Real-Time Monitoring of Rural Sanitation at Scale in Zambia Using Mobile-to-Web Technologies

INTRODUCTION

By 2016 the Government of Zambia aims to ensure that 60% of the population has access to improved sanitation and that Zambia will be open defecation free (ODF) by 2020. In order to achieve those targets, with the support of UKAID, the government and UNICEF are promoting community-wide sanitation improvements through the ‘3 Million People Sanitation Programme’, including: handwashing with soap or ash; safe water handling and use through treatment and safe storage; sanitation marketing to create the demand for toilets; and encouraging households to upgrade their sanitation facilities. The programme is a component of the government’s National Rural Water Supply and Sanitation Programme (NRWSSP) and covers almost all of the nation’s 92 rural districts. While the programme incorporates the latest evidence-based models of community mobilization and behaviour change, one of its most innovative aspects is the Mobile-to-Web (M2W) real-time monitoring system.

Accurate targeting of sanitation and hygiene interventions requires precise and timely data at the village level. Prior to M2W, the programme used a paper-based system in all of its target districts to transfer information from the community level to the district, provincial, and, lastly, the central level where it was aggregated into a central spreadsheet. This system was associated with heavy workloads in processing the data, transcription errors, and long delays in data transfer to the central level. The task was made all the more difficult since Zambia’s population (15 million people) is scattered in a territory three times bigger than the United Kingdom.

While there is great enthusiasm for using digitalized methods for monitoring rural sanitation interventions, the process is still in its pilot phase in many countries and there exists relatively little evidence to inform national scale-up. To address this gap in information, this note reports an efficient and effective sector-wide monitoring framework that is working at scale.

KEY POINTS

• The mobile-to-web (M2W) platform uses low-cost mobile phones combined with simple protocols for reporting and analysis.

• The M2W protocols and tools were piloted in September of 2013, starting with 15 districts then rapidly scaled up. In 2014, the system was used in 29 of the 92 rural districts in Zambia and covered a population of 2,153,788.

• The M2W system has resulted in greater accountability, better data quality, and higher cost efficiency per village targeted.

• Good quality and timely information is now being used to inform the targeting of interventions and to facilitate better follow-up services.

• The Government of Zambia has the potential to expand the monitoring system to not only create a national WASH MIS but also to incorporate indicators from other sectors.
DESCRIPTION OF INTERVENTION

The effective rollout of M2W in rural Zambia has demonstrated how a mobile system combined with simple protocols for reporting and analysis has potential for nation-wide monitoring of ODF. The M2W system was developed in 2013 for monitoring rural sanitation and hygiene by UNICEF and its technical partner Akros, under the lead of the Ministry of Local Government and Housing of Zambia. The system utilizes the Short Message Service (SMS) text delivery system found on most basic mobile phones and is coded using the open source District Health Information Software 2 (DHIS 2). This is a free, open-source software originally designed for health applications, but is currently being used in 40 countries under various sectors, from water management to agriculture and forestry. Its advantages include:

- Availability as an open source software, which minimizes costs;
- Spatial mapping options that provide user-friendly visualization of data, e.g. charts, maps, reports and customized dashboards;
- Real-time mobile-to-web monitoring that eliminates time lost between points of data transfer;
- Minimizing the use of paper-based surveillance in order to reduce data errors together with the need to manually aggregate and digitally convert data; and
- Simple data analysis that improves the managerial capacity of partners for at-scale programmes.

At the village level, Sanitation Action Groups (SAGs) play a key role in driving the M2W process and data collection. SAGs were established with the purpose of encouraging every household to build a toilet and a tippy tap (a makeshift handwashing station using jerry cans and other locally sourced items), as well as to wash hands with soap or ash. SAGs also act as the front line in data collection, recording information on key sanitation and hygiene indicators using paper forms that are handed to Community Volunteers, or ‘Champions’, who in turn enter the data into low-cost, simple Nokia feature phones. As soon as the data are entered, the real-time updating feature displays the information on the online java-based DHIS2 platform.

