

Introducing ICTs for WASH monitoring in Ethiopia

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Abstract/Summary

This paper reviews national WASH sector monitoring in Ethiopia, and recent experiences seeking to improve the related monitoring capacities, processes and systems with a focus on the introduction of new information and communications technology (ICT). The complex enabling environment for WASH monitoring that spans multiple key institutions is mapped, capacity constraints summarised, and recommendations made to promote greater coordination and collaboration across government and wider sector efforts. Two recent federally-initiated initiatives to introduce ICT technologies in the WASH sector are assessed – the development of a management information system for national WASH and the use of mobile-based data collection tools in National WASH Inventory in Somali region – with lessons learned on using ICTs to better update datasets, sustain national monitoring capacities and make full use of the data collected. Finally the paper reviews the current landscape of WASH ICT experimentation, particularly by NGOs, identifying possible strategies to harness capacities across the WASH sectors in support of government-led monitoring processes.

Introduction

Government-led nationwide WASH monitoring is a critical component of the necessary enabling environment to achieve the Sustainable Development Goals. The Sanitation and Water for All (SWA) partnership, for example, emphasises the need for a good evidence base and strengthened government-led planning processes as current top priority issues together with higher political prioritisation (SWA, 2016). This paper discusses national Water, Sanitation and Hygiene (WASH) sector monitoring in Ethiopia, and recent experiences seeking to improve WASH monitoring capacities, processes and systems with a focus on the introduction of new information and communications technology (ICT). ICT is creating new opportunities and possibilities for WASH monitoring linked to new mobile phone and internet technologies (Welle *et al.*, 2015; Fisher *et al.*, 2016) that a wide range of sector actors are seeking to capitalise on within the country.

WASH services in Ethiopia are gradually being transformed through a series of innovations and reforms under the umbrella of the One WASH National Programme (OWNP). The OOWNP is a sector-wide approach to WASH involving four key government ministries and their related sub-sectors to improve the way WASH services are delivered to people (FDRE, 2013). This combines the efforts of the Ministry of Water, Irrigation and Electricity (MoWIE), Ministry of Health (MoH), Ministry of Education (MoE) and the Ministry of Finance & Economic Cooperation (MoFEC). Coordinated by the National WASH Coordination Office (NWCO) it brings together government, development partners and Non-Governmental (NGO) activities in WASH in a coordinated programme with total planned programme investments exceeding USD 2.4 billion (2013-2020).

The aims of the OOWNP are to improve the health and well-being of communities in rural and urban areas by increasing equitable and sustainable access to water supply and sanitation, and the adoption of good hygiene practices. The programme combines a comprehensive range of water, sanitation and hygiene interventions that include capital investments to extend first-time access to water and sanitation as well as investments focused on developing the enabling environment, building capacity, ensuring the

sustainability of service delivery, and behavioural change. The scope includes WASH provision for households, rural and urban communities, and schools, health and other institutions.

So that results can be tracked, and ultimately improved, the OOWNP plans include strengthening national WASH monitoring and evaluation (M&E) systems. OOWNP M&E objectives include: 1) to measure and report progress towards the intended OOWNP results, and 2) to strengthen accountability of the WASH sector at all levels (i.e., federal, regional, town and Woreda) through the use of data and information from the WASH M&E system.

Description of the Case Study

This paper summarises the current status and enabling environment for national-scale WASH M&E and reviews experiences and initiatives to introduce ICT in WASH monitoring. The paper is largely based upon the findings of an inception phase of managerial and technical support provided by IRC to NWCO on behalf of Coffey International Development and with funding from the UK Department for International Development. Further information is provided in the diagnostic review of OOWNP M&E (Coffey/IRC, 2015) and assessments of M&E capacity (IRC, 2015a) and the WASH M&E Management Information System (MIS) (IRC, 2015b).

