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Service monitoring in Ghana

Synthesis of three years of service monitoring in three districts

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Supporting water sanitation and hygiene services for life

IRC Ghana

COMMUNITY WATER AND SANITATION AGENCY

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The report presents the findings of three years of service monitoring in three districts in Ghana.

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Abbreviations

CWSA	Community Water and Sanitation Agency
DA	District Assembly
Danida	Danish International Development Agency
DiMES	District Monitoring and Evaluation System
DP	Development Partner
DWSP	District Water and Sanitation Plan
DWST	District Water and Sanitation Team
EHA	Environmental Health Assistant
EU	European Union
FLOW	Field Level Operations Watch
GHC	Ghana Cedi (Currency of Ghana)
GoG	Government of Ghana
GSB	Ghana Standards Board
GSS	Ghana Statistical Services
GTZ	Gesellschaft für Technische Zusammenarbeit
GWCL	Ghana Water Corporation Ltd
HH	Household
IDA	International Development Association
ITS	Information Technology Specialist
lpcd	Litres per capita per day
M&E	Monitoring and Evaluation
MMDA	Metropolitan, Municipal and District Assembly
MOM	Monitoring Operations and Maintenance
MoU	Memorandum of Understanding
NGO	Non-Government Organisation
PAYF	Pay As You Fetch
PO	Private Operator
RLF	Regional Learning Facilitator
RWSN	Rural Water supply Network
SIP	Strategic Investment Plan
TA	Technical Assistance
UNICEF	United Nations Children's Fund
WD	Water Directorate

1 Introduction

Over the last decades, good strides have been made in increasing rural water supply coverage in Ghana, with rural water coverage increasing from 38% in 1990 to 81% in 2012 (UNICEF/WHO, 2014). With increasing coverage there is a shift in focus away from implementation only, towards also improving the level of water services and their sustainability. The Community Water and Sanitation Agency (CWSA), the lead government agency responsible for rural and small town water supply in Ghana, has set norms and standards related to the level of water services that should be provided under its community management models. It has developed guidelines, manuals and a model by-law which describe the operational, financial and institutional arrangements that should be in place at community, district and regional level, in order to ensure sustainable service delivery. With an increased focus on improving service levels and sustainability of water services, monitoring whether these norms and standards are being met and whether the conditions for sustainable water service provision have been put in place is essential.

The provision of sustainable water *services* goes beyond functionality and takes into account other water service characteristics, like quality, quantity, accessibility and reliability. Furthermore, it is important to assess whether structures and arrangements are in place to ensure that the facility is not only providing water services today, but will be able to do so for a long time to come. Monitoring to be able to track the level of service over time and the performance of key technical, financial and management functions is crucial to allow problems to be anticipated and addressed.

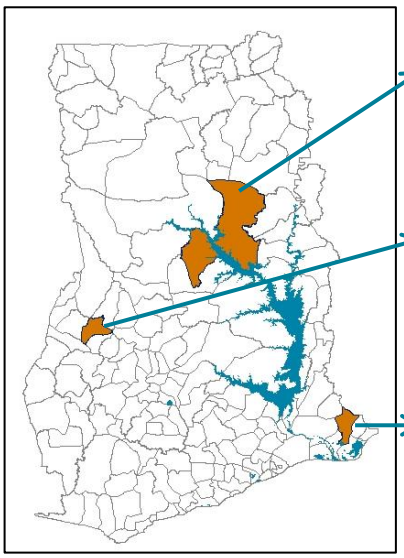
Monitoring of rural water supply so far has mainly been limited to tracking the number of facilities constructed and to some degree, their functionality. This has been the main purpose of the District Monitoring and Evaluation System (DiMES), developed by CWSA. DiMES consists of a Microsoft Access-based database, with district based-data collection and region-based data entry and compilation. However, DiMES was not necessarily intended as a tool for monitoring compliance of water services delivered and performance of (community-based) service providers and service authorities with CWSA norms, standards and guidelines. Also, the operationalization of the system and its nation-wide application has been a challenge.

As part of the Triple-S initiative, CWSA and IRC have been experimenting with innovations to enable and improve rural water service monitoring in Ghana. These innovations have included:

1) sets of indicators and underlying scoring algorithms for monitoring functionality, service levels, performance of service providers and support functions, as per the CWSA norms, standards and guidelines,
2) ICT tools for collecting, processing and storing monitoring data,
3) The monitoring cycle, with procedures for the various steps in monitoring with clearly defined roles and responsibilities.

These different innovations have been applied over a period for three years (2012-2014) in three districts in different regions: Akatsi in Volta Region[1], East Gonja in Northern Region and Sunyani West in Brong Ahafo Region. In these districts, monitoring data was collected, processed and analysed on all water schemes on an annual basis.

Figure 1 Triple-s pilot districts



East Gonja District, Northern Region	
Area (km²):	9,015
Population:	135,450*
Population density (per km²):	15

Sunyani West District , Brong Ahafo Region	
Area (km²):	1, 658
Population:	85,272*
Population density (per km²):	51

Akatsi District , Volta Region	
Area (km²):	906
Population:	128,461*
Population density (per km²):	142

* 2010 population and housing census data (GSS, 2012)

1.1 Scope and outline of this document

This report provides the framework for monitoring rural water services in Ghana, as it stands now, including the indicators, the tools applied for data collection, processing and storage and the procedures developed. This is the main focus of section 2, which describes the monitoring framework. Section 3 presents the findings and lessons learnt from its application in three districts over a period of three years. An indication of the resources required for service monitoring is presented in section 4. This section also gives an overview of the benefits that service monitoring has brought along at different levels. Finally, conclusions and recommendations are presented in section 5.

Although monitoring data has been collected on both small town piped schemes as well as on rural point sources, this report will focus on service provision by rural point sources.

[1] In 2012, Akatsi District was split up into Akatsi North and Akatsi South District. In the subsequent years, monitoring was executed in both districts. The report will refer to these two districts as 'Akatsi district'.

2 Water service monitoring in Ghana

This chapter presents the conceptual and methodological framework for water service monitoring in Ghana. It starts by describing the indicators and algorithms used and the way these were developed. This is followed by a description of the ICT platforms in use for data management. Finally the process for monitoring, starting from data collection to its analysis is presented.

2.1 The service monitoring indicators

The water service monitoring indicators consist of a set of indicators and algorithms based on the national guidelines, manuals and model by-laws. The indicators go beyond identifying, counting and mapping the water service infrastructure.

In order to monitor whether the facilities are actually providing water services, the functionality of facilities needs to be monitored. The functionality of a water facility is determined by an on-site assessment of the status of the facility. As shown in box 1, the way in which functionality is defined, has changed over time.

Box 1: Assessing functionality

As per the first draft of the framework, handpump functionality was initially assessed based on the so-called stroke and leakage test. Stroke test results indicate whether or not a handpump can be used to fill a 20 litre bucket within a certain number of strokes, as per the type of handpump (e.g. within 40 strokes in case of an AfriDev or Ghana modified India Mark II). For the leakage test, pumping is resumed after a 5 minute rest period, after the stroke test. If water flows within 5 strokes, the handpump passes the leakage test.

In order to simplify the functionality assessment and minimize the number of tests, the revised monitoring framework (CWSA, 2014b) suggests to base the functionality status of handpumps only on the results of a '5-stroke' test, whereby:

- A handpump is classified as functional, when water starts flowing within 5 strokes or less,
- A handpump is classified as partially functional when water starts flowing but after more than 5 strokes of the handle of the pump,
- A non-functional handpump is defined as a handpump for which water does not start flowing at all.

Although a facility can be functioning at a given point in time, it can be broken down the rest of the time, providing very unreliable water services. It can be providing water of a quality that is unacceptable, or only a small quantity of water, or it can take people hours to fetch water from it, either because of the distance or because of the fact that too many people depend on the facility, or both. So the system may be functioning, but is not providing an acceptable level of service. There is thus a need to assess functionality, but also to take into account other aspects of service delivery. The level of service can be defined in terms of the quantity and quality of water provided and the ease of accessibility of the service, in terms of distance[2] and maximum number of people per facility, here referred to as 'coverage', and its reliability. In order to

[2] CWSA standards refer to distance between facility and users, rather than to the time it takes to fetch water. This has been a point of discussion in the sector in Ghana (WSMP, 2010).

monitor whether or not facilities provide acceptable services, these characteristics need to be monitored as well.

Recognizing that a water facility may meet only some of the standards, an overall service level is determined based on the number of sub-indicators met. Table 1 shows the standards set by CWSA on the service level indicators and describes the level of service for handpumps and piped schemes.

