GWI Technical Series: Hardware Quality for Sustainable Water & Sanitation

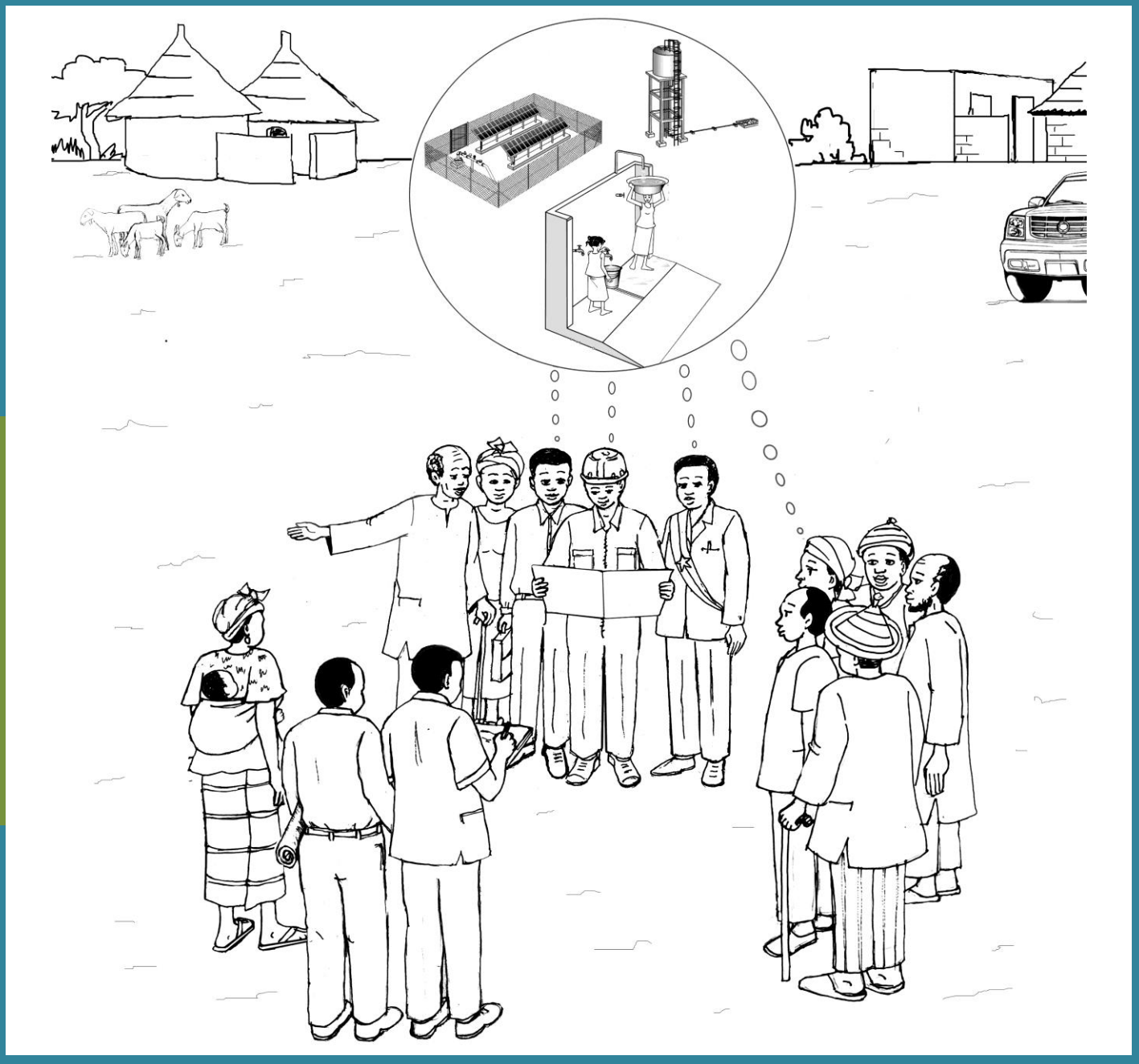
The Global Water Initiative

A Partnership Funded by the Howard G. Buffet Foundation

WEST AFRICA

Assuring Quality: an approach to building long-lasting infrastructure in West Africa

Ref.: 2012-01-E



GWI Technical Series: Hardware Quality

CRS CATHOLIC RELIEF SERVICES

SAHEL CONSULTING

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About this series

The **GWI Technical Series: Hardware Quality for Sustainable Water & Sanitation** is a Global Water Initiative tool that was developed in West Africa by Catholic Relief Services (CRS) and Sahel Consulting as a response to common difficulties in rural water & sanitation projects.