The paper reviews three issues in WASH monitoring:

- The current enabling environment in Ethiopia for country-led WASH monitoring
- Recent federally-initiated initiatives to introduce ICT technologies
- Other ICT introduction efforts, particularly by Non-governmental organisations (NGOs), and possible strategies to harness capacities across the WASH sectors

Main results and lessons learnt

Existing practices and the enabling environment for country-led WASH monitoring

Coordinating to link sectoral and fragmented processes

Under the OOWNP, the WASH sectors are working towards ‘one plan, one budget, and one report’. Such streamlining aims to reduce the administrative and reporting burden on critical staff and improve efficiency, but at the same time, should enable the telling of a full and complete story about WASH, and actions to address implementation issues (using evidence) to improve coordination. However, the existing WASH landscape is rather fragmented and complex, with numerous programmes, plans, financing channels and reports across the WASH sectors. Table 1 summarises the key monitoring reporting processes within government related to WASH including the three main implementing sectors and finance as a supporting ministry. Further data is collected through the household surveys administered by the Central Statistical Agency. M&E responsibilities and efforts are typically fragmented (even within government) because of the complex financing arrangements in WASH sectors and the many different Ministries, Departments, Offices, Processes, Subprocesses and Case Teams involved. Fragmented responsibilities result from the many different funding modalities, for example the block grant, consolidated WASH account, bilateral and multilateral (UN) programmes and projects, NGO projects and emergency WASH interventions. Integrated WASH monitoring through combined data collection processes is a fairly recent development, through for example the National WASH Inventory in 2010/11. There have to date also only been occasional integrated reporting efforts, at largely federal level, that have not been fully successful or sustained and a comprehensive annual sector report remains a major gap at national as well as lower levels.

Table 1: Governmental monitoring processes related to WaSH

Processes	Water	Health	Education	Finance	CSA	Integrated WASH
Data collection (and reporting frequency)	Critical coverage and functionality indicators are calculated based upon data that is reported by woreda water offices (rural water) and urban water supply utilities. Quarterly reporting processes are extensive, but based upon none standard indicators and variable definitions.	Data is collected frequently (monthly, quarterly and annually) by health extension workers and reported through health centres to woredas.	Annually from all schools under supervision of supervisors.	Quarterly from WoFED, BoFED, etc.	Household surveys employing trained enumerators. Generally survey designs with sampling to provide nationally-representative data.	Not routine. Major recent examples of integrated data collection were NWI 2010/11 (NWI in Somali excluded the household sanitation components) and collection of data from regions through standard formats for the (Consolidated WASH account) CWA annual report.
Data processing	Generally done manually with desktop software, e.g. Excel.	Managed by diploma-holding expert at Woreda level who transcribes paper-based submissions and generates CDs with results. Their computer is highly regulated to prevent viruses and reduce maintenance requirements.	Regions aggregate results from paper forms using Excel and submit this to MoE who manage the data in an Access database.	Data processing occurs in IBEX.	Centralised in CSA	NWI data was entered into a custom-made Access database. Most analysis in Excel. Some data from 2010 has been imported into the WaSH M&E MIS by PUT.
MIS/ analysis	Rural and urban water supply included in WaSH M&E MIS but this is not yet operational. Excel is standard for analysis.	HMIS only allows calculations for the limited indicators included.	EMIS data is analysed on an annual basis.	IBEX is currently used to generate reports. MoFED is currently piloting a new Integrated Financial Management Information System (IFMIS).	There are a number of web platforms to generate indicators from CSA, e.g. CountryStat Ethiopia. Many datasets are created by CSA analysts	WASH M&E MIS not yet operational but under implementation.
Reporting	Annual reports are prepared by Planning Department (MoWIE wide) and by Water Supply and Sanitation Directorate for various donor projects and programmes. Reports disseminated in sector meetings such as the Multi-Stakeholder Forum (MSF).	MoH publishes HMIS indicator results on an annual basis in its annual performance report. However, the key sanitation indicators have not yet been included.	An Education Statistics Annual Abstract is produced. A new National School WaSH Strategy and Guideline is expected to support improved reporting.	Budgets are published annually and financial information can be accessed through IBEX.	The CSA website provides access to publications and a number of web platforms for downloading analysis and datasets published on a regular basis. The naming and coding publication, critical for integrated reporting is not yet regularly updated (last updated in 2012)	The first OWNPCWA report was prepared in August 2015. However this was only integrated at federal level, and does not cover the whole country. Integrated reporting is not yet underway at regional or woreda levels.

