



REAL WATER

RURAL EVIDENCE AND LEARNING
FOR WATER

IMAGE: VANESSA GUENTHER, THE AQUAYA INSTITUTE

IMPLEMENTATION MANUAL: WATER QUALITY ASSURANCE FUND

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ABOUT USAID/REAL-WATER:

USAID Rural Evidence and Learning for Water is a five-year partnership (2021–2026) that develops and evaluates strategies for expanding access to safe, equitable, and sustainable rural water services. REAL-Water supports policymakers, development partners, and service providers to make strategic decisions and implement best practices for water management through implementation research. It also ensures coordination with USAID programs contributing to the water, sanitation, and hygiene (WASH) and water resources management knowledge base, in alignment with the USAID Water for the World Implementation Research Agenda. For further information about this and other aspects of the project, as well as to access our knowledge products, please visit: globalwaters.org/real-water.

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INTENDED USE

This manual was prepared to document and disseminate the Water Quality Assurance Fund approach initially piloted in Ghana. Initial evidence supports scaling up the program to contribute to safe management of small, rural water systems. The primary audience is water development implementing organizations. Instances of “you” or “your organization” signify the roles played by program officers from the facilitating organization. Specific local governance units, laboratories, and water management stakeholders in rural settings will likely differ across countries. Where possible, a general description of each role is provided. Formative research may be needed to understand the actors, institutions, and water policy landscape in the specific location where you plan to work (e.g., Aquaya Institute 2019; 2020; Musonge, Matere, et al. 2022; Musonge, Abdiel, et al. 2022). Working within existing political mandates for rural water systems can increase buy-in and reduce risk perceptions.

INTRODUCTION

The Water Quality Assurance Fund is a mechanism wherein dispersed, rural water systems can receive regular, reliable, and professional water quality testing services and interpret data to ensure water safety (Figure 1). It provides a locally accessible standby account to help rural water systems become a more attractive market to urban water quality laboratories in their area. A central laboratory may be more willing to offer monitoring services to water systems with irregular income if they are guaranteed regular payment. When rural water systems are unable to pay testing fees to the laboratory on time, the Assurance Fund ensures the remittance of fees for monthly testing. Local government authorities can enforce a surcharge when water systems repay the Assurance Fund, to reduce drawdown over time. Most of the time, transactions take place between the testing recipients and laboratory providers.

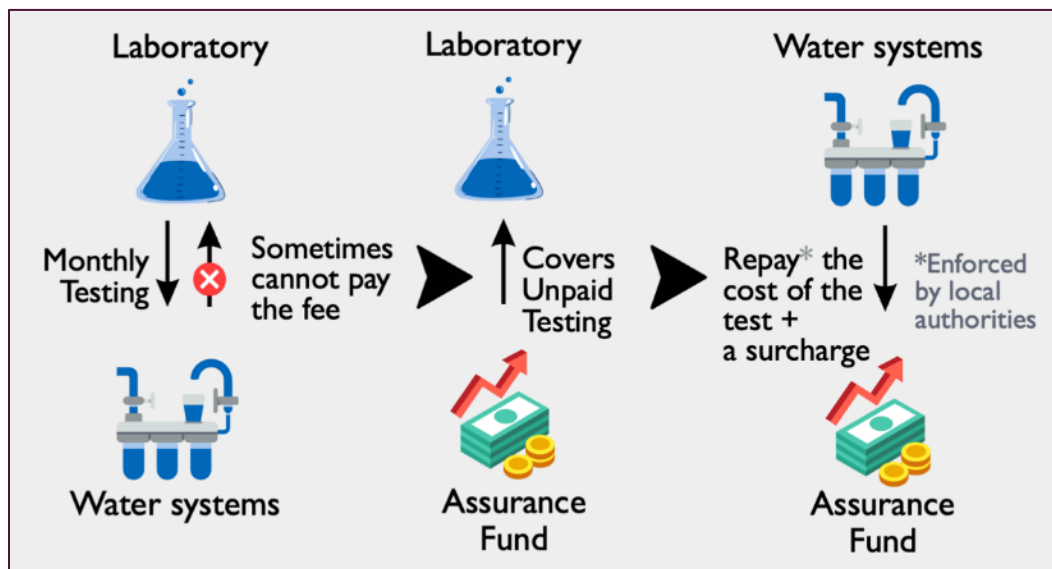


Figure 1. Basic setup of a Water Quality Assurance Fund (Source: Vanessa Guenther, The Aquaya Institute)

To set up the Assurance Fund and enroll rural water supplies, a facilitating organization needs to tackle several tasks and engage stakeholders in the process. Providing ongoing implementation support ensures

actor coordination and linkages to additional water safety management expertise as needed. This document outlines the steps needed.

FREQUENTLY ASKED QUESTIONS

HOW DID THE WATER QUALITY ASSURANCE FUND ORIGINATE?

The Water Quality Assurance Fund concept came from The Aquaya Institute's efforts, as supported by the Conrad N. Hilton Foundation, to overcome barriers to monitoring drinking water safety in the rural district of Asutifi North in southern Ghana (Press-Williams et al. 2021). The pilot in 2020–2022 led to scale-up efforts under the Rural Evidence and Learning for Water (REAL-Water) program (2021–2026) of USAID, with additional support from the Hilton Foundation and Helmsley Charitable Trust.

WHAT ARE THE ADVANTAGES?

- The Water Quality Assurance Fund program connects well-equipped, centrally located, professional laboratories with dispersed rural water systems for whom onsite water quality monitoring would not otherwise be feasible or cost-efficient.
- Formal agreements, auditing, and third-party oversight reinforce trust among the parties.
- Pooling several water systems opens a new potential revenue market for the central laboratory.
- The payment setup leverages donor support, relying primarily on locally sustainable financial arrangements.
- The Assurance Fund setup procedures screen for rural water systems that are most likely to benefit (e.g., within a reasonable day-trip distance from the central laboratory, able to pay for testing fairly consistently, able to address water quality issues if given technical guidance, and committed to sustainment).
- In providing contractual and implementation support, skilled implementation professionals can assist with setup and troubleshooting. This approach holistically addresses financial, logistical, and technical barriers to water testing that often cause new initiatives to stall out (Peletz et al. 2016; 2018).
- Water quality monitoring takes place by default after enrollment, embedding a desirable water safety behavior in everyday practice.
- Evidence from water quality testing can inform tangible water safety and resilience improvements. Support specialists from the facilitating organization(s) meet regularly with rural water system managers and operators to help them interpret results and resolve existing or new issues. For example, two water systems in Asutifi North District, Ghana, used water quality information to improve their operations to ensure adequate chlorine levels 76% of the time, compared to 10% before.
- When needed and agreed upon with the donor, the Assurance Fund can deliver subsidies. For example, during the COVID-19 pandemic, the Assurance Fund in Asutifi North District was modified to pay a portion of testing fees for rural water systems with revenue shortfalls. In other cases, the Assurance Fund was extended to subsidize the laboratory's fuel costs during a period of price inflation and to compensate for the laboratory's travel expenses during unexpected water system breakdowns.
- Ongoing program audits may strengthen the central laboratory's capacity and quality control.

WHAT ARE THE DISADVANTAGES?

- Donor or in-kind support is needed to cover implementation and ongoing facilitation costs (the main expense), as well as subsidies in some cases.
- The Assurance Fund account is likely to draw down over time, due to incomplete repayment and/or subsidy add-ons, requiring replenishment.
- Water quality data in itself does not always lead directly to management improvements, lacking supporting management systems, plans, and resources.
- Partnerships and contracts can take time and expertise to develop (approximately 6–12 months, depending on context). The basic approach likely requires adaptation to fit diverse country contexts.
- The facilitating organization must be able to access reliable records regarding water system payments and water quality to carry out due diligence.
- Participating water systems can opt out of the program at will.

HOW LONG ARE THE ASSURANCE FUNDS EXPECTED TO LAST?

The initial deposit is typically equivalent to four months of testing costs for all enrolled systems. In the pilot, rural water systems defaulted on approximately 11% of the laboratory invoices, and about one-third of those were ultimately repaid. Considering potential subsidy add-ons and repayment compliance variability, the Assurance Fund is likely to draw down slowly over time. A lifespan of 1.5–3 years without replenishment can be estimated for planning purposes.

WHERE HAVE WATER QUALITY ASSURANCE FUNDS BEEN USED?

While continuing to apply the Assurance Fund in Asutifi North District, Ghana, since 2020, The Aquaya Institute and partners identified multiple water systems for expansion in 11 Ghanaian districts in the Ahafo and Bono regions (initiated March 2023). In addition, efforts are underway to replicate and test the Assurance Fund model in Kenya (initiated August 2023), Uganda, and Tanzania.

HOW MUCH IMPLEMENTATION SUPPORT IS NEEDED?

Depending on the geographic scale of the Assurance Fund, at least one full-time local program officer with implementation support expertise is recommended to ensure smooth program startup and sustainability. The facilitating officer should be skilled in field and laboratory practices for water quality monitoring, as well as data analysis, data interpretation, and (most importantly) communication with local stakeholders. Supporting or temporary staff may be needed to offer part-time assistance in areas such as financial management, legal contracts, water treatment engineering, graphics, and marketing.

WHAT SHOULD PARTICIPATING WATER SYSTEMS EXPECT?

