SUSTAINABILITY INDEX OF RURAL WATER SERVICES: BURKINA FASO AND NIGER

Global Water Initiative programme in West Africa 2008-12

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ACRONYMS AND ABBREVIATIONS

AEPA	Approvisionnement en Eau Potable et Assainissement (Burkina Faso) – Potable water supply and sanitation
CNEDD	Conseil National de l'Environnement pour un Développement Durable (Niger) – National Environment Council for Sustainable Development
CGPE	Comité de gestion des points d'eau (Niger) – Water point management committee
CRS	Catholic Relief Services
CUI	Cadre Unifié d'Intervention (Burkina Faso) – Sector-wide approach
DGRE	Direction Générale des Ressources en Eau (Burkina Faso) – National directorate of water resources
IIED	International Institute for Environment and Development
MDG	Millennium Development Goal
NAPA	National Adaptation Programme of Action (Burkina Faso and Niger)
O&M	Operation and Maintenance
PCD-AEPA	Plan communal de développement sectoriel AEPA (Burkina Faso) – district level plan for potable water and sanitation
PN-AEPA	Programme National d'Approvisionnement en Eau Potable et d'Assainissement (Burkina Faso and Niger) – National programme for potable water supply and sanitation
SIT	Sustainability index tool
WUA	Water users association (Associations d'Usagers de l'Eau – Burkina Faso)

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1. INTRODUCTION

Description of Global Water Initiative (GWI) West Africa programme: 2008–12

Between 2007 and 2012, the Global Water Initiative (GWI), funded by the Howard G. Buffett Foundation, supported rural integrated water resources management (IWRM), water supply and sanitation programmes in 13 countries in Africa and Central America. The work in West Africa began in 2008. During this phase of the GWI programme, GWI in West Africa was a consortium led by the International Institute for Environment and Development (IIED) and SOS Sahel UK, in partnership with CARE, the International Union for the Conservation of Nature (IUCN), Catholic Relief Services (CRS) and local non-government organisations, with operations in Senegal, Mali, Burkina Faso, Niger, Ghana and to a lesser extent, Guinea. By 2012, GWI West Africa was working in 133 communities in 40 municipalities in Niger, Burkina Faso, Ghana and Mali. A total of 26,565 families (approximately 166,277 people) participated and benefited directly from the programme activities.

The three strategic objectives of the programme were:

1. Vulnerable, marginalised groups to be actively involved in design, implementation and evaluation of multiple water use service delivery and governance.
2. A vibrant, cohesive and well-informed water constituency to be actively involved in improving delivery of IWRM.
3. Donors, investors and governments to have greater awareness of and give more support to IWRM.

During this period GWI West Africa rehabilitated and constructed 159 water schemes for domestic uses (including protected dug wells for use with rope and bucket, wells and boreholes with handpumps, gravity schemes with public tap stands and rainwater harvesting systems). While the primary purpose of these systems is to serve drinking and domestic needs they also serve other needs (that is, for animals, agricultural production and others) that were included in designs and plans for service management where appropriate.

Purpose and scope of this sustainability assessment

GWI is concerned about the long-term sustained provision of water supply services and has therefore commissioned this survey three years after the end of implementation, to assess the sustainability potential and to learn lessons from governance and management systems.

In September 2013, the director of GWI West Africa contacted the consortium members who were involved in the management of the 2008–12 programme phase, to identify a partner agency willing to conduct a sustainability assessment of GWI water points. Catholic Relief Services (CRS) agreed to develop and conduct the survey through its regional technical advisor for WASH. The technical advisor for CRS co-operated with the director of GWI West Africa and GWI East Africa and Central America counterparts (CARE and CRS) to refine the proposed method so as to ensure a coherent approach across regions. This survey has focused on assessing water supply systems only, as this was the main objective of the GWI programme.

This report summarises the findings and recommendations based on a sustainability index survey conducted in two countries (Burkina Faso and Niger) using the sustainability index tool (SIT)[1] and a functionality survey in Senegal. The initial plan was also to conduct remote functionality checks by telephone in Mali and Ghana but this was not possible due to difficulty in reaching members of local

[1] http://www.washplus.org/rotary-usaid

water committees by phone. See further explanation in Section 4.2, "Lessons and recommendations."

1.1 Rural water supply interventions covered in the survey

Table 1 provides an overview of the water schemes that were installed or rehabilitated by GWI in West Africa. This does not include systems that were installed mainly to serve productive uses, such as irrigation schemes or dugouts.

The shaded columns indicate the facilities that were surveyed.

Table 1: Overview of the water schemes installed or rehabilitated by GWI West Africa

Type of facility **installed or rehabilitated by GWI**	**Burkina Faso**	**Niger**	**Covered by sustainability survey**		**Ghana**	**Mali**	**Senegal**	**Covered by functionality check**
			Burkina Faso	Niger				Senegal
Borehole with handpump	31	11	31	1	34	7		
Protected dug well with handpump					2		19	19
Protected dug well[2] (equipped with frame and rollers)		33		14		7	6	6
Gravity scheme with several distribution points (solar energy)					3	3		
Roof catchment (rainwater harvesting)						3		

[2] These wells are used with rope and bucket.

Total	**31**	**44**	**31**	**15**	**39**	**20**	**25**	**25**
% surveyed			**100%**	**34%**[3]				**100%**

1.2 Snapshot of service levels: functionality and reasons for no service or poor service level

Figure 1: Functionality (provision of water) on the day of the survey (%)

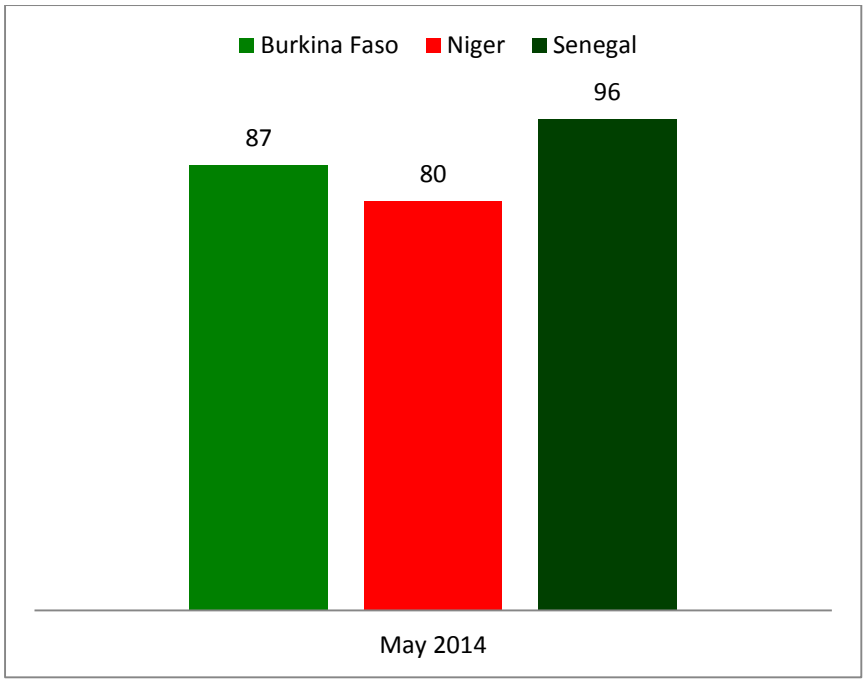
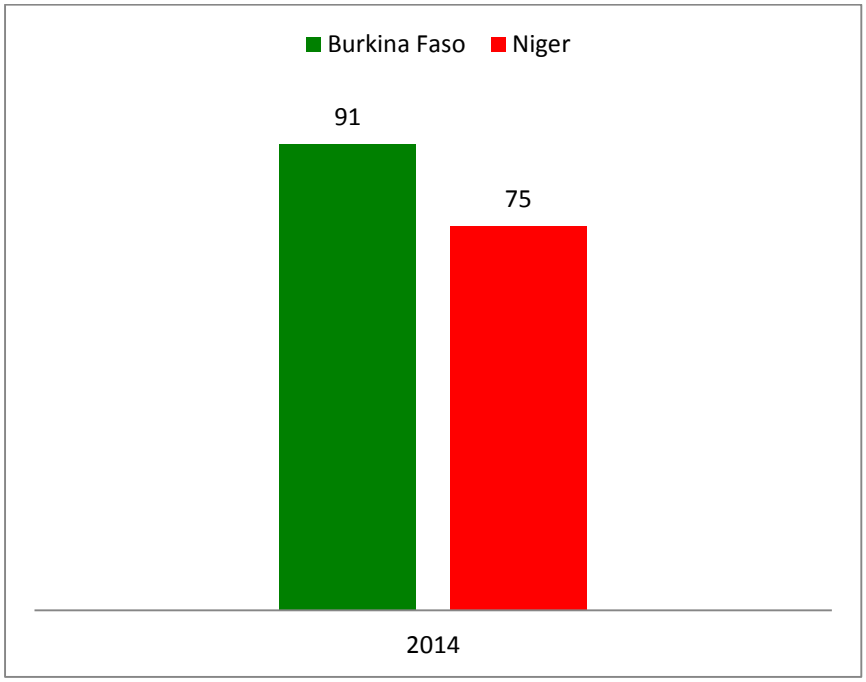


Figure 1 provides a snapshot of the percentage of facilities that were functional on the day of the survey (that is, that can provide water). Though this is an interesting piece of information, it should be considered only as a snapshot and not as an indicator of sustainability.

In Section 3 ("Results of the sustainability index of GWI water points in Burkina Faso and Niger"), "functionality" is assessed using a sustainability indicator as follows: "*Handpump is functional and provides basic level of service*." This indicator is more relevant than a mere functionality check because it aggregates several factors that define service level, that is, water quality, quantity, continuity of service, accessibility and user-friendliness. This gives different results, as shown in Figure 2 (Senegal is not covered by the sustainability index).

[3] In Niger, the sustainability survey did not cover the facilities that were installed during the initial phase (first year) because they are spread over different areas of the country. During the first year, before the formulation of a common GWI programme, funding from the Howard G. Buffett Foundation was provided to CARE and CRS to complement existing water projects that the two organisations were already implementing in various geographical areas.

Figure 2: Service level



Comparing Figures 1 and 2 (service level vs. functionality on day of survey) highlights different trends in Burkina Faso and Niger. Service level is higher in Burkina Faso (91 vs. 87). This is explained by users' satisfaction with several parameters that together define service level (water quality, quantity, design appropriateness, ease of access and user-friendliness).

In Niger, the trend is different: service level is lower than functionality rate on the day of survey (75 vs. 80). This is due to dissatisfaction with water quantity because of temporary interruption of supply during the dry season as well as low user-friendliness rating for three wells.

Additional information regarding faulty facilities is provided below.

Burkina Faso

31 water points surveyed — 27 functional on day of survey

Of four non-functional boreholes on the day of the survey, three had had a mechanical failure for a short time (two for less than a week and one for two weeks or less). Committees gave an assurance that action had already been taken to fix them quickly.

One of the non-functional boreholes had a broken handle. This was probably due to careless use, a problem observed several times. This type of expensive repair is preventable by enforcing "handpump rules" and is therefore a management problem. Moreover, the handle is an expensive part, not usually in stock with local retailers (in Fada N'Gourma) and therefore needing to be supplied from Ouagadougou (300 kilometres away) at 35,000 CFA (US$73). The distance adds substantially to the costs and time of repair.

The fourth non-functional borehole (that apparently had a problem with the pump rod) had broken down eight weeks previously. This is of concern because users had shifted to another source for the time being, even though members of the water user association (WUA) and users claimed that they had plans to fix the handpump soon and affirmed the value that they give to that water point.

The most recurrent mechanical failure reported is from pump rods that disconnect or break. A more specialised survey would need to be conducted to address this issue, but the author assumes that the following are probable causes:

- Rough use: observed several times. Typically people operate the handle with too much force, too quickly, banging the handle up and down
- Poor handpump installation, and
- Poor quality of pump rods or other parts.

Niger

15 water points surveyed — 12 functional on day of survey

Two wells had not been completed during project implementation (Ediri Mahamane, commune of Karofane and Guidan Massabé, commune of Madaoua) and therefore were never operated. Though appropriate hydrogeological investigations had been conducted before digging (to estimate depth to hit water) it was not possible to attain a productive yield. The assumption is that this is due to a problem of discontinuity of the aquifer and could not be predicted.

The handpump (Volanta) on the borehole that was rehabilitated in Taraouraou Zoukouri broke down over three years previously and can be considered as abandoned. According to the water committee the depth of borehole is beyond the capacity of the handpump.

Problems of overuse cause temporary dry up in four wells at the peak of the dry season. They can however be operated on a daily basis, but not all day long. Overuse seems to be the main cause of temporary interruption of supply, but the problem is exacerbated by lack of maintenance. Silt up is an issue and could be prevented by applying routine maintenance. One of the wells reported to underperform due to low yield (Rouanzanfi, commune of Bangui) could not be deepened during construction because of the release of toxic gases preventing further penetration into the aquifer.

Senegal

25 water points surveyed (functionality check only) — 24 functional on day of survey of which 12 wells fitted initially with handpumps but currently used with rope and bucket.

Of wells constructed or rehabilitated by GWI, 96% are operational and provide drinking water. One well that does not provide drinking water was found to have a high level of nitrates on being tested at completion of construction and was therefore declared as a non-potable water source. It is used however for other domestic and productive purposes.