Cooperation between the units managing information systems across WASH ministries and alignment of data from the different MIS systems across the WASH sectors is currently limited, and this hampers efforts to produce WASH sector wide reporting, for example to combine health data on sanitation and education data on school WASH with water sector data on rural and urban water supply. Ministries do

not yet cooperate sufficiently to ensure data sets are complementary, to avoid overlaps and to ensure timely sharing. A further challenge is presented by the decentralised nature of the country. Regions and woredas have substantial powers and a strong stake in what data shows. A typical gap (affecting financial expenditure data for example) is that as data flows up the system it loses value due to aggregation at the different levels (regions reporting consolidated woredas data to the federal level for example). More modern MIS systems have potential to make a major impact in this area.

Major surveys by the Central Statistical Agency (CSA) with WASH questions include the Demographic and Health Survey (every 5 years), Welfare Monitoring Survey (every 5 years), Household Consumption Expenditure Survey (5 years), and Census (10 years). Strong links have not yet been established between the wider WASH sector and the National Statistical System led by the CSA and there is potential for wider use of household survey data within the OOWNP if these links are strengthened, as well as learning from developments in M&E in other sectors. There are established governance arrangements to link NGO reporting to the OOWNP such as the consolidated reporting of the Christian Relief and Development Association (CCRDA) Water and Sanitation Forum, in addition to the agreement-related reporting requirements on NGOs to report to Finance and Economic Development at woreda, region or federal level. Efforts are also underway to strengthen this reporting.

In this context - a complicated grouping of subsectors involving numerous agencies - integrated WASH M&E could facilitate improved information flows and support coordination, with the OOWNP being able to more quickly monitor, evaluate and communicate its successes and failures. It could also help to realise the strengths of a multi-sectoral approach helping make links between water supply, sanitation provision and hygiene behaviours in decision-making.

Capacity constraints

Within MoWIE there are critical constraints with respect to human Resources development, resourcing more broadly including the physical and logistic resources needed to do M&E tasks, and the current supply of training and broader capacity building support (IRC, 2015a). M&E is perceived to have a lower priority than other core processes, and M&E staffing and training is not prioritised. There is high turnover of staff, numerous vacant positions (managerial, technical, expert and support) related to WASH M&E, limited or no financial resources and opportunities to build staff M&E capacity, and a generally low levels of skills in M&E and IT. There is relatively better capacity in health and education M&E, but WASH is not a focus or core competence in these sectors.

Resource gaps (physical, financial and human) between regions and woredas are also significant. Two regions, Tigray and Amhara, are mobilising kebele (sub-district) level water staffing and bringing the water supply sector into a position more similar to the health (with its health extension workers) and education sectors. Woredas with larger donor investments have generally higher capacity and are better equipped. Physical capacity relevant to M&E includes equipment and transport logistics. Although considerable ICT equipment are available at regional level, its use is hindered by a significant shortage of skills to manage and use it effectively. A lack of ICT facilities and equipment is notable from woreda level downwards although there are projects underway to roll out the supply of new computers. There are clear IT skills and systems constraints at all levels. A lack of transport facilities further hinders M&E.

Although the health sector has the strongest of the WASH sector monitoring systems, there is high turnover of HMIS experts who focus on a facilitating a flow of information rather than interpreting or responding to WASH data signals. Limited knowledge of sanitation and hygiene significantly impacts on health staff's ability to gather and analyse monitoring data and to compile accurate reports. Similarly, education departments are primarily concerned with education-related targets, and the positive correlation between improved WASH and achieving education targets is not foregrounded.

On the supply side, Technical and Vocational Education and Training Centres and Health Science Colleges train water technicians and health officers with M&E related content but overall training supply is ad-hoc and there is a lack of continuity in training courses and no central coordinating body. There is also no system to monitor the efficacy or impact of training. The MoWIE Capacity Building Unit aims to tackle these issues but is not yet fully functional. Training on WASH M&E is limited, and where training

exists it's on M&E generally and theoretically, plus there is a general bias towards water over sanitation and hygiene monitoring. Courses also tend to be one-off without a mechanism in place to update training when M&E systems are updated in keeping with sector changes, or when new staff arrive. Training materials are usually not available in local languages and are either not provided or not commensurate with the level of trainee groups. The availability of training materials after completing training courses is a key issue given the high turnover and attrition of M&E and sector personnel.