To achieve the best outcomes, participating local government units and rural water system managers must commit to providing leadership and enabling the program. Ideally, they should be willing to share data with the facilitating organization and partners to help generate further evidence toward strengthening program outcomes. On a regular basis:

- Water systems will receive visits from central laboratory staff taking water samples (typically monthly, although more or less frequent schedules are possible).

- Water systems will receive water quality test results after sampling and hold debrief meetings with the facilitating organization(s) where they can request technical guidance.
- Water system managers, with aid from partners, should report back to community members to share results, address questions, give updates on the program status, and explain its implications for water safety.

WHAT ARE COMMON MISCONCEPTIONS ABOUT THE WATER QUALITY ASSURANCE FUND?

- The Water Quality Assurance Fund provides a small liquid bank account to reimburse urban water quality laboratories when rural water systems cannot make some payments. It may be adapted for related water access purposes (e.g., delivering subsidies), but it does not represent, nor is it related to, a large, unlimited, or broad source of international funding to address water quality issues.
- While the Assurance Fund serves as a guarantee for reducing the financial risks inherent to water quality monitoring programs in rural areas, it does not bring any new or different infrastructure (e.g., new laboratory, improved treatment works) to the rural water systems. Based on the water quality information generated, follow-up technical assistance may recommend infrastructure improvements, for which funding must be negotiated separately.
- Finally, the Assurance Fund is not designed to generate financial returns for contributors.

HOW LONG DO PARTICIPATING WATER SYSTEMS STAY ENROLLED?

Water systems enrolled so far in the Water Quality Assurance Fund have had a start date, when the agreement and sub-agreements are signed, renewable after a period of 1–3 years. New rural water systems can be enrolled at any time during the agreement period. Water systems that do not continue to meet the program terms (e.g., defaulting on multiple consecutive payments) can be removed at any time. In addition, participating rural water systems can opt out with two-months' notice for any reason.

QUICK START GUIDE

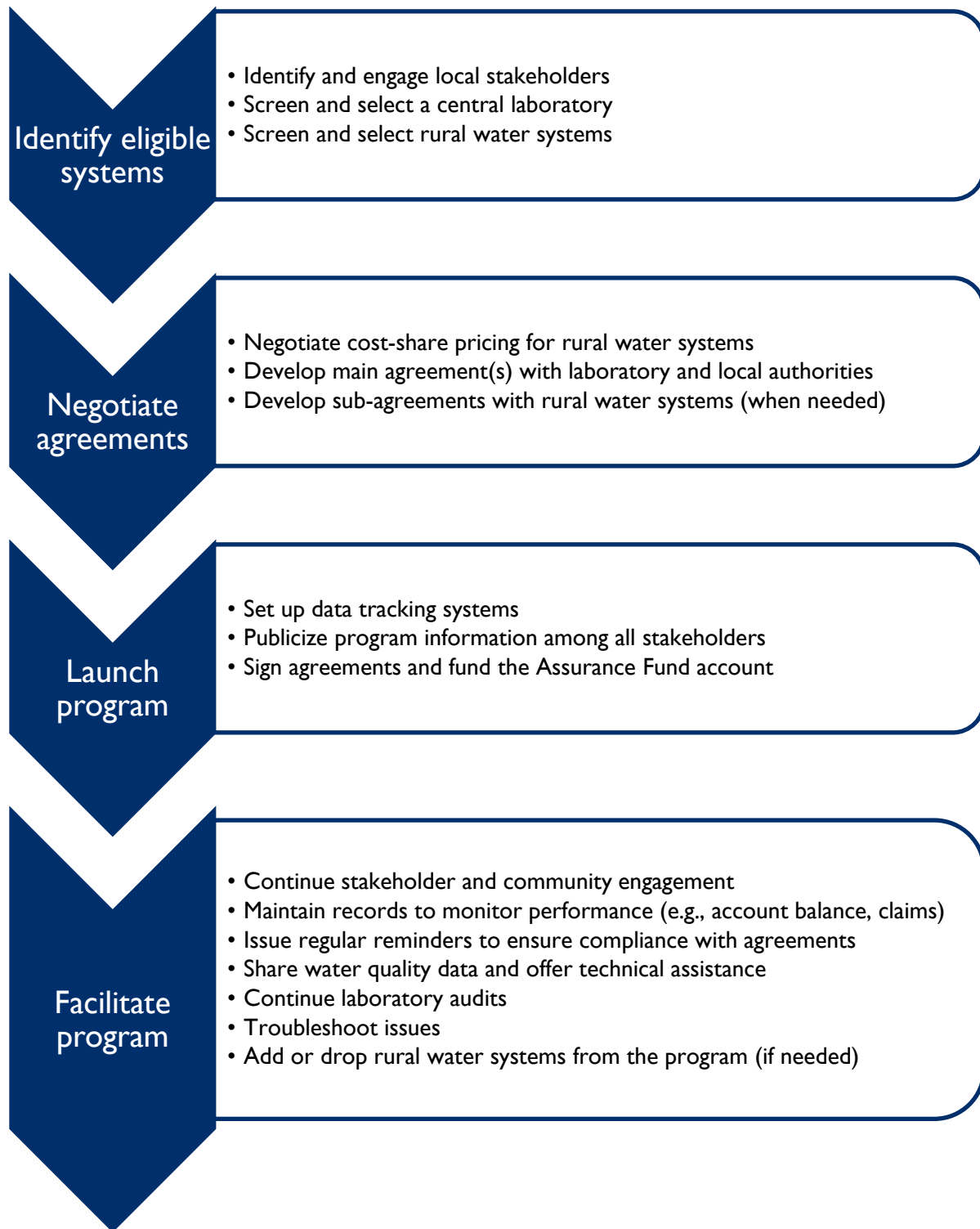


Figure 2. Summary of steps to implement the Water Quality Assurance Fund intervention in new locations

IDENTIFYING ELIGIBLE SYSTEMS

STAKEHOLDER IDENTIFICATION

ACTOR TYPE	ROLE	EXAMPLES IN GHANA	EXAMPLES IN KENYA
Donor	Provide external funding to seed the Assurance Fund and cover the facilitator’s implementation support activities	Hilton Foundation; USAID; Helmsley Charitable Trust	Hilton Foundation; USAID; Helmsley Charitable Trust
Facilitator	Set up and guide implementation of the Assurance Fund	The Aquaya Institute; Kwame Nkrumah University of Science and Technology	The Aquaya Institute; Water Mission
Central laboratory	Operates water quality testing facility	Ghana Water Company Limited	Nakuru Water and Sanitation Services Company Limited, Eldoret Water and Sanitation Company
Regional government, if applicable	Coordinates regional government plans and programming	Regional Coordinating Council	Not applicable
Rural water agency or network, if applicable	Oversees, operates, or provides technical support for rural water systems	Community Water and Sanitation Agency; Association of Small Towns' Water Supply Systems	Nakuru Rural Water and Sanitation Company Limited
Local government	Promotes local development and governs rural water supplies; may own rural water supply infrastructure	District or Municipal Assembly	County Water Department
Rural water system managers	Manage everyday operations of the water system, including water treatment, distribution, monitoring, and tariff collection	Water and Sanitation Management Teams	Community committees; scheme managers under Nakuru Rural Water and Sanitation Company Limited
Community members	Consume water and may financially contribute toward testing though water tariffs	Public water users	Public water users

To begin identifying stakeholders in your area, determine who fills the roles shown in Table 1 or consider using the tools in the “stakeholder analysis” section of USAID’s [Research Translation Toolkit](#).

Table I. Summary of stakeholders that may need to be engaged in the Assurance Fund

COMMUNICATION MATERIALS PREPARATION

It may aid outreach to develop media (e.g., presentations, posters, briefs, fact sheets, flyers, brochures, videos, or other materials) that explain how the Assurance Fund works and support partner engagement. If available, use your organization- or donor-specific guidance for branding and marketing. Alternatively, consider reviewing tools in the “communication products” section of USAID’s [Research Translation Toolkit](#).

INITIAL SCREENING AND OUTREACH

CENTRAL LABORATORY

Large urban water systems represent the best first stop for identifying a qualified water testing laboratory. Other alternatives might include private, government, university, or hospital laboratories that are not affiliated with the nearest urban water system. Selection criteria for a central laboratory are provided in Appendix I: Laboratory Eligibility Criteria. The screening and selection process may include records review and garnering input from local communities or government bodies about their partnership preferences.

Steps to engage and screen a central laboratory include:

- Ask for an introduction or write an introduction letter to the water system or laboratory’s regional head manager:
 - Provide a brief profile of your organization and the background and goal of the program.
 - If possible, submit the letter in person rather than mailing. This helps to identify the appropriate contact for follow-up.
- Schedule an in-person follow-up meeting.
- Reach out to establish contact with the water system’s regional water quality manager and the public relations officer via phone or a messaging service (e.g., WhatsApp).
 - Ask for suggestions about which communication channels they prefer for follow-up.
- Conduct an in-person meeting with the central laboratory representatives, covering the following content:
 - Overview of the Assurance Fund program
 - Brief profile of your organization, demonstrating expertise to carry out the program
 - Potential economic benefit of the program to the central laboratory
 - A request to “audit” the laboratory (i.e., review equipment and protocols)
- Plan an initial laboratory audit.
 - Schedule a meeting with the water quality manager and laboratory technician.
- Follow up with the laboratory technician and water quality manager as a reminder within the week prior to the audit.
- Conduct an initial laboratory audit (see Appendix II: Laboratory Audit Checklist).
- Share recommendations as needed (e.g., to upgrade equipment, revise protocols, or refresh staff training), either during or after the audit.
- Request referrals to other stakeholders, if needed.

