

A Suite of Tools to Support a Systems-Based Approach to Sustainable Management of Water Service Delivery

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Abstract/Summary

Sustainable Development Goal #6 (SDG6) sets ambitious targets for ensuring availability and sustainable management of water for all, which can only be achieved if the water, sanitation and hygiene (WASH) sector expands its approach from one focused at reaching universal coverage to one that ensures sustainability. Water For People includes in our programmatic approach a comprehensive view of sustainability. This paper presents a suite of tools that we use to plan and monitor the various elements of sustainability of service delivery:

The tools support a holistic, clear understanding of functionality and service levels, financial viability, and water resources management.

- **AtWhatCost:** A life cycle costing tool mapping revenue and expenses of a water system to understand better the levels of financial sustainability for service providers.
- **Asset Assessment Tool:** A spreadsheet that paints a district-wide picture of all water infrastructure and considers its age, functionality, and physical condition to illustrate risks and priorities for future investment needs and planning by the service authority.
- The annual service delivery **monitoring activity** allows service authorities and service providers to measure progress and trends in water service delivery. It is a critical tool in measuring levels of service and as a basic measurement of sustainability.
- **Sustainable Services Checklist:** An Excel-based score card reflecting the institutional strength of WASH service delivery stakeholders. Through data analysis and direct interviews of the stakeholders, the Sustainable Services Checklist is an indicator used to reflect progress to the delivery of sustainable services, and ultimately when external intervention can exit.
- The **Water Resources Inventory tool** is designed to establish a foundation for developing district water resource management plans. In Honduras, this tool has led to the purchase and protection of high priority drinking water catchments.

Each of these tools can stand alone to address an individual element of sustainability of service delivery. As a suite of tools taken together, they support a holistic approach to implementing system change in rural water service delivery.

Introduction

Sustainable Development Goal #6 (SDG 6) sets ambitious targets for ensuring availability and sustainable management of water, sanitation and hygiene (WASH) sector expanding its current focus on infrastructure investment towards sustainable service delivery.

At Water For People, we have been implementing, evaluating, and evolving our district-level systems-based approach¹ to sustainable water service for the past 5 years. We currently work in 9 countries and 30 districts in Africa, Asia and Latin America. Global progress since we started our district-level approach is summarized online at <http://eftracker.waterforpeople.org/>.

We have consistently measured progress towards universal access in 30 districts since 2012. During this time, two districts have achieved universal access to adequate services, which was a major breakthrough across our organization. It showed us and our partners that the impossible was possible.

Despite these achievements, we face the very real risk that service levels will drop. Although sustainable water service has always been our focus, we have learned the need to expand our programmatic approach to more directly incorporate a more comprehensive view of sustainability that starts earlier in the process of planning and working with a local government. Central to this planning process are the tools that support a systems-based approach. The suite of tools that we use focus on four primary themes – monitoring service delivery, financial management and water resources management.

Conceptual framework behind the tools

All of the tools presented here – the service level monitoring tools, the institutional measurement tools, the financial management tools, and the water resources management tools – link directly to our organizational monitoring framework which provides a holistic view of a district’s ability to provide services over time in a sustainable way on an ongoing basis.

Service level monitoring measures whether the service people get now is adequate. The data from this monitoring is essential in understanding how to improve the current level and lead to continual increases in water services over time. Sustainability of services starts with the adequacy of the current service, but the other monitoring tools are complementary in understanding that service can be maintained over time.

Institutional sustainability, measured through a combination of service level monitoring data and interviews with service authority and service providers, is most simply put as a way to look at the management and financial structures within the two institutions.

Financial sustainability of water service delivery is a key challenge with overall system sustainability. In conjunction with WASH sector partners over the past three years, Water For People has developed and been working with a suite of tools to support community and district financial planning. Conceptually, the suite of tools allows service providers and district WASH officers direct access to information needed to strategically plan and manage WASH services. Without proper life cycle financial calculations and asset inventory, a district is ill-equipped to plan and budget appropriately to support the needs of each community within a district.