National initiatives to introduce ICT technologies in WASH monitoring

There are a large number of existing MIS systems that hold WASH related data at both national and local levels. These systems include, in health firstly, the Health MIS or HMIS (with 3 household sanitation indicators and 2 health institution indicators; located within the Health System Special Support Directorate) which is complemented by the Hygiene and Environmental Health directorates programme monitoring system (with four additional WASH indicators proposed). The Education sector also has an existing national level management information system in place known as EMIS (within the EMIS directorate) with School WASH indicators (3 key indicators) and annual reports include reporting on these indicators. Finance has the national Integrated Budget and Expenditure System (IBEX) system to manage public expenditure according to standard budget codes. All of these systems have gaps with respect to WASH indicators and the quality of data collected (see for example, Jones, 2015). However, these are all functioning national scale data collection and reporting systems within OWP implementing ministries.

The introduction of Information and Communications Technologies (ICT) to support M&E across the WASH sectors is however at an early stage. The Health and Education reporting systems are largely paper based (data becomes digital at woreda level in the HMIS and at regional level in the EMIS). There is no use at scale of internet and mobile communications technologies within these systems although pilots are underway with mobile data collection technologies in the health sector. IBEX is a series of standalone databases at regional level and is not networked. Data is sent to federal level by hardcopy official letter and sometimes by email. There is some variation in regions with data entry being done at woreda levels where infrastructure is better. Currently at federal level it is only possible to access consolidated regional data, so analysis possibilities are limited (Prat, et al. 2014). It is only possible to access woreda level data at the regional or lower levels. Data is re-entered at federal level. When IBEX is networked, starting in Tigray, woreda level data will be available up to federal level. Staff may then be able to dedicate more time to data analysis rather than data entry.

While IT-enabled MIS systems at national level are operational within the education, health and finance sectors, there is not yet a comparable national system in use in the water supply sector. Federal ministries, led by water, have taken important initiatives to improve WASH monitoring over recent years including through the deployment of new ICTs as these have become available. Success has been mixed to date, but there are critical lessons that can be drawn and used to help ensure further successful utilisation of newer generation ICTs, databases and visualisation solutions that offer ever improving capabilities.

The development of the WASH M&E MIS using proprietary software

A national system known as the WASH M&E MIS has been in development since 2008 with software handed over to MoWIE in 2015. The system was developed by local consultants Professionals Unite Together (PUT) and is based upon proprietary software applications (IRC, 2015b).

The WASH M&E MIS has been assessed to be functional with key functions possible as originally intended, but it is not operational i.e. is not in use. Most basic functions such as entering and editing data, generating analysis and outputting results are possible, despite a few bugs. Despite a large-scale roll out of training (to over 300 woredas which is about a third of the total) significant use of the system has not yet been triggered. A telephone survey in September 2015 of 24 regional, zonal and woreda offices found that all had knowledge of the WASH M&E MIS database, and had received training but none reported using the MIS. These findings are consistent with interviews undertaken during a series of regional visits. The database at national level contains only 2010/11 NWI data that has been manually imported and new data is not yet being entered. The hardware and training roll-out (300 staff trained) have not as yet led to use of the system. Many of the 800 computers bought are still being distributed. Further hardware roll-

out and training (500 more woredas staff) is currently being provided to other woredas that have not yet received support to use the system.

In its current status, the WASH M&E MIS lacks some characteristics considered necessary for operationalization, for example training and other support activities are not likely to be sufficient for widespread use of the system. There are also significant technical and operational challenges with the system and the testing processes that have been undertaken have not been sufficient to ensure that the system has met user requirements and capabilities. Critically the software is not yet user friendly (easy to use, meaning it is not difficult to learn or understand, and that it is simple, intuitive and reliable), or easy to reconfigure which is challenging given that it is now necessary to fully update the indicators with new requirements. For example, the Second Growth and Transformation Plan (GTP2) requires some new indicators to be adopted within the OOWNP and others to be modified.

MoWIE have, until recently, received limited support in ICT procurement and weaknesses in the contracting of the WASH M&E MIS have proved a major headache. To address the current gaps in the system, plans to make use of the system now focus on its use for critical data archiving and reporting functions, with alternative solutions found for woreda-level data entry that are based on the use of mobile phone technologies.