- Let the laboratory recommend the appropriate strategy to request referrals. It may be via letter, in person, or both. (Note: If you can choose, we recommend both.)
- Draft introduction letters if the laboratory agrees this would be helpful.



Figure 3. Observing the water testing procedures in a central laboratory operated by Ghana Water Company Limited (Source: The Aquaya Institute)

PUBLIC SERVICE OVERSIGHT

Once all Water Quality Assurance Fund stakeholders have been identified for your location, the appropriate public service oversight bodies (and appropriate outreach order) can be planned. This manual generally recommends beginning from the largest applicable scale of governance (e.g., regional) and working toward the local scale. In the long term, novel initiatives such as the Water Quality Assurance Fund may need to be embedded in the service providers' governance approaches at a local, regional, or national level. Engaging the entities that oversee public services such as rural water provision can help to ensure goal alignment, proactive cooperation, and program sustainment.

Regional Government

Depending on your work location, oversight of small, rural local government units may sit with a regional government authority. If this is the case, establish contact using the following steps:

- Ask for a referral introduction from one of your partners if possible, or write an introductory letter including a brief profile of your organization and the background and goal of the program.
 - Identify the appropriate officer with purview and influence.

- Ask your reference to join you in visiting the regional government office to submit the letter.
- Ask for suggestions about which communication channels they prefer for follow-up (e.g., in person, phone call, or text message).
- Schedule meeting with regional government office.
 - Schedule a meeting with the appropriate officer.
 - Determine if a per diem, transportation allowance, catering, or other remuneration or gift items are necessary within the local context (i.e., if not providing it would undermine the meeting) and the appropriate amount.
 - Offer a reminder about the proposed meeting using their preferred mode of communication.
- Ensure relevant government officials (e.g., regional minister, regional coordinating director, regional economic planning officer) are available for the meeting to gain their buy in.
 - These individuals are likely power brokers. For example, the regional minister is the political head of the region and is appointed by the president in Ghana. The regional coordinating director is the administrative head of the region and is employed by the civil service commission.
- Plan meeting content and participate in discussion:
 - Give a brief profile of your organization.
 - Review the background and goal of the program.
 - Demonstrate your organization's technical knowledge of water quality monitoring.
 - Solicit information on how the program aligns with government policies.
 - Ask for general feedback about their views, advice, level of support for the program, and preferred mechanism for continued engagement.
- Request referrals to other stakeholders, if needed.

Rural Water Agency or Network

If one exists in your location, engage the relevant nationally or regionally applicable rural water supply agency, umbrella authority, public utility, consortium, association, circuit-rider organization, or network to help establish connections with rural water systems. Consider the following outreach steps:

- Write an introductory letter including a brief profile of your organization and the background and goal of the program.
- Submit the letter in person and identify the appropriate officer for follow-up. Ask for suggestions about which communication channels they prefer (e.g., in person, phone call, or text message).
- Schedule an in-person meeting with the officer and/or regional director.
- Determine if a per diem, transportation allowance, catering, or other remuneration or gift items are necessary within the local context (i.e., if not providing it would undermine the meeting) and the appropriate amount.
- Send a reminder regarding the scheduled meeting, according to their preferred mode of communication.
- Plan meeting content and participate in discussion:
 - Give a brief profile of your organization.
 - Review the background and goal of the program.
 - Demonstrate your organization's technical knowledge of water quality monitoring.

- Solicit information on how the program aligns with government policies.
- Ask for general feedback about their views, advice, level of support for the program, and preferred mechanism for continued engagement.
- Request referrals to other stakeholders, if needed.

Local Government

The local government actor (e.g., county, district, or municipality, depending on the country context) will likely play a strong role in Assurance Fund agreements and enforcement. These units typically have jurisdiction over rural water systems within their boundaries.

Determine in advance what type(s) of water systems you can support through water quality testing. For example, the Assurance Fund in Ghana worked with mechanized boreholes or pressurized water systems (e.g., from an elevated tank) distributed at public access points. This excluded manually powered groundwater handpumps, which often have low-capacity caretakers and inadequate user fee recovery. In such cases, testing might not be affordable and findings of microbial contamination might not have clear follow-up action.

Outreach is best achieved through a site visit, if feasible:

- Request that the regional government or rural water agency, if one exists in your location, write an introductory letter to the local government authority and copy your organization.
 - If they agree it would be helpful, draft an introduction letter including a brief profile of your organization and the background and goal of the program.
 - If possible, share a copy of the letter with the local government units electronically while the hard copy is in transit. Mail may be delayed due to official government communication procedures.
 - Follow up to ensure the local government contacts received the letter.
- Conduct an initial round of screening via phone call with local government officers.
- Work with the regional government or rural water agency to schedule meetings with the candidate local government units.
- Consider inviting a range of relevant participants (see examples in Checklist 1).
- Plan the meeting.
 - Determine if a per diem, transportation allowance, catering, or other remuneration or gift items are necessary within the local context (i.e., if not providing it would undermine the meeting) and the appropriate amount. Make sure to budget for their team's fuel and daily allowance expenses, if such reimbursement is customary for travel outside of their normal work location.
 - The regional government or rural water agency representatives can introduce the Assurance Fund to the local government participants, followed by a presentation from your organization.
 - Provide a brief profile of your organization.
 - Review the background and goal of the program.
 - Demonstrate your organization's technical knowledge of water quality monitoring.
- Travel with your regional government or rural water agency contacts to visit the local government units under consideration.

- Solicit information on the interest of the local government authority.
- Describe the next steps for screening and enrollment.

Checklist 1: Sample list of local government site visit meeting invitees, from a Ghanaian example

- Regional Water Officer
- Regional Economic Planning Officer
- County/District/Municipal Chief Executive
- County/District/Municipal Coordinating Director
- County/District/Municipal Planning Officer
- County/District/Municipal Environmental Health Officer
- County/District/Municipal Water Engineer
- County/District/Municipal Health Director
- County/District/Municipal Community Development Director
- County/District/Municipal public board members
- Rural Water System Management Committee representatives

RURAL WATER SYSTEM MANAGEMENT COMMITTEES

Volunteer or paid workers may contribute to rural water system operations and maintenance, depending on your location. Take the following steps to ensure the onsite management committees thoroughly understand the Water Quality Assurance Fund program and their opportunity to participate:

- Request a referral to rural water system managers through the local government unit.
 - Ask about their preferred mode of communication (e.g., in person, phone call, or message).
- Schedule an in-person meeting with the rural water system managers to enable screening (see next section).
 - Request that the local government authority invite the water system managers to a meeting at their offices.
 - If helpful, draft the invitation letter for the local government authority.
 - Follow up with the local government focal person to ensure the water system managers have received the letters.
 - Determine if a per diem, transportation allowance, catering, or other remuneration or gift items are necessary within the local context (i.e., if not providing it would undermine the meeting) and the appropriate amount.
- Plan the meeting content and format.
 - Use the local language.
 - Offer a brief profile of your organization.
 - Provide the concept background and goal of the program.
 - Describe the importance of water quality testing and treatment to public wellbeing.
 - Solicit information on the committees' interest, willingness to share financial and other relevant data, and availability to participate in future meetings.
- Share a (paper-based) template for data submission through the local government focal person (see Appendix III: Water System Description Templates).
- Set a deadline for them to submit their water system description and financial data.

- Conduct follow-up with the local government focal person and the water system managers to remind them of the data request, using their preferred mode of communication.
- Review submitted data thoroughly to ensure completeness.

SCREENING CONFIRMATION

The following steps summarize the efforts you can make to confirm the suitability of rural water systems for participation in the Assurance Fund (also see Checklist 2):

- Check that the distances between the central laboratory and rural water systems do not exceed approximately a two-hour drive and justify a centralized monitoring approach (see Appendix IV: General Cost-Sharing Calculation Tool).
- Conduct a financial assessment of the water systems as thoroughly as possible to determine their eligibility for enrollment and ensure affordability of the testing fee. Financial screening of rural water systems might use one or more of the following approaches:
 - One year of historical financial records (see Appendix III: Water System Description Templates) used to calculate eligibility against quantitative criteria (see Appendix V: Rural Water System Eligibility Criteria)
 - A short list of referred “model” water systems that would be able to afford testing
 - A signed certification of financial standing and commitment
- Respond to the local government units regarding the selection status of their respective rural water systems. Consider providing standardized guidance and/or starter materials for water quality treatment and testing, even if they are not selected (see Box I under *Technical Assistance and Corrective Action*).

Checklist 2: Potential screening criteria for participating local government units and rural water systems

- Local government or rural water agency has formal oversight authority for rural water system management.
- For ease of facilitation and meeting attendance, the local government headquarters, rural water systems, and central laboratory are located within a two-hour driving distance (see Appendix IV: General Cost-Sharing Calculation Tool).
- Current water quality testing frequency falls short of national government standards.
- Water system management committee is well constituted (e.g., following the membership numbers and positions outlined in national policies or guidelines).
- Water system managers have good communication with the local government authority.
- Water system managers keep good financial records and are willing to share information to participate in the screening process (see Appendix III: Water System Description Templates).
- Rural water systems are not struggling financially and their average monthly profit is greater than the monthly cost of testing (see Appendix V: Rural Water System Eligibility Criteria).