Each document in the series addresses a particular aspect of technology choice, design, build and maintenance. All these aspects are important in delivering a reliable and lasting community water/sanitation resource within an increasingly decentralised context.

We aim to influence those with the power and responsibility to get water and sanitation to the rural poor.

We also want to influence the communities themselves to become proactive and break away from their past role as passive beneficiaries.

The tools have been designed and field tested for use with communities, development workers, commune leaders and government technical services. They focus specifically on gaining an informed understanding that will lead these key decision makers to choosing the correct technology, supervising construction to assure quality, putting in place correct operation and maintenance systems, and assuring that revenue generated is adequate to keep that service going.

These tools are not a method in themselves, they presume that anyone using them is already engaged in a robust participatory process.

The **GWI Technical Series: Hardware Quality for Sustainable Water & Sanitation** includes:

A practical guide for building a simple pit latrine	ref.: 2011-01-E
Assuring Quality: an approach to building long-lasting infrastructure in West Africa	ref.: 2012-01-E
Monitoring checklists : water points and latrines	ref.: 2012-02-E
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Making the right choice: comparing your rural water technology options	ref.: 2012-07-E

Please use any of the documents freely. They can be downloaded from http://www.crsprogramquality.org/publications/tag/water-manualsuser-guides.

We would be most interested to receive feedback from you on the usefulness of this material.

The series is published in French and English. If you translate the material into another language please send a copy to lambert.nikiema@crs.org, jeanphilippe.debus@crs.org, suecavanna@sahelconsulting.org.uk.

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This document was developed by Lambert Zounogo P. NIKIEMA (CRS), Sue CAVANNA (Sahel Consulting), and Jean-Philippe DEBUS (CRS), the Hardware Quality team of the Global Water Initiative (GWI) in West Africa.

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About the Global Water Initiative

The Global Water Initiative (GWI), supported by the Howard G. Buffett Foundation addresses the challenge of providing long term access to clean water and sanitation, as well as protecting and managing ecosystem services and watersheds, for the poorest and most vulnerable people dependent on those services. Water provision under GWI takes place in the context of securing the resource base and developing new or improved approaches to water management, and forms part of a larger

framework for addressing poverty, power and inequalities that particularly affect the poorest populations. This means combining a practical focus on water and sanitation delivery with investments targeted at strengthening institutions, raising awareness and developing effective policies.

The Regional GWI consortium for West Africa includes the following partners:

- International Union for the Conservation of Nature (IUCN)
- Catholic Relief Services (CRS)
- CARE International
- SOS Sahel (UK)
- International Institute for Environment and Development (IIED).

GWI West Africa covers five countries: Burkina Faso, Ghana, Mali, Niger and Senegal. Some activities also take place around the proposed Fomi dam in Guinea. For more information on the GWI, please visit: www.globalwaterinitiative.com.

Introduction

The quality assurance approach that is already partially in use in many countries, aims to serve as a guideline and to measure our achievement in reaching infrastructure quality. This assumes that both the design of the works and the technological choice of the equipment to be used have been well carried out before implementation starts.

This approach is justified as GWI aims to help vulnerable people to have improved and durable access to water and sanitation. It is necessary to be vigilant during the construction in order to assure the quality of the facilities. GWI keeps the moral responsibility of the quality of the infrastructures funded by him even if the contract has been subcontracted to others. In consequence, the GWI project must retain the responsibility of the technical supervision in order to assure quality service.

The steps below are proposed as elements of the quality approach:

- ✓ Providing a clear outline on the way the works should be carried out (including a detailed review of the quality of the materials);
- ✓ Organizing a touring of the sites (where the works should be accomplished) by the bidders before compiling their bids ;
- ✓ Choosing a skilled/reliable contractor;
- ✓ Establishment of a formal contract for the work;
- ✓ 100% guarantee of any advance of funds;
- ✓ Organizing a start-up meeting between the contracting agency, the controller and the implementing agency, where all the technical requirements of the works will be remind to the implementing agency (and to the controller) ;
- ✓ Checking whether staff skills on the sites and the materials proposed in the technical proposal are in compliance with those agreed in the bidding proposals;
- ✓ Implantation of the work (facilities) in the presence of the beneficiaries, the project and other representative whose presence is requested by the legislation in force in the country (example: commune representative or technical service representative, etc.);
- ✓ The control of the implementing agency's work by a competent/skilled person: supervision on the building site, provisory partial receptions at some key steps while the construction is underway, etc. ;
- ✓ Supervising the technical works by the project and if necessary by the government technical services;
- ✓ Training and involving the communities in the supervision of the works;

- ✓ Holding site meetings (for work running over time)
- ✓ Receipt of the works in the presence of all the parties ;
- ✓ The retention of money for guarantee.