The National WASH Inventory and deployment of mobile-based data collection technologies

A key achievement in WASH monitoring over the recent past has been the undertaking of the National WASH Inventory. In 2010/11, a huge and focused effort ensured the collection of basic data from all 93000 ‘improved’ rural water supply systems in the country (now there are estimated to be 160,000) as well as 50,000 schools and health institutions and 1600 towns (Welle, 2013). At that time, the Somali region was left out for logistical reasons, but good advantage was taken of this in 2014 when the survey was extended to the Somali region. By this time, new new mobile data collection technologies were available. The Somali inventory, under the leadership of MoWIE and with UNICEF support, used the Akvo FLOW app on smartphones to greatly improve the time to availability and the quality of data collection compared to paper-based data collection in other regions. Data entry, which was a major burden for regions following the 2010/11 exercise, was also eliminated as all details are logged using the phones in the field and data directly submitted to a database.

A major success of the NWI was an improved national estimate of access to improved water supplies, and the results were accepted and used by both the parliament and later the World Health Organisation (WHO)-United Nations Children’s Emergency Fund (UNICEF) Joint Monitoring Programme (JMP) in determining that Ethiopia had successfully met the MDG water target.

Nevertheless, even more use could have been made of the data. Limited investments were made in the analysis and dissemination of data either in the 2010/11 or 2014 Somali exercise. Future plans aim to invest resources in analysis and reporting to produce an accessible WASH atlas, and publish results as part of an annual OOWNP report.

While the NWI was multi-sectoral in its WASH scope, and engaged health extension workers and teachers in data collection, it has not achieved the same level of ownership in the health and education sectors as in water who led the process. Going forwards the need has been identified to ensure that the NWI is further integrated into the ongoing monitoring efforts of all sectors, with duplication avoided.

Capacities or processes to update the NWI have also not yet been put in place. However, the intention is that as the NWI is repeated in 2016 to provide the baseline for future ongoing monitoring activities, approximately 5 years after the previous nationwide data collection, capacities (both skills and tools such as the phones and applications) will be built at all levels, and especially the woreda level, to ensure that in future new systems are systematically added to the database and the changing status of existing systems (e.g. functionality) is properly tracked. This should make the need for any similar future NWI redundant. Rather it will be possible to focus on validating data for a sample of schemes, or collecting additional in-depth information through the survey since a basic, up-to-date database will already be maintained.

