based or electronic) is only as good as the information being fed into it. So a crucial question for any initiative looking to harness ICT is why those being asked to input information into the system are likely to do so – what the incentives of the various stakeholders to give information, use the system and provide reliable information are.

## ICT has opened up a new world of opportunity

Whereas the typical systems existing in the water sector have a very linear and closed flow of information, the new ICT tools allow radical changes. Traditional systems tend to rely on their data from field staff of the water service providers (often municipal staff) – who would then submit this – at the end of the day or week – to the provider’s IT system. From there the data wends its way via the accounting and engineering departments to management (often with significant delays). Providers then submit a ‘prepared brief’ to the regulatory or policymaker – perhaps monthly, or more often quarterly or less often.

The rapid evolution of ICT tools allows ‘new systems’ to radically depart from this practice. New avenues for collecting data and falling transmission costs have led to an explosion in the amount of data that can be practicably collected (and turned into useful information). This can also be done now in almost real time, with the rapid collection of a range of data in both higher quantity and quality now possible. On top of this the source of the data is no longer just the field-staff of the water services provider – but information can be collected from the public directly (either customers or concerned ‘members of society’) as well as other organisations, such as NGOs or community-based organisations (CBOs).

The two figures below show how ICT is permitting a different flow of information amongst key stakeholders.



### Key learning points

Some of the key learning points are:

1. Putting in place an effective ICT system can make a visible impact on the ground. It can pay for itself quite quickly in terms of efficiency gains and even costs saved. Yet a fair amount of thought must go into designing to the system to fit the local context - just transplanting a system that has worked in one place to a new environment is generally a recipe for trouble.
2. A significant spin-off of looking at how to use ICT is that the effort taken to design a responsive system forces stakeholders to reflect more closely on the existing structures, process and current information flows. This can have significant benefits even if no system is later built.
3. A recommendation is to spend due time and effort in understanding the system, asking direct stakeholders what information they currently get, what information they need and then seeing how and whether ICT systems can be used to gather data that can generate additional, better or faster information and get it to where it is needed (in a way that suits the working patterns of those individuals).

4. For impact at any significant scale it is crucial that ICT systems, whether in healthcare or water and sanitation, integrate with existing government systems. There is a great risk of fragmentation - too many organisations piloting new ICT systems put in place technologies or processes that cannot easily be absorbed into existing government systems (or worse still, undermine these).
5. A lot of initiatives, particularly in the healthcare system, have tried to harness ICT to get people to do what is good for them. And only that. For instance, cellphones used to gather field information can be restricted so that they can only do one thing and no longer function as a phone. Airtime and data bundles used for transmitting information can be isolated to only contribute to 'the project'. The disadvantage is that this turns the device into something used only for work, something alien and otherwise 'not useful'. Alternatives do exist though and can be productive. If frontline workers being asked to use phones and new ICT tools are permitted - sometimes on a limited basis - to use them for their own purposes (browsing the internet, accessing facebook, receiving SMS) then they are more likely to engage with the project, look after the equipment, etc. A balance is surely needed, but a quid pro quo arrangement can be a sensible approach. This was characterised as "*give them pizza with their broccoli!*"
6. ICT tools can be incredibly powerful at improving the flow of data and, from there, the flow of information. But what if the flow of information is not the real problem? There are many issues that undermine healthcare or water and sanitation systems - and a lot of them have little to do with information. Cultural conflicts, different worldviews, individual rivalries, dysfunctional facilities - all of these can be the 'sand in the gearbox'. One must not assume that a new ICT system is going to solve all problems - after all, these are tools, not a panacea to what are typically complex and entrenched challenges.

## Conclusions

A key point made by many present at the event was that the technology itself is rarely the issue. Mobile phones, free software applications (apps) and open-source databases are widely available or can easily be developed. To make ICT in the water sector successful though, it is crucial to make technology demand-oriented and fit-for-purpose. This means making data entry by citizens, customers or utility field staff as simple as possible. It means not overburdening the participants in any system. And above all it means paying close attention to the incentives of key stakeholders – those that need to adopt the system, those whose inaction can block it and those who will resist change altogether.

Creating ownership and standardisation of systems are further issues to be addressed to make ICT approaches in the water sector efficient and sustainable. The scale of eventual impact will thus greatly depend upon the institutional and regulatory responses to ICT initiatives. Governmental water authorities must have control over the establishment of such systems, but will often require assistance from others. Donors and NGOs can assist with capacity development, but in this ICT is no different from any other innovation – ownership needs to be vested locally and local champions found. This is essential in getting utilities and customers to adopt new systems.