Figure 4. Tapstand in a rural village in the Asutifi North District in Ghana (Source: The Aquaya Institute)

NEGOTIATING AGREEMENTS

TESTING COST CALCULATIONS

At the startup phase, take the initiative to calculate the provisional testing fees and then discuss them with the selected central water quality laboratory (see "Appendix VI: Specific Cost-Sharing Calculation Tool).

Confirm with the laboratory that their fees reflect current market prices of water quality testing consumables and, as relevant, amortization of higher-cost water quality testing equipment. This helps to ensure the laboratory approaches the program with a business development mindset rather than expecting supplies to be provided by the donor or facilitator. The total fees should consider:

- Sampling costs
- Analysis costs
 - Itemize, citing the method of analysis per test parameter.
 - Microbial quality indicators: *E. coli* and total coliform
 - Disinfection effectiveness: free chlorine residual
 - Physiochemical parameters: color, turbidity, conductivity, temperature, pH, total dissolved solids
 - Geogenic contaminants: fluoride, arsenic, lead, manganese, iron (optional, if these pose a concern in the monitoring location)
 - Include quality assurance/quality control costs (e.g., duplicates for 10% of samples, plus one blank and one positive control per daily batch of samples).
- Transportation costs
 - Distance (km)
 - Fuel price range
- Negotiated price reduction (e.g., if you are enrolling multiple rural water systems)

AGREEMENT(S) WITH CENTRAL LABORATORY AND LOCAL GOVERNMENT UNIT

Different written contractual agreements are possible depending on the stakeholder presence and interrelationships in your area of work. Two examples appear in Figure 6. The general steps to set up the agreements include:

- Draft an agreement between your organization, the central laboratory, and the local government units defining the roles and responsibilities of the parties (see example table in Appendix VII). Depending on the context, this can take the form of multiple bilateral agreements between your organization and each party (Figure 6). In other cases, the local government unit may request that a rural water agency be a co-signatory or witness the agreement (particularly if a rural public utility exists). Make sure to:
 - Specify a conflict resolution alternative.
 - Indicate the duration of the agreement.
 - Ask the central laboratory to include a water quality report template as an appendix to the agreement. This helps them to internally clarify expectations regarding the type of water quality tests to be conducted and the reporting of quality assurance and quality control procedures.
 - Provide a financial commitment (i.e., the amount of money to be seeded into the Assurance Fund account). In Ghana, the initial deposit was equivalent to four months of testing costs for all enrolled systems.
 - Request legal review.
- Share a draft of the agreement with the signatory parties for their input.
- Ask representatives from all parties to sign the final agreement and give each party a copy.



Figure 5. District representatives in Ghana signing Assurance Fund program agreements as a demonstration of their commitment (Source: The Aquaya Institute)

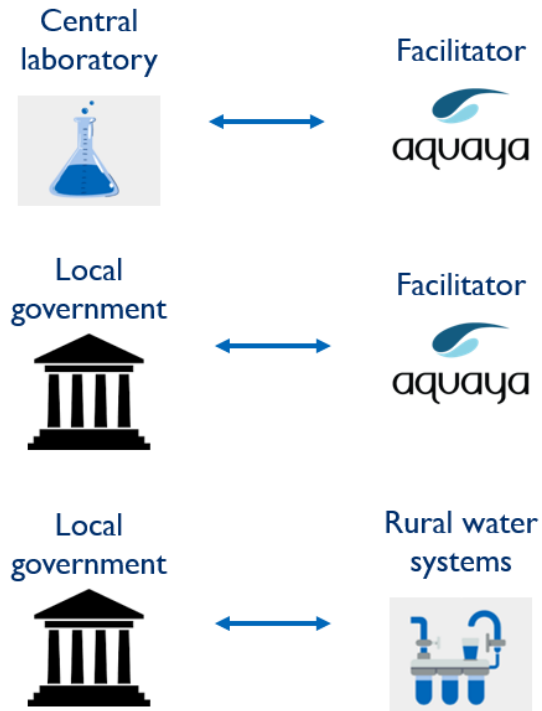
SUB-AGREEMENT(S) WITH WATER SYSTEM MANAGERS

In some locations, sub-agreements may be required between local government units and water system managers in addition to the main agreement. In these cases, draft a sub-agreement for these two parties coherent with the terms of the main agreement:

- Define their respective roles and responsibilities.
- Specify the duration of the sub-agreement.
- Specify procedures for opting out and removing a water system (e.g., due to repeated nonpayment).
- Include provisional invoices in the sub-agreement.
- Request legal review.
- Share draft agreement with parties for their input.
- Ask the parties to sign the final agreement and keep an executed copy for reference.

GHANA EXAMPLE

- Facilitator signs separate agreements with central laboratory and local government.
- Local government signs sub-agreement with rural water systems.



KENYA EXAMPLE

- A single agreement binds the facilitator, central laboratory, local government, and (where present) rural water public utility.
- Rural water systems not centrally managed by the local government or a rural utility sign a sub-agreement with the local government.

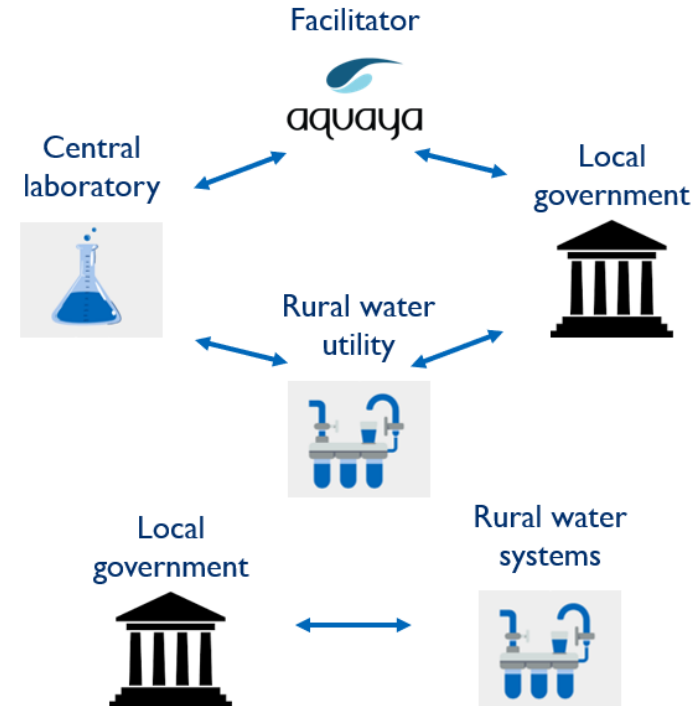


Figure 6. Two examples of potential agreement and sub-agreement setups for the Water Quality Assurance Fund.

LAUNCHING THE PROGRAM

STAKEHOLDER KICKOFF MEETINGS

Community members represent consumers or customers of the rural water systems. They are the primary beneficiaries of water safety monitoring and can influence program outcomes. Engaging them before the first round of testing has the potential of improving the relationship between the water systems and the customers, revenue collection, and the demand for better services. If appropriate and feasible, multi-stakeholder or public events may help to raise excitement and awareness about the Assurance Fund program (e.g., Figure 7; Figure 8).

To effectively engage the community, consider the following:

- The local government should first notify its assembly members, traditional authorities, and/or the water system managers about the program inquiry.
 - Formal letter
 - Informal verbal announcement
- Then, follow up with the local government members and the water system managers to schedule a meeting.
 - Phone call
 - In-person visit
- Properly observe all local protocols for appropriate community entry.
- Help the community leadership select an appropriate meeting venue, for example:
 - Community center
 - Information center
 - Religious center
 - Chief's residence
- Plan meeting content:
 - Hold the meeting early, at midday, or late in the day to avoid peak work hours.
 - Use the local language as the medium of communication.
 - The local government authority, water system manager, and facilitating organization should constitute the speakers.
 - Give a brief profile of your organization.
 - Offer some background and the goal of the program.
 - Describe the importance of water quality testing and treatment for public wellbeing.
 - Ask a local government representative and water system manager to explain the program in their own words and answer questions from community members.



Figure 7. Researchers, traditional authorities, and other stakeholders joined together for a celebratory Assurance Fund launch event in Ghana (Source: The Aquaya Institute)



Figure 8. A community meeting in Ghana to enhance knowledge and awareness of the Water Quality Assurance Fund program (Source: The Aquaya Institute)

ACCOUNT SETUP

The facilitating organization should open a liquid (readily accessible) bank account to ensure ease of payment remittance for claims. For example, The Aquaya Institute opened an account in Ghana and seeded it with the amount necessary to cover four months of water quality testing activities (microbial parameters, pH, residual chlorine, and quality assurance/quality control) for enrolled water systems. In the event that the initial amount is depleted prior to the termination date of the contractual agreement, Aquaya committed to replenishing the Assurance Fund such that testing service costs for an additional two months are assured.

DATA MANAGEMENT SETUP

DATABASE SETUP

Setting up a central database will allow your organization to monitor all aspects of the program: invoices and payments, Assurance Fund account drawdown, water quality results, quality control procedures, debrief meetings with water system managers, community engagement, and results of periodic laboratory audits. The database can take the form of a limited-access spreadsheet with a different tab dedicated to each of these aspects. Setting up the database in a shared Google Sheet or Excel spreadsheet will allow for multiple data managers. Incorporating automation and formulas can help minimize data entry errors, for example:

- Lookup tables automatically fill cells with content that does not change over time (e.g., water system names, number of monthly tests, sampling fees stipulated in the agreement).
- Conditional formatting flags problematic situations (e.g., an invoiced amount not matching the expected value).
- Formulas can detect when parties do not follow the terms of the agreement (e.g., a water system has defaulted three or more times, or the laboratory has not submitted a claim within two months of issuing an invoice).