Table 1: Service levels for handpumps and piped schemes

Functionality status	**Description of functionality status**
Functional	Handpump: water starts flowing within 5 strokes or less Standpipe: water flows at least 85% of the designed rate
Partially functional	Handpump: water starts flowing but after more than 5 strokes of the handle of the pump Standpipe: water flows at a rate of less than 85% of the designed rate
Non-functional	water does not start flowing at all
Service level indicators	**Standard**
Quantity	20 litres per capita per day
Quality	Meets all Ghana Water Authority standards for water quality of drinking water
Crowding	Hand dug well: maximum 150 people per facility Borehole or standpipe: maximum 300 people per facility
Distance between water point and users	Up to 500 metres
Reliability	The facility is providing water for at least 95% of the year, interpreted as at least 345 days of regular service, without interruption.
Handpump service level	**Description of handpump service level**
III	The handpump provides water services meeting the standard on all the service level indicators
II	The handpump provides water services but fails to meet the standard on one or more of the service level indicators
I	The handpump is not functioning or not used
Piped scheme service Level	**Description of piped scheme service level**
IV	The piped scheme provides service as per design standards for population category and meets all the sub-indicators
III	The piped scheme provides service as per design standards for population category but does not meet one of the sub-indicators
II	The piped scheme provides service below design standards per population category and fails to meet one or more of the sub-indicators
I	Facility is non-functioning

Source: adapted from CWSA, 2014a

Monitoring water service reliability, accessibility, quality and quantity does, however, not give insight into whether or not the conditions for sustainable water service provision are in place. Service providers are responsible for operation and maintenance of the water facilities, ensuring sustainable water supply. They are monitored, supported and regulated by service authorities, which provide direct support to the service providers and to planning and coordination related

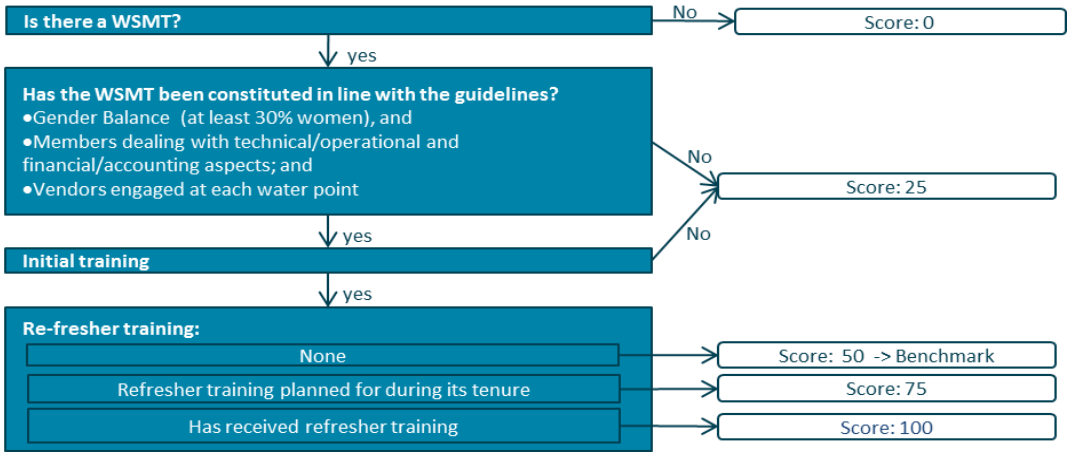
to the development and provision of water services. The roles and responsibilities of these service providers and authorities are described in CWSA guidelines and standards and in the model by-law for Water and Sanitation Management Teams (WSMTs). Service provider and authority indicators describe the extent to which roles and responsibilities are fulfilled as per these guidelines and standards. It is considered that when the service providers and authorities comply with these standards, they are in a good position to provide sustainable water services.

The service provider indicators are grouped into 3 sets of indicators, as shown in Table 2. Table 2 also presents the service authority indicators. In order to quantify the qualitative data, for each indicator we use the scoring system, going from 0 (worst case) to 100 (best case) and a benchmark has been set, indicating the minimum acceptable level. Each service provider and service authority is scored and benchmarked based on a number of sub-indicators. Logic decision-tree like algorithms are used to determine the service provider and authority scores on the different indicators, based on the sub-indicator data. An example of the scoring logic can be found in Figure 2. Annex 1 gives an overview of the service provider and service authority benchmarks as used in this report, based on the CWSA monitoring framework (CWSA, 2014a).

Table 2: Service provider and service authority indicators

Service provider indicators			Service authority indicators
Management and governance indictors	**Operations indicators**	**Financial management indicators**	
• Presence and composition of a Water and Sanitation Management Team (WSMT) • Record keeping and accountability • Non-interference in the composition of the WSMT	• Spare part supply • Area Mechanics • Breakdown maintenance • Routine maintenance • Water quality testing	• Revenue and expenditure balance • Financial management • Tariff setting	• Presence of a District Works Department • District Water and Sanitation Plan • Budget allocation and utilization • Facility management plans and by-laws • NGO coordination • Monitoring support to service providers • Data transfer from district to regional level

Figure 2: Scoring logic of the 'presence and composition of a WSMT' indicator



Source: authors

In order to ensure the collection of the required data to easily and unambiguously score the indicators, the set of indicators and algorithms is accompanied by a set of surveys with 'assessment questions'. In addition to the 'assessment questions' which provide the required data for the performance statistics, the surveys include questions related to descriptive statistics, like type of handpumps and the source of funding.

The indicator set has been developed in a participatory way, with involvement of the sector as a whole, led by CWSA. Over the three years of service monitoring, small changes have been made to the indicators and the algorithms used for scoring the service providers on the indicators. The results presented here are based on the most recent indicators and algorithms as published by CWSA (2014a). This has become the set of indicators the country will follow in future for rural water supply monitoring.

Service monitoring indicators are related to functionality, service levels, service provider performance and service authority performance. This section introduces these different indicator sets and their scoring logics.

2.2 Service monitoring tools

One of the innovations introduced by the Triple-S project in the service monitoring process was the application of mobile phone technology for the collection and storage of monitoring data. Data obtained in the field are filled in on the smart phone application of AKVO-FLOW, a web-based information and communication technology (Akvo, 2014). Submitted surveys are stored on the phones and transferred over the local mobile data network or WIFI into the online database.

At the time of the three service monitoring rounds in the three districts, MS Excel was used to process and visualise the data. Processing of data logical formulas was done by means of logical

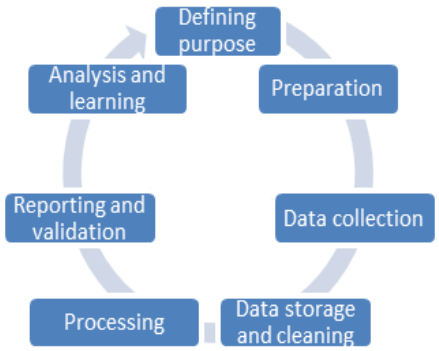
formulas in MS Excel, based on the algorithms set in the indicator framework. Data compilation and visualisation was done by means of pivot tables and graphs.

In the future, Akvo-FLOW will continue to be used for data collection, but the collected data will be fed into DiMES for data processing, visualisation and storage.

2.3 The service monitoring process

The service monitoring process consists of a number of steps (see Figure 3). For each of the steps we briefly describe who does what, and which tools were used.

Figure 3: Steps in monitoring



Source: Smits et al. 2013

The first step involves clearly **defining the purpose** of the monitoring. In Ghana, water service monitoring serves different purposes at different levels. At local level, water service monitoring provides users and service providers with an opportunity to see how their service is doing in relation to the standards set. This can stimulate users in demanding better services and service providers taking steps in providing these services. At district level it presents service authorities with information on the current state of water service provision in a certain area. It can be used to inform investment planning and budget allocation, corrective action and post-construction support. At regional level, service monitoring data can be used to inform regional strategic planning, while at national level it can be used to 1) Inform national level strategic planning; 2) Create better insight in what works and what does not and inform discussions on how to do things better and/ or differently; 3) provide an overview of progress in the sub-sector towards achieving its set goals and targets and 4) feed into a Sector Information System (SIS).

The second step is the **preparation** of data collection. This phase consists of the initial training and subsequent re-training of district staff for data collection. These trainings include familiarisation with the data collection tool (Akvo-FLOW) and familiarisation with the indicator framework and assessment questions, both in a classroom setting as well as in the field. For each pilot district a team of at least six district staff is trained. The trainings were conducted by Regional Learning Facilitators (RLFs), (CWSA hosted Triple-S project staff).

Data collection is the third step. During each monitoring round, data is obtained from all water schemes, including point sources and piped schemes. Furthermore, data is obtained from water service providers and water service authorities. This is done through the following methods:

- Review of project documents,
- Field inspection and observations of facilities, including stroke and leakage test (in the case of handpumps), taking GPS coordinates and photography of each facility,
- Focus group discussion/ group interview with WSMTs,
- Inspection of financial and administrative records, where available,
- Focus group discussions/ group interview with DWST (Adank et al. 2013).

Data that has been collected and submitted needs to be cleaned before it can be processed and used for analysis and reporting. **Quality assurance and cleaning** of the incoming data has to be led from regional level. During the three rounds of service monitoring in the three pilot districts, this task was taken up by the Regional Learning Facilitators and the regional CWSA monitoring staff. Data quality assurance was done using the web-based Akvo-FLOW dashboard through which there was near real time access to data from the field to monitoring incoming data and for quality assurance. Data cleaning mainly took place in district-level workshop-settings, involving data collectors and other relevant Metropolitan, Municipal and District Assemblies (MMDAs) and CWSA staff. This served simultaneously as a way for data validation. Processing of the cleaned data was mainly done by district, CWSA and Triple-S staff, using MS Excel sheets with logical formulas for data processing, scoring and benchmarking. The use of pivot tables allowed for some level of automation of the data processing, analysis and reporting. In the future, this role will be taken up by the Information Technology Specialist (ITS) of the regional CWSA office and data processing and visualisation will be automated further.

Data analysis and learning involves the compilation and sense making of the monitoring results. During the service monitoring pilots, this was done through a series of witting weeks and presentation of results at district, regional, national and international level.

3 Findings from three years of water services monitoring: state and trends of rural water services

3.1 Rural water supply facilities

In Ghana, rural water services are mainly provided through boreholes and hand-dug wells with handpumps. Table 3 gives an overview of the handpumps that have been mapped and assessed over the three years of service monitoring in the three pilot districts. It shows an increase in the number of handpumps in the districts from the first year to the subsequent years. This increase was not only caused by construction of new facilities, but also by identification of existing facilities which had not been identified in earlier rounds.

Table 3: Number of handpumps

District	2012	2013	2014
Akatsi	249	294	286
East Gonja	122	136	135
Sunyani West	103	138	161
Total	**474**	**568**	**582**

The majority of the handpumps in the three pilot districts were of the Afridev type (59% in 2014) and the Ghana Modified India Mark II type (34% in 2014). The remaining handpumps mostly consisted of Nira Type handpumps.