Finally, the environmental protection of catchments that provide drinking water is another critical piece to sustainability. Treatment systems and infrastructure improvements are costly alternatives to preventing degradation of the source area. If the source degrades, the system will be abandoned regardless of the quality of the infrastructure or the capacity of the service provider or authority. Climate change puts further strain on water resources and heightens the need for proactive approaches for protecting drinking water sources. Catchment management can occur at many different scales from one community and one water source to large river basins or aquifers that include hundreds of sources with different competing uses. This paper presents a Water Resources Inventory tool that is focused on improving management of water resources at the district level, as district governments make decision on water system investments. It provides the needed data to develop site-specific and actionable protection measures in order of priority.

The following table lists the key tools that support our systems-based approach to achieving SDG 6 in

¹ District-level is any defined political boundary, usually just below the state or departmental level with an established responsibility for rural water services. Although in different locations it can be called a municipality, a district, or a sub-county, Water For People uses the term district-level throughout this paper for consistency. Water For People defines a systems-based approach to shift the focus of our work from infrastructure to include all of the systems needed to effectively operate water systems and keep water flowing over time.

target area. An embedded necessity in each of these tools is the capacity of the responsible institution, which often means investment in trainings and capacity buildings to ensure the tools are embraced and used over the long-term. The goal of this paper is to share the tools with other organizations that can use and adapt them to their context.

Tool	Description
Service Level Monitoring	A set of indicators and scoring methodology to monitor levels of service over time.
Sustainable Services Checklist	A list of indicators and metrics to monitor institutional sustainability over time. Its focus is to determine if a service provider and service authority exist and at what capacity they are functioning. Water For People is using this checklist as one way to determine the ideal time to exit a district.
AtWhatCost	A spreadsheet that allows water committees/service providers to assess whether current spending on operation and maintenance is adequate and to set a tariff that is both fair and sufficient to cover the operation and maintenance costs, as well as a percentage of capital maintenance costs.
Direct Support Cost tool	A spreadsheet to help districts establish budgets that cover all roles and responsibilities associated with water service delivery, such as monitoring, oversight, delegated regulation, planning, local by-law development and otehrs.
Asset Analysis	A spreadsheet that allows districts to understand and prioritize future infrastructure investment needs for eventual major repairs and system replacement
Water Resources Inventory	A database of all current and future potable water sources in a district to better align supplies with demands and prioritize protection measures

Context, aims and activities undertaken

This section presents a description of each of the tools, our experience in applying them, and a sample of the findings.

Tool 1: Service Level Monitoring

Description: We monitor services through indicators that reflect the level of service in aspects of 1) presence of improved water sources, 2) quantity, 3) quality, 4) reliability/continuity, and 5) accessibility and include the following. Data on these indicators is collected through FLOW, which is also the platform for validation and processing the data. Jointly, they form our main service level monitoring tool.

Water Service Level Metrics	Points Possible
Presence Of An Improved Water Point/System	1
Number Of Users Meets Standards	1
At Least 95% Of The Community Members Have Access To An Improved Water Point/System	1
There Is Enough Drinking Water Every Day Of The Year For Every Community Member	1
The Water Point/ System Was Down For 1 Day Or Less In The Last 30 Days	1
There Are No Current Problems With The Water	1

Point/System	
The Quantity Of Water Available Meets Standards	1
The Quality Of Water Meets Standards (E. Coli, Bacteria Presence/Absence or Residual Chlorine)	1
Water Is Available On The Day Of The Visit	1
Time It Takes To Collect Water (Round Trip) Meets Standards	1
Total	10

These metrics are aggregated for each water point/system and based on a 10 point scale it is given the following classification.

