NOTE 2: SANITATION APPS

A brief overview of sanitation app developments

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Mobile phone and web-based ICT applications are increasingly being developed to support the development of WASH services. While there has not yet been much innovation in the sanitation sector, a lot can be learned and transferred from recent developments in the water sector. Apps have the potential to support significant improvements in the monitoring and planning of sanitation projects, programmes and policies.

This note gives an overview of the types of apps (mainly prototypes) that have been developed so far in the sanitation sector and identifies the need for further development of ICT tools.

What apps have been developed so far in the WASH sector?

Many mobile phone applications have been developed for the water sector, in particular to map water points and infrastructures, and collect data on their functional status in rural areas, or to read meters and make water bills payments in urban areas.[1, 2] Even though it is still early days, these apps appear to hold great potential for amassing data quickly, thereby facilitating programme management and mobilising information directly from users and the populations concerned.

In April 2012, the Pacific Institute released a study entitled: "mWASH: Mobile Phone Applications for the Water, Sanitation, and Hygiene Sector". This report provided a snapshot of existing mobile phone applications to assist future change agents in the global water, sanitation, and hygiene sector. It identified four broad categories of problems in the sector that could be tackled with the support of mobile apps: access, post-construction failure or breakdown, service unreliability and long-term sustainability. It concluded that well managed mobile WASH solutions hold great potential for gathering high quality information effectively, which in turn can help make significant improvements in the monitoring and planning of WASH projects, programmes and policies.

Schaub-Jones, Beilharz & Nash (2013) identified the main ways in which ICT including mobile apps can be used in the water sector as follows:

- Streamline and improve the collection of field data;
- Strengthen revenue collection for water utilities;
- 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)

More recently, apps have started to be used in the sanitation sector, some being adaptations of tools used for the water sector. Some initial experiences have emerged to map sanitation facilities as detailed below, but these remain limited so far and have been little documented, except for a few project briefs and blog posts on the internet (See "Useful links" endnote).

The potential of mobile phone applications has not yet been harnessed on a wide scale in the sanitation sector. To foster their development, the Water and Sanitation Programme (WSP) organised the first Sanitation Hackathon in December 2012, following on the 2011 Water

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[1] The World Bank published a report on lessons learned from the Water Hackathon organised in 2011, which presents the applications developed during the event.(http://www.scribd.com/doc/97458967/Water-Hackathon-Lessons-Learned)

[2] The Rural Water Supply Network (RWSN) recently organised online discussions on Water Point Mapping and have published a summary of the discussions held in 2012 (http://www.rural-water-supply.net/_ressources/documents/default/1-450-3-1357715729.pdf)

Hackathon. Hackathon events (a combination of the words "hack" and "marathon") started in the mid-2000s and gather computer programmers and sector specialists around a specific subject for which they propose innovative software solutions such as mobile phone applications. This worldwide event brought together over 1,100 IT developers and sanitation sector specialists to tackle some of the sector's leading challenges. The principle of the Sanitation Hackathon is to build on this increasing connectivity, through mobile phones, social media and other sites, to develop tools that will help increase access to sanitation. To minimise the risk that the initial burst of activity linked to a hackathon dissipate quickly afterwards, they also organised a follow-up "Hack at Home" and the "Sanitation App Challenge" to develop initial ideas into prototypes that can be tested and marketed in the field. 181 app concepts emerged from the Sanitation Hackathon event, 70 of which were presented at the Sanitation App Challenge. Of that 70, ten were declared as finalists and three were nominated as grand prize winners, whilst another got the people's choice award. These various apps represented a mix of different solutions for which a typology is given below.

Typology of apps used in the sanitation sector

Applications that have been developed so far for the sanitation sector so far can be classified in four main categories:

1. Self-reporting of maintenance needs
2. Mapping of infrastructure and needs
3. Monitoring of sanitation programs
4. Education for behavioral change

Many applications such as the Sanitation Investment Tracker (SIT), developed with SHARE support www.shareresearch.org/Resource/Details/sit_note_1 can combine several of these functions. In particular, mapping is a common feature of many such apps, which is made possible by harnessing the powers of GPS localization.

As innovation takes place, many other potential usages are likely to emerge.

Figure 1 - Typology of apps and ITC tools developed for the sanitation sector

Self-reporting applications	Mapping applications

Self-reporting applications
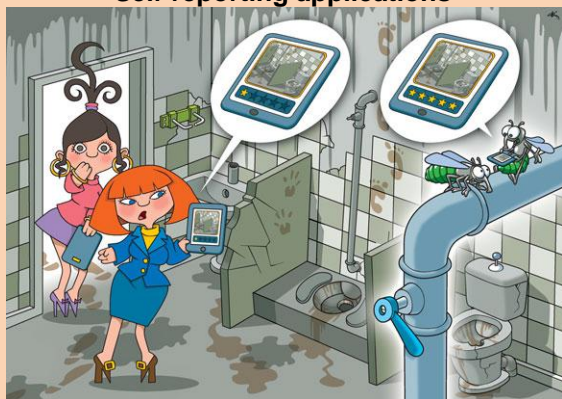
Overview:
Self-reporting apps can be used to report problems or maintenance needs for public or private sanitation infrastructure. Reports can be used to inform service providers and request their intervention. They can also be used to raise the awareness of public authorities and facilitate the enforcement of regulations.