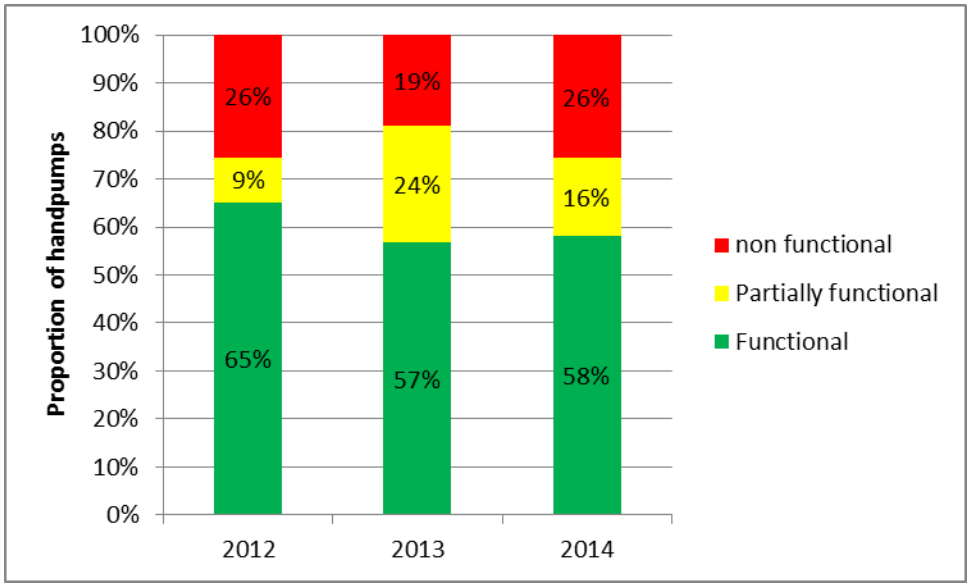
The major financiers of handpump implementation in the three districts have been bi- and multilateral donors (a bit more than a third of handpumps), International NGOs (a bit less than a quarter of handpumps, mainly in Akatsi District by Lifetime Wells), and the Government of Ghana (about a fifth of handpumps).

3.2 Functionality

Over the three years of service monitoring in the three districts, functionality of handpumps has fluctuated around roughly the same level, as shown in Figure 4.

As expected, functionality was found to decrease with age of facilities. Furthermore the Afridev pumps were found to have higher functionality rates than the India Mark II and Nira pumps. However, it should be noted that the Afridev handpumps had a median age of only five years, against a median age of Ghana Modified India Mark II and Nira pumps of 14 and 12 years respectively.

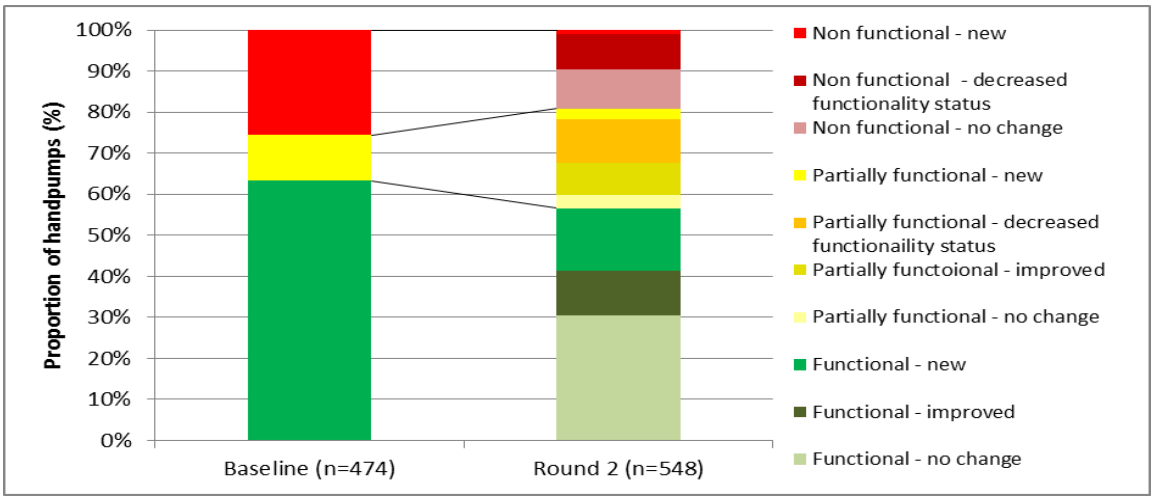
Figure 4: functionality



The findings also show that handpumps deteriorate faster than that repairs are carried out. Confronted with the findings from the first monitoring round, local government in the three districts had set itself the task of improving functionality of handpumps, by repairing or rehabilitating some of these. This contributed to an improvement of functionality in a number of cases, indicated in dark green in Figure 5. However, the overall proportion of handpumps for which functionality deteriorated (in orange and dark red), was larger than the proportion of handpumps with improving functionality levels.

Finally, we found that a relatively high percentage of newly installed handpumps become rapidly not- or partially functional. Between the first and the second monitoring round, a total of 107 new handpumps had been constructed. However, almost 20% of these newly constructed handpumps were found to be either not or partially functioning. A similar situation was found in the third monitoring round, with 3 out of the 14 (21%) newly constructed handpump either not or only partially functional. This is not likely to be due to miss-management, but rather to problems with the initial construction and technological and / or environmental challenges.

Figure 5: Change in functionality status of existing handpumps from the 2012 and 2013 round

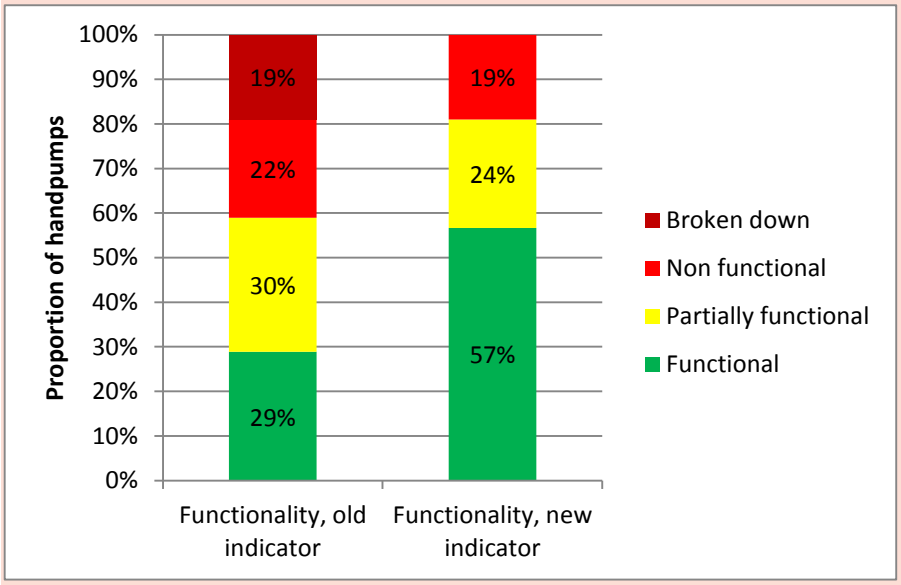


Box 2: Evolution of the functionality indicator

As mentioned in Box 1, the way in which functionality is assessed has changed over the three years of service monitoring. Figure 6 shows the data from the 2012 monitoring round. The left bar shows functionality data, using the stroke and leakage test, while the right bar presents the functionality data, using the '5-stroke test'. More than 90% of the handpumps that were under the old definition classified as 'partially functional', passing either the stroke or leakage test, were under the new definition classified as fully functional. This indicates that it was generally the stroke test that was misrepresenting the handpumps' functionality status under the old definition.

The new way of determining handpump functionality has the advantage of being simpler. The disadvantage of not considering the stroke test, is that some facilities that are classified 'functional', are resulting in such small numbers, that they can hardly be considered providing a basic level of service.

Figure 6: Functionality (left: using stroke and leakage test; right: using '5-stroke' test)



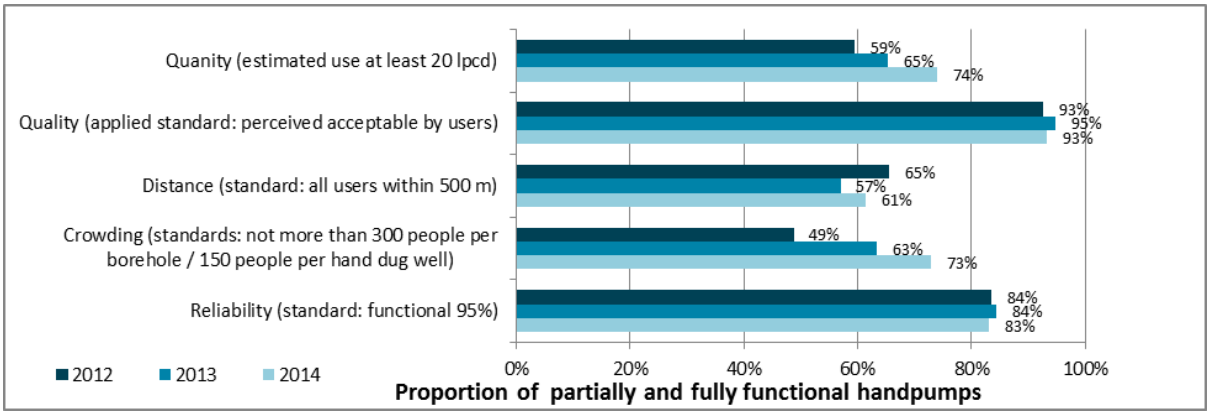
Source: 2012 service monitoring data from three districts

3.3 Service level

Figure 7 gives an overview of the results of the assessment of fully and partially functional handpumps against the national standards related to quality of water use per person per day, (perceived) quantity, accessibility in terms of distance and crowding, and reliability.