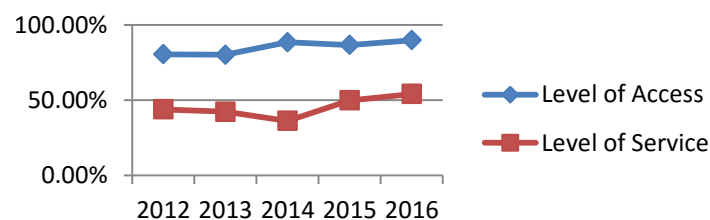
- No Improved System – 0 Points
- Inadequate Level of Service – 1 Point
- Basic Level of Service – 2 to 6 Points
- Intermediate Level of Service – 7 to 9 Points
- High Level of Service – 10 Points

The goal for Water For People is to achieve 7 or more of these indicators (so at least an intermediate level of service) in all water points in a district.

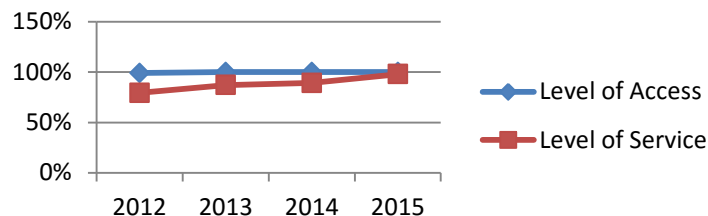
Application: Water For People first began systematic monitoring of water and sanitation projects in 2006. Over the next 6 years we learned significant lessons, most notably the importance of mobile data collection, which prompted the development of Akvo FLOW. By 2012, we expanded to a full district approach to monitoring, where we monitored water levels of service at the community and household levels across whole districts regardless of who installed the infrastructure. Water For People collects its Service Level Monitoring data during an annual data collection exercise, either through a sampling or census of all water services in the 30 districts where Water For People currently works. This has been done since 2012, allowing our programming to be informed by trends over time and annually updated information.

Sample Findings: The graphs below show both level of access (anywhere with an improved water source) and level of service (those with an intermediate or high level of service) over time in a sampling of the areas where Water For People is implementing work.

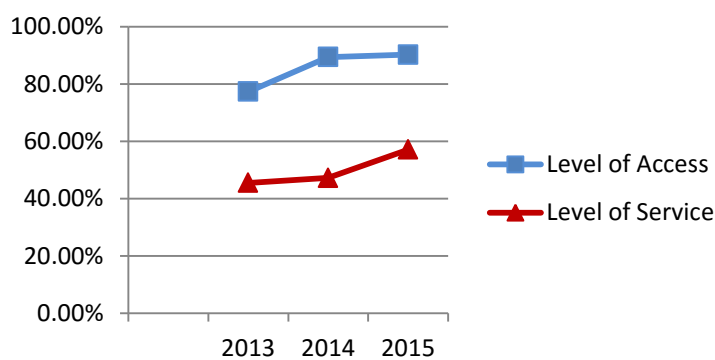
Uganda (Kamwenge District)



India - South 24 Parganas District (Sagar and Patharpratima Blocks)



Peru



The Uganda example in 2014 illustrates the importance of measuring both indicators in order to understand the quality of the services being delivered. It is possible when large infrastructure investments happen, there can be a slip in the quality of services if the focus remains on hardware. As seen in the India graph above, as a district gets closer to reaching full coverage and sustainable service delivery for water, the level of service and the level of access will likely be more in line with one another. As can be seen in Peru from 2014-2015, when work focuses on sustainable services over the rush to 100% coverage, it is possible to see a sharper increase in the level of service and a plateau in the level of access.

The results of all monitoring data collected since 2012 in each district are available here - <http://eftracker.waterforpeople.org/>. The data show that when looking at access alone, 11 districts have achieved 100% coverage, while three districts have achieved an intermediate or high level of service. Therefore the service delivery monitoring provides us with the priorities to focus on.

- Reaching the hard to reach and marginalized families within a community - this is based on the challenge of achieving the 95% access indicator.
- Setting and compliance with sustainable tariffs, based on the challenges identified when reflecting on the causes for the low scores on down time and other system problems. .
- Improved water resource management and water safety planning, based on the challenges with the water quality and quantity indicators.