There are several cases of failed projects (one that has been openly honest was *Maji Matone*, undertaken by Daraja in Tanzania) – these tend to highlight the fact that much work needs to be done to address behavioural constraints, which despite the potential benefits of improved services, can hinder adoption of new technologies by customers. Following the premise that incentives are what shape behaviour, it is crucial to understand the motivation for citizens and other stakeholder to use - or not use - a given technology. Only if this is understood systems can be adapted to the demands and incentives be created that may boost the adoption rates.

As suggested, with ICT in the water sector still relatively unexplored, it is important to embrace the lessons already learned by other sectors. In return, stakeholders involved in ICT initiatives in the water sector should make their experience public, even if project outcomes did not meet the expectations. Being transparent about both positive and negative experience will help the whole sector to move forward much quicker, ultimately benefitting the citizens that currently suffer from inadequate service provision.

### Acknowledgements

The author/s would like to extend particular thanks to Ulrike Rivett of the University of Cape Town for co-convening the event and all her - and iComms' - support in general. We would like also to thank all those that attended, sharing so freely of their knowledge and experience in doing so.

---

### References and further reading

- Bannerjee, S. and E. Morella (2011) *Africa's Water and Sanitation Infrastructure: Access, Affordability, and Alternatives*. The World Bank. Washington D.C.
- Daraja (2011) *Maji Matone hasn't delivered. Time to embrace failure, learn, and move on*. In: <http://blog.daraja.org/2011/12/maji-matone-hasnt-delivered-time-to.html>
- Foster, T. et al. (2012a) *Mobile water payments in urban Africa: adoption, implications and opportunities*. Global Water Forum. Discussion Paper 1206.
- Foster, T, F. Pesin and D. Schaub-Jones (2012b) *ICT-focussed initiatives about water and sanitation*. SeeSaw PowerPoint Presentation.
- GIZ (2009) *The use of ICT in the Water Sector. Management Information Systems to support regulators and resource management*. Eschborn.
- Heatwole, A.R. (2011) *FLOW: Where Mobile Tech and Water Meet*. In: <http://www.mobileactive.org/flow-where-mobile-tech-and-water-meet>
- Hope, R.A. et al. (2011) *Mobile Water Payments Innovations in Urban Africa*. School of Geography and the Environment and Skoll Centre for Social Entrepreneurship at Saïd Business School, Oxford University, UK.
- Hutchings, M. et al. (2012) *mWASH: Mobile Phone Applications for the Water, Sanitation, and Hygiene Sector*. Pacific Institute: Oakland.
- McCann, D. (2012) *A Ugandan mHealth Moratorium Is a Good Thing*. *ICTworks*. In: <http://www.ictworks.org/news/2012/02/22/ugandan-mhealth-moratorium-good-thing>
- Sattler & Schaub-Jones (2012) *Background paper to 'But does it Float'* SeeSaw: Cape Town
- SeeSaw (2011) *Rubbish In, Rubbish Out*. In: <http://liquidit.blogspot.com/2011/10/rubbish-in-rubbish-out.html>
- SeeSaw (2012) *An m-water odyssey?* In: <http://liquidit.blogspot.com/>
- WaterAid (2010) *Water Point Mapper*. In: <http://www.waterpointmapper.org/About.aspx>
- World Bank (2011) *In Africa, Technology Helps Citizens Hold Their Governments Accountable*. In: <http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/AFRICAEXT/0,,contentMDK:22910663~pagePK:146736~piPK:226340~theSitePK:258644,00.html>
- 

### Note

<sup>1</sup> SeeSaw is a social enterprise whose web address is [www.GreenSeeSaw.com](http://www.GreenSeeSaw.com). iComms is a research initiative of the University of Cape Town and can be found at [www.iComms.org](http://www.iComms.org)

---

### Contact details

Schaub-Jones, David  
SeeSaw  
210 Long Street  
Cape Town, South Africa  
Tel: +27 82 400 6068  
Email: [david@greenseesaw.com](mailto:david@greenseesaw.com)  
www: [www.greenseesaw.com](http://www.greenseesaw.com)

Beilharz, Jossekin  
SeeSaw  
Gneisenaustr  
Berlin, Germany  
Tel: +49 176 7800 2979  
Email: [jossekin@greenseesaw.com](mailto:jossekin@greenseesaw.com)  
www: [www.liquidit.blogspot.com](http://www.liquidit.blogspot.com)

---