The graph shows a reasonably stable proportion of reliable handpumps and of handpumps with a perceived acceptable water quality. The changes in 'crowding' and quantity over the three monitoring rounds may at least partially be due to changes in the way the handpumps are assessed on these indicators.

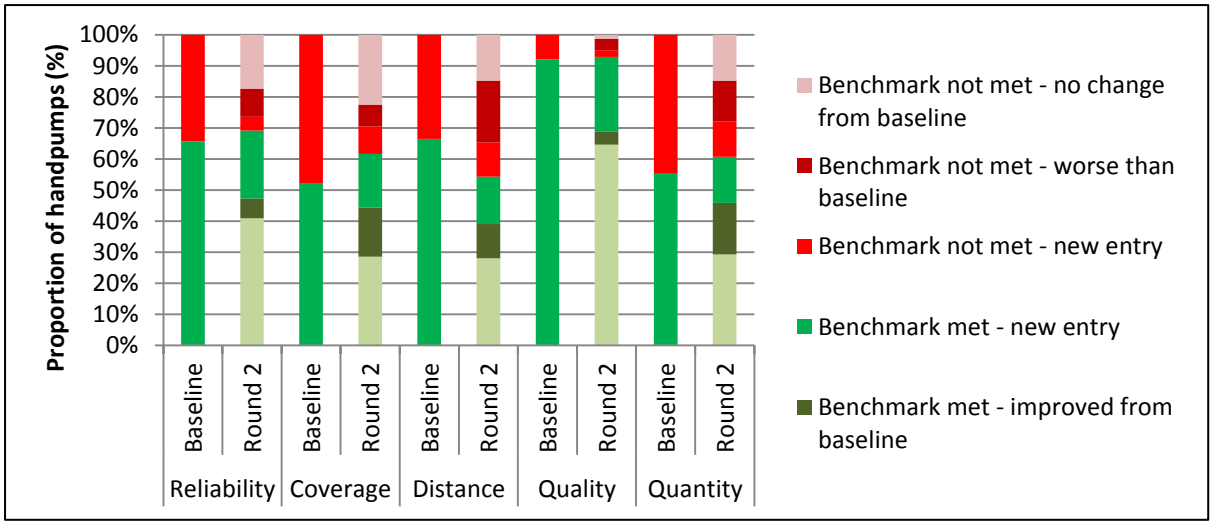
Figure 7: Proportion of handpumps meeting the service level indicator benchmarks



Source: 2012, 2013 and 2014 service monitoring data from three districts

Figure 8 gives an overview of the proportion of handpumps meeting the standard on the different service level indicators in the 2012 and 2013 monitoring round. Although one would hope (and expect) that the majority of new handpumps are meeting the service level indicators, the graphs show this is not the case. Almost half of the newly constructed handpumps were found not to meet the norm on the distance, coverage and quantity indicators. Reliability of newly constructed handpumps is a bit better, with the majority of the new handpump entries being reliable.

Figure 8: Changes in handpump status related to the service level indicators



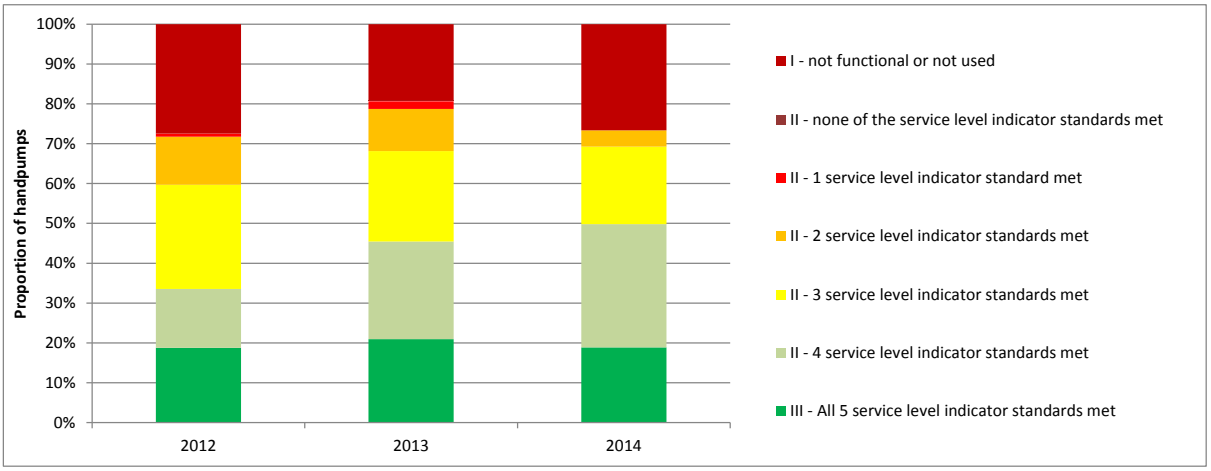
The proportion of existing handpumps within 500 m from all users was found to be lower in the 2013 than in the 2012 monitoring round. A significant overall decrease in the percentage of handpumps meeting the norm on this indicator can be observed. If accurate, this could only be explained by population growth outside the maximum distance of 500 m from the handpump. However, this difference can also, at least partially, be caused by difficulties in giving an accurate assessment of whether or not the users are within 500 meters of the handpump.

The improvement that was observed in the proportion of handpumps meeting the 'coverage' indicator cannot fully be explained by the increase in number of facilities. Rather, this could be due to the more accurate way of assessing coverage that was applied in 2013, as compared with the 2012 monitoring round.

The proportion of handpumps meeting the quantity indicator has increased slightly. This could also be (partially) due to the fact that the 2013 round of monitoring data collection took place in the middle of the dry season, while the 2012 data collection took place in the beginning of the dry season.

Considering the number of service level indicators on which handpumps have met the norm provides us with an indicator of the overall level of service provided by the handpump. Figure 9 shows than only about 20% of handpumps meets the norm on all service level indicators. The majority of handpumps fail to meet the norm on at least one of the service level indicators. The increase in the proportion of handpumps that meet the service level indicator standards on 4 indicators between 2012 and 2013 is likely to be due to the above described changes in the 'crowding' and 'quantity' indicators.

Figure 9: Level of service



Box 3: Including quantity of water used into the level of service provided?

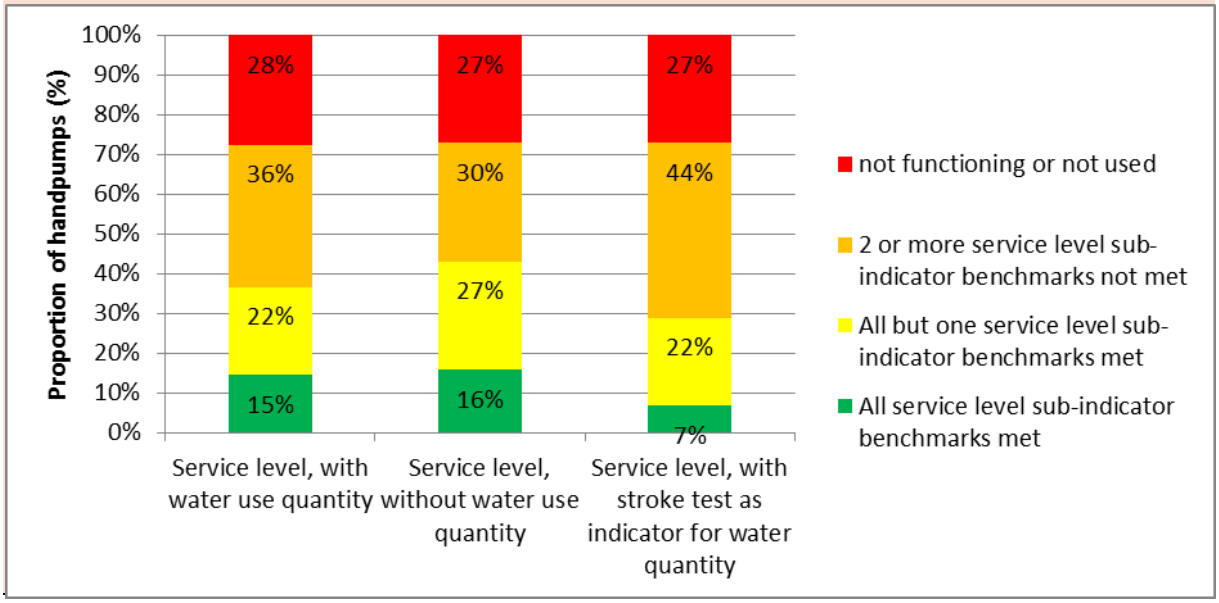
The water quantity indicator as used here gives an indication of the level of service accessed by users, rather than the level of service that can potentially be provided by the handpump. Differentiating between the level of service provided and the service used can be useful, as failing on either can warrant a different response. If the norm on the quantity provided is successfully passed, but the norm related to the quantity used is not, then this may point towards behavioural issues, rather than technical or managerial issues. Assessing and monitoring water use can inform possible corrective actions, addressing the reason why people are using less water (e.g. health education and promotional activities in order to increase demand for water services; recommending longer opening hours, in order to minimize crowding, etc.).

However, over the three service monitoring rounds, it was realized that obtaining reliable data on water use from handpumps is not easy, especially when the main unit of observation is the handpumps themselves (the supply side) and not the users (the demand side), as was the case here.

When not considering water use quantity, the proportion of handpumps that meet the norms on all service level sub-indicators is only marginally higher then when taking water use into account, as shown in Figure 10. When a handpump does not meet the water quantity norm, it is likely to also fail on one or more other service level indicator(s). Therefore it could be argued that the water quantity used is not an essential indicator for determining the level of service.

The stroke test can be considered as a test for determining whether or not a handpump provides an adequate quantity of water. When the stroke test is included as a parameter of water quantity provided in the service level assessment, the proportion of handpumps providing a basic level of service decreases, as shown in Figure 10.