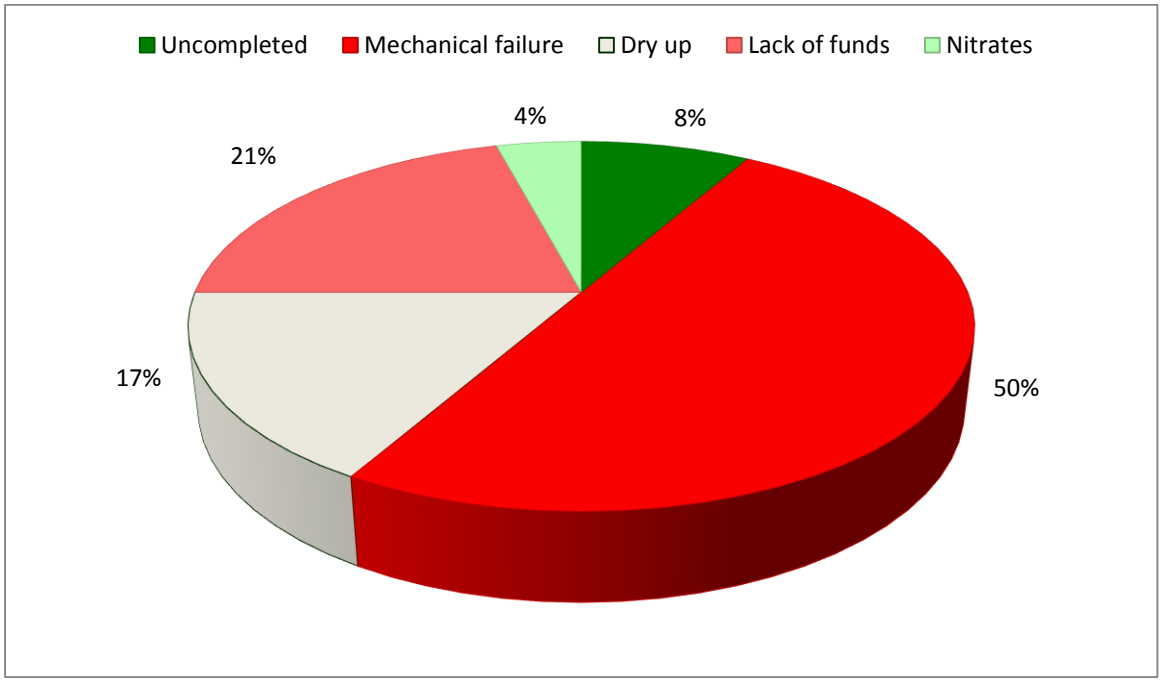
Out of 19 wells that were initially fitted with handpumps (India Mark II), 12 are currently used with rope and bucket. The average length of time that handpumps have been non-functional is 54 weeks (over a year), which is a clear sign that they are abandoned and that people have reverted to using rope and bucket. This is confirmed by the fact that well covers were removed and some committees have installed frames and pulleys.

All water committees established by the GWI programme still exist. Fees are collected by 11 committees out of 25. All the committees, except where the level of nitrates was found to be excessive, report satisfaction with water quality in GWI wells. All the wells had been tested for compliance with national standards for drinking water at the regional laboratory in Kaolack.

Of 25 wells, 23 are reported to meet the criteria for quantity (continuity of supply all year round and acceptable yield).

See Section 4.2 ("Lessons and recommendations"), point 4: "Use a sound participatory process to ensure an informed technology decision".

Figure 3: Apparent reason for no service or poor service level (Burkina Faso, Niger and Senegal combined)



The causes for no service or poor service level are often multiple and not dependent on local factors alone. A distinction needs to be made between apparent causes (Figure 3) and underlying causes. The above pie chart shows the apparent reasons, as per users' explanations. In reality, there are often other underlying causes, most of which are due to poor management.

Mechanical failure is normal in handpumps, but abnormal frequency of breakdown can be due to several causes including poor installation, low manufacture quality of components or spares, lack of preventive maintenance, lack of caretaker's knowledge, motivation or careless use, or a combination of all of these as well as others. The long duration of a breakdown can be due to insufficient funds, low level of demand, poor performance of the water committee or area mechanic, lack of external support or a combination of all these besides others.

In the case of the handpump that had been broken for eight weeks (Oure Niebe, commune of Bartiébougou) at the time of the survey in Burkina Faso, members of the WUA responsible for that water point and community members clearly said that they would do whatever was needed to fix it, but that they did not consider it a priority because they could temporarily use another borehole with a handpump located nearby. This attitude raises two serious problems. It puts extra pressure on the other water point and there is a risk of slippage towards abandoning the one that is broken down. Each handpump that is not quickly fixed is at risk of being abandoned.

That some wells are reported to dry up temporarily in Niger is not necessarily caused by insufficient depth or low yield as mainly mentioned by users. Overuse is definitely a major problem exacerbated by lack of maintenance and both these factors contribute to accelerate silt up. The committee reported annual revenue of US$17 from one well whilst for a second, no revenue is collected from

users. So clearly, while low yield (dry up) is the apparent cause, the underlying reasons are related rather to poor management and in particular, to lack of maintenance. That minimum maintenance requirements are not achieved on wells represents a serious risk to their sustainability. Good general standards of construction fortunately contribute to delayed degradation.

2. METHODOLOGY USED FOR THE SUSTAINABILITY INDEX SURVEY

In preparation for this survey, the CRS regional technical advisor for WASH conducted a desk review of sustainability in the WASH sector. The key tools and resources reviewed were:

- GWI West Africa's reports and publications
- Papers from IRC — International Water and Sanitation Centre's WASH Cost and Triple-S (Water Services that Last) programmes
- WaterAid's Sustainability Framework (2011)
- Working paper on mapping leading sustainability assessment tools (Boulenouar *et al*. 2013)
- Report on monitoring governance factors and sustainability (Welle and Williams, 2013) commissioned by GWI East Africa, and

Communications by email and a Skype meeting were held with GWI counterparts from East Africa (CARE) and Central America (CRS) to discuss the approach and build upon the experience from East Africa in monitoring functionality and governance, to ensure comparable analysis between the two regions.

The sustainability index tool (SIT)[4] was used to conduct the sustainability index survey in Burkina Faso and Niger, based on the following selection criteria:

- Uses comprehensive framework to assess multiple aspects of sustainability, including financial, institutional, environmental, technical and social factors
- Multiple level assessments: at community management level (service provider and users), decentralised level (local government or service authority) and national level (line ministry)
- Identifies areas requiring attention to enhance sustainability potential of interventions
- Provides sets of questions that can be adapted to the local context
- Provides overall sustainability measurement as well as scores per factor assessed
- Fully applied at operational level more than twice
- User-friendliness and access to guidance for self-study (complete tutorial included), and
- Developers of the tools (Aguaconsult) can be contacted for questions.

The objective of the SIT is to assess the likely sustainability of WASH interventions by analysing five critical factors of sustainability. For each factor, several sustainability indicators are measured using series of questions assessed through different methods (semi-structured interviews, group meetings, observation, and so on). Aggregated scores/100 are expressed for each sustainability indicator, sorted under five key factors of sustainability:

1. Institutional
2. Management

[4] http://www.washplus.org/rotary-usaid

3. Financial
4. Technical, and
5. Environmental.

Surveys are conducted at three different levels:

- Community (service provision level and users)
- District (service authority), and
- National.

The questionnaires used for this survey are found in the Annex. The scores are interpreted using the following benchmarking:

Likely sustainability	Score	Colour coding
Low	0 to 49	red
Moderate	50 to 74	orange
High	75 to 100	green

The SIT was adapted to match some needs and constraints of this survey. For example, instead of selecting a sample, the survey aimed to cover all the GWI water points in Burkina Faso and Niger that were installed or rehabilitated during the long-term phase of the GWI West Africa programme. Owing to their dispersal, the water points that were constructed in Niger with funding from the Howard G. Buffett Foundation before the long-term phase were not included in this survey.

All water points could be visited in Burkina Faso because they were constructed during the long-term phase of the GWI West Africa programme and are therefore concentrated in the same geographical area. In Niger, 15 out of 19 water points constructed or rehabilitated during the long-term phase were surveyed.

The triangulation required to conduct household level surveys was carried out by using group discussions rather than household sample interviews so as to reduce time and costs. Field assistants with good knowledge of the local context helped greatly to assess the reliability of answers provided by key informants. Finally, field observations and verifications completed the triangulation process.

The following activities were conducted for the field surveys:

- Meetings and semi-structured interviews with administrative and technical service authorities at decentralised level, WUAs and water point committees
- Group meetings with community members
- Field observations at level of each water point, including sanitary surveying and discharge tests
- Field level technical assistance through provision of practical advice to enhance local management of water supply services, and
- Taking pictures and recording geolocation of each water point.

Two terms, “service authority” and “service provider” are used repeatedly in the report. The sustainability index tool defines them as follows:

Service authority: "*Institutions that fulfil functions in relation to water, sanitation or hygiene, such as planning, coordination, regulation and oversight, and technical assistance, but not the actual service provision itself. Typically these authorities are located at the intermediate level and in most countries are carried out by local government (district, municipalities or communes).*"

Service provider: "*The institutions or individuals that deliver services to end users, including tasks such as operation, maintenance and administration. These may be community organizations, small private operators, public sector utilities or companies, or NGOs and faith-based organizations.*"

Use of iFormBuilder mobile platform for data collection

The survey questionnaires were converted into electronic forms for use with iFormBuilder mobile platform: https://www.iformbuilder.com/

This offered several advantages:

- Many different possibilities for data input (widgets): text, lists, image, video, sound, geolocation, and so on
- Works with a variety of iOS and Android devices, making it more convenient for filling questionnaires in the field than by using a paper form on a clip board
- Can be used offline to collect data
- Eliminates redundancy
- Real-time data upload to a database on the Cloud. Eliminates the need for a data manager
- Different possibilities for data view: Excel, HTML and PDF and basic map view, and
- Good technical support internally (CRS) and from the provider (iFormBuilder)

3. RESULTS OF THE SUSTAINABILITY INDEX OF GWI WATER POINTS IN BURKINA FASO AND NIGER

The field surveys were conducted from 23 April to 3 May 2014 in Burkina Faso and from 13 to 24 May 2014 in Niger. The geographical area of the survey in Burkina Faso is the East region, in local districts (communes) of Gayéri, Fotouri and Bartiébougou. In Niger, the field survey took place in the department of Madaoua, in the communes of Galma, Bangui, Karofane, Bouza and Madaoua.

GWI water points are in arid areas far from permanent surface sources. Owing to the lack of alternative sources during the peak of the dry season, the wells and boreholes installed or rehabilitated by GWI are critical to meeting domestic and other needs for water. This puts heavy pressure on these water points and it was observed when conducting the field surveys that some handpumps are used non-stop to serve people and animals. Low coverage (access to improved water source) in the area adds to the pressure on GWI water points, attracting users residing several kilometres away. Therefore all GWI water points, except in isolated areas, serve many more people than the national standard of 300 in Burkina Faso and 250 in Niger. The survey found an average number of users per water point of 602 in Burkina Faso and 1,408 in Niger. While this confirms that the programme targeted needy areas, it also causes serious challenges for the sustainability of these water points owing to a combination of overuse and lack of ownership from non-resident users who are reluctant to pay fees.

Quantitative indicators and norms in Burkina Faso and Niger

The national norms below are for rural areas.

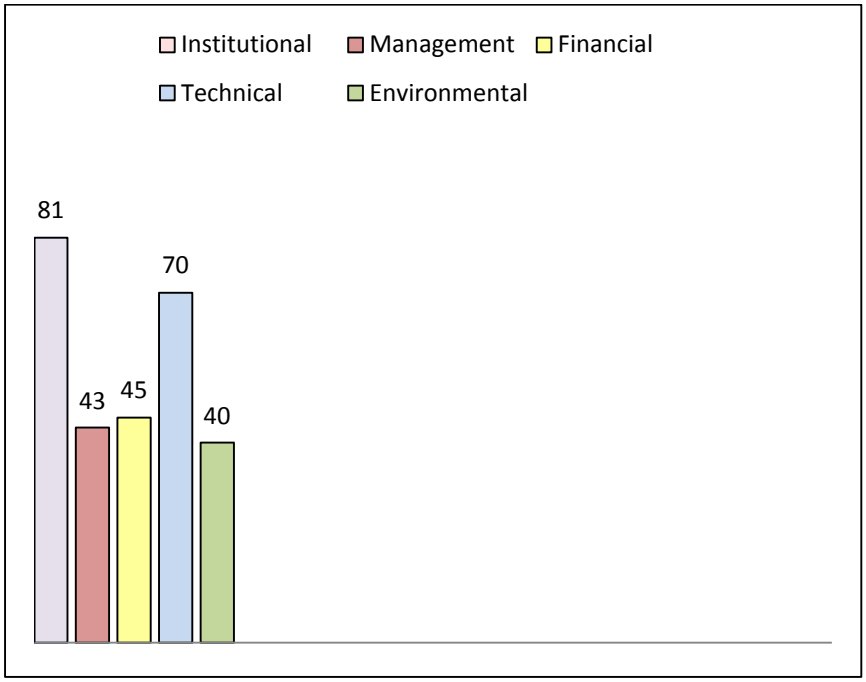
	Burkina Faso	**Niger**
Drinking water quality	WHO	
Quantity for domestic use	20 litres per day	20 litres per day
Distance	Improved water source less than 1,000 metres from the centre of the human settlement	Not specified in policy, but any official settlement of less than 250 people should have a modern water point at a distance of less than 5 kilometres
Access	1 modern water point/village of less than 300 people	1 modern water point/250 people
Handpump discharge	≥ 700 litres per hour	≥ 500 litres per hour

3.1 Aggregated scores for the five sustainability factors: Burkina Faso

In Burkina Faso, the sustainability index survey covered 31 boreholes with handpumps, mostly India Mark II, except for one rehabilitation of a borehole already equipped with an ABI-Vergnet handpump. Figure 4 provides aggregated sustainability scores for the five key factors of sustainability (institutional, management, financial, technical and environmental) that were assessed through surveys conducted at national, local government (service authority) and community levels (service provider).

See Table 2 for a general view of scores for all 23 sustainability indicators.