An integral component of M2W is its ability to conduct timely quality assurance, as summarised in Figure 1. Community Champions are offered an incentive to submit their reports on a given date, after which, Environmental Health Technicians (extension workers of the Health Sector working at sub-district level, EHTs) receive an automated SMS with a summary of the data from the Community Champions in their wards with a request to follow-up on poor performances. On the last day of the month the Community Champions who reported on time receive talk time (3 USD) for each report submitted before the deadline. The data is available on a near real-time basis, with total reporting time from village to national focal points taking 24 hours. Meetings occur regularly between the Community Champions and Environmental Health Technicians to review the data submitted and provide support as necessary. By logging this information into the system, the accountability for each actor to play his or her role is strengthened. It also allows for each level of the data collection to be cleaned and assured for through the feedback loop.
Table 1: Mobile-to-Web Monitoring Indicators (Rural Sanitation)

<table>
<thead>
<tr>
<th>Status</th>
<th>Indicator¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>Going Beyond ODF</td>
<td># HHs the CC has done a quality check on</td>
</tr>
<tr>
<td>Quality check +, sustainability</td>
<td># of HHs passed the quality check</td>
</tr>
<tr>
<td>Sanitation Ladder</td>
<td># latrines in use with platform</td>
</tr>
<tr>
<td>Step 2+</td>
<td># latrines with smooth cleanable floor</td>
</tr>
<tr>
<td>Adequate sanitation,</td>
<td># latrines with lid on top of hole</td>
</tr>
<tr>
<td>Meeting the criteria of the ‘adequate latrine’ / Open Defecation</td>
<td># latrines with superstructure providing privacy</td>
</tr>
<tr>
<td>Free Status</td>
<td># latrines with hand washer with soap/ash</td>
</tr>
<tr>
<td>Sanitation Ladder</td>
<td># improved sanitation facilities built after sanitation interventions</td>
</tr>
<tr>
<td>Step 1</td>
<td># latrines in use with platform</td>
</tr>
<tr>
<td>Improved sanitation</td>
<td>Village population</td>
</tr>
<tr>
<td>Sanitation Ladder</td>
<td># households per village</td>
</tr>
<tr>
<td>Step 0 (baseline)</td>
<td># latrines built before sanitation interventions</td>
</tr>
<tr>
<td>Unimproved sanitation / Open Defecation</td>
<td># improved built after sanitation interventions</td>
</tr>
</tbody>
</table>

¹HH = Household; CC = Community Champion

Figure 1: Mobile-to-Web Quality Assurance and Feedback Cycle

Reviews data in DHIS2, inform program management decisions and district staff performance and EHT performances
EHT receives monthly SMS with progress reports for his/her ward to inform CV/EHT meetings
OJs conducts quality check on Data Collection sheet each month to improve household data reporting

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CV

Community Volunteer (CV)

Community

Community

Health Promotion Team (from District Community Medical Office) Focal Person

Environmental Health Technician (EHT)

CV

Community

CV

End of Month: Community Data Collection

Last Day of the Month: Talk time for reports sent out to all CBWs.

10th of the following Month: Automated SMS to all CVs and EHTs, reminding to report on Community Data Collection

1st - 10th of the following Month: CVs report on their triggered villages, EHT-CV monthly meeting (Data Collection + support for submission with phone), EHT-CV and CV-Community meetings logged in system
OUTCOMES

Over the past year, the system has been put in place in 29 out of 92 rural districts which are now submitting monthly reports through 1,564 Community Volunteers and 210 Environmental Health Technicians; over 1,500 phones and tablets are now operational and being utilized by the trained counterparts. This covers a total population of 2,383,704 from 13,805 villages. In addition, 32 Chiefdoms have been trained in using the monitoring tools. Within the areas covered by M2W, the programme aims to achieve 1,520,661 new users of improved sanitation and to raise the practice of handwashing with soap or ash from 8.6% to 47%. The costs of the monitoring framework include: funds necessary to maintain the server, mobile phones and district laptops/computers; SMS messaging; costs of talk-time top-ups given to Community Volunteers for timely reporting; spot-checks to validate data; and support visits in wards and villages to ensure that management meetings are occurring as planned. The system requires 18 to 24 months capacity building to ensure that it is being rolled-out without support from UNICEF or Akros and this cost represents up to 88% of the total WASH budget. The remaining 12% of the running costs are being supported with the national budget, which will be altered as Akros hands off the monitoring system to the government to ensure sustainability.

Triggering a community in Southern Province to realize their need to practice safe sanitation and hygiene.
LESSONS LEARNED

• Although the monitoring of rural sanitation is still in its pilot phase in many countries, in Zambia the M2W system has demonstrated how a mobile system combined with simple protocols for reporting and analysis has potential for nationwide monitoring of ODF.