Consider linking the management database to the data visualization software (e.g., Tableau) and customizing views for each role: facilitating organization, central laboratory, local government units, and rural water system managers.

INVOICE CALCULATION TOOL

Although pricing is negotiated up front for the duration of the agreement, actual testing fees typically change every month for multiple reasons:

- Fuel prices fluctuate, affecting the cost of sample collection.
- Some water systems may opt to receive quarterly testing or have occasional water supply interruptions, affecting the number of water systems sharing sample transport costs.
- Some water systems periodically receive additional tests, such as annual metals testing.
- If the laboratory failed to follow certain quality assurance or quality control procedures in a given month, the corresponding costs should be deducted from the following month's invoice.
- New water systems may join the agreement over time, while others may withdraw or be dropped due to repeated nonpayment.

- The facilitating organization may temporarily subsidize part of the testing fee (e.g., during emergency periods), such that water system invoices only reflect a fraction of the total fee.

Because invoice calculations are prone to variations and errors, consider developing a calculation tool (e.g., in an Excel spreadsheet) to aid the laboratory.

CLAIM TRACKING FORM

To help improve documentation and facilitate claim processing, set up a web form (e.g., Google Form) and request that the central laboratory staff fill it out before each subsequent round of testing. The fields should include survey questions about whether any payments were not received, which water systems have not paid, the mode of invoice follow up (e.g., phone call, text message, WhatsApp message), and the date of the follow up.

FACILITATING THE PROGRAM

REGULAR ENGAGEMENT

Ongoing stakeholder engagement is critical to facilitating a Water Quality Assurance Fund. For the duration of the program, consider scheduling standing meetings with the relevant oversight organizations, the central laboratory, and rural water system managers (Table 2). This interaction will initially establish awareness and buy-in, and later help you review implementation progress, learn from experiences, and anticipate any changes. We recommend meeting with headquarters and regional offices if both apply. These engagement expectations may be written into agreements and sub-agreements.

Following the launch activities, your organization should continue working with the local government authority and water system managers to engage the participating communities on the program and its benefits. Aim to extend beyond posting written water quality results in public places, to allow real-time interaction addressing comments and questions. This could take the form of:

- Community center gatherings
- Town hall meetings
- Radio talk shows or announcements
- Community celebrations or fora (e.g., markets)
- Announcements or presentations at churches, mosques, or schools
- Social media posts (e.g., WhatsApp, Facebook, LinkedIn, Instagram, YouTube, Twitter)

For radio shows, first work with the local government to identify the radio stations with the widest coverage and peak listening hours. If you are able to arrange a time slot, determine which implementing partner will participate. Then, draft notes outlining the Assurance Fund program and sample discussion questions to share with the radio host several days before the show. Be sure to respect their time schedule and leave about half of the time for call-in questions.

Table 2. Summary of ongoing Water Quality Assurance Fund implementation support needs and suggested frequency

TARGET STAKEHOLDER	IMPLEMENTATION SUPPORT	MODE	SUGGESTED FREQUENCY
Regional government	Status update	Phone call, message, or in-person meeting	At least annually, or any time major events or changes occur
Rural water agency or network	Status update	Phone call, message, or in-person meeting	At least annually, or any time major events or changes occur
Local government units	Status update	Phone call, message, or in-person meeting	At least annually, or any time major events or changes occur
Central laboratory headquarters office	Status update	In-person meeting	Biannually
Central laboratory regional office	Status update	In-person meeting	Quarterly
Central laboratory	Laboratory audit	In-person visit (see Appendix II: Laboratory Audit Checklist)	At least annually, up to quarterly (especially after many new rural water systems enroll)
Central laboratory	Remind lab to notify rural water systems of upcoming sampling and to confirm water is accessible (within seven days and again within two days before)	Phone call or message	Monthly, seven days prior to scheduled sampling
Central laboratory	Remind lab to file and document non-payment claims	Message linked to claim tracking form	Monthly, between sampling events
Rural water system board members	Enhance understanding and buy-in regarding importance of regular water quality testing	In-person meeting in groups of 7–13 people	Once prior to program launch, with at least annual follow-up
Rural water system managers	Debrief on water quality data	In-person meeting in groups of 5–10 people	Monthly for first six months, then quarterly
Community members	Work with local government, traditional cultural leaders, and water quality managers to disseminate status updates and water quality information	Interactive fora (e.g., radio shows, in-person meetings, social media posts, announcements)	Monthly if possible, or quarterly



Figure 9. Laboratory personnel taking a sample from a rural water supply in Ghana (Source: The Aquaya Institute)

TEST RESULT TRACKING

To track water quality test results:

- Transcribe the test results into a spreadsheet or other data visualization tool (e.g., Tableau).
 - Microbial quality indicators: *E. coli* and total coliform
 - Disinfection effectiveness: free chlorine residual
 - Physiochemical parameters: color, turbidity, conductivity, temperature, pH, and total dissolved solids
 - Geogenic contaminants: fluoride, arsenic, lead, manganese, and iron (optional, if these pose a concern in the monitoring location)
- Review the results closely and follow up with the central laboratory if needed.
- Confirm the inclusion of negative and positive controls as well as duplicates in each round of testing.
- Follow up with the laboratory to rectify issues if they did not comply with agreed-upon quality assurance or quality control procedures or if the control samples indicate potential issues with lab procedures (e.g., contamination detected in negative control, no/low contamination in positive control, duplicates differing by more than one order of magnitude).
- Compute summary statistics (e.g., median, range, distribution) for microbial contamination levels and concentrations of free chlorine residual, relative to local water quality standards.

DEBRIEF MEETINGS TO SHARE DATA

Host regular debrief meetings to share water quality data with small groups of rural water system managers. Preferably, the communication should take place in a local language. The local government offices would be an appropriate venue. Topics can include:

- Latest round of water quality testing results
- Questions or areas of concern, if any
- Urgent responses needed to ensure water safety, if any
- Relevant approaches to ensuring long-term water safety management
- Locally appropriate strategies to communicate water quality information and water safety measures to consumers on a weekly or biweekly basis, for example:
 - Use rural water system information or payment centers to share displays (e.g., posters), issue loudspeaker announcements, and engage customers in conversation about monitoring activities and results.
 - Print and post test results in public places.
 - Invite local government officers or water system managers to announce test results (including contamination events, if they occur) via radio or town hall meetings.
 - Request assistance from a local committee with related duties or form a new committee to plan engagement activities.

TECHNICAL ASSISTANCE AND CORRECTIVE ACTION

From the program outset, or when water quality issues are detected, the facilitator should be prepared to offer limited technical assistance (e.g., Box I) or refer the water system managers to a qualified consultant. The central laboratory may have capacity to assist with adjusting water treatment procedures; however, the most appropriate stakeholder for providing such services will likely vary by location. *Extensive engineering services or financial support for these services generally have not been covered as part of the Assurance Fund agreement.* If extensive technical assistance is needed, the Assurance Fund facilitator and the donor may opt, through a separate decision process, to offer financial support for larger water system repairs, upgrades, or improved treatment approaches upon request by the local government unit.

Box I. Quick tips for facilitating capacity strengthening among rural water system managers

- Customize the World Health Organization [sanitary inspection forms](#) to fit the local context, so water system managers can work toward improving water source and distribution system protection and resilience.
- Design simple graphical instructions about how to add chlorine to the water supply and offer in-person training on request.
- Design simple graphical instructions for measuring the free chlorine residual to confirm the proper level of chlorine dosing (relative to existing standards) and offer in-person training on request.
- Translate water quality testing parameter descriptions and relevant limits into widely spoken local languages for easy interpretation of monitoring results.
- Compile advice tailored to the local context:
 - Where to buy chlorine, chlorine testing equipment, and personal protective supplies

- How to access low-cost training
- How to join communities of practice (e.g., Rural Water Supply Network) or local subscription-based water maintenance service providers.
- Review other tips in the pending World Health Organization Guidelines for drinking-water quality: small water supplies document: “Guidelines for drinking-water quality: small water supplies.”

FINANCIAL MANAGEMENT

INVOICE AND PAYMENT TRACKING

Invoice information should be reviewed regularly by the program facilitator. You can take the following steps to ensure a smooth invoicing and payment process:

- Transcribe invoices onto a spreadsheet.
- Check for discrepancies from expected amounts and notify the central laboratory, if needed.
- Modify amounts on the spreadsheet after sampling occurs, if needed.
 - For example, if water is not available at the water system at the time of sampling, the water system generally does not have to pay anything, and the facilitating organization pays transportation costs using the Assurance Fund. Note that the central laboratory may not be able to rectify invoices once they are issued and may prefer to add an adjustment to the following month’s invoice.
 - If the central laboratory did not comply with agreed-upon quality assurance or quality control procedures, the testing costs should be deducted from the next invoice for all affected water systems.
- Document payment dates.

Monthly invoicing for water quality testing is typical, although some participants may face fewer hurdles by prepaying for several months at a time to reduce processing complexity. We recommend tracking program performance and adapting to the payment system that works best within the local context. In Assurance Fund implementation examples to date, most payments have taken the form of mobile money, cash, or check exchanges with a paper receipt issued; eventually, it may become possible to improve digital financial systems to automate transactions and keep electronic records.