Figure 4: Sustainability scores (maximum 100) for Burkina Faso



Institutional score: 81

Sustainability indicator	Type	Score
National policy, norms and guidelines for community-managed water supply and enabling legislation is in place	Institutional	88
Roles and responsibilities of district (service authority) and ownership arrangements are clearly defined	Institutional	56
There is a water committee which has been constituted in line with national norms and standards	Institutional	100

Background on the institutional framework for rural water supply services in Burkina Faso

In December 2006, Burkina Faso adopted a national programme for potable water supply and sanitation (PN-AEPA) that provides a programme framework for attaining the millennium development goals (MDGs) for water and sanitation. The PN-AEPA has a component on infrastructure development and on strengthening planning, management and sustainability through a sector-wide approach. The programme is integrated with the decentralisation policy (Code Général des Collectivités Territoriales [CGCT], law N°055-2004/AN) adopted in December 2004, covering the transfer of responsibilities and competencies to local government.

Local government ("commune" in French), also referred to as "service authority" in this report, is the primary stakeholder responsible for potable water supplies in rural and semi-urban areas. The PN-AEPA promotes planning for rural drinking water services through a process called PCD-AEPA, which requires the development of a district level plan covering potable water supply and sanitation. The planning process should be participatory and involve multiple stakeholders including WUAs (village level), private partners and civil society. District level plans are endorsed by the regional representation of the line ministry (DGRE). Populations contribute to capital investment costs and

pay for water services to feed cost recovery for operation, maintenance and repair. The reform adopted in 2000 was intended to enhance the existing management model to ensure continuity of supply and sustainability. Key features include:

- Transfer of contract ownership for public water points to local government (communes) and users
- Local government tasked to contract pump mechanics to conduct monitoring visits that include technical advice and preventative maintenance
- Establishment of water user associations (WUAs) at village level managing several water points, pooling revenues and paying a fee to the local government for preventative maintenance contracts with area mechanics
- Promotion of private sector participation in management, in particular for large systems (gravity-fed systems)
- Strengthening of local capacity (local government, WUAs, private sector, NGOs, and so on), and
- Central government retains a financial and technical support role.

Official sources (DGRE, 2013) indicate a national coverage rate in rural areas of 63.5% and 50.5% in East Region, where GWI intervened. The WHO/ and UNICEF Joint Monitoring Programme (JMP) for Water Supply and Sanitation indicates a rate of 76% (use of improved drinking water sources) in rural areas and estimates that the national MDG target for water is met (WHO/UNICEF, 2014).

The data is based on the technology used (improved vs. not improved water sources). It does not consider the level of service that users benefit from. For example, how many of the 63.5% have to walk less than 1,000 meters or take less than 30 minutes for a trip to collect water that meets drinking quality standards?

Scoring for institutional factor

The indicator "*National policy, norms and guidelines for community-managed water supply and enabling legislation is in place"* obtains a good score (88), reflecting the existence of a national programme for potable water and sanitation (PN-AEPA) and the legal status given to community water management through the establishment of village level WUAs that are supposed to pool resources for all the water points in their administrative village. The national programme is aligned with decentralisation policies that plan for the transfer of responsibilities and resources for rural water supply to the local government.

Roles and responsibilities for the management of community water supply are in general well defined and known at all levels (from the Ministry of Water down to community level management). In two local governments (Gayéri and Bartiébougou) there is a lack of clarity and understanding within the service authority on their own roles in supporting community management. While the GWI programme contributed to training of local officials, changes occurred after the 2013 municipal elections. The problem is that political changes do not only affect elected members of the local government , as the "winners" usually impose changes on "permanent" staff, thus undermining investments made by the programme in strengthening capacity.

Except for two communities, all the WUAs responded that they have a good understanding of the roles and responsibilities of the service authority (local government). The score for the indicator "Roles and responsibilities of district (service authority) and ownership arrangements are clearly defined" is 56.

In all villages WUAs were established as per national norms and followed a participatory, transparent process that was directly supported and facilitated by the GWI programme. The process used the following steps:

- **Formation of general assembly**: In each neighbourhood or community attached to an administrative village, representatives composed of men and women, half of them young people, were nominated to form the general assembly of the WUA.
- **Formation of Executive Office**: members of the general assembly voted to elect an Executive Office for the WUA. The Executive Office (referred to as the water committee in this report) is composed of six members (one president, two hygienists, one information manager, one secretary and one treasurer).

All the WUAs established with GWI support are still in place. Representation of women is 33%. Unfortunately, women rarely occupy decision-making roles. At best they are treasurers. Most are hygienists, which in fact means being responsible for keeping the surroundings of the water point clean.

Management score: 43

Sustainability indicator	Type	Score
There is an updated national monitoring system or database available	Management	88
National support to district/service authority is provided, including refresher training	Management	0
There is regular monitoring of water services and community management service provider and follow-up support	Management	0
Representative water committee actively manages water point with clearly defined roles and responsibilities	Management	79
Water committee members actively participate in committee meetings and decision making processes and reporting is transparent	Management	46

The roles and responsibilities of local government in supporting rural water supply are well laid out in national policies (PN-AEPA and the reform of rural and semi-urban water supply management adopted in 2000). It was possible to access the texts that describe these roles and responsibilities in only one local government (Fotouri). We also noticed uncertainty regarding the specific roles of individuals in the local government.

In three local governments, key informants reported that they did not receive any training on water resource planning or management or on how to support community management. The indicator "*National support to district/service authority is provided, including refresher training*" scores 0. However, the interview at national level indicated that such training exists but has not reached the local governmentss surveyed. The only training that was provided to the local government on water resource management was delivered by the GWI programme before the municipal elections of 2013.

The major management flaw noticed is lack of maintenance. The reform on management of rural water supply gives responsibility to local governments for establishing a maintenance contract with pump mechanics. The Scope of Work includes routine maintenance and provides technical assistance to local water committees. WUAs in return pay an annual fee of 10,000 CFA (about

US$21) to the local government. None of the surveyed local governments have started to implement this system, but they have instructed WUAs not to make their own arrangements for maintenance as requested by the reform. This creates a maintenance gap, however, as the maintenance contracts are not effective. A critical situation results where preventive maintenance is non-existent, except for minor interventions by committees themselves, such as greasing the chain of the handpump. Expenses for the handpumps are therefore exclusively repair-based. This represents a high risk for sustainability unless a robust maintenance programme is quickly effective. Most WUAs declared that they were willing to pay the fee to the local government for service in return. According to a key informant, the absence of maintenance contracts is not restricted to local governments of the GWI programme, but is general to the East region.

None of the three local governments (Fotouri, Gayéri and Bartiébougou) provide technical support to community management. This is expressed by both the local government members and the WUAs. There are no technical staff at local government level and there are no plans to recruit any soon. Local governments have a focal point for water, whose role is limited to updating the national inventory of water points by reporting rehabilitations or new constructions occurring within local government area boundaries. No other activities were mentioned. Therefore, the indicator "*There is regular monitoring of water services and community management service provider and follow-up support*" scores 0.

All WUAs/water committees are still in place, have clearly defined roles and are active. This gives a good overall score of 79 for the indicator "*Representative water committee actively manages water point with clearly defined roles and responsibilities*."

Although 68% of WUAs meet at least twice a year, fewer than half keep minutes or written records of their activities or share information with users. There is substantial disparity on the performance level of WUAs which explains the low average score (46) for the indicator "*Water committee members actively participate in committee meetings and decision making processes and reporting is transparent*."

Financial score: 45

Sustainability indicator	Type	Score
There are national/local mechanisms beyond community contributions and tariffs, to meet life-cycle costs, while ensuring affordability, equity and non-discrimination	Financial	13
Resources available for district/service authority to fulfil functions	Financial	5
Tariff setting complies with national/local regulations, including social tariff	Financial	99
Tariff collection is regular and sufficient	Financial	66
The water committee demonstrates effective financial management and accounting	Financial	40

There is a national budget to gradually transfer resources to local governments but as yet only limited financial resources for rehabilitation have been issued by the national government. The Ministry of Water reported that some local governments received up to 30 million CFA for rehabilitation of gravity schemes.

The very low score (5) for the indicator "*Resources available for district/service authority to fulfil functions*" is due to a lack of local government resources for supporting community management of water supply and sustainability. None of the three local governments (Fotouri, Gayéri and Bartiébougou) reported the ability to raise sufficient resources. The commune of Bartiébougou twice received financial support from the National Government of 4 million CFA in 2011 (roughly US$6,000) to rehabilitate two boreholes and 2 million CFA in 2012 (roughly US$3,000) to rehabilitate one borehole. These are the only subsidies received to support sustainability of water supply services since the GWI programme ended. Local governments report that they are unable to raise funds locally due to poverty and negative attitudes towards paying tax or service fees. On the other hand, communities are reluctant to pay because they say that they do not receive service in return. This is a major obstacle that prevents the implementation of the maintenance system required by the reform.

All WUAs have set a water tariff in line with recommendations from the local government. This is supposed to cover operation, maintenance and repair costs for a 15-year period. The local government applied the estimate provided by the National Water Department which is annual revenue of 75,000 CFA/borehole. This is based on 300 users representing 30 households, requiring a charge of 2,500 CFA per household. The GWI programme developed and used a pricing tool[5] to estimate an annual budget of 135,000 CFA (about US$281) per year per borehole and advocated increasing the annual fee in order to raise this amount per borehole. Local governments in consultation with WUAs finally decided to apply a fee of 3,000 CFA per household, which in theory should allow 90,000 CFA ($187.5) per borehole to be raised.

All WUAs reported setting the tariff at 3,000 CFA per household per year and allowing free access to the poorest and most vulnerable households of the community.

A regular schedule for tariff collection is applied by 71% of committees, but most do not succeed in collecting fees from the majority of users. Their difficulty is in collecting contributions from users who are irregular yet represent a large proportion of total users, especially during the dry season when alternative sources dry up. The average number of users for the 31 boreholes surveyed is estimated at 602 with significant variations. For eight boreholes the number of users is close to 1,000 or more.

Annual revenue varies greatly. In previous years it has fluctuated between US$38 and US$333 with an average of US$195 per borehole. While it seems encouraging that average annual revenue is higher than annual expenses this is not a sign of sustainability because expenses are mainly repair-based. Investment in maintenance is very low, and is only for minor interventions at village level such as regular greasing of the chain on the handpump. There is however a general understanding of the need to save for increased costs of repairs and replacement parts in the future.

Average number of users/households[1] per borehole (actual)	Average annual revenue per borehole(actual)	Average annual revenue per borehole if 100% of users pay (86 households)
602 users/86 households	US$195	US$538

[1]Average number of seven people in one household

[5] GWI Excel tool 'Calculating the Price of Water' – for more information, contact: Jamie Skinner jamie.skinner@iied.org

The calculation above estimates that the rate of payment (number of users paying vs. total number of users) is 36%.

Despite overall good quality of construction, some damage (cracks) starts to occur to the superstructure and drainage channels, but is not fixed. Little importance is given to maintaining the superstructure in a good condition. Attention is on ensuring that the handpump continues to deliver water. Expenses are exclusively for handpump repairs and spare parts.

	Average annual revenue (US$)	Average annual expenses (US$)
Sample of 31 boreholes with handpump (30 with India Mark II, one with ABI-Vergnet) installed or rehabilitated between 2009–11	195	107

Among committees, 71% reported keeping financial records, but this could not always be verified. Only 48% have a bank account. The others keep the funds at village level under responsibility of the treasurer. Financial information is shared with users by 42%. There is no system for auditing financial accounts. The indicator "*The water committee demonstrates effective financial management and accounting*" has a low score of 40.

Technical score: 70

Sustainability indicator	Type	Score
There are national/local norms that define acceptable service levels with explicit indicators and thresholds (for example, water quality, quantity, accessibility, affordability, and so on)	Technical	90
There are national/local norms that define equipment standardisation and arrangements for providing spare parts	Technical	63
District water staff are able to provide support for maintenance and repairs on request	Technical	0
Handpump is functional and provides basic level of service according to national policy	Technical	91
Handpump complies with standards and norms in terms of siting and public health risk	Technical	89
Knowledge and spare parts are available to conduct maintenance and repairs in a timely manner	Technical	86

There is no support from the service authority (local government) for maintenance and repairs. Local governments do not fulfil their role of establishing a maintenance and technical support contract with area mechanics. As stipulated by the national reform, WUAs are responsible for managing repairs paid for by users' contributions. There is no support mechanism to fill the gap when communities are unable to raise the funds for major repairs. This has not yet been needed, as the

boreholes surveyed were installed or rehabilitated less than five years ago, but this will become a critical issue in the near future. One replacement of a major part (broken handle) is already needed but is unlikely to be procured quickly. This is probably the result of overuse and/or careless use.

The oldest borehole supported by GWI in Burkina Faso is a rehabilitation carried out in April 2009. The water point is in good conditions and meets users' satisfaction (Photo 1).

Photo 1: Borehole rehabilitated by GWI in April 2009 (Haaba, commune of Bartiébougou – Burkina Faso). Credit: GWI West Africa / Jean-Philippe Debus

The oldest borehole constructed by GWI in Burkina Faso dates from October 2009 (Oure Niebe, commune of Bartiébougou). The water point is in good condition and meets users' satisfaction (Photo 2).