These example priorities are consistent with previous years and shape our efforts to focus on the subsequent tools presented in this paper.

Tool 2 – Sustainable Services Checklist

Description: The Sustainable Services Checklist is an institutional scorecard in checklist format that is scored annually through data review and interview of key stakeholders, mainly service providers and

service authorities. This tool has allowed Water For People to holistically understand our various data sets in a consistent manner across different contexts and score the effectiveness of the institutions in delivering water services. The intention is to provide an objective indication of the sustainability of service delivery in a district, as well as a score for Water For People to understand the most opportune time to exit a district.

Application: The Sustainable Services Checklist has been tested in all countries where Water For People works in 2016. The nine global measurement indicators are consistent across all country programs, and the metrics which are sub-indicators of the nine categories are contextualized to the district level in order to measure the unique structures and conditions in that district. The testing consisted of an internal discussion and mock scoring, conducted by our country program staff and regional management. After final tweaks, we plan to conduct the baseline in 2017 as part of our data collection and monitoring reflection work.

Sample Findings: The initial scores emphasize the importance of focusing on sustainability before reaching full coverage with adequate services. Only a few of the indicators were met in most country programs which shows that we have succeeded in most places in establishing a service authority. This indicates to our internal review teams that there is much work to be done in the areas of finance and management and how services are best delivered. Water For People will have more concrete data sets to work with after our 2017 monitoring, from which we will build our way forward to increasing sustainability of services.

9 GLOBAL INDICATORS

1. Service Authority – Structure
2. Service Authority – Finance
3. Service Authority – Management
4. Service Authority – Monitoring
5. Service Provider – Structure
6. Service Provider – Finance
7. Service Provider – Operations and Maintenance
8. School and Clinic WASH Services
9. Water Resource Management

Tool 3 - AtWhatCost

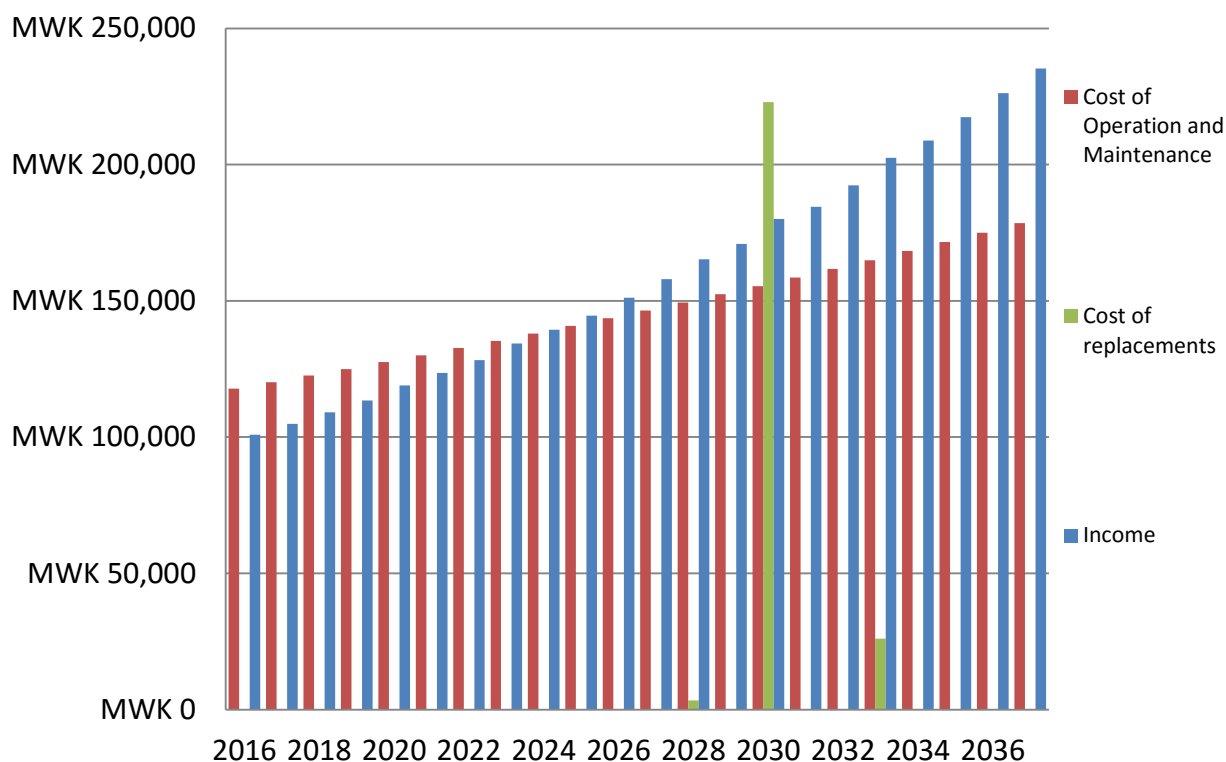
Description: AtWhatCost is a spreadsheet that allows water committees/service providers to understand the life cycle costs of delivering adequate service levels and to also set a tariff that is fair and sufficient to cover at least their operation and minor maintenance costs, and in some cases a certain percentage of capital maintenance costs, based on life cycle cost analysis. The key outcome of AtWhatCost is the understanding that it takes a multi-year perspective (10-20 years) recognizing that capital maintenance comes at irregular intervals, but requires bulky expenditures. An annual review of income and expenditure would not be able to cover these irregular and bulky investments adequately – hence the multi-year perspective. It has flexibility to input various cost assumptions and expected revenue streams to show a cash flow for each system.