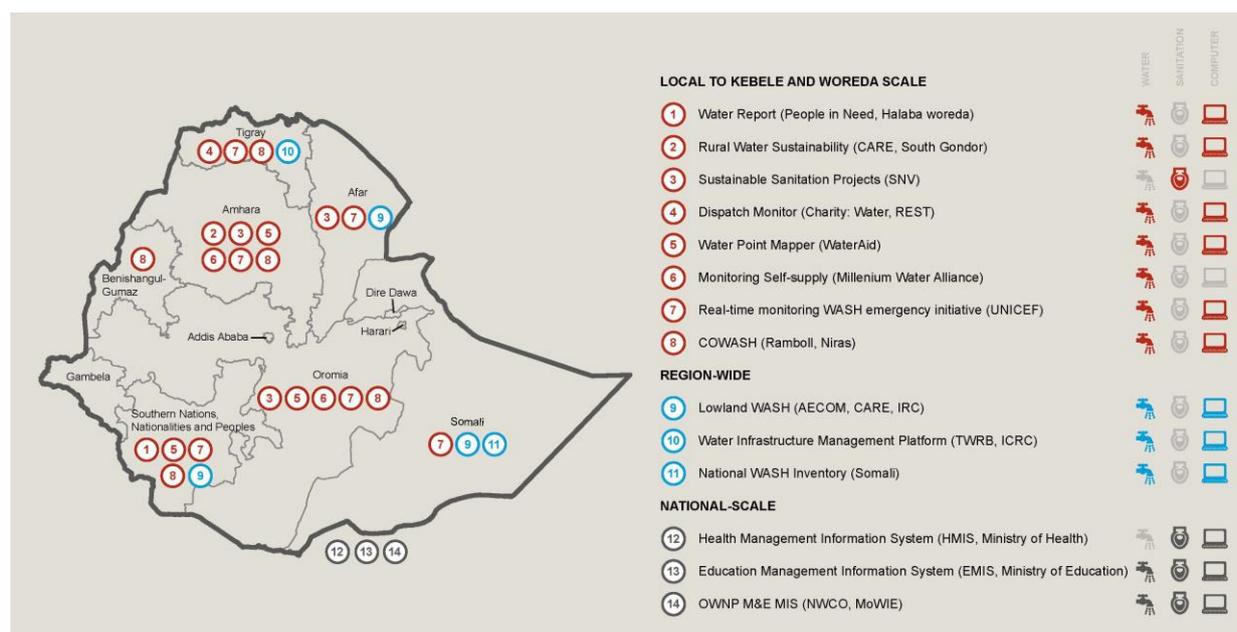


Figure 1: Some current initiatives introducing ICTs into rural WASH monitoring

Other ICT initiatives in WASH monitoring

Figure 1 and Table 2 presents a first effort to map current and recent initiatives to introduce ICTs in rural WASH monitoring. The criteria for including initiatives were that they 1) focus on an aspect of rural WASH monitoring, 2) involve ongoing monitoring and reporting with government or local organisations rather than a one-off baseline, impact evaluation or short-term research effort (where tools such as Akvo FLOW and M-water are also widely used) and 3) include an ICT component. The initiatives cover a range of scales from a relatively small number of water points in a single woreda to whole regions. Figure 1 illustrates were initiatives focus on water or sanitation, the deployment of a computerised database or dashboard and the use of mobile phone and sensor technology.

Table 2: Some current initiatives utilising ICTs in rural WASH monitoring

Title	Location	Description
<i>Local to kebele and woreda scale</i>		
Water Report	Halaba, SNNPR	SMS based fault reporting system set up by NGO People In Need, with Woreda Water Office staff responding.
Rural Water Sustainability	South Gondor, Amhara	In 2015, Care supported local governments in South Gondor zone to map all the 2505 water supply schemes (and 195 institutional latrines) in 9 woredas using the mWater smartphone app.
Sustainable Sanitation Transformation	Amhara, Afar, Oromia	SNV use the Akvo FLOW system for M&E purposes within their sanitation programmes, Sustainable Sanitation Transformation in Urban and Peri urban areas (SSTPU) and Sustainable Sanitation & Hygiene for All (SSH4A).
Dispatch Monitor EST	31 woredas in Tigray	Charity: Water/ REST's 'Dispatch Monitor' system logs and displays the water point status (functioning or needing repair) as reported by in-coming calls on free call line, AKVO FLOW spot-check surveys filed by program circuit riders, and sensors. There are currently over 3000 water points in the database, but these are only CW/REST schemes. Almost 1000 of these water points are fitted with sensors providing real-time data.
Water Point Mapper	Amara, Oromia, SNNPR and BSG	WaterAid Ethiopia is supporting use of its excel-based Water Point Mapper tool in 14 woredas in 4 regions (Amhara, Oromia, SNNPR and BG) by regional and woreda governments.
Monitoring Self-supply	Focus kebeles in 7 woredas in Amhara and Oromia	The Millenium Water Alliance are monitoring existing and new household-level water supply facilities that are constructed and improved through private investment. Akvo FLOW is used for surveys led by woreda government staff.

Real-time monitoring WASH emergency initiative	Woredas in Somali, Oromia, Amhara, Tigray, Afar, SNNPR	In 7 regions and in a total 70 priority woredas Akvo FLOW is being used for monitoring features to collect weekly data at all water points in the identified woredas. An automatic linkage has been setup between the Akvo FLOW system and the prototype online dashboard for data visualisations.
COWASH	CMP (Community Managed Project) woredas in Amhara, Oromia, SNNPR, Beninshangul, and Tigray.	COWASH uses handheld GPS devices and open source software (OpenOffice, QGIS). Capacity has been built at woreda-, zone-, and region-levels but the data is still mainly used at federal level. A1-size maps are generated for all COWASH woredas with an estimated 90% of water point data available for these woredas (in total 7827 waterpoint in the federal database).
<i>Region-wide</i>		
Lowland WASH	Afar, Somali, SNNPR	New project (AECOM/ Care/IRC/USAID) supporting the strengthening of WASH Management Information Systems in 3 regions, promoting the use of data for planning in 24 woredas, and involving installation of sensors on new and rehabilitated water supply schemes.
Water Infrastructure Management Platform	Tigray	The Tigray Water Resources Bureau (TWRB) manages WIMP which was developed with the support of ICRC on a web-based (Majella) platform. Rolled out to 34 rural woredas and working well in 18. These woreda water offices manage information on 15,279 water supply schemes. This system has been used regionally for official coverage calculations.
National WASH Inventory (Somali)	Somali region	The regional water bureau mapped a total of all 2914 rural community water supply systems, 22 urban facilities and 2386 institutional facilities within 22 actual days, with a total of 5696 records collected using Akvo FLOW app on mobile phones. Initiative led by MoWIE with UNICEF support.
<i>National-scale</i>		
Health Management Information System (HMIS)	Nationwide	National database including sanitation and hygiene indicators fed local health centres nationwide with data sent upwards to woredas, zones and regions by CD and internet.
Education Management Information System (EMIS)	Nationwide	National database including school WASH indicators with data entered at woredas and sent upwards to zones and regions (Access database). Aggregated data used to produce the Regional and National Education report.
OWNP M&E MIS (PUT)	Nationwide	National WASH database developed by consultants PUT for MoWIE. Based on proprietary software housed on servers at the National Data Centre connecting woredas by internet. Holds imported data from the 2010/11 National WASH Inventory.