Photo 2: GWI borehole constructed in 2009 (Oure Niebe, Burkina Faso) Credit: GWI West Africa / Jean-Philippe Debus

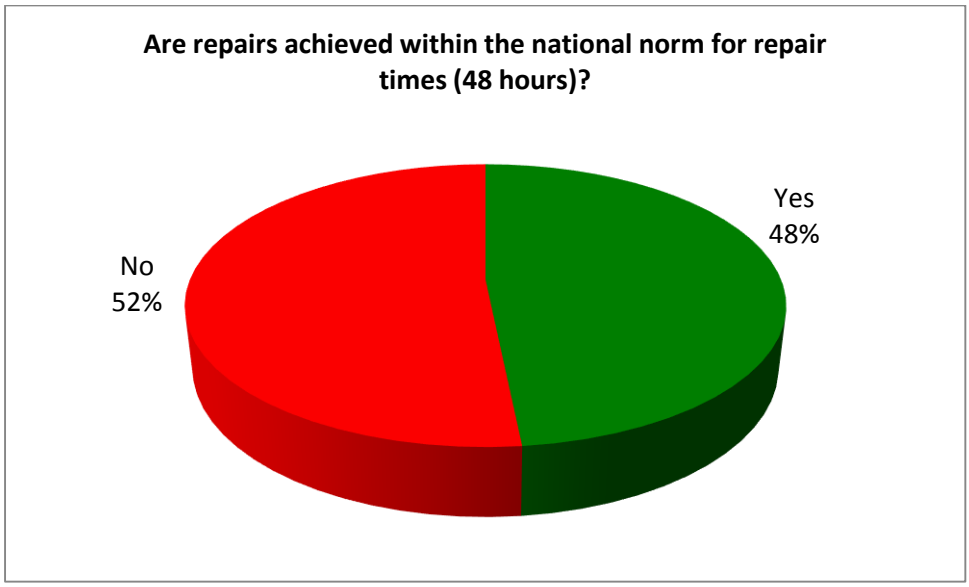
Functionality and service level: The indicator "*Hand pump is functional and provides basic level of service according to national policy*" scores 91. It combines several factors assessing service level (water quality and quantity, design appropriateness and construction quality). No lab tests were

conducted by this survey, but all GWI water points had been lab tested for meeting drinking water quality as per national standards (aligned with WHO norms) when they were commissioned. The survey responded to the question on water quality by combining a sanitary survey and questions on users' satisfaction.

All functional handpumps provide acceptable discharge. This was measured by timing how long it took to fill a 10-litre bucket. All results were well below one minute. Committees reported that all operational boreholes achieve continuity of supply all year round, despite high pressure being observed at several boreholes that are used to water herds of goats and other animals such as donkeys during the peak of the dry season.

Of 31 water points, four were not operational at the time of visit; of these, two had been non-operational for a week or less, one for two weeks and one for eight weeks, according to users. The handle was broken on one handpump. This is a sign of careless use and/or overuse. One has a problem with the cylinder and two have disconnected or broken rods. This is also probably due to careless use, though it can be a combination of several causes. We found high motivation to fix the handpump quickly when repair is needed, even though one of the broken-down boreholes has been out of order for eight weeks. All communities mentioned that skilled pump mechanics were available in the vicinity. The GWI programme supported the establishment of a good network of mechanics through training and support to start up business activities. It is however quite challenging to complete repairs in the remotest areas within the national norm of 48 hours (Figure 5). Pump mechanics do not have a stock of spares (except for a few minor parts). They do not benefit from investing to create their own stock of spare parts because of slow turnover due to the low density of handpumps in the area (small market size). So when a repair is needed, the pump mechanic first comes to the village to diagnose the problem. He then has to travel to Fada N'gourma (capital of East region), which is about 100 kilometres from the remotest villages, to get the spare part(s) from a retailer.

Figure 5: Repair time



All boreholes are installed at an appropriate location away from sanitary risks (latrines, animal pens, dumping sites, and so on), but 12 out of 31 are at risk of being flooded in their immediate surroundings. Platforms offer good elevation, but this is not sufficient to protect them in case of exceptional floods. Such arid areas represent a challenge for implementing a groundwater source.

The priority is to hit groundwater and this directs location towards lowlands where the risk from floods is higher because of high run-off coefficient (soil erosion) and scarcity of vegetal cover.

Protection levels against surface contamination are appropriate for all boreholes and platforms are in good general condition. In only one borehole there was a pool of stagnant water close to the platform. This is due to spillage because of incessant pumping to fill the animal trough.

Environmental score: 40

Sustainability indicator	Type	Score
National environmental protection standards are established and applied to WASH services	Environmental	44
National integrated water resources management plan is in place, updated regularly and applied to WASH services planning	Environmental	6
Local watershed management plan is in place, updated regularly and applied to WASH services planning	Environmental	53
Natural resources are managed to support sustainable WASH service delivery	Environmental	58

The process to develop a National Adaptation Programme of Action (NAPA) started in 2005 with support from the United Nations Development Programme (UNDP) and was finalised in 2007. Some adaption actions that compose the programme are geared towards water management. They include:

- Deepening of traditional wells
- Installation of water points adapted to climate change risks
- Migration towards more humid zones, and
- Preventive actions to prevent silt up of water resources.

Local governments are considered as primarily responsible for supporting local level climate change adaptation in vulnerable communities, but their level of awareness and overall capacity to handle this role is very low.

The following two indicators "*Local watershed management plan is in place, updated regularly and applied to WASH services planning*" and "*Natural resources are managed to support sustainable WASH service delivery*" have fair scores (53 and 58). All Local governmentss reported developing district level plans for water supply and sanitation in alignment with watershed management plans and seeking participation of stakeholders from vulnerable communities, civil society, and so on. Of 31 communities, 26 responded that they contributed to the development of the Communal Development Plan for Water Supply and Sanitation (PCD-AEPA), but only nine said that the plan is publicly available and that steps are taken to educate them about it.

Burkina Faso sustainability scores for all indicators

The scores below represent an average of the 31 surveyed water points. Some indicators are measured by collecting data from a single level (national or local government or community) and some required triangulation, for example between water user associations and local government.

Table 2: Burkina Faso sustainability scores for all indicators

Sustainability indicator	Type	Score
National policy, norms and guidelines for community-managed water supply and enabling legislation is in place	Institutional	88
Roles and responsibilities of district (service authority) and ownership arrangements are clearly defined	Institutional	56
There is a water committee which has been constituted in line with national norms and standards	Institutional	100
There is an updated national monitoring system or database available	Management	88
National support to district/service authority is provided, including refresher training	Management	0
There is regular monitoring of water services and community management service provider and follow-up support	Management	0
Representative water committee actively manages water point with clearly defined roles and responsibilities	Management	79
Water committee members actively participate in committee meetings and decision making processes and reporting is transparent	Management	46
There are national/local mechanisms beyond community contributions and tariffs, to meet life-cycle costs, while ensuring affordability, equity and non-discrimination	Financial	13
Resources available for district/service authority to fulfil functions	Financial	5
Tariff setting complies with national/local regulations, including social tariff	Financial	99
Tariff collection is regular and sufficient	Financial	66
The water committee demonstrates effective financial management and accounting	Financial	40
There are national/local norms that define acceptable service levels with explicit indicators and thresholds (for example, water quality, quantity, accessibility, affordability, and so on)	Technical	90
There are national/local norms that define equipment standardisation and arrangements for providing spare parts	Technical	63
District water staff are able to provide support for maintenance and repairs on request	Technical	0
Handpump is functional and provides basic level of service	Technical	91
Handpump complies with standards and norms in terms of siting and public health risk	Technical	89
Knowledge and building materials/spare parts are available to conduct maintenance and repairs in a timely manner	Technical	86
National environmental protection standards are established and applied to WASH services	Environmental	44

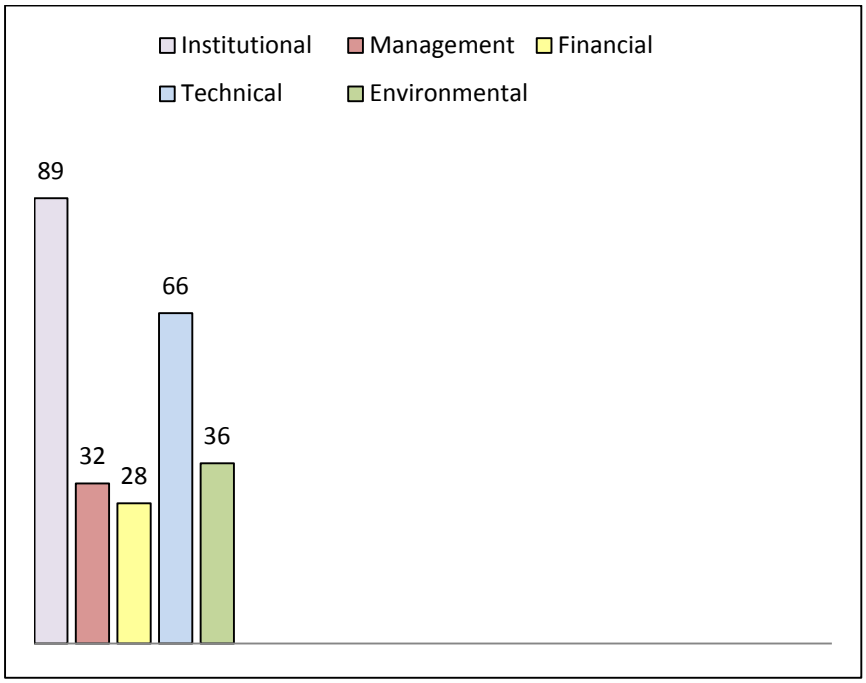
Sustainability indicator	Type	Score
National integrated water resources management plan is in place, updated regularly, and applied to WASH services planning	Environmental	6
Local watershed management plan is in place, updated regularly and applied to WASH services planning	Environmental	53
Natural resources are managed to support sustainable WASH service delivery	Environmental	58

3.2 Aggregated scores for the five sustainability factors: Niger

In Niger, the sustainability index survey covered 14 protected wells and one borehole with a Volanta handpump. Figure 6 provides aggregated sustainability scores for the five key factors of sustainability (institutional, management, financial, technical and environmental) that were assessed through surveys conducted at national, local government (service authority) and community levels.

See Table 2 for a general view of scores for all 23 sustainability indicators.

Figure 6: Sustainability scores (maximum 100) for Niger



The scores below represent an average of 15 surveyed water points. Some indicators are measured by collecting data from a single level (national or local government or community) and others required triangulation, for example between water committee and local government. Each sustainability indicator was assessed using four sub-questions (see sample of survey form in the Annex).

Institutional score: 89

Sustainability indicator	Type	Score
National policy, norms and guidelines for community-managed water supply and enabling legislation is in place	Institutional	88
Roles and responsibilities of district (service authority) and ownership arrangements are clearly defined	Institutional	79
There is a water committee which has been constituted in line with national norms and standards	Institutional	100

Background on the institutional framework for rural water supply services in Niger

In June 2011, Niger adopted a national programme for potable water supply and sanitation (PN-AEPA 2011–15) that provides a programme framework for attaining the MDGs for water and sanitation. This programme is integrated with the national action plan for IWRM.

The objectives are:

- In urban areas, to increase access to potable water from 72.7% in 2009 to 82.5% in 2015 and from 79% in 2009 to 100% in 2015 for sanitation, and
- In rural areas, to increase access to potable water from 48% in 2010 to 58% in 2015 and from 7% in 2009 to 25% in 2015 for sanitation.
- Programming principles:
- Constant increase of access to potable water and sanitation throughout the whole national territory
- Reduce disparities in access to potable water and sanitation
- Strengthen sustainability of water services in urban and rural areas, and
- Strengthen user ownership through applying cost recovery for potable water services, promoting hygiene and individual investment in sanitation.

Sustainability is a key objective of the national programme. Expected results by 2015 for the rural water supply area are:

- Reduce the breakdown rate by half, from 18.32% in 2010 to below 10% in 2015
- Renew infrastructure by replacing all the abandoned and non-operational systems
- Install mini piped gravity schemes in localities with a population of over 2,000 people
- Develop systems that can serve multiple localities and communes, and
- Achieve transfer of responsibilities to local government for operation of public water service with more than 75% of communes applying the procedures of the guide for water services.

Scoring for the institutional factor

The high score for the institutional factor (89) illustrates an enabling policy environment described above.

Roles and responsibilities for rural water services are defined and known at different levels (from line ministry down to community-based management). All the water committees, except three, responded that they have a good understanding of these roles. There is however some uncertainty regarding the share of some responsibilities between decentralised technical services (line ministry) and decentralised authority (local government).

Decentralisation in Niger is a slow process for which the transfer of responsibilities is not yet achieved. Decentralised co-operation is encouraged by the national government which adopted a decree authorising local governments to sign co-operation agreements with foreign partners.

In all communities, water point management committees (CGPEs) have been established and trained through the GWI programme. Most committees are comprised of four members (president, general secretary, treasurer and hygienist). Community members estimate that the election process was participatory and transparent. Representation of women is 38.3% but women mainly occupy secondary roles, most often as treasurer and hygienist. The author is not aware of the existence of a national norm on representation of women in water committees. The PN-AEPA however stipulates that lack of participation of women is a problem in rural water supply services.

The government ensures dialogue with key stakeholders through the annual review of the PN-AEPA and other opportunities to maintain regular consultation.

Management score: 32

Sustainability indicator	Type	Score
There is an updated national monitoring system or database available	Management	50
National support to district/service authority is provided, including refresher training	Management	70
There is regular monitoring of water services and community management service provider and follow-up support	Management	0
Representative water committee actively manages water point with clearly defined roles and responsibilities	Management	37
Water committee members actively participate in committee meetings and decision making processes and reporting is transparent	Management	5

Niger maintains a water resources inventory coupled with a geographic information system intended to assist planning, management and decision making for actors in the water sector. The tool, IRH-SIGNER, was developed by the Ministry of Water and Environment with support from UNDP in 1996. This decentralised tool is supposed to be updated by technical services in departments, but the author has no information about a recent update, the last known dating from 2006–07.

The most recent information on potable water and sanitation indicators was published by the Ministry of Water and Environment in 2013. It provides nationwide updated data (2012) on coverage rates sorted by regions, departments and communes (local districts) and an inventory of water points and functionality rates. No information is provided on performance of service providers.

Four local governments out of five responded that they benefited from training to support community water services. These were provided by GWI and included refresher training, but no

follow-up has been initiated by the government so far. Training covered the establishment of water committees and the responsibilities and roles of local government in the management of rural water services. However, none reported a system to monitor effectiveness of training.