Potential challenges:
Self-reporting highly depends on people's willingness to report information and their ability to use the tool (in some cases, sending an SMS is not appropriate where people do not read or write). Citizens may not feel concerned by the status of public infrastructure, so they may need to be incentivised to report faults. This can be done in several ways: first, users can be financially rewarded when posting a report. Second, they would need to feel that their report is being used effectively and acted upon. This can be done by feeding complaint reports directly to service providers and ensuring that they would act upon those reports. If service providers address the issues quickly, users will be encouraged to use the self-reporting app.

A few examples:
- **Taarifa** is an open source web application for information collection, visualization and interactive mapping. It allows people to collect and share their own sanitation-related stories using various media platforms, such as SMS, Web Forms, Email or Twitter, placing these reports into a workflow where these reports can be followed up and acted upon, while engaging citizens and communities.
- **mSchool** is a low-tech participatory platform that helps monitor the condition of school toilet facilities. Students, parents and teachers can send formatted SMS to alert local service providers of breakdowns and repairs.
- **mSewage** is an open source platform to map sewage outflows and sanitation infrastructure. This helps empower communities to identify water sources that are at risk and track efforts to improve the situation.

Mapping applications
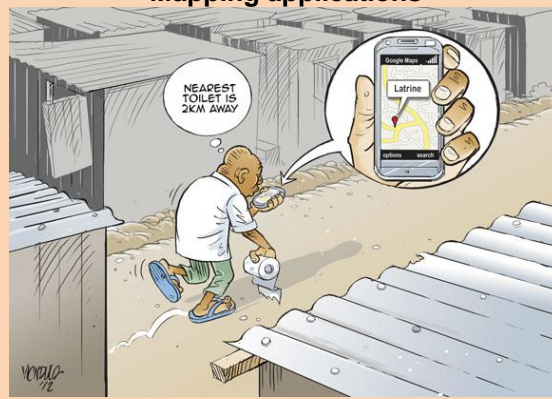
Overview:
Mapping apps can be used to map private and public sanitation facilities, sewerage and drainage networks, identify open defecation areas and polluted water streams. This can be done by surveying communities (Sanitation Mapper) or through households self-reporting (Taarifa). These maps can be used to localise areas where infrastructure or services are needed.

Potential challenges:
Mapping sanitation infrastructure with precision can be challenging in a dense urban area. Therefore some systems have been developed to combine the collection of GPS references with other ways to identify the latrine such as tagging a unique reference number or a barcode to the facility or taking a picture of the facility (and its owner).

A few examples:
- The **Sanitation Mapper** is a low cost participatory sanitation monitoring tool (including a spread sheet and map-based outputs). It enables to map out sanitation infrastructure through area-based mapping (village level coverage) and point-based mapping (individual sanitation facilities). The tool is intended to be used by local level policy-makers and planners to monitor sanitation facilities and make appropriate decisions.
- **Toilight** is an app to find the nearest toilets with desired information (rate, price, opening time, type of toilet etc.). The app allows adding new toilets on the app (via GPS or marking it in a map) and their features.
- The **Sanitation Investment Tracker (SIT)** is a tool to track investment (and associated expenditure) in sanitation at household level. Data is collected from households with a data collection mobile phone app, which enables to map sanitation facilities.
- **mSewage** (see also self-reporting apps)
- **Taarifa** (see also self-reporting apps)

Planning and monitoring applications	**Gaming and awareness-raising applications for education and behavioural change**
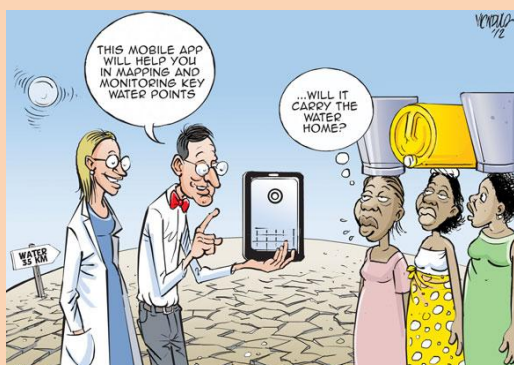
Overview: Planning and monitoring apps can be used by sanitation programme managers and service providers to collect data on a regular basis to monitor the quality or the costs of services and infrastructure and identify whether externally-funded interventions (i.e. not funded only by households) are reaching the desired outcomes.

Potential challenges: These apps need to be flexible so that they can adapt to the specific features of different sanitation programmes.