TRACKING ACCOUNT BALANCE

To ensure the program functions sustainably over time, take the following steps:

- Take a screenshot of the Assurance Fund account balance at the beginning of every month and save it to a reliable storage location (e.g., Dropbox).
- To retain editable data, update the financial tracking spreadsheet (either in a separate file or within the program database described above) any time a transaction is made. Transactions might include:
 - Money deposited in the fund by the facilitating organization
 - Interest accrued on the account
 - Payments made to the central laboratory as a result of a claim

- Repayments (plus surcharges) received from rural water systems after an Assurance Fund payment was made to the laboratory on their behalf.
- In addition to tracking the overall fund balance, track the individual balance of each signatory (i.e., local government unit).

DOCUMENTING CLAIMS

To understand program functionality accurately, the central laboratory must file nonpayment claims in a timely manner. The agreement language can support this by providing a cutoff time period for filing claims (e.g., 1–2 months) or, as a consequence of not filing, ceding the right to repayment from the Assurance Fund.

- The central laboratory should follow up with the rural water systems one business day after the due date to confirm payment via phone call or message.
 - This follow-up should be repeated at least twice, if needed, before the next sampling event.
 - The central laboratory should complete the web form to share nonpayment information with the facilitating organization before the ensuing round of testing.
- The central laboratory should make a final attempt to collect payment in person during the next sampling event. If the rural water system manager refuses or is unable to pay, the central laboratory representative should obtain a signature on the invoice, acknowledging that they received the invoice but have not paid it.
- The central laboratory staff member should take a photo of the signed invoice.
- The central laboratory should submit claim requests to the facilitating organization using the claim tracking form.

In some cases, it may be helpful to share select financial statistics (e.g., payment compliance rates) with the larger group of stakeholders to encourage friendly competition among local government units or water systems. For instance, this could use electronic files or a login-protected dashboard display (e.g., Tableau visualization tool).

SEPARATION OF WATER SYSTEMS

- Systems that default repeatedly may be facing revenue challenges following the initial assessment. If a water system defaults on payment three or more times (or as per the frequency threshold specified in the agreement), the facilitating organization should have the ability to remove the water system from the program. Your organization will need to notify the local government and the central laboratory that the defaulting water system is being removed from the agreement.
- If a water system sends an official written notification two months in advance, or as per the terms stated in the sub-agreement, they may withdraw voluntarily.

TROUBLESHOOTING

Table 3. Common Water Quality Assurance Fund implementation issues and troubleshooting suggestions

COMMON ISSUES	POTENTIAL SOLUTIONS
Central laboratory is charging rural water system more on their invoice than agreed upon.	Determine the cause and request a new invoice. Often, laboratories are quick to adjust their invoice as market considerations change, but this can shortchange the rural water systems. Providing the laboratory with an invoice calculation tool that matches the agreement language can also help minimize conflicts.
Testing results are perceived as falsified (e.g., showing increased contamination to ensure continued testing business).	Reassure rural water system managers about the quality assurance and quality control mechanisms put in place for the program, including extensive screening, laboratory auditing, equipment calibration, positive and negative controls, and data review by the facilitating organization.
Central laboratory fails to include time-stamped quality assurance data in the water quality testing report to system managers.	Notify central laboratory that they need to subtract the charges for work not completed on the next invoice.
Testing results are otherwise invalid, indeterminant, or not credible.	Setting up quality assurance and quality control procedures from the beginning of the program will help to prevent these issues. Under the pilot program in Ghana, the central laboratory was responsible for re-testing at their expense if any issue precluded usability of the results.
Central laboratory doesn't file claims after a rural system fails to pay an invoice.	Design a short web form (e.g., Google Form), automated messaging system, or call schedule to help the laboratory track and follow up on this information.
Central laboratory cannot keep up with increased demand for rural water testing.	Although staffing sufficiency is part of the up-front screening, capacity issues could arise at any time, especially when greatly increasing the number of rural water systems enrolled in the program. These may manifest as delays in monthly sampling activities or reduced performance on laboratory audits. In your regular meetings with the laboratory and laboratory oversight offices, revisit whether staffing could accommodate added rural system testing or if the laboratory has reached its maximum capacity.
Rural water system needs to improve revenue collection to participate or continue participating.	While tariff setting is largely outside the scope of the Water Quality Assurance Fund, your organization (depending on available expertise) may be able to assist the community in carrying out a willingness-to-pay survey, recommend locally effective pricing and fee collection approaches, and/or present on the benefits of water quality testing at a community meeting.

COMMON ISSUES	POTENTIAL SOLUTIONS
<p>Water quality results are consistently good, and rural water systems get tired of paying for testing.</p>	<p>Remind the water system managers that water contamination events are often intermittent, and regular monitoring creates an essential barrier to the potential introduction of new risks. Recommend guidance from the World Health Organization or relevant national agencies on sanitary inspection and/or water safety planning approaches for small systems to help them strengthen the water supply’s resilience. In addition, they could consider working with consumers or community groups to reinforce safe water transport and storage practices.</p>
<p>Water quality results are poor and might implicate the water supplier.</p>	<p>Bring any potentially hazardous water quality conditions to the immediate attention of the water supplier so they can pursue corrective actions (e.g., consumer notification, reporting to operators or authorities, internal meetings, adjusting treatment, changing the water source, point-of-use treatment, storing water or stored water access, retesting, staffing changes, revising policies or standard operating procedures). Depending on the severity of the situation, they may request legal or public relations consultations to help manage crisis response.</p>
<p>Informal private water providers in the area do not conduct water quality testing, although they serve the same communities as enrolled rural water systems and compete with them for customers.</p>	<p>Liaise with the local government unit to discuss this issue and potential steps to formalize and include private providers in the agreements. In one district in Ghana, the local government took steps to catalog informal private providers and reach out to discuss the option to engage in monthly water quality testing.</p>
<p>Community members perceive the program as unfair because it leaves out rural water systems that cannot afford testing services.</p>	<p>In conjunction with the local government, explain that the program initially focuses on financially capable water systems to achieve a proof of concept for the Assurance Fund approach and attract more permanent funding. When the Assurance Fund approach is well established, it can be used as a vehicle to subsidize water quality testing among a pool of wealthier and poorer rural water systems. Meanwhile, share the low-cost water safety management tips in Box 1 with water systems that do not qualify to participate.</p>

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APPENDIX I: LABORATORY ELIGIBILITY CRITERIA

Many considerations can go into selecting the most appropriate central laboratory for rural water testing, and some criteria will carry greater weight than others. An information template and several tips for evaluating relative compatibility for the Assurance Fund program appear below. We recommend filling out as much information as possible via calls or (preferably) site visits. You can also revisit this form when enrolling new rural water systems into an existing testing program.

CRITERIA ¹	LABORATORY A	LABORATORY B	LABORATORY C
Type of laboratory (public/private/nonprofit/medical) ²			
Area(s) served (list)			
Preferred by local government units or rural water systems (yes/no) ³			
Estimated transport delay between sampling and analysis (hours) ⁴			
Physicochemical and microbiological water quality testing (yes/no)			
<i>E. coli</i> test method and cost (local currency)			
Laboratory certification by a third party (which, if any) ⁵			
Laboratory staffing (excellent/good/fair/poor) ⁶			
Laboratory infrastructure condition (excellent/good/fair/poor) ⁷			
Can procure water quality testing consumables (yes/no/unclear) ⁸			
Has staff trained to properly collect water samples (yes/no)			
Has price list for services (yes/no/in prep) ⁹			
Uses digital record keeping (yes/no)			
Overall fit (good/fair/poor)¹⁰			

Eligibility evaluation notes:

1. You can also request records (e.g., to review the laboratories' financial health, certifications, or standard procedures). Private laboratories may hesitate to share financial data due to the potential tax implications. Thus, asking other types of questions that do not require financial records can help inform their suitability.
2. Private laboratories may have less bureaucratic oversight of new programs than government labs and can sign agreements and secure supplies more quickly; however, government labs may already have mandates or relationships in place that facilitate the program.
3. In some cases, rural communities may have clear preferences for which laboratories they find suitable to work with, depending on their past experiences and pre-existing relationships.
4. Central laboratories must be located within a distance where it is feasible to return water samples from the rural systems for processing within eight hours. Given that multiple water systems should be grouped and sampled on the same day, this means that each water system should typically be within a two-hour drive of the laboratory.
5. Certification or government affiliation may be critical to ensure the agreements are legally binding (internationally recognized certification such as ISO is preferred).
6. Asking multiple questions can offer insight into staffing sufficiency (e.g., Are staff permanent or temporary employees? What type of training do they have? Is staff turnover an issue?). In addition, consider whether staffing could accommodate adding multiple new days of sampling and testing activities to cover future rural community enrollees in the program, or if the laboratory has reached its maximum capacity.
7. Laboratory infrastructure condition might consider having appropriate equipment and sample processing stations (e.g., sanitizing, filtering setup, incubator) in place, as well as having items labeled well, having reliable electricity or a power generator, and a generally clean facility. This indicator also includes sampling vehicles.
8. Ask the manager to describe procurement procedures. Too much bureaucracy has the potential to negatively affect testing services.
9. A commercial price list is one indicator that the laboratory may be open and interested in offering testing to others. If the laboratory does not have set pricing or a high level of interest in developing it, it may take excessive time to reach an agreement. At this stage, also begin considering if the sampling and test pricing appears inflated or unaffordable.
10. The overall fit should be a qualitative assessment weighing the importance of various eligibility factors. It is possible that more than one or no options are available in a specific area to support centralized water quality monitoring through an Assurance Fund. If many options are available, explicitly assigning weights (e.g., 10%) to each criterion, depending on your needs, and converting fields to numerical values (e.g., yes = 1, no = 0) could help to compile the information into a single summary score that aids in laboratory selection.