Local government does not provide supervisory support to the community level. This indicator was triangulated by questioning the 15 communities and five local governments. All the communities reported that they did not receive any form of technical support or monitoring of their financial, technical and administrative performance from the local government. Only one local government responded that they do provide this type of support, but this was not confirmed by the water committee interviewed in that commune. This indicator therefore has a score of zero.

Though water point management committees are established in all communities and members have clearly defined roles, they operate in a loose manner, only conducting a few technical tasks to ensure functionality of the system in four out of the 15 committees. Administrative and financial duties are only conducted by three committees. This explains a low score of 37 for the indicator "*Representative water committee actively manages water point with clearly defined roles and responsibilities*."

Only two committees reported meeting at least twice annually, and only one reported keeping records of these meetings or from technical, administrative or financial activities and sharing some information with the community. This gives a very low score of five for the indicator "*Water committee members actively participate in committee meetings and decision making processes and reporting is transparent.*"

The overall management score is low, reflecting the gap between an enabling policy environment and the barriers to applying and enforcing policies, standards and processes. There is a general lack of capacity and resources for applying reforms and regulations for water services management. Important discrepancies were noted between the various indicators for this sustainability factor. While service authorities were trained by GWI, community level water point management committees operate in isolation without external support.

An assessment of water governance in Niger (GWP/AO, 2009) raises the following key problems that are confirmed by the results of this survey and indicate little progress achieved since 2009:

- Non-application of texts and insufficiency of complementary texts
- Lack of knowledge of legislation by most actors, and

  Lack of capacity in local governments to fulfil responsibilities transferred to them through the decentralisation process (local regulation, water resource planning, management, protection and control of implementation quality, that is, construction quality, service level monitoring, support to community management, and so on).

Financial score: 28

Sustainability indicator	Type	Score
There are national/local mechanisms beyond community contributions and tariffs, to meet life-cycle costs, while ensuring affordability, equity and non-discrimination	Financial	25
Resources available for district/service authority to fulfil functions	Financial	18

Tariff setting complies with national/local regulations, including social tariff	Financial	62
Tariff collection is regular and sufficient	Financial	17
The water committee demonstrates effective financial management and accounting	Financial	17

The low scores (25 and 18) for the first two indicators reflect the absence of adequate financial mechanisms at national and district levels to support post-construction management of water services, in particular there is no financial system to fill the gap when the revenue collected at community level does not allow for major repairs or upgrade needs.

Five of the local governments surveyed do not have adequate staffing to oversee community water management. Elected officials who are responsible for water do not feel that they have sufficient skills and local governments do not have a budget to recruit a technician. This results in a very low score (18) for the indicator "*Resources available for district/service authority to fulfil functions*."

Of 15 committees, 11 have set a tariff for water collection. The tariff was established through consultation between the water committee and users. Fees are provided in the form of millet at harvest time. The committee sells the cereals to obtain cash. Tariff collection is neither regular nor sufficient. Only two committees reported collecting tariffs regularly. The annual revenue per well varies greatly, from US$10 to US$225. The latter is exceptionally high compared to others which are all in the range US$10 to US$20. Little attention is given to the maintenance of wells and annual expenses for maintenance are very low (US$3 or less) though there are clear needs. For example, some wells are silted up. This causes reduced yield and temporary dry up when demand is high. Concrete platforms, well heads and drains are still in good condition but will require some repairs in the future and this necessitates collecting and saving water fees from now onwards.

Only one committee reported receiving financial contributions from most users (the committee that raised annual revenue of US$225). The score for the indicator "*Tariff collection is regular and sufficient*" is very low at 17.

Only two committees keep financial records and/or share financial information with users. Five committees have a bank account. No form of financial audit is done. The score for the indicator "*The water committee demonstrates effective financial management and accounting*" is very low at 17.

Technical score: 66

Sustainability indicator	Type	Score
There are national/local norms that define acceptable service levels with explicit indicators and thresholds (for example, water quality, quantity, accessibility, affordability, and so on)	Technical	73
There are national/local norms that define equipment standardisation and arrangements for providing spare parts	Technical	75
District water staff are able to provide support for maintenance and repairs on request	Technical	13
Well or handpump is functional and provides basic level of service *according to national policy*	Technical	75

Well or handpump complies with standards and norms in terms of siting and public health risk	Technical	67
Knowledge and building materials/spare parts are available to conduct maintenance and repairs in a timely manner	Technical	95

Niger has established national norms to define access to improved water sources. In rural areas the standard is 250 people for an improved water point that can deliver at least 500 litres per hour on a basis of ten hours' operation per day. Users should be within a radius of 1,000 metres from the water source. Isolated settlements of less than 250 people are to be provided with a water point if they are more than 5 kilometres away from an improved water source.

The indicator "*There are national/local norms that define acceptable service levels with explicit indicators and thresholds (for example, water quality, quantity, accessibility, affordability, and so on)"* scores 73. National norms cover all aspects except affordability, which is apparently an ongoing political debate that has not reached consensus.

The indicator "*There are national/local norms that define equipment standardisation and arrangements for providing spare parts*" has a satisfying score of 75. National technical guidelines exist for the various types of facilities and each region has defined standards for the types of handpumps. There is a perception that the standards are well disseminated, known and used by stakeholders.

There is an almost total gap in technical support. Service authorities (local governments and decentralised services) say they do not have the capacity to provide technical support for maintenance and repairs. Only one community responded that they benefited from technical support for maintenance and repair from the district water staff. This indicator has a very low score of 13.

Functionality and service level: This combines several factors that define service level (water quality and quantity, design appropriateness and construction quality). Users' satisfaction with water quality is quite high but eight committees out of 15 reported that water quantity is not sufficient. This is obviously the case for non-functional facilities (one borehole with a broken-down handpump and two uncompleted wells) but the problem of insufficient quantity is also noted for operational wells and is probably linked to lack of maintenance and overuse. The wells could probably meet local demand if a sound maintenance routine was applied to prevent silt up. The actual number of users per well is also a serious issue. Based on estimates from water point management committees, numbers of users per well vary between 252 and 4,000 with an average of 1,308. This has inevitable negative effects on water quality and quantity. The indicator "*Well or handpump is functional and provides basic level of service according to national policy*" scores 75.

All water points are installed at an appropriate location away from sources of pollution. All wells, except one, are equipped with a solid frame and pulleys to facilitate water lifting. Concrete platforms are well designed, though headwall height is too low. Platforms include built-in spillways to pour water for feeding distant animal troughs. This feature contributes to reducing workload and keeping animals at a distance. Protection levels are generally good, except for the borehole (platform was not rehabilitated). The uncompleted wells should be covered. The indicator "*Well or handpump complies with standards and norms in terms of siting and public health risk*" scores 67.

Note on water quality in protected dug wells

Photo 3 shows a GWI protected dug well constructed in compliance with the national standard design. There are however many challenges to protecting water quality in this type of facility because it does not provide a seal with surface contamination. Therefore, the GWI programme also included a substantial component on promoting drinking water quality, protecting groundwater and

safe handling and storage methods for drinking water. These activities included locally appropriate water treatment methods.

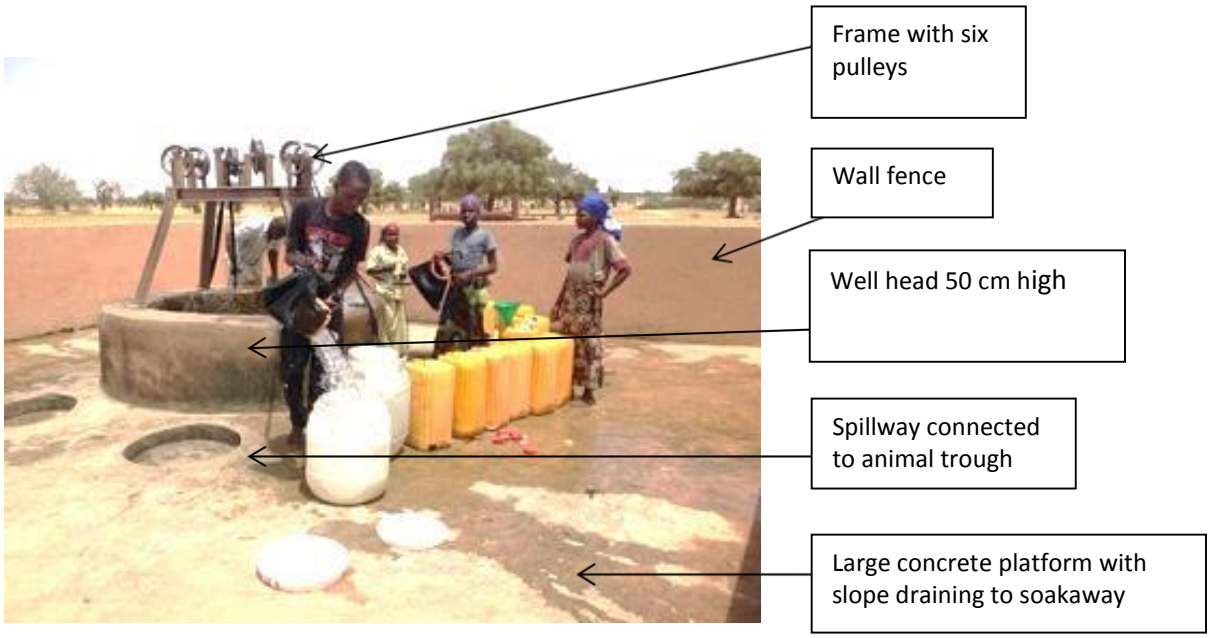


Photo 3: Typical GWI well/platform design, Sabon Guida, commune of Madaoua (Niger). Credit: GWI / Hyacinthe Convolbo

Environmental score: 36

Sustainability indicator	Type	Score
National environmental protection standards are established and applied to WASH services	Environmental	48
National integrated water resources management plan is in place, updated regularly and applied to WASH services planning	Environmental	43
Local watershed management plan is in place, updated regularly and applied to WASH services planning	Environmental	25
Natural resources are managed to support sustainable WASH service delivery	Environmental	28

Niger has put in place several reforms and actions to develop national policies for water and sanitation and IWRM. A national council for the environment and sustainable development has been established and has developed the national adaptation programme of action (NAPA) in which water resource management is a priority. Key issues are:

- Pollution of surface and groundwater
- Impact of climate change on availability of surface water and receding of the aquifer, and
- Stress on wetlands

The plan also seeks to address the multiple effects of repeat periods of drought on water resources, soil erosion and silt up of surface water sources.

Needs related to water resource management in the plan are expressed as follows:

- Developing co-ordinated management of water resources
- Increased knowledge of major groundwater sources
- Surface water management
- Flood risk reduction
- Capacity strengthening of all actors
- Fight against pollution of water resources, and
- Controlled use of water resources.

These elements contribute to good scores (48 and 43) for the indicators "National environmental protection standards are established and applied to WASH services" and "National integrated water resources management plan is in place, updated regularly and applied to WASH services planning."

However, even though institutions and policies are in place to address environmental protection and sustainable management of water resources these are not yet applied locally. The level of awareness and understanding of national plans for environmental protection at district level is mixed and local governments and communities reported that lack of capacity (human and financial resources) is a major impediment to applying national environmental protection standards at district level.

The following two indicators "Local watershed management plan is in place, updated regularly and applied to WASH services planning" and "Natural resources are managed to support sustainable WASH service delivery" have low scores (25 and 28). This illustrates a disconnect between a favourable policy environment and low level of implementation. None of the surveyed communities think that they were adequately involved in the development of the district level water resources management plan and none consider the district plan to be publicly available or that adequate steps are taken to disseminate the information to water committees and community members. No local action is reported to assess climate change/ecosystem-related risks to drinking water resources. There is no appropriate control to ensure rational use of water resources. The average number of users per well is much higher than national norms (1,308 vs. 250). While this high pressure causes environmental problems such as rapid silt up in wells, these are not addressed by water committees or the service authority. Only two committees reported having conducted minor maintenance interventions in the last 12 months.

Niger sustainability scores for all indicators

The scores below represent the average of the 15 communities surveyed. Some indicators are measured by collecting data from a single level (national or local government or community) and some required triangulation, for example between water user associations and local government.