Figure 10: Service levels, with and without taking into account water use quantity and stroke test results

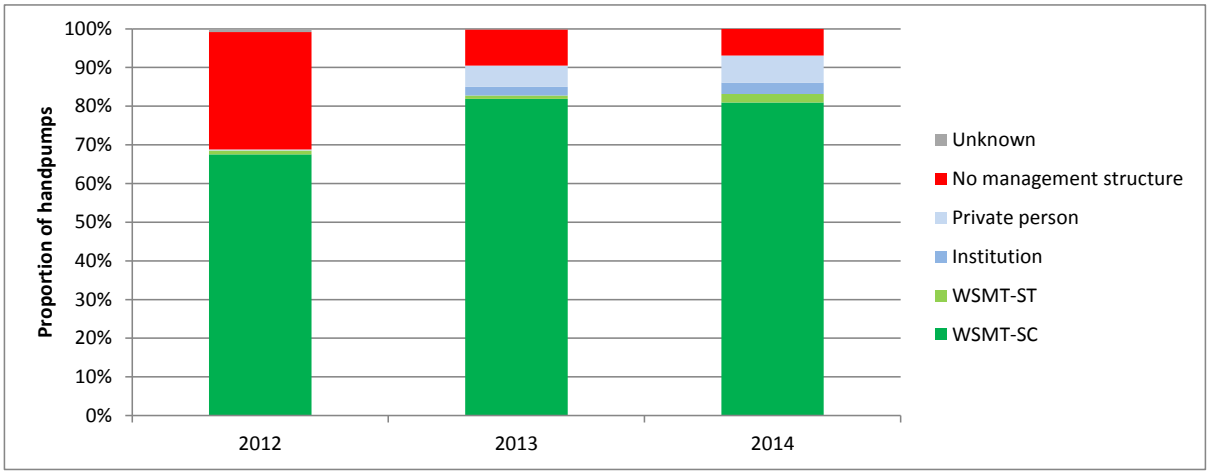


3.4 Service providers and their performance

Handpumps are commonly managed by Water and Sanitation Management Teams (WSMT), which manage one or multiple handpumps within the community. In addition, some handpumps were found to be managed by private persons or by institutions, such as schools, clinics or churches.

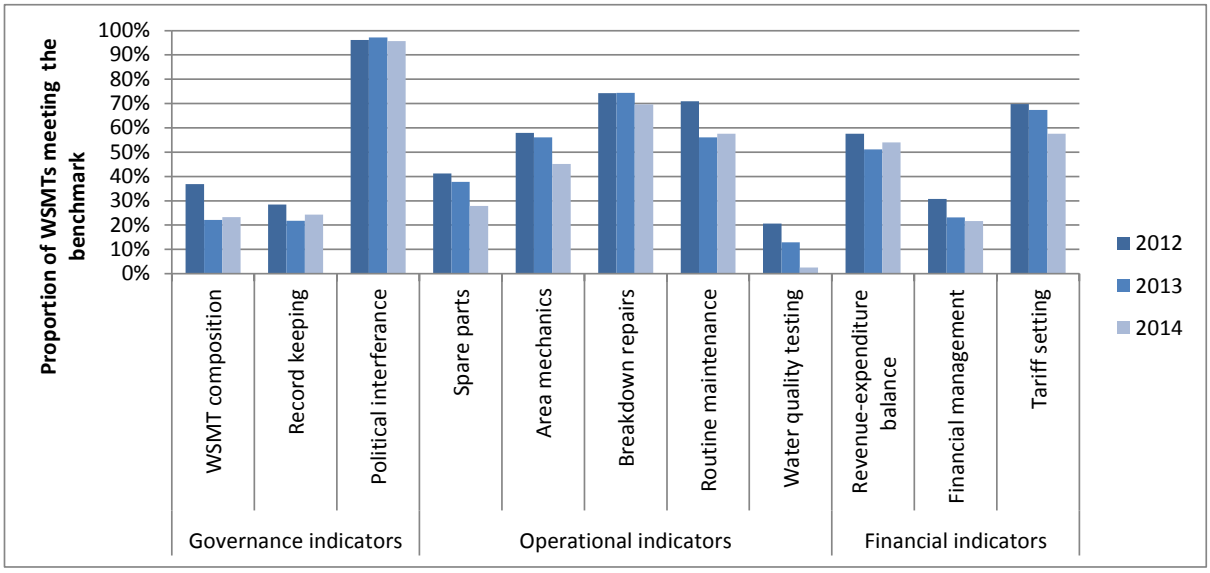
The number of handpumps managed by Water and Sanitation Management Teams (WSMTs) has increased since the first year of service monitoring. Faced with the data of the first round, the MMDAs decided to put in extra efforts into establishing additional WSMTs, especially in Akatsi District. It should be noted that in the first round (2012), no distinction was made between management structure and private and institutional management.

Figure 11: Handpump management



In general, as shown in Figure 12, there seems to be a trend of a decreasing proportion of WSMTs meeting the benchmarks on the different service provider indicators. Below, we have a closer look at each of the service provider indicator sets to understand which indicators were mostly complied with and which ones not, and what the trends in each one were.

Figure 12: Service provider benchmarking results



3.4.1 Governance indicators

There is a considerable drop from the first to the second monitoring round in the proportion of WSMTs that have received initial training and have been composed as per the CWSA guidelines. The proportion of WSMTs with at least a third of female members has remained stable at around 89%, but the proportion of WSMTs with a treasurer and area mechanic dropped, as did the proportion of WSMTs which reported having received initial training.

The proportion of WSMTs meeting the benchmark on the record keeping indicator has fluctuated slightly around 24%. Political interference in the composition of the WSMT does not seem to have been a big issue, with a stable majority of the WSMTs meeting the benchmark on this indicator over the three years.

3.4.2 Operational indicators

The drops in compliance on the spare part supply, area mechanics and routine maintenance indicators is to a large extent due to a slightly different way of defining these indicators over the three monitoring rounds. The spare part supply and area mechanic services indicators initially referred to the general response time. In 2014 it was, however, proposed to refer to spare part supply and area mechanic service as enjoyed by the WSMTs over the last year. This accounts for the drop in proportion of WSMTs meeting the benchmark on these indicators between the 2013 and 2014 monitoring findings. The drop in proportion of WSMTs meeting the routine maintenance indicator benchmark of having routine maintenance at least once a year is likely to be caused by a similar reason. In 2013 and 2014, the assessment question was referring to routine maintenance over the course of the past year, while in 2012 it was referring to routine maintenance in general and whether it was normally carried out every year, increasing the risk of recall bias.

The proportion of WSMTs meeting the benchmark on the breakdown repairs indicator has been relatively stable and high, around 73%. The proportion of WSMTs meeting the benchmark on the water quality testing indicator on the other hand has been very low, and dropping.

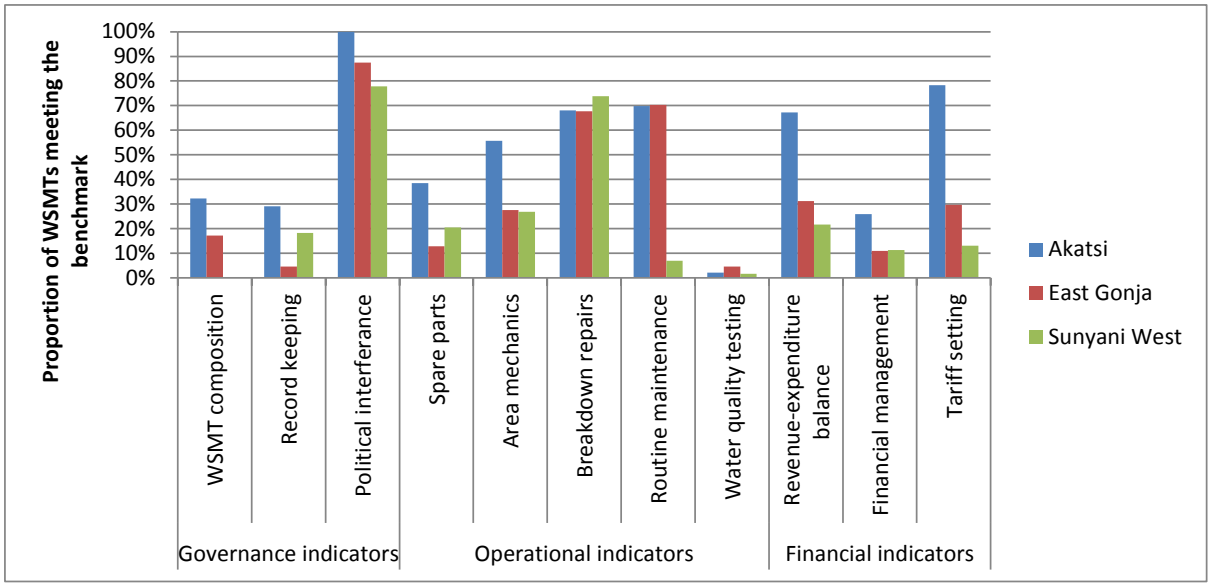
3.4.3 Financial indicators

A relatively big proportion of WSMTs has met the benchmark on the revenue/expenditure balance and tariff setting indicators. This proportion is considerably lower for the financial management indicator. Only around 40% of WSMTs had a dedicated bank account. Of the WSMTs that did have a bank account, only about half had up-to-date financial accounts.

3.4.4 Comparing service provider scores between districts

Comparing service provider benchmarking between the three districts shows big differences. As shown in Figure 13, Akatsi scores significantly better on the record keeping and finance indicators than the other two districts and on the water quality testing indicator East Gonja scores best.

Figure 13: Comparison of service provider performance between districts (2013 service monitoring round)



3.5 Performance of service authorities

Overall the proportion of WSMTs that indicated that district staff had monitored operation and maintenance of their water facilities, checked financial, technical and administrative performance, and provided technical support where needed, has remained more or less stable at around 60% over the last three years.