Application: AtWhatCost has been applied in all of our country program contexts from rural Latin America to peri-urban Africa. It is a tool intended for service providers and the local government to manage in the long-term. In some places district WASH staff have begun using this tool, but it is currently still managed for the most part by Water For People staff. We are building in training plans in the coming year to support the district management of this.

Sample Findings: We have seen AtWhatCost successfully used to advocate in rural Malawi for improved tariff payments among communities reluctant to pay. Our work in Bolivia has also seen

increased water committee financial viability. Using the basic numbers from the AtWhatCost tool, district water office staff working with communities were able to better understand and plan for the lumpy costs of major repair and replacement. In addition, service providers are more able to understand the replacement costs and to understand their role in supporting a portion of the replacement costs with tariffs that are set at a sustainable and appropriate level. An example below illustrates the visual graph that is a result of an AtWhatCost cash flow calculation for a rural Handpump in Malawi.

Annual Income and Expenditures



Tool 4 - Direct Support Cost

Description: The Direct Support Cost tool is a worksheet to estimate the budget needed by the district government/service authority to fulfil all its roles with respect to water service delivery. Costs range from human resources, water catchment protection activities, monitoring, oversight, post-construction support to service providers, and major replacement costs of water service delivery infrastructure. The tool compares the current allocation of budget – both in terms of staffing and expenses for transport, per diems and others – with an ideal budget. The resulting gap analysis allows for discussion and advocacy of increasing or more effectively allocating district water office funding which is an important first step in advocating for sufficient public funding allocated to water services by the service authority.

Application: The Direct Support Cost tool has been used for the past 3 years in each district. This tool is currently used as a conversation starter and an advocacy instrument with the local government about WASH-related allocations for ongoing running costs of service delivery. This tool does not take into account the capital costs for infrastructure work.

Sample Findings: We have seen various successes and challenges with the use of this tool. It is useful to compare side-by-side the gap the district has in funding water support services. However, in our Nicaragua country program, it has shown to effectively increase the amount of staff and budget the municipality can allocate to water support services. In India, our staff has struggled to authenticate the numbers because governmental budget numbers (including staff salaries) is not publicly available. There

has also been success in our Uganda country program in the district acknowledging the needed increase in technical staff to support water service delivery from the service authority level. However, the one district where we are working still lacks the sufficient number of staff and support costs, like fuel to oversee implementation work in the field.