The steps presented above can be gathered into three parts: before, during and after the implementation.

Part 1: Steps or elements to follow before the work implementation

Providing a clear schedule of works delineating how the works should be carried out

Before looking for an implementing agency, it is imperative to clearly define the administrative and technical contours of the works (what are the works and the way they should be carried out?). This will be done by elaborating the invitation of tenders that will be used to call for competition. The technical requirements and the plans being fully included in the invitation of tenders help provide the overall technical elements on the works (type, size, construction method, material to use, quality of the materials, etc.).The quantitative estimates and the details related to the costs (descriptive estimate) contribute to a much bigger precision on the way the works should be carried out. If need be it can called upon a specialized company to provide the technical specifications, the descriptive and quantitative estimates.

Organizing of a touring of the sites (where the works should be accomplished) by the bidders before compiling their bids

To help taking account the work implementation zone parameters during the bids elaboration by the tenders, the work location or zone must be specified in the invitation of tenders and the tenders invited if necessary for a touring of the site or zone of construction before they can present their bids. It is convenient that the owner organize the site touring in order to avoid going for this touring individually with the tenders.

Choosing a competent implementing agency

The commission in charge of selecting the implementing contractor should be able to choose a good (the best) agency if it takes the appropriate time to thoroughly check the technical references of the proposals (on site checks and information collected from the contracting agencies). The references included in the bidding documents are very often inaccurate. The evaluation of the technical proposal

will focus on: the proposed staff (skills and experience); the experience of the implementing agency in carrying out similar projects in the past years; and on the material proposed to carry out the works.

At this step it is important to meet other actors (governmental and NGO) to collect reliable information on the bidding agencies.

The choice of a good contractor should be done thoroughly and is essential to avoid issues which could impact negatively on the quality of the project itself. It also requires keeping the information easily accessible for the purposes of selecting a contractor at a future date. This means identifying those who are performing well, but also more importantly identifying those who should be absolutely avoided in the future.

In selecting the competent implementing agency, it must be considered upstream the habitual requirements that the bids must comply with. These requirements must be specified in the invitation of tenders: administrative requirements documents, bid bond. In addition a performance bond must be provided by the selected company.

Establishment of a formal contract for the work

Since the contract is the basis of the agreement as regards implementation of the work especially on the technical aspects, it is necessary to have a contract approved before work begins. It is primordial to use good contract formats (good models of contract).

100% guarantee of any advance of funds

This disposition guarantees (protects) the project funds.

Any other payment must be done only on the basis of the work really achieved and after provisional acceptance.

Part 2: Steps or elements to follow during the work implementation

Organizing the work with a start-up meeting

A technical meeting on the start-up of the works will help to outline the works requirements. It will also provide an occasion to emphasize/explain the penalty in failing to implement the works as agreed. This will remind the contractor to stick to the technical specifications requirements in every detail.

Checking the conformity of site staff's skills and experience, and company material against those listed in the proposals

It is important when starting the works to make a technical assessment reception of the equipment, materials and staff put in the field. Among other this step helps in particular to make sure that the staff sent to the field is the same identified in the offer. It is the responsibility of the controller to follow, verify it.

Setting out of the work (facilities) in the presence of the beneficiaries, the project and other representative whose presence is requested by the legislation in force in the country (example: commune representative or technical service representative, etc.)

The community's presence avoids errors concerning the location selected for the facilities that can have adverse consequences on the use of the facility, its management and its sustainability.

As the implantation includes technical parts (measurement), the results of the implementation works must be presented to the communities and approved by them (report signed) before the work can be continued.

It is indicated that supervisors from the community also participate in different partial provisional acceptance of work.