However, when differentiating between the three districts, as shown in Figure 14 and Table 4, it becomes clear there are big differences between the districts. In Akatsi, a considerably larger proportion of WSMTs indicated to have benefitted from monitoring and technical support from the district than in the other two districts. As indicated in Adank et al (2013), a reason for this could be the fact that Akatsi District was one of the districts where the Monitoring Operations and Maintenance (MOM) tool had been piloted under a DANIDA project some years back. Under this initiative, quarterly monitoring visits and technical audits were undertaken to water user communities by district Environmental Health Assistants (EHAs). Akatsi District was one of the few districts that maintained this practise as much as possible, also after the conclusion of the Danida project (Komives et al, 2006).

Figure 14 : Proportion of WSMTs that received monitoring visits and subsequent support

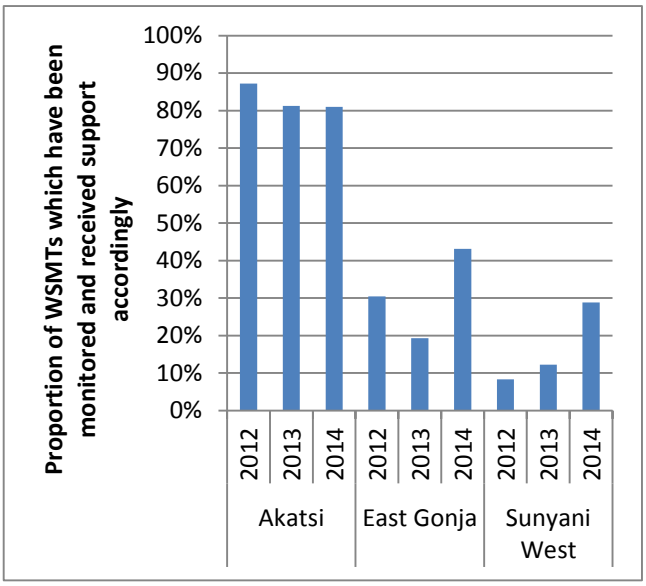


Table 4: District service authority score card

Service authority indicators	2012	2013	2014
Presence of a District Works Department	XX√	√√√	√X√
District Water and Sanitation Plan	XX√	X √√	√√√
Budget allocation and utilisation	√X√	X√√	X√√
Facility management plans and by-laws	XXX	XXX	√XX
NGO coordination	√XX	√XX	√√X
Monitoring support	√XX	√XX	√XX
Data transfer from district to regional level	XXX	√XX	√√X

(X=benchmark not met; √=benchmark met; Order of scoring: Akatsi; East Gonja ; Sunyani West)

The three districts have also been assessed on their performance related to their service authority roles and responsibilities. The table below shows that the number on indicators on which Akatsi and East Gonja met the benchmark has increased over the three years. Sunyani West has remained the same and is the one that is currently meeting least of the indicators.

3.6 Summing up

The results of three years of service monitoring in the three pilot districts have not shown considerable changes in functionality and overall service levels.

In general, many WSMTs do not meet the benchmarks on many of the service provider indicators. On 5 out of 11 indicators, less than half of the WSMTs manage to meet the benchmark.

Over the three years of service monitoring, the service provider indicators and algorithms have undergone slight changes. The latest indicators and algorithms have been used to assess the performance of the WSMTs over the three years. On some indicators, notably the spare part, area mechanic services and routine maintenance indicator, there have also been small changes in the assessment questions. This makes detailed comparison of the performance of the WSMTs on these indicators over the different years more difficult. The indicators are, however, useful for comparing the proportion of WSMTs meeting the benchmark on the service provider indicators between different districts for a certain year.

The performance of the service authorities has improved slightly as per the indicators and benchmarks set. This could over a longer time frame contribute to improved service provider performance, service level and functionality.

4 Costs and benefits of service monitoring

The three years of service monitoring in the three districts has provided the sector with lessons to inform future sector monitoring, scaling up and mainstreaming in sector processes. This section describes the costs of service monitoring, as well as the benefits that service monitoring has brought so far.

4.1 Costs of service monitoring

The costs of service monitoring during the first round of monitoring was on average US$ 10,910 per district (about US$ 0.10 per capita) and US$ 7,845 (about US$ 0.07 per capita) in the second. The difference is due to the fact that the duration for training for data collection, monitoring and supervision, data cleaning and analysis was reduced in the second round. These amounts are broken down as presented in Table 5. As can be seen, the data collection is the phase which carries the highest costs, as expected, as that involves lots of travel expenditure. In all phases of monitoring, the costs have gone down between the first and the second round.

Table 5: Per district Cost of the service monitoring (in 2012 US$)

Phases and costs	First round	Second round
Preparation:		
Procurement of equipment	$660	
Training of enumerators - per diems and travel	$725	$414
Training of enumerators - time input (3 days, 6 district level staff; 3 days, 1 regional level CWSA staff)	$285	$285

Phases and costs	First round	Second round
Data collection:		
Transport and per diem	$5,934	$4,423
Time input (20 days, 6 district level staff; 3 days, 1 regional CWSA staff)	$1,390	$1,390
Cleaning, processing, reporting and validation and analysis at district level:		
Validation workshops - per diems and travel	$1,666	$1,083
Processing, cleaning, validation and reporting - time input (3 days, 6 persons; 3 days, 1 regional person)	$315	$315
Total	**$10,975**	**$7,910**
Total personnel costs	**$1,990**	**$1,990**
Total other costs	**$8,985**	**$5,920**

During the three monitoring rounds, the personnel costs were covered by the districts (district staff) and CWSA (regional staff). The Triple-S project covered the remaining costs.

Drawing on expert opinions from across CWSA and DAs, the estimated expenditure of a typical district on all its support functioning, including periodic monitoring visits to small communities, service monitoring, annual financial audits of piped schemes and the logistical and administrative support that would enable the District Works Department/ District Water and Sanitation Team to undertake the work, was estimated at around US$ 22,373 (Burr et al., 2013). This amount includes all cash expenditure but not the costs of salaries of district staff. The non-personnel costs related to continuous monitoring are more than a quarter of the total current budget.

4.2 Benefits

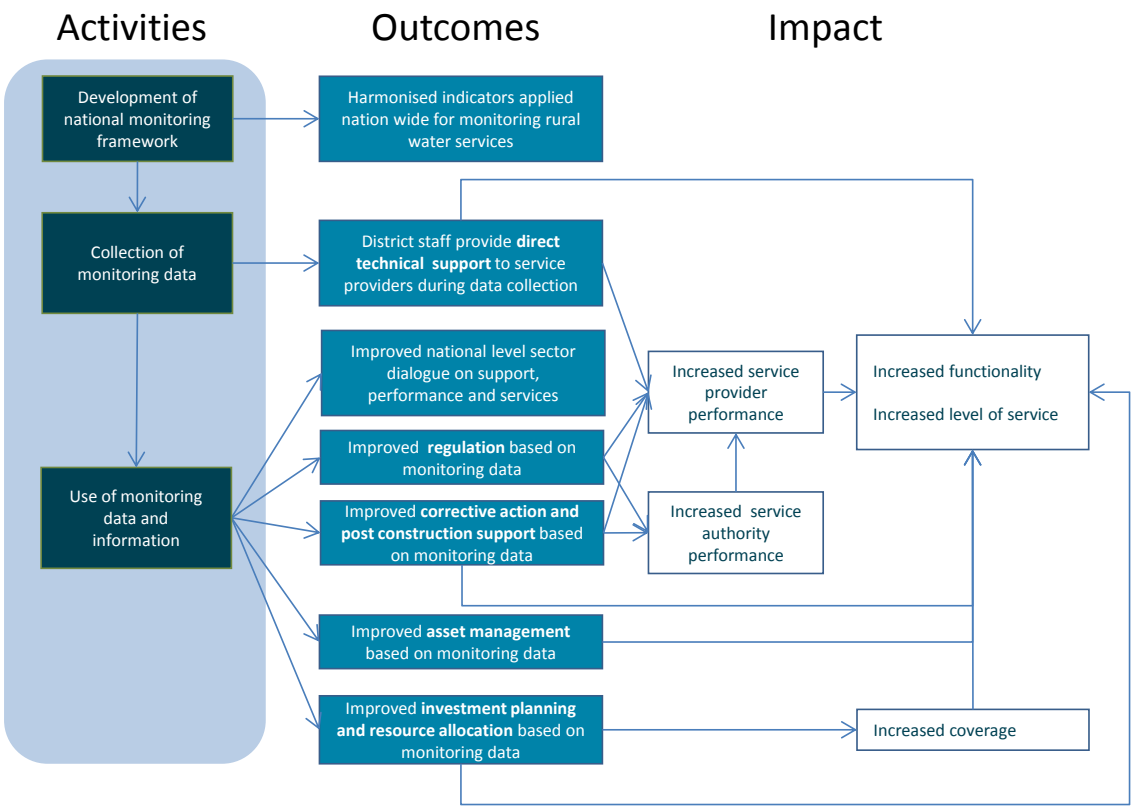
The rational of service monitoring in Ghana is to provide data that can be used to inform better 1) corrective actions and post-construction support; 2) district and national strategic investment planning and asset management; 3) and regulation. This is expected to have a positive impact on the performance of service authorities and service providers, functionality, service levels and coverage and hence to contribute to improved water governance and service delivery. Furthermore, monitoring findings can be used to inform sector dialogue, which can lead to improved policy and practice in the sector.

However, benefits of service monitoring were found to not only relate to the use of (cleaned, processed and reported) monitoring data. The data collection process itself can already trigger corrective actions. And the participatory development of a harmonised set of indicators and monitoring process can contribute to harmonisation of efforts and alignment of development partners to the goals set by government.

In principle, improved service monitoring is also expected to contribute to improved national and regional level regulation. However, as service monitoring was only piloted in three districts in three regions, this was not a realistic expectation in this case and is therefore not considered here.