• For technical innovation in monitoring to be successful and sustainable, it needs to be driven by national government and supported at provincial, district and community level. The more buy-in, the greater the chance of success. In Zambia, M2W is supported by a vast surveillance network from the village up: including the SAG; headmen and headwomen; Community Champions; Environmental Health Technicians and Chiefs.

• Community Champions were initially provided with smart phones (using a specially designed application and open-source DHIS2 software). However, the Community Champions found the handsets difficult to use, and so these were replaced with more affordable and widely available simple phones. However, Internet connectivity remains a major barrier to reducing lags between transfers.

• Empowering Chiefs with data has been a powerful catalyst for accelerating progress. Chiefs have been given computer tablets in order to view reports, charts and maps generated from the data collected in their Chiefdom: the data has been customized so that Chiefs can see ODF status per village in their Chiefdom, an ODF summary for their whole Chiefdom, and how their Chiefdom compares across districts. The data has helped create a system of benchmarking and competition between Chiefs and used to inform Chiefdom Total Sanitation plans. Chiefs may initially lack the technical knowledge and skills to interpret the data, therefore the initiatives often entail capacity building activities to train the Chiefs, experience shows the Chiefs need little encouragement to act on the data presented.

• A high degree of ownership of any monitoring system by those with the on-going responsibility for sanitation and hygiene is essential and ideally linked to monitoring the targets set in national policy. In many settings, external development partners and NGOs play a primary role in monitoring WASH. In Zambia, the Ministry of Local Government and Housing has ownership of the M2W system through their lead throughout the process from conceptualisation to development and implementation, and this has ensured a national harmonized approach. A staggered exit strategy has been planned by the technical partner, to allow them to gauge district and provincial-level governments’ and community stakeholder’s ability and commitment to maintain the system.

• The Government of Zambia found that having limited data created challenges in designing and implementing rural sanitation and hygiene interventions. The M2W system has been used as a management tool for programming: feedback loops and course correction mechanisms have led to increasing numbers of people now using improved sanitation and practicing hand washing with soap or ash. M2W also led to efficiencies that reduced the average cost of implementation: in areas covered by the mobile-to-web system the cost per new user of improved sanitation is 1.65 USD, compared to an average of 2 – 2.5 USD in areas relying solely on paper documentation.

• Monitoring sanitation and ODF status is not easy, and technology – such as smart phones - isn’t a silver bullet. Effective monitoring of rural sanitation ultimately depends on people and an enabling environment. The enabling environment must have a broad range of factors, such as: appropriate policy, legal and regulatory frameworks; adequate human resources; sufficient budget; good governance and clear institutional responsibilities/accountabilities; consistent incentives for community volunteers; a good understanding of the social and cultural context; and rewards and sanctions to promote ODF. Citizens and communities have an important role to play and the effectiveness of any monitoring systems depends on the willingness and ability of citizens to effectively engage in making WASH service provision more responsive and accountable.
The key attributes of M2W are that it is an appropriate, accessible and affordable monitoring tool. The system addresses sector performance monitoring as well as coverage and functionality, and highlights organisational accountability.

The Ministry of Local Government and Housing has pledged to establish a national WASH Management Information System (MIS) by 2016, for 65% of all districts, or approximately 67 of the total 103, in Zambia. Having witnessed its success, the government seeks to make the M2W system the backbone of the National WASH MIS. Presently the data are accessible online for focal points at district, provincial and central level but there is the intention to make the data more widely accessible to other ministries, as well as development partners.

UNICEF’s technical partner is currently adapting the platform for monitoring school-led total sanitation as well as water point monitoring; for water point monitoring this will be a GIS-integrated database, with Community Volunteers providing monthly updates on key indicators to measure sustainable access to safe drinking water. It will be the first time in Zambia’s history where districts, provinces and central personnel are provided with data on the status of all water points in a large cross-section of rural districts in order to improve the targeting of resources for installation and repair of water points.

NEXT STEPS

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AUTHORS
Nicolas Osbert, UNICEF Zambia; Alexandra Hoehne, UNICEF Zambia; Engervell Musonda, Ministry of Local Government and Housing; Swathi Manchikanti, UNICEF Zambia; Abel Manangi, Ministry of Local Government and Housing; Paul Mboshya, Ministry of Local Government and Housing

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This Field Note is part of the UNICEF Eastern and Southern Africa Sanitation and Hygiene Learning Series, designed to improve knowledge of best practice and lessons learnt in sanitation and hygiene programming across the Region. The series has been funded by the Bill & Melinda Gates Foundation in support of improved knowledge management in the sanitation sector.

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