Controlling on the works underway on site

The works carried out by the contractor should be mandatorily controlled by a skilled and experienced person. The choice of an independent control should be made also on a competition basis and should follow the same steps as those for the choice of the contractor for the works. The purpose of the control is to make sure that the implementing company thoroughly complies with the technical requirements as stated in the contract.

The activity of the controlling body should include partial provisional acceptance as the works progress. Before making reinforced concrete, for example, it should conducted an inspection of the steel framework and the aggregate that will be used, before allowing the company to make the concrete. There should mandatorily be a reception of the pumps to install (checking of the quality of the parts and their conformity) before they could be installed. We should proceed with a reception of the works already carried out before pursuing with the works, etc.

The different steps requiring partial provisional acceptance of work before pursuing with the works should be listed and clearly stated.

Minutes of each delivery will be made specifying the nature of the work approved. No structure or portion of a work shall be approved with defects contradicting the technical requirements.

Supervising the technical works by the project and if necessary by the government technical services

The project must supervise the works carried out. That should help to raise the control vigilance level and the professional awareness of the company or to catch up with some situations.

Involving the State's technical services competent in the areas of current work may have the advantage of ensuring compliance with standards if it is not already included in the technical requirements set in the invitation of tenders.

Involving the communities in the supervision of the works

Involving the beneficiary communities in the supervision activities will help achieve a greater ownership of the infrastructures and make sure that the contractor is serious in his construction role. To achieve that objective, the community people who have been officially chosen for this activity should be trained and sensitized: they should be explained the way the works are carried out (examples: number of blocks to obtain with a bag of cement, quality of sand and gravel to use, etc.) and its importance on the sustainability of the facility. A good training through the use of explicit pictures should be enough.

Posters should also be put in place to inform future users on the level of services expected and the technical features.

Holding site meetings (for work running over time)

During the execution of the work site meetings are required. Because they allow the different actors (project, technical service, client, community, design office, company) to discuss about the difficulties encountered during the implementation and to make proposals for solutions.

These meetings also allow detecting technical problems early.

Part 3: Steps or elements to follow at the end of the work.

The reception of the work in the presence of all the parties

The provisional acceptance of work and the definitive reception must be done in the presence of all the stakeholders including the communities.

No work will be received with defects contradicting the technical requirements and preventing its normal operation. All needed repairs must be completed before definitive acceptance/ final payment for each newly built infrastructure.

The how and the why of the different tests (if any has to) during the reception must be clearly explained to the communities.

During the provisional acceptance process, the principle of the warranty period should be clearly understood by beneficiaries and mechanisms for appeal to the company for corrections in case of equipment malfunction during this period must be well defined and brought to their attention.

Applying the retention money principle

The retention money principle to be applied at the temporary reception step allows managing a given amount of money to use for the correction of mistakes or imperfections identified during the retention period.

It is recommended to retain a period long enough to enable to see the occurrence of any defects that may exist. The amount of the retention money for guarantee varies between countries (5-10%).

It is strongly recommended to make sure to have a good work instead of looking for reparations that are often difficult to carry out.

Conclusion

The quality assurance approach presented below reminds the main disposition to undertake in order to ensure effective implementation of the infrastructures. The steps listed are not exhaustive and can be improved. The important thing is to effectively implement these steps. The checklist in appendix helps to monitor this implementation.

Annex: Check-list for the monitoring of the implementation of the quality assurance approach

Provide a clear schedule of works delineating how the works should be carried out

Steps / precaution	Yes	No	Observation
Is the nature of the work clearly defined?			
Are the technical requirements clearly defined?			
Are there plans for each part of the work?			
Is there a descriptive estimate of the work?			
Are there BoQ's of the work?			

Organize or facilitate a touring of the sites (where the works should be accomplished) by the bidders before compiling their bids

Steps / precaution	Yes	No	Observation
The work location/zone is specified to those tendering			
A tour of the site/zone of the work is organized or facilitated.			

Choosing a competent implementing agency

Steps / precaution	Yes	No	Observation
A tendering process is organized to choose the implementing agency			
The technical references (experiences) of each tender are checked with the different owners of the works they have previously carried out.			
Reliable information on the agencies that are presenting bids has been obtained from other actors (governmental and NGO)			
A list of "good" and "bad" implementing agencies is regularly kept/updated			
Is a bid bond required from tenders?			
Is a performance bond required from the selected company?			