Table 3: Niger sustainability scores for all indicators

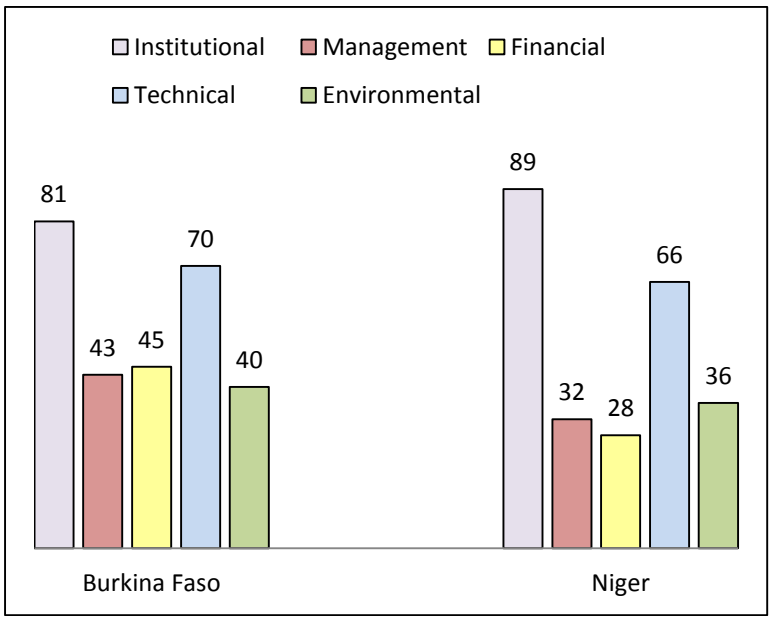
Sustainability indicator	Type	Score
National policy, norms and guidelines for community-managed water supply and enabling legislation is in place	Institutional	88
Roles and responsibilities of district (service authority) and ownership arrangements are clearly defined	Institutional	79
There is a water committee which has been constituted in line with national norms and standards	Institutional	100
There is an updated national monitoring system or database available	Management	50

Sustainability indicator	Type	Score
National support to district/service authority is provided, including refresher training	Management	70
There is regular monitoring of water services and community management service provider and follow-up support	Management	0
Representative water committee actively manages water point with clearly defined roles and responsibilities	Management	37
Water committee members actively participate in committee meetings and decision making processes and reporting is transparent	Management	5
There are national/local mechanisms beyond community contributions and tariffs, to meet life-cycle costs, while ensuring affordability, equity and non-discrimination	Financial	25
Resources available for district/service authority to fulfil functions	Financial	18
Tariff setting complies with national/local regulations, including social tariff	Financial	62
Tariff collection is regular and sufficient	Financial	17
The water committee demonstrates effective financial management and accounting	Financial	17
There are national/local norms that define acceptable service levels with explicit indicators and thresholds (for example, water quality, quantity, accessibility, affordability, and so on)	Technical	73
There are national/local norms that define equipment standardisation and arrangements for providing spare parts	Technical	75
District water staff are able to provide support for maintenance and repairs on request	Technical	13
Well or handpump is functional and provides basic level of service	Technical	75
Well or handpump complies with standards and norms in terms of siting and public health risk	Technical	67
Knowledge and building materials/spare parts are available to conduct maintenance and repairs in a timely manner	Technical	95
National environmental protection standards are established and applied to WASH services	Environmental	48
National integrated water resources management plan is in place, updated regularly and applied to WASH services planning	Environmental	43
Local watershed management plan is in place, updated regularly and applied to WASH services planning	Environmental	25
Natural resources are managed to support sustainable WASH service delivery	Environmental	28

4. CONCLUSIONS AND RECOMMENDATIONS

4.1 Summary of findings

Figure 7: Sustainability scores for Burkina Faso and Niger



Institutional factor scores: Burkina Faso 81, Niger 89

Both countries developed policies that support the decentralisation of rural water services through the transfer of competencies to local governments. Community management for basic systems such as protected wells and boreholes with handpumps is recognised and institutionalised in Burkina Faso and Niger.

Reforms were adopted to enhance management of rural water services through increased participation of users, private sector participation and external support with service authority transferred to local government. Sustainability factors are also increasingly integrated in national policies and guidance, but many challenges remain in implementing these policies and significant disparities exist between different geographical areas.

Management factor scores: Burkina Faso 43, Niger 32

Low scores in both countries reflect the many challenges preventing the implementation of relevant policies and decentralisation reforms. This process seeks to create self-governing communes with the capacity to plan and manage their own water resource development programmes and mobilise the necessary resources through increased local revenues and government fiscal transfers. In Burkina Faso and Niger the decentralisation process progresses very slowly. The transfer of competencies, responsibilities and resources to local governments is not achieved and local governments do not have the capacity to fulfil their responsibilities. In both countries we found a similar situation characterised by limited capacity to plan and manage water resources in local governments and the quasi-absence of support provided by local government and decentralised technical services to community management. From 2010 GWI had highlighted the ineffective

transfer of competencies to local government and other weaknesses in the decentralisation of water service management:

- Poor enforcement of policies
- Lack of human, material and financial resources
- Insufficient support for local actors, in particular for local government, water user associations and pump mechanics
- Low level of competencies among actors
- Absence of information management at local level, and
- Diversion of resources and services.

The same issues are found in 2014 and village level water committees are left on their own to manage their water services. Moreover, failure to apply the reform has pernicious effects. For example, in Burkina Faso, local governments who are responsible for maintenance by contracting pump mechanics have instructed WUAs not to manage preventive maintenance, but none of these local governments has yet made contract arrangements with pump mechanics.

It is probable that there are many political reasons behind the lack of progress, but this survey did not allow them to be explored.

Community management: the table below shows the average scores (maximum 100) for some key indicators of community management performance.

	Burkina Faso	**Niger**
Existence of water user association/committee	100	100
Committee fulfils overall responsibilities (technical, administrative and financial)	79	37
The water committee is established in line with national policies and democratically elected	100	100
Representation of women	33%	38%
Tariff collection is regular and sufficient	66	17
Committees meet at least twice a year	68	13
Committees report back to users on technical, administrative and financial records	39	2
Institutional support from service authority (monitoring, audit, technical assistance)	0	0

GWI supported the establishment of water committees as per national policies and trained them to conduct technical, administrative and financial tasks. Unfortunately since the end of the GWI programme, committees have been operating without external support while local goverments were

supposed to take up the baton. It was encouraging to meet all committees in place, active and easily mobilised to participate in this survey. There is a significant discrepancy in community management performance between Burkina Faso and Niger. Water committees in Burkina Faso fulfil their tasks better; they organise more regular meetings, collect water fees and keep records. None of the countries perform well in reporting back to users.

Technology is probably an important factor in explaining the difference in performance. In Burkina Faso, the fact that a functioning handpump is necessary for getting water from a borehole is a motivating factor to collect water fees so that repairs can be paid for. In Niger, people have less motivation to contribute financially because they do not depend on technology to lift water, but can use their own rope and bucket.

Financial factor scores: Burkina Faso 45, Niger 28

Both countries score low, especially Niger. National budgets in Burkina Faso and Niger include new constructions and rehabilitations but there is no process for complementing community contributions to meet life-cycle costs. Local governments have great difficulty in securing financial resources to support community management and they usually rely on external projects, mainly from NGOs.

In all aspects of financial management the water committees in Burkina Faso perform better than in Niger. As suggested in the previous section, the dependence on handpump technology to get water is probably a factor contributing to financial management performance.

The water tariff applied in Burkina Faso is 3,000 CFA (about US$6.25) per household, per year. GWI used a pricing tool to determine that it would be necessary to raise 135,000 CFA (US$281) annually per borehole to cover operation, maintenance and repair costs over a period of 15 years. The calculation does not include direct support expenditure and rehabilitation. Local governments and water user associations finally decided to adopt a tariff of 3,000 CFA per household, which in theory should allow 90,000 CFA (US$188) per borehole per year to be raised.

In Niger, revenue collection is only achieved for five water points out of 15. In both countries a minority of users pay. The main reasons for the difficulty in collecting water fees are the struggle to meet conflicting survival priorities and unwillingness to pay by irregular users. Access is not dependent upon water fee payment. Water committees do not believe that they have the authority to prevent access to water. The table below provides a summary of financial management performance in both countries.

	Average number of users per water point	**Average annual revenue per water point**	**% of committees keeping financial records**	**% of committees having a bank account**	**% of committees sharing financial information with users**
Burkina Faso	602 users	US$195	71%	48%	42%
Niger	1,408 users	US$22.2	13%	33%	13%

The costs indicated below are derived from research conducted by IRC in Burkina Faso (Pezon and Bassono, 2013) which covered 842 boreholes with handpumps.

Life-cycle costs (borehole with handpump)	**CFA**	**US$**
Operation expenditure (salaries, maintenance and repair costs)	105,600/year	220
Rehabilitation (in theory after 15 years)	3,300,000 one time or 220,000/year	6,875 one time or 458/year
Direct support (performance monitoring, technical assistance, administrative support, training, organisational support, and so on)	672,600/year	1,401/year

Based on the above data the total life-cycle cost per borehole is US$2,079 per year, including rehabilitation after 15 years. In Burkina Faso, this means an annual contribution of US$6.9 per capita, assuming 300 users per borehole. This is well above the payment capacity of users. This highlights the need for external financial support to be able to cover life-cycle costs. The average revenue collected for GWI boreholes in Burkina Faso (US$195 per year) is a little below the annual amount for operation expenditure estimated by IRC's research (US$220).

Technical factor scores: Burkina Faso 70, Niger 66

All indicators for the technical factor score relatively well in both counties, except for the indicator "*district water staff are able to provide support for maintenance and repairs on request*." As explained in the previous section, village level water committees are left unsupported. The only external support that they receive is from pump mechanics and well technicians.

The construction quality of GWI water points is generally good. This is an important factor for their sustainability as they degrade less quickly despite pressure and careless use. Some special features contribute to the design and construction quality of GWI water points; for example, Photo 4 (below) shows a concrete drain in Burkina Faso that is 30 meters in length from the borehole platform to the animal trough; the pointed shape on top of the walls is to prevent people from sitting on them.

Photo 4: Pointed shape on top of wall fence, Burkina Faso. Credit: GWI West Africa / Jean Philippe Debus

See Photo 1 for a typical GWI borehole with handpump design in Burkina Faso and Photo 3 for a typical GWI well design in Niger.

The indicator on functionality and service level scores higher in Burkina Faso (91 vs. 75).

Of 31 boreholes, 27 were functional on the day of the survey. Two of the four non-operational water points had been out of action through mechanical failure for a week or less, one for two weeks and one for eight weeks. Even though the last has been broken for a long time, there are signs that it is not abandoned and should be fixed soon. There are skilled pump mechanics in the area and spare parts can be purchased from the regional capital (Fada Ngourma). All boreholes have appropriate discharge rates and they all provide water all year round. Sanitary risks are low.

GWI wells in Niger are also well constructed with good superstructure and drainage, except for one well that is not equipped with a frame. However only one well has a cover. The borehole that was rehabilitated does not have a good superstructure. Apparently this part was not even rehabilitated. The handpump was abandoned a few months after rehabilitation in 2011. According to users the depth of the borehole exceeds the handpump's capacity which causes the rods to break (or possibly disconnect) when it is used.

One main reason why Niger scores less on the technical factor is dissatisfaction with water quantity in five functional wells. This is not necessarily related to depth or yield, but is probably due to poor maintenance (silt up) and overuse (average number of users per well is 1,408 compared with the national norm of 250).

High pressure on water points

It was observed in both Burkina Faso and Niger that water points are used by many more users than planned. This is because communities are underserved in the area and because surface water sources are scarce at this time of year (peak of the dry season). Even boreholes with handpumps are used to water animals. The high pressure on wells and boreholes raises two major issues impacting on sustainability and water quality:

- Concentration of animals around water points increases sanitary risks and potential damage to superstructure

- Overuse in Niger causes dry up at the end of the day in a few wells, and
- Increased frequency of mechanical breakdown of handpumps. At some boreholes, pumping is done carelessly and non-stop from dawn to dusk to water animals.

Environmental factor scores: Burkina Faso 40, Niger 36

Both countries developed a national adaptation programme of action (NAPA). These programmes consider water resource management to be a priority and plan for adaptation measures to preserve ground and surface water resources and to minimise risks from climatic stress and pollution.

Local governments are responsible for climate change adaptation and environmental management at local level. Similar problems to the management of water services are evident: there is a serious lack of resources and capacity to apply the programme at local level. The level of awareness and understanding of the NAPA is quite low in local governments and they lack human and financial resources to fulfil the responsibilities given to them for environmental management.

4.2 Lessons and recommendations

The lessons and recommendations in this section cover multiple issues that required more attention to enhance sustainability. They were identified through the application of the sustainability index tool in Burkina Faso and Niger and are therefore closely associated with this particular context. However, most of them are applicable globally with minor modifications, in the context of low-income rural communities in developing countries.

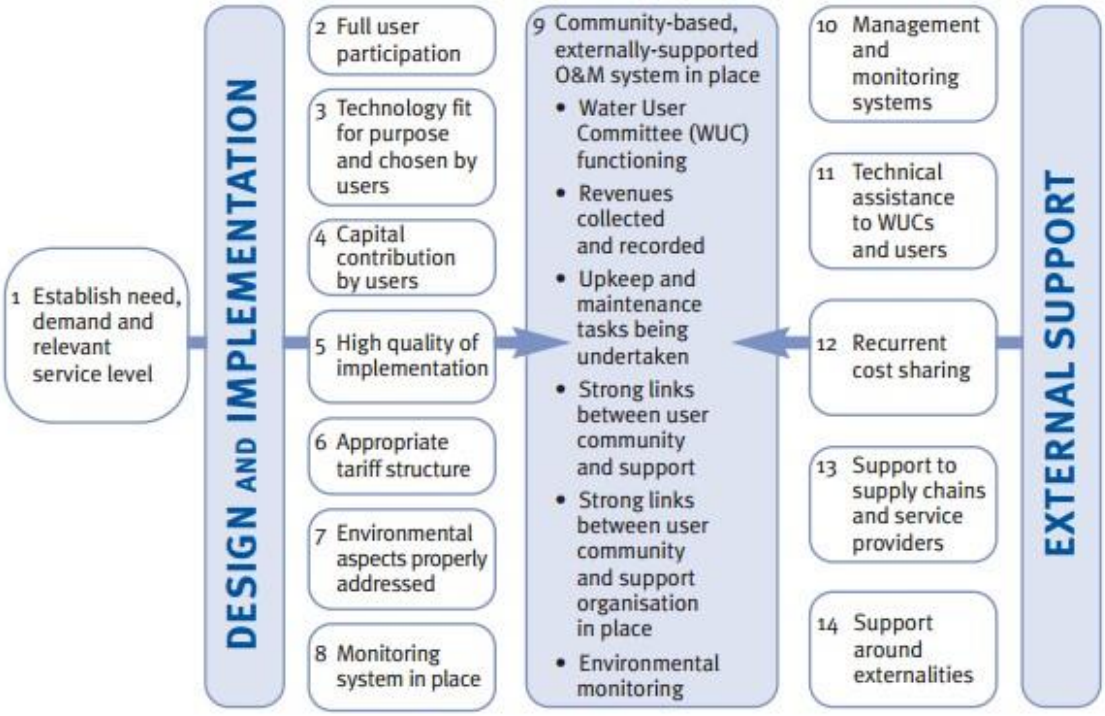
1. Focus on sustainability of water services throughout all programme phase

As mentioned in "*Myths of the Rural Water Supply Network*" (RWSN, 2010), keeping water supply services operational is far more difficult than expected. Often systems fail and are abandoned before the end of their design life. They are then replaced through rehabilitation or new construction and the same cycle repeats itself. In order to avoid wasting resources and to ensure lasting impact, water programmes need to adopt an approach that fully integrates sustainability as the main driver for programme decisions.