APPENDIX II: LABORATORY AUDIT CHECKLIST

After the initial laboratory audit, the long-term goal of the Assurance Fund from a capacity strengthening perspective is to have an independent body (e.g., government entity or ISO) audit the laboratory; however, such audit procedures may or may not delve into all relevant aspects of the Assurance Fund testing program. Thus, regular standalone audits specific to the Assurance Fund are recommended.

SAMPLE COLLECTION AND TRANSPORT

QUESTION	YES	NO
Did the sample collector wear gloves when collecting samples? If not, did he/she use hand sanitizer?	<input type="checkbox"/>	<input type="checkbox"/>
Did he/she use sterilized sampling bottles or bags? If so, how where they sterilized (e.g., autoclave, purchased pre-sterilized)? _____	<input type="checkbox"/>	<input type="checkbox"/>
Did the sampling bottle/bags contain sodium thiosulfate? (They should, as this chemical helps to quench any residual chlorine.)	<input type="checkbox"/>	<input type="checkbox"/>
Did the sample collector avoid putting fingers in the sampling bottle or touching the tap/handpump spout with the bottle? (This could introduce contamination in the sample.)	<input type="checkbox"/>	<input type="checkbox"/>
Did the sample collector flush the water source (e.g., tap, handpump) before taking the sample? If so, for how long? _____	<input type="checkbox"/>	<input type="checkbox"/>
Was the sample transported in a cooler? If not, how was it transported? _____	<input type="checkbox"/>	<input type="checkbox"/>
For each sample taken, was the time between sample collection in the field and laboratory sample processing less than eight hours? If not, how long was it? _____	<input type="checkbox"/>	<input type="checkbox"/>

SAMPLE PROCESSING

QUESTION ¹	YES	NO
Does the analyst seem confident with the method? (If the analyst seems hesitant or uncomfortable during the analysis, this may be a red flag.)	<input type="checkbox"/>	<input type="checkbox"/>
Is the testing space relatively clean and organized? (We want to look out for potential sources of cross-contamination.)	<input type="checkbox"/>	<input type="checkbox"/>
Does the laboratory have distilled water? If not, do they have deionized water?	<input type="checkbox"/>	<input type="checkbox"/>
Is the temperature setting of the incubator at 37°C? (Optimal temperature may vary slightly depending on the microbial analysis technique used.)	<input type="checkbox"/>	<input type="checkbox"/>
Could the analyst report when the incubator was last calibrated? (This helps ensure that the temperature reading is correct).	<input type="checkbox"/>	<input type="checkbox"/>

QUESTION ¹	YES	NO
Ask the analyst how long the samples will be incubated. Is the response between approximately 21–24 hours? (Try to avoid incubating for longer than 24 hours.)	<input type="checkbox"/>	<input type="checkbox"/>
Did the analyst wear gloves? (Gloves should be used throughout the water testing process and changed if they potentially become contaminated, for example if water spills on them or the analyst touches a dirty surface.)	<input type="checkbox"/>	<input type="checkbox"/>
Did the analyst carefully handle funnels and petri dishes? (Note that the analyst should avoid touching the inside of the funnels and petri dishes.)	<input type="checkbox"/>	<input type="checkbox"/>
Did the analyst label the samples (e.g., petri dishes, trays, or films) well? (There should be enough information to easily identify the sample, such as the name, date, and time.)	<input type="checkbox"/>	<input type="checkbox"/>
Did the analyst slightly shake the sample before pouring it into the funnel? (They should do this to re-suspend any bacteria that might have settled.)	<input type="checkbox"/>	<input type="checkbox"/>
Did the analyst filter a full 100 mL water sample? (In some cases, the analyst might dilute the sample, but a total volume of 100 mL should always be filtered.)	<input type="checkbox"/>	<input type="checkbox"/>
Did the analyst place the filter on the manifold (filter stand) with the gridded side facing up?	<input type="checkbox"/>	<input type="checkbox"/>
Did the analyst properly sterilize surfaces during testing? (Typically, it is good practice to use methanol, although ethanol is also common.)	<input type="checkbox"/>	<input type="checkbox"/>
Did the analyst properly sterilize the forceps between samples? (This might involve applying methanol/ethanol and sometimes flaming. If the analyst uses alcohol to sterilize equipment, we want to make sure they allow sufficient time for it to evaporate. If not, we might see false negatives. Flaming equipment helps mitigate this risk, but is not absolutely necessary. After flaming, they should allow the equipment to cool for approximately 5–10 seconds.)	<input type="checkbox"/>	<input type="checkbox"/>
If the manifold has only one filter stand, did the analyst properly sterilize the manifold between samples? (Again, this might involve applying methanol/ethanol and flaming.)	<input type="checkbox"/>	<input type="checkbox"/>
Did the analyst use a new funnel for each sample?	<input type="checkbox"/>	<input type="checkbox"/>
Did the analyst avoid handling the filter membranes directly with his/her hands? (Membrane filters should only be handled with sterilized forceps.)	<input type="checkbox"/>	<input type="checkbox"/>

¹For microbiological water quality analysis, membrane filtration is the most common method. The checklist can be adapted for use with other methods.

READING RESULTS

QUESTION	YES	NO
Did the analyst count colonies using a marker pen and a tally?	<input type="checkbox"/>	<input type="checkbox"/>
Did the analyst record results in a clear and well-organized fashion (e.g., notebook, Excel sheet, or electronic records system)? If so, please describe it: _____	<input type="checkbox"/>	<input type="checkbox"/>
Did the analyst record results immediately after counting? If not, how long was the delay? _____	<input type="checkbox"/>	<input type="checkbox"/>

QUALITY ASSURANCE AND QUALITY CONTROL

QUESTION	YES	NO
Did the analysis process a duplicate, a positive control (e.g., river water), and a negative control (e.g., boiled, distilled, or deionized water)?	<input type="checkbox"/>	<input type="checkbox"/>
For the positive control, was the sample collected recently? (It is not ideal to use stored river water for the positive control, as bacteria will die off over time.)	<input type="checkbox"/>	<input type="checkbox"/>
For duplicates, did the analyst collect twice the normal sample volume and then process it as two separate samples in the lab? (This is the recommend procedure.)	<input type="checkbox"/>	<input type="checkbox"/>
Did they collect the duplicate samples in two separate containers? (This is the recommend procedure.)	<input type="checkbox"/>	<input type="checkbox"/>
For the negative control, ask the analyst what he/she would do if there were colonies on the plate after incubation (i.e., if the result was positive). Do they indicate a proper course of action? (Example of correct action: He/she should report it, and the batch of samples would be considered invalid or inaccurate due to possible contamination during sample processing.)	<input type="checkbox"/>	<input type="checkbox"/>

APPENDIX III: WATER SYSTEM DESCRIPTION TEMPLATES

RURAL WATER SYSTEM BASIC INFORMATION			
Year of Assessment: _____		Assessor: _____	
	Water system details	Response	Remarks
1	District		
2	Name of water system		
3	Community or location		
4	Number of water system management committee members		Males = Females =
5	Number of boreholes		
6	Number of public standpipes		
7	Number of private connections		
8	Number of institutional connections		
9	Number of commercial connections		
10	Approximate population served		
11	Does the system treat water? (yes/no) If so, how and how often?		
12	Does the water system keep records? (yes/no)		
13	System manager (name and contact)		
14	System chairperson (name and contact)		
15	System operator (name and contact)		
16	System accountant (name and contact)		

RURAL WATER SYSTEM HISTORICAL FINANCIAL DATA (PAST YEAR)			
Year of Data: _____		Assessor: _____	
MONTH	REVENUE	EXPENSES	REMARKS
January			
February			
March			
April			
May			
June			
July			
August			
September			
October			
November			
December			
MONTHLY AVERAGE			AVERAGE MONTHLY PROFIT:

APPENDIX IV: GENERAL COST-SHARING CALCULATION TOOL

It is important to understand whether the water systems are located in a geographical distribution amenable to sample transport cost sharing for monitoring via a central laboratory. Alternatives to centralized testing include setting up field laboratories, although this is often more costly. A general planning tool to evaluate the location's fit for centralized water quality monitoring is shown in Figure 10 and available for [download](#).