The mapping illustrates the high level of interest and activity in the introduction of new ICTs for WASH monitoring. While it is challenging to generalise across such a wide range of initiatives at different scales, some identified trends are:

- NGOs are particularly active and a source of innovation in WASH monitoring. Examples include large International NGOs like Care and ICRC, water specialists like WaterAid or Charity: Water, small NGOs like People in Need and Ethiopian NGOs such as the Relief Society of Tigray (REST). WASH alliances, including the Millenium Water Alliance and the WASH Alliance International, are working to to promote standardised monitoring approaches across their NGO memberships and there is potential to use their scale to get NGOs behind government-led monitoring systems, and to learn valuable lessons from piloting in different areas.
- A shift from project monitoring by NGOs and projects towards supporting woreda-wide monitoring by regional and woreda governments is quite advanced. Examples include WaterAid, Care and ICRC. Others still have to make or support this step, and it is a recommended strategy.
- There is considerable use of leading sector applications such as Akvo FLOW and mWater apps for mobile-based data collection, and the country is developing substantial experience in the use of such tools. Care for example have used M-Water at zonal scale, and the government used Akvo FLOW at regional scale in the Somali NWI in 2014.

- A fairly recent and exciting new area of innovation is linking monitoring and messaging tools to the development and deployment of capacities to maintain water supply schemes. Examples include Charity: Water/REST’s system where local teams will respond to breakdowns if existing government systems are unable to fix the problem, and SNVs initiative in Tigray to develop private sector capacities to repair water supply schemes with messages channelled from WASHCOs.
- Using new sensor technologies, some organisations are innovating to fit sensors to water pumps to provide real-time monitoring data. Charity; Water/ REST have been an early pioneer in the use of such technologies, with sensors now in use on almost 1000 schemes, and the Lowland WASH Activity are working with the company SweetSense to fit sensors to remote water supply systems in pastoral areas.

Conclusions and Recommendations

At the outset, our analysis highlighted the huge scale of the challenge to build coherent WASH M&E processes and systems in a context of fragmentation and capacity constraints. The introduction of new ICTs clearly has potential to drive improvements. This is more likely to be the case if lessons are learned from existing ICT introduction efforts such as the development of the WASH M&E MIS and the NWI in Somali region. The final section on ICT initiatives highlights another side of the capacity coin. While government may have some capacity gaps for WASH monitoring and use of data in reporting and planning, there are significant additional capacities within NGOs, private companies and UN agencies. Many organisations are innovating and finding better ways to do WASH monitoring. To build on these initiatives and innovations and the related capacity that is being developed, it is recommended:

- To develop agreed standards, definitions and a minimum set of indicators that all are expected to adopt in order to promote alignment and synergies, rather than duplication, in WASH monitoring.
- To actively promote collaboration to harness the capacities of NGOs, UN agencies and others to support government such as encouraging moves towards support for woreda-wide rather than project or institutional-based monitoring. On its own, the latter is not enough and is unlikely to promote coordination.
- To promote use of data for all purposes at all levels, but particularly to promote use of data at the local level for operational purposes.
- To explore opportunities to drive improvements in the use of WASH M&E data through results-based payments, improved incentives or the commercialisation of some data use.
- To develop a network or community of practice to regularly share expertise and promote lesson learning and synergies between different efforts in WASH monitoring in Ethiopia.

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