Figure 15 gives an overview of these expected beneficial outcomes and impact. The extent to which these benefits have been realised, in discussed below.

Figure 15: Expected benefits from monitoring



4.2.1 The use of monitoring data for informing improved water governance and service delivery

Faced with their own low scores on the service authority indicators, the three districts have been putting in efforts of improving their performance related to the service authority indicators. This has resulted in the slight **increase in number of service authority indicators met** over the last 3 years, as presented in section 3.5.

The poor state of water service delivery as shown by the service monitoring findings, triggered the District Assemblies in the three pilot districts to develop **corrective action** plans to improve the poor state of water service delivery. District assemblies focused especially on undertaking direct corrective actions to improve functionality rates and the presence of service providers, like the rehabilitation of broken down handpumps and the (re-) establishment of WSMTs. However, these newly established WSMTs were not always provided with the needed training and supervision for them to be able to take up their responsibilities. Service monitoring findings were not or hardly used for targeted trainings of and technical assistance to service providers. In Akatsi District, a plan and budget were made for undertaking water quality testing, but this budget was never disbursed. The monitoring findings have thus led to corrective actions, but these corrective actions have mainly focused on addressing the symptoms of bad service provision, like infrastructure breakdowns, rather than the potential underlying causes related to

these symptoms, such as the lack of financial capacity of water service providers. Only a limited part of the monitoring data was used to inform these actions.

Monitoring findings were used by technical district staff to substantiate their claims towards district-level decision makers for the need for increased **budget allocation** to improve and sustain water services. The direct involvement of the district staff in the entire service monitoring process contributed greatly to the appreciation and acceptance of the findings by the decision makers. As a result, district budget allocation to water service provision was augmented over the years and increasingly included costs items related to monitoring and the provision of direct support. However, distribution of the allocated funds has been a challenge, as the piloting coincided with major budgetary restrictions.

Service monitoring data has been used to inform **planning and budgeting** in the three pilot districts and has enabled local government to direct activities of implementing NGOs and development partners to the most critical areas. The service monitoring pilots have gone hand-in-hand with training of local government staff on how to plan and budget for life-cycle costs related to water services. The district revised their budgeting practices accordingly, disaggregating planned expenditure into different life-cycle cost components (such as one-off capital expenditure and recurrent expenditure on direct support). The monitoring data and the renewed insights into how to do life-cycle planning and budgeting have informed District Water and Sanitation Plans which have been incorporated into the four-year District Medium Term Development Plan. This has greatly improved the quality of the District Water and Sanitation Plans, as evidenced by the fact that the Brong Ahafo Regional Coordination Council, responsible for compiling district level plans, commended Sunyani West on the high quality of their plan and encouraged other districts to use the same framework.

Over the last year of the service monitoring pilot, activities were undertaken in Akatsi District to improve **asset management**. Based on the experiences from Akatsi, the district Assembly of Sunyani West initiated a similar process. In both cases, part of the monitoring data was used to create an asset register and asset management tool for ensuring timely repairs and replacement of water supply assets (Triple-S, 2015).

As service monitoring was only applied in three pilot districts in three different regions, the use of monitoring data for informing **national level planning and regulation** has been minimal. The pilots did show good potential of the use of service monitoring data for informing regulation. It raised the interest of CWSA to have access to service monitoring data on a larger scale, preferably nationally, as this would be essential for them to really take up its role as regulator of the rural water sub-sector. For this, the wider indicator set and the benchmarks are most useful.

Having access to the monitoring data has given local government a means of holding NGOs **accountable** for their interventions in the district. Also, monitoring findings have given implementing NGOs the means to hold local government accountable for taking up their roles and responsibilities, like ensuring the establishment and training of WSMTs and providing them with post-construction support. In Akatsi District for example, the monitoring findings triggered the main implementing NGO to use the establishment and training of WSMTs as a condition for investments in rehabilitation of boreholes. When made publicly available, the monitoring data has the potential to be used by water users for holding service providers and service authorities accountable for the provided water services. This would require visualization and translation of the data in a way that is easily interpretable by water users.

4.2.2 Direct technical support to service providers during monitoring data collection

Corrective actions are not only triggered by having access to the monitoring data, but also by the monitoring data collection process itself, as this often leads to direct technical support to service providers.

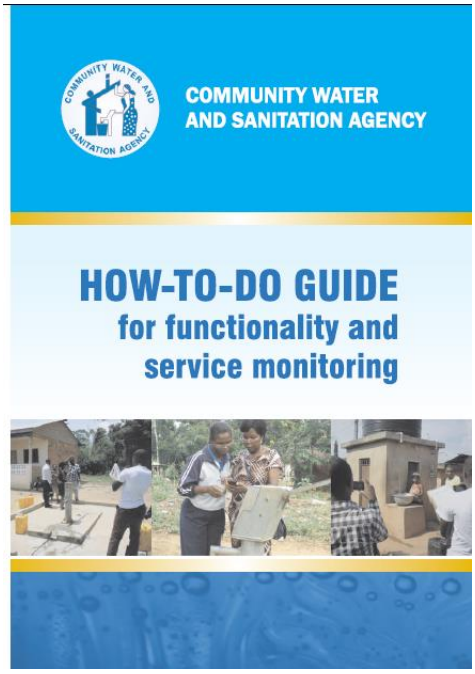
An interesting difference was observed between the Akatsi District and the other two districts, related to the provision of technical support at time of data collection. In Akatsi District, local government staff had in the past already been responsible for quarterly monitoring of water service providers, including checking of books etc. as part of Danida's Monitoring for Operation and Maintenance (MOM) Project. Akatsi District was one of the few districts that maintained this practise as much as possible, also after the conclusion of the Danida project (Komives et al, 2006). As they used to do under the MOM project, the local government staff did not just extract monitoring data, but also provided technical support to the service providers accordingly. This is evident from the fact that in Akatsi more than 85% of water service providers indicated that they received technical support from district staff during monitoring visits, while this was less than half and only about twenty percent in East Gonja and Sunyani West respectively.

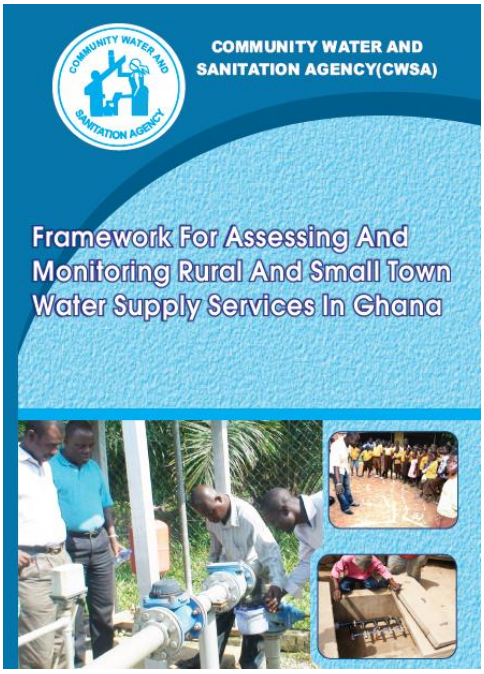
In general, it was found that the odds of a WSMT meeting the benchmark on certain service provider indicators was significantly higher (with a significance level of 5%) for WSMTs that had received monitoring visits and subsequent technical support, than for WSMTs that had not. This was the case for the service provider indicators related to 1) WSMT composition; 2) Spare parts; 3) revenue/expenditure balance and 4) tariff setting. Also the odds of a handpump being functional was found to be significantly higher (with a significance level of 5%) for handpumps which had received monitoring visits and technical support, than for handpumps which did not.

4.2.3 A harmonized service monitoring framework

The participatory development of the service monitoring approach spearheaded by CWSA and the involvement of local government staff throughout the monitoring cycle in the three pilot districts have led to a high level of sector ownership. This is evident from the publication of the national monitoring framework by CWSA (2014a) and the "How-to" guide (CWSA, 2014b) and the attitude of CWSA leadership towards service monitoring. During a sector meeting in 2013 for example, the Chief Executive Officer of CWSA mentioned that "*[..] we defined for ourselves what we mean by services, and what components of our service, if handled well, will result in sustained high level of service [...] we also determined what we call the service indicators which will serve as a guide to the rural water sub-sector whenever we examine our facilities and service delivery*" (Bugase, 2013).

Figure 16: Front cover of How-to-do guide (left) and the framework for assessing and monitoring rural and small town water supply services in Ghana (right)





The service monitoring framework intends to link to the Sector Information System (SIS) and to provide the SIS with the required data from the rural and small town water sub-sector. At the time of writing of this paper the SIS was under development.

The development of harmonised monitoring indicators has enabled the CWSA to define the future frame of monitoring and to mix activities of development partners to support a government-led agenda for rural and small town water sector monitoring.

4.2.4 Application of the national monitoring framework at scale

Following the piloting of service monitoring in the three Triple-S focus districts and the official adoption of the indicator framework by the CWSA, a variety of organisations have come forward to partner with CWSA to scale up service monitoring nationwide to other districts. After the first round of service monitoring in the three pilot districts, UNICEF supported the collection of service monitoring data in an additional 12 districts in the Northern Region, while SNV supported this in one district in Northern and three districts in the Upper East Regions.

Further development of the model (including Akvo-FLOW monitoring features, integration with DiMES and the development of easy reporting formats) is currently ongoing in the SmarterWASH Initiative, with financial support from the Dutch government and the World Bank. They will undertake among others baseline data collection in 119 districts in six regions. Under an initiative funded by the Hilton Foundation to strengthen local government in Ghana, service monitoring is applied in an additional ten districts in three regions.

Under these initiatives, a total of 36 CWSA staff and 714 district staff have been trained in service monitoring data collection, cleaning, processing and analysis. At the time of writing of this paper, a total of 20,221 handpumps and 1,177 piped schemes (including 4,515 standpipes) and their service providers and service authorities had been mapped and assessed.