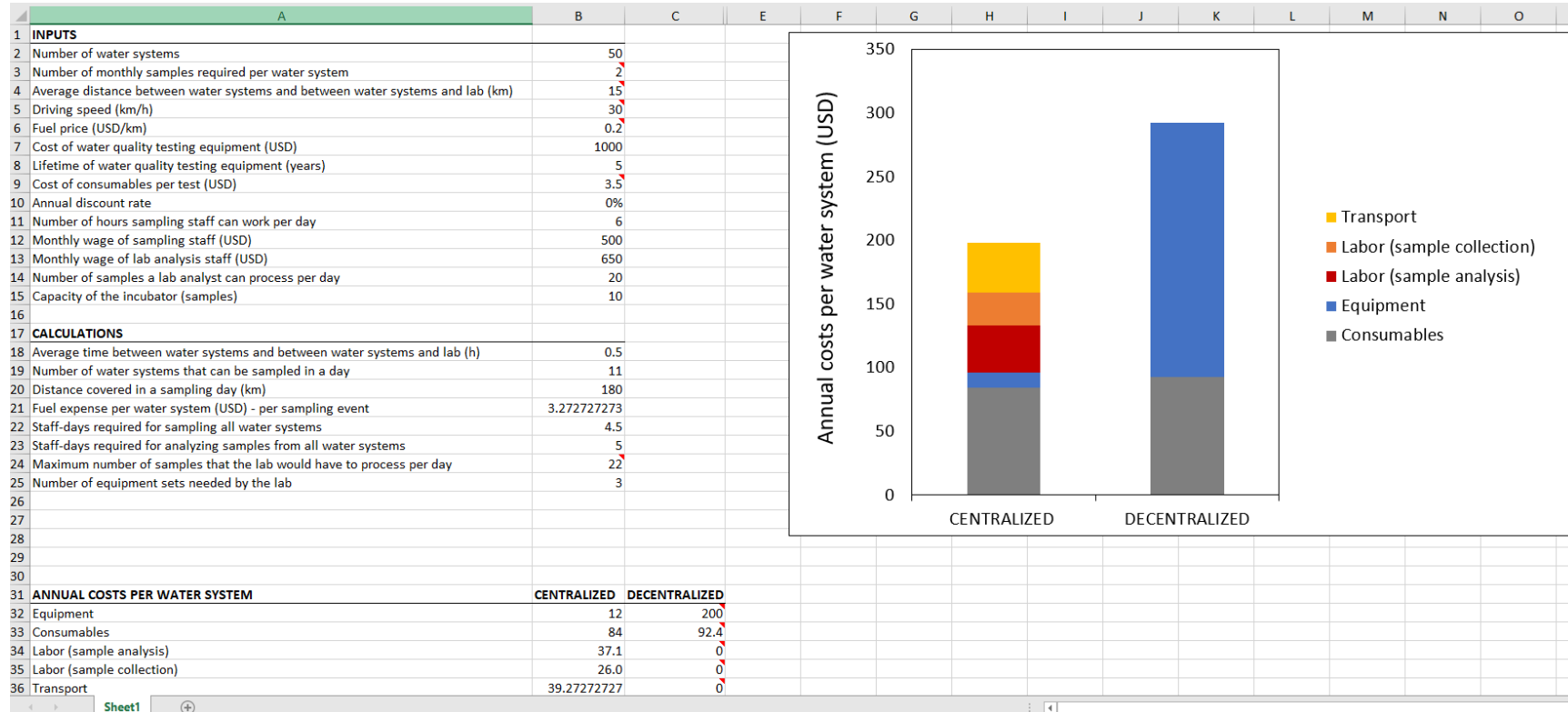


Figure 10. Preview of spreadsheet tool to visually compare the costs of centralized versus decentralized water quality monitoring, considering transport, labor, equipment, and consumable expenses ([download editable version](#)).

APPENDIX V: RURAL WATER SYSTEM ELIGIBILITY CRITERIA

Table 4. Community-level affordability calculation template to determine eligibility for Water Quality Assurance Fund participation (all values are monthly)

Water System	Population Served	No. of Samples Needed ¹	Total Testing Cost ²	Typical Water System Revenue ³	Typical Water System Profit ⁴	Is Profit > Total Testing Costs?	Meets Both Eligibility Criteria?
Drobo	15,000	3	782	38,923	5,503	Yes	Yes

¹Generally, one sample per water point (e.g., standpipe) with a service population under 5,000; or, use sampling frequency guidelines from your country's national regulations.

²Approximate total cost to process the number of water samples shown in the previous column (using local currency).

³Use historical data from the past year to estimate revenue (water user tariff collection) and profit of the rural water system. Annual profit for the rural water system is equal to revenue minus operating expenses. School or healthcare facility water systems that lack revenue collection mechanisms specific to water services represent a special case, where a statement of financial standing and commitment may be requested instead of financial records.

⁴Use the value calculated in Appendix III: Water System Description Templates, if available. Ideally, water systems would set aside the costs related to routine maintenance, anticipated capital upgrades, and emergency repair savings within their annual operation and maintenance expenditures. If they have not done so, the profit amount may need to be reduced by the monthly average value needed to cover these typical expenses within the local area.

APPENDIX VI: SPECIFIC COST-SHARING CALCULATION TOOL

A simplified cost-sharing calculation (Table 5) shows each area-specific water system appearing in a separate row. Adjustments to the fields may be needed for increasing complexity; for instance, one program offered a fuel price subsidy from the Assurance Fund during an inflation period.

Table 5. Simplified water system cost-sharing calculation template (complete one row per participating water system)

Number of Systems Sharing Costs	System Name	Number of Samples Needed ¹	Sampling Costs	Liters of Fuel for Full Route ²	Transport Fee per System ³	Laboratory Analysis Costs ⁴	Total Cost per System
7	Drobo	3	200	60	129	480	809
7	Japekrom	2	150	60	129	320	599
7	...			60	129		
Total cost for all systems: ⁵							
Average cost per system: ⁶							

¹Generally, one sample per water point (e.g., standpipe) with a service population under 5,000; or, use sampling frequency guidelines from your country's national regulations.

²This value will vary and should be negotiated as agreeable to all parties; for example, you can estimate based on the known distance to the farthest water point or a mapping estimate or use actual mileage from driving the route.

³Fuel price multiplied by number of liters of fuel for full route to visit all water systems in a given day, divided by the number of systems visited that day.

⁴Itemize if needed, citing the method of analysis per test parameter and quality assurance/quality control costs.

⁵Minus any negotiated discounts or group rates, if applicable.

⁶Divide total cost for all systems by number of systems on the route (shown in first table column).

APPENDIX VII: SAMPLE CONTRACTUAL RESPONSIBILITIES

Table 6. Sample roles and responsibilities of signatories to a Water Quality Assurance Fund agreement (party names have been removed)

ACTIVITY	RESPONSIBLE PARTY		
	FACILITATOR	CENTRAL LAB	LOCAL GOVT
Water System Enrollment			
Identify water systems eligible for joining the testing agreement in the specified regions and execute sub-agreements with the management entity they report to.	X		
Inform water system managers that they will be enrolled in water quality testing and that they must pay the laboratory directly for the service and execute sub-agreements with enrolled water systems.			X
Develop a schedule for sampling at different standpipes based on a risk-based assessment of water systems.	X	X	
Hold one community engagement meeting with each water system community upon enrollment to discuss the testing program and water quality issues.	X		X
Sampling, Analysis, and Reporting			
Provide sampling and water quality testing services (microbial parameters, physicochemical parameters, and optionally chlorine residual) for enrolled water systems at agreed-upon intervals.		X	
Inform water system managers by text message or phone call about scheduled sampling events at least seven calendar days in advance and again two calendar days in advance.		X	
Send test results by text message to water system managers within 24 hours of reading the final counts and conduct a follow-up phone call to discuss microbial results.		X	
Return paper or electronic results to water system managers within one month of testing and include quality control readings, following the template provided.		X	
Send an electronic copy of all water quality testing results, including quality controls, to the facilitator within one week of testing.		X	
Encourage all parties to follow the communication responsibilities specified herein.	X		

Maintain and calibrate laboratory equipment for membrane filtration and all other physicochemical tests included in this agreement.		X	
Procure materials for membrane filtration and all other physicochemical tests included in this agreement.		X	
Follow the sampling procedure, quality control procedures, and reporting procedures specified in this agreement.		X	
Payment and Finances			
Collect payment for testing services directly from water system managers.		X	
Issue an invoice to water system managers seven calendar days in advance of testing by text message or phone call.		X	
Send text message reminders to water system managers to pay for each test at least two days before sampling occurs.		X	
Fund and manage a Water Quality Assurance Fund as specified in this agreement to assure the laboratory in case of unreceived payment.	X		
Administer short electronic survey to track water system payments to the laboratory.	X		
Fill the electronic payment tracking survey within the month after sampling. This may require up to three survey entries for water systems that pay late.		X	
Demonstrate a good-faith effort, as provided herein, to collect payment before submitting a claim to the Water Quality Assurance Fund.		X	
Submit claims to the Assurance Fund within two months of the issuance of the unpaid invoice.		X	
Issue penalty notices to water systems that default on payments to repay the Assurance Fund within three months.			X
Keep records of any activity in the Assurance Fund (debit and credit) and provide an account statement to signatory parties upon request.	X		
Send the laboratory a confirmation when wire transfers have been made from the facilitator to the laboratory.	X		
Inform water system managers that they have defaulted and discuss remedial actions, including exclusion from the program in the event of repeated water system default on payments.	X		

Withdraw repeated defaulting water systems from program.	X		X
Other			
Conduct community engagement when needed (via community centers, radio programs, etc.)	X		X
Hold regular debrief meetings with water systems (2–12 per year) to discuss test results and water quality issues.	X		
Conduct regular (up to quarterly) audits of laboratory procedures and provide additional training as needed.	X		
Hold quarterly meetings with the laboratory to discuss sampling and payment issues.	X		
Hold biannual meetings with the laboratory and head office to provide program updates.	X		
Evaluate the testing program and make recommendations for ongoing testing frequencies based on observed water quality patterns.	X		
Provide access to digital records of all tests conducted and related results of water systems when requested by the facilitator.		X	
Develop an accessible data sharing and visualization platform to house water quality data in the long term.	X		
Provide two month’s written notice prior to contract withdrawal.	X	X	