The author suggests using WaterAid's sustainability framework (WaterAid, 2011) which is well adapted to guide programmes like the Global Water Initiative which has a primary focus on rural water services for poor communities in developing countries. It can serve as an advocacy tool to plan for sustainability jointly with key stakeholders; in particular, local government, decentralised services, water committees, water users and private operators.

WaterAid's sustainability framework illustrates the key components for sustainable WASH services: use of demand-driven approaches, quality of programme design and implementation in support of community operation and management and the requirement for external support from national/local governments and private actors in the context of an enabling institutional framework.

Figure 8: Conceptual framework for effective externally supported community-based management of rural water supply services; WaterAid (2011) Sustainability Framework



2. Work at the scale of the communes (local government) and advocate for their support for community management

GWI West Africa intervened in three communes in Burkina Faso and six in Niger with the intent to work at the level of a sub-basin as per IWRM principles. The programme would have had greater potential to influence sustainability by limiting water supply interventions to one commune in each country. Water programmes should limit their geographical scope to a scale considered adequate to influence change and have an impact. In the context of GWI West Africa the relevant scale is the commune because of the role that the local government holds in managing water services (maîtrise d'ouvrage) in its communities and the many challenges that need to be addressed by the local government (financial and human capacity, political will, attitudes, and so on) to effectively carry out its expected roles and responsibilities.

The main weaknesses that were noted in national and local governments are:

- The national budget for water focuses on increasing access but does not adequately support sustainability of existing services
- Linked to the above, the transfer of competencies and resources from line ministry to local government is slow and local governments are unable to raise sufficient resources locally, and
- There is consequently little or no support (financial, technical and audit) provided to community management.

Based on the above points the following recommendations are proposed:

Water programmes such as GWI should take a more radical approach in their collaboration with local governments by putting preconditions (attainment of sustainability benchmarks) before supporting water supply infrastructure development. This should include a no-go decision if preconditions are not met. For example, in Burkina Faso, the national reform on management of rural water supply systems requires local governments to manage the maintenance component for handpumps through contracting pump mechanics. Water programmes should therefore require the implementation of the maintenance contract in a targeted local government, before investing in borehole construction in a community belonging to that particular local government. Ideas for a list of core preconditions are developed in the third recommendation.

Another requirement in the context of decentralisation is that communes (local government) recruit water technicians. Smaller communes might need to regroup (pool their resources). This seems feasible if the salary of the technician is integrated with community contributions. Lack of support is considered by village water committees and WUAs to be a serious problem. They are definitely willing to pay if they receive support services in return. Therefore, water programmes such as GWI need to include funds to support the emergence of technical services for water in communes. The post of a water technician could be sponsored for the first year of a programme after which coverage of salary could be gradually transferred to the commune while service fees are collected from communities.

3. Establish preconditions (sustainability benchmarks) before starting to drill a borehole or dig a well

Preconditions should be defined by the water programme in consultation with key stakeholders including users, local government, decentralised services and private actors. In the context of a current programme (PASAM TAI) funded by the US Agency for International Development (USAID-FFP), CRS Niger used lessons from GWI to decide on the following preconditions before starting construction of piped gravity schemes:

- Feasibility survey completed, including hydrogeological, environmental and social investigations and spare part supply chain
- Ongoing sanitation activities with substantial progress achieved. At least 50% coverage with latrines meeting quality standards for safety and hygiene (smell and fly control)
- Ongoing activities to promote water quality (to stimulate demand for potable water)
- Water user associations established, well trained on technical, administrative and financial matters and engaged
- Users informed about technology, service level, life-cycle costs of the system and water tariff
- Willingness to pay expressed by users
- Financial contribution for capital investment made by users. In Niger, the policy requires 250,000 CFA (US$520) for each public tap stand
- Training of administrative and elected officials in local government completed, covering roles and responsibilities of management of water services (maîtrise d'ouvrage)
- Independent technical control identified, and
- Advocate for establishment of technical assistance and maintenance services where gap exists.

Preconditions before completion of works and commissioning

- Identification of private operator and training provided to operator as needed, and
- Total sanitation achieved (ready for certification).

4. Use a sound participatory process to ensure an informed technology decision

The case of Senegal illustrates a failed attempt to introduce an "improved" technology. Initially, when GWI Senegal supported the construction and rehabilitation of protected dug wells for drinking water, the programme faced a dilemma between responding to the demand of communities who were reluctant to use handpumps and the need to comply with the national programme for potable water (PEPAM) that requires wells to be covered and handpumps installed. The GWI programme therefore attempted to introduce a low-cost handpump, the rope pump, that can be manufactured, maintained, repaired and replaced using locally made parts. However, the rope pump was introduced without ensuring meaningful user participation and was rejected by users because they felt that they were not involved in the choice of technology, which was unknown locally and did not meet their needs. Finally, the programme replaced the rope pumps with better performing handpumps (high lift type, India Mark II). Activities to increase acceptance and demand for handpumps, support for a spare part supply network and community management were implemented thereafter but could not be completed owing to the sudden closure of the GWI Senegal programme in 2011, when regional funding levels were reduced.

Three years later the functionality check found that 12 out of 19 wells fitted with India Mark II handpumps have been used with rope and buckets for more than a year on average. This means that users have abandoned the handpumps because they find the rope and bucket more convenient even though this exposes groundwater to increased risks from surface contamination.

This situation could have been avoided by using an appropriate approach to choice of technology applying the following principles:

- Start by promoting water quality (that is, benefits of potable water) with consideration for local culture and values. This is best done by developing a behaviour change strategy informed by formative research
- Integrate user choice by assessing felt needs and demand
- Provide users with information on proposed technologies to encourage communities to carefully weigh up and consider the main factors before choosing a technology (include basics on how it is operated, service level needed, operation and maintenance requirements, life-cycle costs, and so on).
- Include analysis of willingness to pay and local capacity for operation and maintenance, and
- Assess supply chain for spare parts.

Brikké and Bredero (2003, p.3) identify community involvement and the consideration for local demand as key factors of ownership and therefore community commitment to sustain improved services. It is therefore essential that programmes such as GWI play a facilitating role in a participatory process that leads to informed technology choice (considering operation and maintenance, financial, managerial and technical requirements) led by communities.

Building on these lessons, GWI West Africa developed a practical, illustrated guide for West Africa (Nikiema *et al.* 2012a) to ensure effective local participation in the process of selecting an appropriate technology. The guide can be downloaded here >>

5. Construction quality with features that prevent degradation of infrastructure

The survey found that the overall good construction quality of GWI water points has substantial impact on the sustainability of water services. It contributes to:

- Minimise repair expenses
- Preserve the groundwater source, and
- Ease of access and use.

The following features contribute to quality and durability of hardware:

- Pointed top on the wall fence to prevent people sitting on it (see Photo 4).
- The above feature should also be applied to headwalls of wells to prevent people climbing on them, as often observed. This contaminates the well with dirt falling from feet (Cairncross and Feachem, 1993, p. 71). It also minimises the risk of falling into the well.
- Quality of concrete works. This requires a system (independent control) to monitor quality of building materials, masonry works and curing.
- Reinforcing concrete at the location below the spout of the handpump because of erosion due to water spillage and buckets. Over time this creates cracks and holes that allow surface contamination to enter the borehole. Otherwise that zone can be protected with a flat stone or by using a cut jerry can when pumping to fill the trough (Photo 5).

Photo 5: Use of a cut jerry can to prevent erosion of the concrete apron when pumping to fill the animal trough, Kienkiega Tambiwaga, commune of Bartiébougou (Burkina Faso). Credit: GWI West Africa / Hyacinthe Convolbo

6. Community management remains a key component of sustainability for basic water schemes and requires appropriate investment

It is widely accepted that community management has its limitations (RWSN, 2010, p. 4) and that external support is necessary to ensure sustainability. However, water programmes need to maintain a strong focus on strengthening capacity for community management:

- Basic water schemes such as protected wells and handpumps do not represent a business opportunity for management by private operators, especially in low-density areas and are therefore better managed by users in this type of context.
- Gaps in institutional support: local governments lack capacity; they do not fulfil their responsibilities to support community management. Moreover, areas targeted by GWI West Africa are too distant from technical services.
- The only local support mechanism is represented by well technicians and pump mechanics who can provide paid services in maintenance and repairs. They play an important part in supporting sustainability.

Based on these lessons, the following recommendations are proposed:

- Adopt a multiple-use water services approach to ensure equal access and integrate water supply activities with economic development.
- Focus on stimulating demand for water quality by targeting men in the first place. The reason for this is that men place little value on water quality even though they make the decisions on household investment priorities. Promotional activities should target men and include messages on economic savings achieved by:
  - drinking potable water, and
  - applying preventive maintenance of water schemes.
- Systematically use a participatory process for technology selection that covers:
  - appropriate technologies in the local context, service levels and life-cycle costs
  - local capacity required for operation and maintenance, and
  - capacity and willingness-to-pay.
- Resort to social pressure to raise users' contributions. This could be, for example, a theme for village level meetings run by traditional authorities. People should be reminded of the commitments they made when the water scheme was installed.
- Charge on a "per use" basis to irregular users who draw large quantities for animals and do not pay annual or biannual fees.
- More focus on "well rules" or "handpump rules" to restrict damage and protect the groundwater resource. (These last two points are developed in more detail in the next section.)

7. Improve collection efficiency and enforce "handpump rules"

Water committees need to increase collection efficiency. There are serious challenges in collecting water fees from irregular users who are not from the community. Maybe these users could be charged per bucket as it is impossible to expect them to pay the annual fee.

To put this in place, salaried pump caretakers would be required to collect payment per bucket. This is probably cost effective because their role should also be to enforce compliance with "handpump rules." Careless use may be the cause of some mechanical faults such as broken rods and handles. The latter was observed at one borehole (Nassourou Kollangal) requiring a handle that costs 35,000 CFA (US$73) and is not available locally. The average salary of a borehole manager is estimated by research conducted in Burkina Faso (Pezon and Bassono, 2013) to be roughly 32,000 CFA (US$67) per year, less than the cost of a broken handle. The salary of the pump caretaker should be integrated into the calculation of operation expenditure covered by water fees.

Improving collection efficiency is linked with reinforcing the level of information provided to water users as lack of information and transparency discourages payment. Lack of financial transparency and accountability to users were noted as key weaknesses in the operation of WUAs and water village committees.

Improving revenue collection also needs to address sociocultural and economic challenges that are particularly strong in Niger:

- The cultural perception that access to a dug well should be free.
- The acute context of poverty and vulnerability. People do not have cash and the only time of year when they can contribute is at harvest time, however Niger experiences production deficits almost every two years. Vulnerable populations cannot recover from a bad year due to debts and this keeps them in a vicious circle of vulnerability. Saving resources or cash to contribute to cost recovery is just not possible for many users and not a priority while they struggle every day to secure a single meal.

8. Advocate for and support preventive maintenance

Preventive maintenance is of primary importance for sustainability. It requires regular control of the handpump at a fixed time interval to verify and change spare parts before they are fully worn (SKAT—RWSN, 2008, p. 28). This helps to avoid sudden breakdown, reduces maintenance costs in the long term and extends the life of the system. Proper preventive maintenance requires users and pump mechanics together to adhere to a regular programme on a monthly and quarterly basis at a minimum and complemented by a yearly plan to replace some parts such as rubber sealings, cup seals, ball bearings, and so on.

The lack of preventive maintenance not only undermines sustainability, but also jeopardises the medium-term functionality of boreholes and wells. Unfortunately, local governments in Burkina Faso instruct water user associations not to manage maintenance because the reform places the local government in charge of establishing a contract with pump mechanics and collecting an annual contribution of 10,000 CFA (US$21) from the WUAs. This fee is supposed to cover biannual maintenance on each borehole as well as technical advice. The system seems appropriate in theory but it is not applied in the GWI programme zone.

An advocacy campaign is necessary at national and decentralised levels to request application of this system on a country-wide scale.

Preventive maintenance should not be limited to checking and changing wearing parts on handpumps or desilted wells, but should also be applied to the superstructure to prevent surface contamination reaching groundwater (including fixing cracks and holes on the apron slab, and so on). Unfortunately, as observed during this survey little to no maintenance is carried out on the superstructure. Therefore, training for water committees needs to focus more on this aspect of maintenance and on conducting sanitary surveys to identify potential risks of contamination and remedial actions.

Several good training tools exist in the sector for conducting preventive maintenance on handpumps. GWI West Africa developed a tool (Nikiema *et al.* 2012b) that combines a monitoring checklist for the handpump with sanitary surveying. There are also many other good monitoring and maintenance tools for specific handpumps, such as India Mark II (SKAT-RWSN, 2008), Afridev (Erpf, 2007) and others.

9. Use of new technology to collect data

As explained in Section 2, "Methodology used for the sustainability index survey," the use of tablets with iFormBuilder to collect and analyse data for the sustainability index tool was relevant and practical. However, the hardware is vulnerable in high temperatures (roughly 40°C) at this time of year (April–May) in the Sahel. One of the tablets overheated and turned off without notice, requiring regular saving of data while filling a questionnaire. It was therefore decided for subsequent field surveys to carry a few printed forms in case of repeated overheating of equipment and difficulty with cooling down the devices.