Tool 5 - Asset Analysis

Description: An inventory tool that documents the age, physical state and functionality of all water infrastructure in a district, to understand and plan for the eventual capital maintenance works, and provide a prioritized list of actions to keep water flowing over time.

Application: The asset analysis tool being used in our country program is now being piloted in Uganda, India, and Peru in order to ensure the technical pieces all function as designed. This was used in one district in Honduras early in 2016 and the results were helpful as we worked with the municipal government to understand the long-term maintenance needs of the water systems in the municipality.

Sample Findings: Water For People’s experiences, albeit limited to the work in Honduras and the current pilots, shows that the tool will allow for a high-level assessment of the state of the municipal water systems – based on age, level of service, and physical state. This visual scorecard has supported municipal WASH offices to easily prioritize their investments in system rehabilitation and replacement. It is more support than the technicians have had, because the priorities are based on methodologically collected data.

Level of Service	Age-based Risk	Replacement Priority
1 Nivel de Servicio Intermedio	Bajo Riesgo	Baja Prioridad
3 Nivel de Servicio Intermedio	Medio Riesgo	Baja Prioridad
1 Nivel de Servicio Intermedio	Bajo Riesgo	Baja Prioridad
3 Nivel de Servicio Intermedio	Alto Riesgo	Media Prioridad
2 Nivel de Servicio Intermedio	Medio Riesgo	Baja Prioridad
2 Nivel de Servicio Intermedio	Medio Riesgo	Baja Prioridad
3 Nivel de Servicio Intermedio	Medio Riesgo	Baja Prioridad
2 Nivel de Servicio Intermedio	Bajo Riesgo	Baja Prioridad
2 Nivel de Servicio Básico	Medio Riesgo	Media Prioridad
3 Nivel de Servicio Intermedio	Medio Riesgo	Baja Prioridad
3 Nivel de Servicio Intermedio	Bajo Riesgo	Baja Prioridad
3 Nivel de Servicio Intermedio	Bajo Riesgo	Baja Prioridad

Tool 6 - Water Resources Inventory

Description: A database of all current and future potable water sources in a district, including characteristics of the source (source type, location, capacity, etc.), characteristics of the recharge area (land use and topography of delineated catchment), other contaminant sources (such as agrochemical applications, latrines, etc.) and existing protection measures (such as catchment committees, field demarcation of protection area, source water protection plans in place, etc.). The purpose is to provide the baseline information necessary to identify and prioritize contextualized and impactful protection measures.

Application: Various versions of Water Resources Inventories have been implemented in 5 districts over the past 4 years.

Sagar Island, India – 2013 – Data is focused primarily on source characteristics and quantity issues and was collected with support of volunteers from World Water Corps (Water For People’s volunteer group). Rulindo, Rwanda – 2016 - Data includes full set of data elements listed in the current inventory in addition to aquifer characteristics with modelled delineation. Data was collected by hired Rwandan consultants in coordination with district government and Water For People staff.

San Rafael del Norte, Nicaragua – 2014 – Data is focuses primarily on source characteristics and was collected with support from volunteers from World Water Corps.

El Negrito, Honduras – 2015-16 – Data includes source and characteristics of delineated catchments and was collected by district government with support from Water For People staff.

Cascas, Peru – 2014 – Data includes source characteristics along with delineation of larger catchment areas for modeling purposes. The data was collected by volunteer water resource modelers.

The current version of the inventory (available [here](#)) reflects the lessons learned from these experiences but has not yet been implemented in its current form by a district government.