Establish a formal contract for the work

Steps / precaution	Yes	No	Observation
Is a clear contract approved before the work begins?			
Is this contract in compliance with national standards?			

Require a 100% guarantee of any advance of funds

Steps / precaution	Yes	No	Observation
Is any advanced funds (if it is foreseen) 100% guaranteed?			

Organize the work with a start-up meeting

Steps / precaution	Yes	No	Observation
Is a technical meeting organized on start of the works?			
The work requirements have been outlined during this meeting			

Check the conformity of site staff skills & experience, and company material against those listed in the bid

Steps / precaution	Yes	No	Observation
The technical assessment acceptance of the equipment has been made			
The assessment of the staff placed in the field has been made to make sure that the staff sent to the field is of the calibre identified in the bid			
The quality of the materials has been checked before their use			

The setting out of the facilities is done in the presence of the beneficiaries, the project and the other representatives whose presence is required by the national legislation in force (example: commune representative or technical service representative, etc.)

Steps / precaution	Yes	No	Observation
Is the community represented and consulted during the work/facility setting out?			
Is a setting out report elaborated?			
Has the setting out of the facilities been approved by the community representative and the setting out report signed?			

Control of site-works underway

Steps / precaution	Yes	No	Observation
The works carried out by the contractor are controlled by a skilled and experienced person / structure			
The controller (a person or a structure) have been selected in accordance with the rules (after a bidding process)			
A list of the partial provisional acceptances to be conducted has been drafted (and attached to the invitation of tenders).			
The community representatives participate in the partial provisional acceptance of each part of the works.			
An official record is produced for each partial provisional acceptance.			

Supervision (by the project and if necessary the government technical services) of the works

Steps / precaution	Yes	No	Observation
Is the project supervising the work?			
A supervising check list is prepared before making a supervisory visit.			
Is supervision by government services foreseen and organized?			

Involve the communities in the supervision of the works.

Steps / precaution	Yes	No	Observation
The beneficiary community representatives are involved in the work supervision.			
The beneficiary community representatives have been trained to supervise the work			
The community is informed of the exact nature of the work to be carried out (type of facility, quantities, location, etc.)			
Public information (postings) is made to provide information on the exact nature of the work and the changes occurred in the course of the implementation.			

Hold periodic site meetings (for work running over time)

Steps / precaution	Yes	No	Observation
Site meetings are organized during the work implementation			
The community representatives are part of the site meetings			
The technical services are invited to participate to site meetings			
During the site meetings technical visits of all the works are conducted.			

Organize the reception of the work in the presence of all stakeholders

Steps / precaution	Yes	No	Observation
The community representatives and the government technical services participate to the provisional acceptance of the work.			
The works provisionally accepted are without defects which contradict the technical requirements and/or prevent their normal operation			
The how and the why of the different tests (if any) during the provisional acceptance have been clearly explained to the communities.			
The principle of the warranty period has been clearly explained to the beneficiary community.			
The details (phone number and physical address of the contractor and of the project) are given to the communities to allow them to call for help if the equipment installed does not working well.			

Apply the retention money principle

Steps / precaution	Yes	No	Observation
A retention bond is applied			

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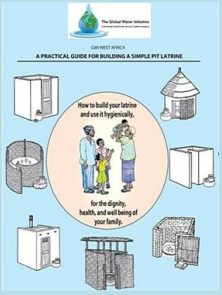

Contracting for water point construction: Provisional and final acceptance forms.

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Monitoring checklists: water points and latrines.

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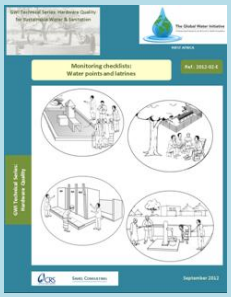

Community monitoring during the construction of a gravity-fed, solar powered water supply: a training guideline.

ref.: 2012-06-E

Community monitoring of borehole construction: a training guideline.

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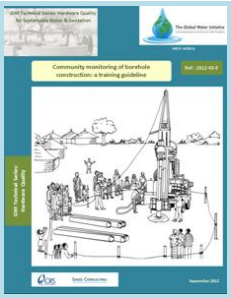

Making the right choice: comparing your rural water technology options.

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These documents are also available in French.

The main authors are Lambert Zounogo P. Nikiema (CRS), Sue Cavanna (Sahel Consulting) and Jean-Philippe Debus (CRS).

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