A few examples:
- **WashCost Calculator** is an app to help WASH sector practitioners use life-cycle cost information to adapt their plans and build sustainable water and sanitation services. It helps the user run a sustainability check to strengthen delivery of water and sanitation services, make use of reliable life-cycle cost information, and understand the benefits of the life-cycle costs approach.
- **WSP's Outcome Tracker Application** is a monitoring system aiming to track usage of toilets for the assessment of the Clean Village Prize. The Outcome Tracker tracks inputs such as budget spent and outputs in terms of toilets constructed. The mobile phone app is used to collect data from households on their economic status, access to a toilet, sanitation behaviour of each member of the household, type of sanitation facility used or whether they are practicing open defecation, method of disposal of child faeces and observation of material available for hand-washing. The data is then centralised in a Management Information System to consolidate and analyse village data.
- **Empowering Girls** is an app to track girls' attendance in school via text messages to measure attendance rates before and after the creation of appropriate sanitation facilities for female students.
- **SIT** (see also Mapping applications) enables to collect information on financial inputs and outputs that can be used to inform the monitoring and planning of WASH projects, programmes and policies aiming to support households investment on sanitation.

Overview: Gaming apps can be used to educate people and raise their awareness about the negative consequences impact of open defecation, so as to encourage them to change their behaviour. They can be used by education teams going in the field to conduct sanitation educational campaigns (such as Community Led Total Sanitation) or directly by urban people who have access to games on the internet on their mobile phone.

Challenges and solutions: these apps may need to be customised to local contexts to reflect different languages, cultural practices, modes of communication, age groups or senses of humour. The link between the use of such apps and effective behaviour change would also need to be assessed: some of the apps presented below (such as San-Trac) are linked to devices to monitor effective behaviour change.

A few examples:
- **Clean Kumasi** developed by WSUP and Ideo.org is a digital platform relying upon phones, maps and databases to bring together residents of urban neighbourhoods to eliminate open defecation. Signs are placed in spots in the community where open defecation, flying toilets, and dumping occur. The signs ask residents to flash a number (i.e. to give a miscall) if they want to join the effort to stop open defecation. They receive an automated voice message with information on how to get involved. Sparked by Clean Kumasi organizers, residents come together to confront open defecation. Natural community leaders emerge to demand and mobilize solutions to improved sanitation.
- **SunClean** is a game developed in Indonesia that playfully teaches children about sanitation and hygiene, hand washing behaviour and recycling.
- **San-Trac** is a system to remind people to wash their hands whenever they use sanitary facilities. It also allows tracking hand-washing behaviour.
- **LooRewards** is an educational app that can be used by hygiene education team to improve engagement towards healthy/hygienic behaviour by rewarding people for adopting hygienic practices like using toilets, clean water.

What's next for sanitation apps?

The sanitation mobile applications that have been developed so far have the potential to bring significant benefits to the sector. At this early stage, there is yet to be a significant uptake of those apps by a large number of users or programme managers. Crucially, these apps should be seen as tools to support existing processes but are by no means a silver bullet.

More testing needs to be undertaken by sanitation practitioners so that these apps are used and practical implementation issues (such as internet access, issues to do with battery life or memory size of mobile phones) can be successfully overcome. Additional research is also needed to demonstrate their added value and cost-effectiveness in comparison to more conventional "pen and paper" processes, once such practical issues can be successfully overcome.

Much remains to be learned from other public sectors (water, health and education) on ways in which these tools can be used and where disruptive innovations can take place to support existing information processes, although the application in the sanitation and hygiene sectors may be a little different, Many organisations in the sector are increasingly supporting the development and use of mobile phone apps and ICT tools for the sector. WSUP and Ideo.org are developing open defecation mapping and the Clean Kumasi project. The SHARE Research Consortium has supported the development of SIT and of the Sanitation Mapper. Once other organisations start adopting these apps in their own programming, full-scale testing can take place.

Service providers are also realising the potential of mobile apps to monitor and facilitate their business. In Senegal, for instance, ONAS is testing mobile money payments with W@ri for desludging services. Mobile phone payment for sanitation services is an area where sanitation apps could be developed to improve the effectiveness of sanitation service delivery.

Contacts and useful links

Sanitation Hackathon and hackathome competition details:
http://www.sanitationhackathon.org/, http://sanitation.hackathome.com/
http://www.sanitationhackathon.org/apps

Useful notes on sanitation apps
- WSUP practice note: 2011, "GIS & mapping tools for water and sanitation infrastructure"
- C. Ajith Kumar and Upneet Singh, 2012, You Manage What You Measure: Using Mobile Phones to Strengthen Outcome Monitoring in Rural Sanitation, Water and Sanitation Program Field Note
- Pacific Institute and Nexleaf Analytics, 2012, mWASH: Mobile Phone Applications for the Water, Sanitation, and Hygiene Sector
- D. Schaub-Jones, J. Beilharz & A. Nash, 2013, Applying ICT to solve complex WASH challenges – insights and early lessons from the water and health sectors, 36th WEDC International Conference, Nakuru, Kenya, 2013.

The illustrations are taken from the 2013 WSP Calendar, illustrated by Vladimir Kadyrbaev, Jesus Felix-Diaz, Sudhir Dar, Wisnoe Lee and Victor Ndula.

If you are interested in using SIT and want to know more, you can contact Marie-Alix Prat (marie-alix@tremolet.com) or Sophie Trémolet (sophie@tremolet.com). This note can be read in conjunction with: Note 1: Sanitation Investment Tracker (SIT) – An Overview and SIT user guide