Sample Findings: The application in El Negrito, Honduras is most similar to the current form of the Water Resources Inventory presented here and best illustrates the potential impact from developing this type of inventory. Catchment management is an integral part of system administration in El Negrito largely because of the commitment to source protection from the Mayor, Delvin Salgado. A municipal catchment committee (*COMIC – Comité de Compra de Micro Cuencas*) was formed in 2013 with the goal of (1) uniting community water boards in the protection of natural resources and (2) aligning the municipality with the national government’s Institution of Forest Conservation (ICF). The primary function of the COMIC is to purchase land to protect drinking water catchments with money collected from the communities through an additional fee per month per user and from the municipality. In order to purchase and legally protect drinking water catchment areas, a water resource inventory must be completed that delineates the catchment area. To date, 5 drinking water catchments have been declared protected areas and land purchases are in process. Challenges exist, especially with full participation with the additional tariffs for land purchase, the pace of land purchases and negotiation conflicts, but the municipality has shifted and the priority is clear - drinking water watersheds must be protected, the steps are clear to achieve this goal, and the first step is to complete a Water Resources Inventory.

Main results and lessons learnt

Through our experience developing, testing, training and implementing these tools to varying degrees, we have learned several lessons.

- The process for every one of these tools has been **iterative and evolutionary**. The pilot tests and development included a lot of field staff input, the reality is they will continue to be refined and improved upon as we continue to understand more. The purpose of the tools doesn’t change, but the functionality, the methodology and the inputs evolve – which has taught us that patience and flexibility are key to the implementation of any tool.
- **Contextualization for a region, country, or even district** has shown to be more important than maximizing user interface and tool simplicity. Therefore, most tools have multiple versions based on the local context. We have individual versions of the Sustainable Services Checklist for each of our 30 districts. Water For People has no expectation our tools will be used without modification by others. Instead, we hope they serve as a base for others to build upon.
- **Technological differences also require individualization within the tool**. In addition to the need to contextualize according to geography, differences between community wells and piped networks with household connections are also significant. Consequently, some of our tools are duplicated to accommodate this difference.
- **Instructions, training, better instruction and more training** are always needed no matter how simple the tool may seem. Time must be allocated for both with the rollout of any new tool. The key to scaling up and replication of use is dependent upon the adoption of the tool by the local government. Therefore, initial trainings are similar to “train the trainers” in addition to direct trainings. Related to this lesson, **sufficient resources are necessary for a wide roll-out and training across multiple contexts**.
- **Need for basic computer software skills, so audience is limited to local and national government officials and NGO staff**. These tools require a computer and use of Excel and are focused at district level management, who can then work with community water committees/service providers to collect information and present findings. These tools are

intended for the use of the service authority so they can most effectively carry out their responsibility for providing adequate water service delivery to all.

Conclusions and Recommendations

- Service level monitoring is a way of finding out what users get now, but is insufficient to assess whether users will get the same in future. Therefore it is important to balance the tools focusing on service levels and those focusing on sustainability.
- There is a need to have tools to assess the probability that services will continue at a high level in the future. That focus on sustainability is how we have landed on the categories of tools we present here: institutional, financial and environmental/water resources
- The tools need to go into the depth of each element of sustainability, but their results, taken together should provide holistic assessment of future sustainability

The sample findings differ across the countries, but first results indicate:

- There is a trade-off between access and service levels. If you improve service levels, access growth may stagnate. Or, if you only invest in access, service levels may go down
- Of the different life-cycle costs, operation and minor maintenance can most easily be covered by users. But, direct support and capital maintenance are most underfunded
- Institutional sustainability proves challenging because it encompasses many of these issues into one or two entities. Clearly outlining roles and responsibilities is the first step – and who is responsible to cover what costs. Once those are understood and accepted it is a simpler step to understand where the funding comes from to cover the costs and ensure proper capacity of skills in the government.

There are three main recommendations based on our experiences to-date.

1. Tools are most effective when used and implemented at the district or municipal level.
2. Contextualization and localization is key, but plan for the additional resources for the extra work that is required for this level of individualization.
3. Engaging long-term stakeholders from the start results in an easier shift to ownership and up-take of the tools at a larger scale more quickly.

Each of these tools can be made available to interested organizations in the version that best matches their context. We hope others in the sector will benefit from our learnings as we work together to achieve SDG6.

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