4.2.5 Monitoring findings inform sector debate

The monitoring findings from the three pilot districts have been presented at national, regional and district level. The shockingly low level of compliance to national norms and standards have triggered sector debate on what is needed to improve the current situation and on whether the current norms and standards based on country systems have been set at a realistic level. It has sparked sector dialogue on the strengths and weaknesses of the main service delivery models, especially the Community Ownership and Management model. However, this has not (yet) led to concrete changes in policy or practice.

4.3 Conditions for success

An important condition of the success of the development, application and scaling up of the monitoring framework, is the **involvement and leadership role of CWSA**. Over the three years CWSA has dedicated considerable amounts of national and regional level staff time to the development and piloting of the various components of the service monitoring model. The technical committee has played a crucial role in the development of the indicator framework, the regional staff has been actively involved in the piloting of the data collection and both regional as well as national staff has been actively involved in data analysis and presentation of findings. CWSA leadership was kept up-to-date on the progress of the service monitoring experiment and was presented with the preliminary findings at different occasions. The monitoring indicators were based as much as possible on the national norms, standards and guidelines as set for the community water sub-sector by CWSA. As a result, CWSA took full ownership, published the service monitoring indicator framework and the "How-to" guide and is committed to take sector monitoring forward. It has actively brought together different financiers to support nation- wide scaling up of service monitoring. Where Triple-S project staff facilitated the district level data collector training and data collection process during the pilots, this role has been taken over by dedicated CWSA regional staff in the scaling-up phase.

But no matter how committed CWSA may be, **funding sources and mechanisms must be available for ensuring sustained service monitoring**. Currently, rural water service financing is very project-dependent. Service monitoring has been replicated under different initiatives funded by UNICEF and SNV, and is currently being scaled up with finding from the Dutch government, World Bank and the Hilton Foundation. However, this is mainly project funding, with projects covering the training and data collection costs. This presents a risk, as projects have a finite lifespan. With current levels of budget for direct support, service monitoring of the level described here cannot be carried out on an annual basis.

Some question marks remain: where should budget for undertaking 'post-project' support functions for CWSA come from? This is a crucial question that needs to be addressed, especially considering the changing role of CWSA from implementer to facilitator and regulator. Should financing of post-project/post-construction activities, like service monitoring, come from the institutional fees raised by CWSA as part of project contacts? Or are these fees only sufficient to

cover overhead costs? Should it come from districts, who solicit support from CWSA on an on-demand basis? Or should it come from central government, through public financing?

Besides access to monitoring data, a number of conditions need to be in place in order for monitoring to be used and to contribute to improved service delivery.

There is a need for **capacity and ability to process, analyze, interpret and use the data**, but also for a need for **resources to take action**. During the three rounds of monitoring data collection, the district level staff was assisted by the Triple-S team in the processing and analysis of the monitoring data. This played an important role in ensuring the availability of the required skills at district level to do data processing and analysis. The Triple-S RLFs have been playing a critical role in stimulating the districts to develop plans for remedial actions. They have received support from the political leadership of the district, but what would happen when new political leadership is put in place. Resources for undertaking action could be raised from different sources through different mechanisms, including from users, through user contributions and tariffs; from development partners, through the development of funding proposals; from national government, e.g. through the District Development Facility or the District Common Fund; or through the use of internally generated revenues at district level.

5 Conclusions and recommendations

5.1 Conclusions

5.1.1 The strengths and weaknesses of the service monitoring framework

The development of the service monitoring framework under the leadership of CWSA has led to a sector-wide recognised set of national service monitoring indicators. The application of service monitoring in the three pilot districts has been essential for the development and refinement of the indicators.

The monitoring cycle and the data collection, processing and reporting tools have emerged over time from the pilots and their subsequent application at scale. The application of mobile phone technology for the collection of monitoring data has been instrumental in ensuring the availability of high quality monitoring data within a relatively short time span. The piloted data collection process and tools have been useful for collecting monitoring data and have proven scalable. However, the process and tools related to data cleaning, processing and reporting at scale are under further development to facilitate the application at scale and over time.

Data has been collected on the costs related to service monitoring, but less attention has been given to the financing arrangements and processes which should be in place in order to ensure sustainable financing of service monitoring and the use of the monitoring data to take action. Furthermore, the institutional framework and process of long-term service monitoring have not been fully worked out yet.

5.1.2 Does service monitoring provide data that leads to improved water governance and improved service delivery?

Monitoring data has informed planning processes and corrective actions at district level, like the repair of broken-down systems and establishment of WSMTs. A start has been made with using monitoring data for informing asset management. Furthermore, monitoring data has been successfully used to increase the awareness of local politicians and government staff of the state water services in their districts and to advocate for financial and technical support. Access to monitoring data has strengthened accountability relations between local government, implementers and users. Access to monitoring data has thus, as least to a certain degree, contributed to improved decision making and governance. However, this has not (yet) translated into improved service delivery in terms of higher functionality levels and increased service levels.

The monitoring data has not been used to its full potential for informing corrective actions. This raises the question of whether the indicators are too elaborate, leading to the collection of too much data, or whether there are other reasons why the data has not been used to its full potential. A number of conditions need to be in place in order for access to monitoring data to contribute to improved governance and service delivery. There is a need for adequate capacity of service providers and service authorities to interpret monitoring data and to act upon it, and for systems and procedures to be in place to use the monitoring data to inform decision making. These include asset management systems to timely maintain facilities and replace critical parts;

and planning and budgeting systems that account for the life-cycle costs of water systems. Above all there is a need for financial resources to take the needed corrective actions based on the monitoring data. During the pilots attempts were made to address some of these boundary conditions, while others, like the availability of human and financial resources at district level, go beyond the WASH sector and are influenced by the reality of the wider political economy.

The full data set has been used to inform sector dialogue and learning. The monitoring findings from the three pilot districts have increased insight into the dire state of rural water services in Ghana, and in correlations between service levels and service providers and service authority performance. However, it needs considerable time, effort and expertise in order to translate the monitoring data into messages that are used to influence policy and practise. It should also be noted that if monitoring data was to be used for this purpose only, data from a smaller sample would suffice.

The full data set has the potential to inform regulation at national and regional level. However, this use of the data has not been fully tested. The ongoing application of the monitoring approach in 133 districts can provide useful insight in the need for further revision and refinement of the indicators in order to optimise the use of monitoring data to serve the different purposes at the different levels.

Monitoring is a critical piece of the puzzle for ensuring sustainable water service provision. Other critical pieces are asset management to timely maintain systems and replace critical parts; increased capacity of WSMTs; planning and budgeting systems that account for the life-cycle costs of water systems; and above all the finances needed to repair and replace systems. However, pieces depend to a large extent on access to monitoring data. Monitoring may thus only be a piece of the puzzle, but it is definitely a cornerstone: knowing is the first step in solving problems.

5.2 Recommendations

Monitoring is not a one-off exercise. It is a continuous process, which needs to be financed as such. Therefore there is a need to further develop and clarify the institutional framework around monitoring (who is responsible for what) and the financial framework (who pays for what, through which mechanisms?).

Water service monitoring should ideally be done quarterly to take corrective actions, however based on the findings from the three years of service monitoring in the three pilot districts, this would mean that about the entire district's WASH budget would be spent on monitoring. We therefore consider annual monitoring to be more financially feasible.

Although monitoring has been used to inform corrective actions, asset management plans etc., the potential of the use of the monitoring data is far greater, especially when collected on a larger scale. There is a need to further elaborate strategies and protocols for the use of the monitoring data at district, regional and national level.

The available monitoring data, and especially the forthcoming service monitoring data that is being collected as part of the service monitoring scaling up, provides the opportunity for deeper analysis of the drivers and barriers for sustainable water service provision. This could be a very valuable source of information for sector debate for the years to come, in Ghana and beyond.

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Annex 1: Service provider and service authority benchmarks

Service provider indicators

Management and Governance indicators:	
Composition of WSMT	There is a WSMT, which has been composed in line with the CWSA guidelines, and has received at least initial training
	WSMT-ST: At least half of the following positions have been filled by adequately qualified staff: System Manager, System Operator, Administrative /Financial Clerk, Revenue Collector, Vendors for each standpipe
Record keeping and accountability	All records are kept and up-to-date
No political and chieftaincy interference	Any change that had occurred in the WSMT was not due to political or chieftaincy interference
Operational Indicators:	
Spare parts supply and Technical services	WSMT-SC: It takes 3 days or less to acquire spare part(s) WSMT-SC: It takes 3 days or less to acquire the services of an area mechanic WSMT-ST: There are spare parts and well-equipped private sector. It takes 3 days or less to carry out maintenance or repairs.
Corrective maintenance and Routine maintenance	WSMT-SC: Breakdown repair is carried out within 3 days WSMT-SC: Routine maintenance is carried out WSMT-ST: Routine maintenance is excecuted according to the maintenance schedule
Water quality testing	Water Quality Sampling and Analysis done by certified institutions WSMT-ST: This is done at least once a year.
Financial management indicators:	
Revenue / expenditure balance	Annual revenues are higher than annual expenditure
Financial management	WSMT-SC: There is a bank account and an up-to-date cash book WSMT-ST: An operational account, a capital account and a sanitation account has been opened and proper accounts are kept.
Tariff setting	There is a tariff

Service authority indicators:

Indicator	Benchmark
Presence of service authority	There is a full unit for WASH activities, and coordination and collaboration for WASH activities is good.
Budget allocation and utilisation	There is a budget for WASH activities
Coordination	At least half of NGOs inform the MMDA about implementation activities and align their implementation to the DWSP
DWSP	There is a DWSP ,which has been developed with active participation of relevant departments
Monitoring and data flows	DWD submits MOM reports to the regional CWSA office
Bye-laws	There are bye-laws which are published and gazetted

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