10. Remote monitoring remains a challenge

With the boom in mobile phone technology in Africa and rapid expansion of geographical coverage of GSM networks in the last few years, the initial plan was to supplement the sustainability survey (Burkina Faso and Niger) with "remote functionality checks" in the other countries (Senegal, Mali and Ghana). It was expected that at least 50% of village water committees would be contacted by phone and invited to answer a few simple questions related to functionality. This would have allowed, at very low cost, a snapshot of functionality levels for the five GWI West Africa countries. Despite efforts to collect phone numbers and attempt to reach the committees it was not possible to contact a representative sample to obtain the required information.

This was a lesson on the limits of relying on mobile communication to conduct remote surveys in rural West Africa. The following constraints prevented us reaching members of water committees by phone:

- Invalid numbers: this is a frequent problem, probably due to the fact that people lose their number because prepaid SIM cards are disconnected after a few months if credit is not renewed. This is why people frequently change numbers.
- Villages where GWI intervened are often not covered or are at the limit of the GSM coverage zone, so people can be reached only at certain times.
- The phone numbers that people give are often not theirs but belong to a relative who has a phone but might not even live in the village.

A system for remote monitoring using mobile technology cannot therefore rely on using a list of numbers for members of water committees. Another challenge is the language barrier, as members of water committees rarely speak the official language. Remote monitoring however has great potential and should be systematically used in water programmes to enable functionality and service level monitoring in the long term on a low budget. It might work if the method is included as part of induction training for village water committees. This could be SMS-based using a platform such as DataWinners or TextToChange with a free toll number so that senders do not require credit to send information and are rewarded with airtime credit when the required information is provided. Although this may not be sustainable if implemented by a NGO project, the approach has excellent potential if it can be institutionalised.

11. Sustainability surveys need to be repeated over time

While simple functionality checks repeated over time give a trend analysis, they do not provide a complete sustainability analysis that allows flaws, priorities and recommendations to be identified.

It is therefore recommended that in future sustainability index surveys should be repeated. Guidance from the sustainability index tool recommends performing the assessment at intervals of three, five and ten years following implementation. This first survey was conducted three years after

completion of the last water schemes constructed and/or rehabilitated by GWI West Africa. It is therefore recommended that the survey is repeated in 2016 and 2021.

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ANNEXES

Links to images of surveyed water points

Country	District	Village	Type of water point	Link to open image
Burkina Faso	Gayéri	Kotougou	Borehole with handpump	click here>>
Burkina Faso	Gayéri	N'Bina	Borehole with handpump	Click here >>
Burkina Faso	Bartiébougou	Penkatougou Diamonti	Borehole with handpump	Click here >>
Burkina Faso	Bartiébougou	Penkatougou N'Gomonli	Borehole with handpump	Click here >>
Burkina Faso	Bartiébougou	Bossongri Centre	Borehole with handpump	Click here >>
Burkina Faso	Bartiébougou	Bossongri Dabala	Borehole with handpump	Click here >>
Burkina Faso	Bartiébougou	Tambiga Centre	Borehole with handpump	Click here >>
Burkina Faso	Bartiébougou	Kienkiega Tambiwaga	Borehole with handpump	Click here >>
Burkina Faso	Fotouri	Tankoualou Centre	Borehole with handpump	Click here >>
Burkina Faso	Fotouri	Nassourou Bonkoungou	Borehole with handpump	Click here >>
Burkina Faso	Fotouri	Nassourou Centre	Borehole with handpump	Click here >>
Burkina Faso	Fotouri	Lougou Peulh	Borehole with handpump	Click here >>
Burkina Faso	Fotouri	Lougou Centre	Borehole with handpump	Click here >>
Burkina Faso	Fotouri	Tankoualou ourodjagou	Borehole with handpump	Click here >>
Burkina Faso	Fotouri	Nassourou Oure Seno	Borehole with handpump	Click here >>
Burkina Faso	Fotouri	Nassourou Kollangal	Borehole with handpump	Click here >>
Burkina Faso	Bartiébougou	Batiebougou gourma Dankiere	Borehole with handpump	Click here >>

Burkina Faso	Bartiébougou	Bartiebougou Peulh Centre	Borehole with handpump	Click here >>
Burkina Faso	Bartiébougou	Bartiebougou Gourma Tamboankpela	Borehole with handpump	Click here >>
Burkina Faso	Bartiébougou	Bartiebougou Gourma Bomoanga	Borehole with handpump	Click here >>
Burkina Faso	Bartiébougou	Pagou peulh Tanguitenga	Borehole with handpump	Click here >>
Burkina Faso	Gayéri	Tiargou marche	Borehole with handpump	Click here >>
Burkina Faso	Gayéri	Nbina centre	Borehole with handpump	Click here >>
Burkina Faso	Bartiébougou	Haaba	Borehole with handpump	Click here >>
Burkina Faso	Bartiébougou	Oure Niebe	Borehole with handpump	Click here >>
Burkina Faso	Bartiébougou	Oure Niebe	Borehole with handpump	Click here >>
Burkina Faso	Gayéri	Tiargou kalmama	Borehole with handpump	Click here >>
Burkina Faso	Bartiébougou	Bontegou	Borehole with handpump	Click here >>
Burkina Faso	Bartiébougou	Pagou Gourma	Borehole with handpump	Click here >>
Burkina Faso	Gayéri	Tiargou centre	Borehole with handpump	Click here >>
Burkina Faso	Bartiébougou	Haaba	Borehole with handpump	Click here >>
Niger	Madaoua	Gadambo	Protected dug well	Click here >>
Niger	Galma	Jan Dodo	Protected dug well	Click here >>
Niger	Madaoua	Kouazga	Protected dug well	Click here >>
Niger	Bangui	Rouanzanfi	Protected dug well	Click here >>
Niger	Karofane	Kodymio	Protected dug well	Click here >>
Niger	Karofane	Nassaraoua	Protected dug well	Click here >>
Niger	Karofane	Zongon Kankara	Protected dug well	Click here >>
Niger	Karofane	Ediri Mahamane	Protected dug well	Click here >>
Niger	Bouza	Batan Warka	Protected dug well	Click here >>
Niger	Galma	Arewa Garin Malam	Protected dug well	Click here >>
Niger	Madaoua	Kaoura Fouri	Protected dug well	Click here >>

Niger	Madaoua	Guidan Dan Baki	Protected dug well	Click here >>
Niger	Madaoua	Guidan Maissabe	Protected dug well	Click here >>
Niger	Sabon Guida	Guidan Kara	Protected dug well	Click here >>
Niger	Karofane	Taraouraou Zoukouri	Borehole with handpump	Click here >>

Sample of survey form

The form below, used to survey boreholes with handpumps, is adapted from the sustainability index tool (SIT) found here: http://www.washplus.org/rotary-usaid

It was converted into electronic form, using iFormBuilder mobile platform.

N: National level
D: District level
SP: Service provider level
HH: Household level

Date:

Water point reference number:

Country:

Region:

Department:

District/commune:

Village/commune:

Village population:

Record geolocation of water point:

Take picture of water point:

Date installed or rehabilitated:

Water source type:

Water lifting method:

Handpump type:

Number of users:

Primary investigation method	Triangulation	National policy, norms and guidelines for community-managed water supply and enabling legislation is in place
N		a) Does national policy for water supply recognise community management?
N		b) Have national norms and standards been set for the constitution and governance of community-based service providers (e.g. water committees in terms of functions)?
N		c) Is legislation in place that gives community management legal standing (e.g. by-laws formalising water committees)?
N		d) Is there a national registry of the water systems/points that are managed by community-based organisations?

Primary investigation method	Triangulation	Roles and responsibilities of district (service authority) and ownership arrangements are clearly defined
D		a) Are there formalised roles and responsibilities for the service authority?
D		b) Are the roles and responsibilities of the service authority written down and accessible? (*Verify)*
D		c) Are the roles and responsibilities of the service authority understood by all in the service authority involved in overseeing the water system?
SP	D	d) Are the roles and responsibilities of the service authority understood by the service provider?

Primary method	Triangulation	There is a water committee that has been constituted in line with national norms and standards
SP		a) Is there a water committee?
SP		b) Are there national (or local) norms and standards for the composition of a water committee? If YES-> Is the water committee constituted in line with the national (or local) norms and standards, in terms of number of members and the functions of each member?
SP		c) Is the water committee constituted in line with the national norms and standards, in terms of gender? *In the absence of a standard, how many men?* _____ *how many women?*_____
SP	HH	d) Has the water committee been democratically elected with involvement of the entire community?

Primary investigation method	Triangulation	There is an updated national monitoring system or database available
N		a) Is there a national water system/water point database?
N		b) Does the collected monitoring data include information about the functionality of facilities and performance of service providers?
N		b) Is monitoring data collected at the district level sent to the national level on at least an annual basis?
N		c) Is the national water database used to influence national water planning and budgeting?

Primary investigation method	Triangulation	National support to district/service authority is provided, including refresher training
N	D	a) Is the district/service authority trained to support community water systems?
N	D	b) Is routine refresher training provided to the district/service authority for their support to community water systems?
N	D	c) Does this training occur at least once per year?
N		d) Is there a system to monitor the effectiveness of the training?
Primary investigation method	**Triangulation**	**There is regular monitoring of water services and community management service provider and follow-up support**
SP	D	a) Does the district/service authority monitor the financial, technical and administrative performance of the service provider?
SP	D	b) Does monitoring lead to direct support to the service provider when required?
SP	D	c) Does the district/service authority visit the community on monitoring visits at least two times per year?
SP	D	d) Does monitoring include periodic financial audits?

Primary investigation method	Triangulation	Representative water committee actively manages water point with clearly defined roles and responsibilities
SP		a) Are the management roles and responsibilities of the water committee clearly defined? ("*No" if there is no committee)*
SP	HH	b) Does the water committee carry out its technical responsibilities (e.g. ensuring system functionality)?

SP	HH	c) Does the water committee carry out its administrative duties?
SP	HH	d) Does the water committee carry out its financial management responsibilities?

Primary investigation method	**Triangulation**	**Water committee members actively participate in committee meetings and decision-making processes and reporting is transparent**
SP		a) Are water committee meetings conducted at the minimum frequency stipulated by local by-laws (*or at least once every six months*)?
SP	HH	b) Are technical records kept and shared with the community on a regular basis? *(Verify)*
SP	HH	c) Are administrative records kept and shared with the community on a regular basis? *(Verify)*
SP	HH	d) Are financial records kept and shared with the community on a regular basis? *(Verify)*

Primary investigation method	**Triangulation**	**There are national/local mechanisms beyond community contributions and tariffs, to meet life-cycle costs, while ensuring affordability, equity and non-discrimination**
N		a) Is there a line item for this in the national budget?
N		b) Was the budget created considering total life-cycle costs including operation and minor maintenance costs, as well as making provision for capital maintenance (rehabilitation and replacement)?
N		c) Are national/local mechanisms in place to fill the financing gap between collected revenues and life-cycle costs where these occur?
N		d) Are there national/local policies that ensure affordable access and equity/non-discrimination with regard to services?

Primary investigation method	**Triangulation**	**Resources available for district/service authority to fulfil functions**
D		a) Is there adequate staffing?
D		b) Do the staff have adequate qualifications and skills?
D		c) Is there sufficient budget allocated to the district water staff to provide the required support and service?
D		d) Is the budget dispersed and used for this support/Or if support has not yet been needed is there a clear process for doing so?

Primary investigation method	Triangulation	Tariff setting complies with national/local regulations, including social tariff
SP		a) Has a water tariff been set?
SP	D	b) Do national/local regulations prescribe that the tariff be based on projected costs, including operation and minor maintenance costs, as well as making provision for capital maintenance (rehabilitation and replacement)?
SP		c) Has the tariff been set in line with national/local regulations?
SP		d) Does the tariff make provision for the poorest within the community (e.g. through a social tariff)?

Primary investigation method	Triangulation	Tariff collection is regular and sufficient
SP		a) Is the tariff collected on a regular schedule (e.g. on pay-as-you-fetch basis, or monthly household levies, instead of collecting money when there is a breakdown)?
SP		b) What is the annual revenue? *(Verify)* What is the annual operating expenditure? *(Verify)* Is the annual revenue greater than the annual expenditure?
SP		c) Is there a national/local target for collection efficiency (i.e. percentage who pay regularly)?
SP		d) Do most (at least 80%, *or a proportion in line with national or locally set standard*) households pay the tariff (*i.e. are they achieving the specified collection efficiency*)?

Primary investigation method	Triangulation	The water committee demonstrates effective financial management and accounting
SP		a) Does the water committee keep financial records? *(Verify)*
SP		b) Does the committee have a bank account? *(Verify)*
SP	HH	c) Does the committee share financial records with the community on a regular basis?
SP		d) Are financial accounts audited? *(Verify)*

Primary investigation method	Triangulation	There are national/local norms that define acceptable service levels with explicit indicators and thresholds (e.g. water quality, quantity, accessibility, affordablity, etc.)
N	D	a) Are there national/local norms for water quality?
N	D	b) Are there national/local norms for quantity (e.g. the borehole is deep enough to provide water throughout the year, including during the dry season)?
N	D	c) Are there national/local norms for accessibility (distance from household, crowding at water point) which also explicitly address issues of equity and non-discrimination against women, disabled, children and the elderly?
N	D	d) Are there national/local norms for affordability?

Primary investigation method	Triangulation	There are national/local norms that define equipment standardisation and arrangements for providing spare parts
N		a) Do national/local norms define equipment standardisation and arrangements for providing spare parts?
N		b) Do national guidelines exist with regard to the construction of water points (borehole apron or platform, drainage, fencing, etc.)?
N		c) Are these guidelines available and widely disseminated?
N		d) Are the roles and responsibilities with regard to monitoring and enforcement clear?

Primary investigation method	Triangulation	The district water staff are able to provide support for maintenance and repairs on request
D	SP	a) Are the district water staff able to provide technical support for maintenance on request?
D	SP	b) Are the district water staff able to provide technical support for repairs on request?
SP	HH	c) Is the water point functional?
SP	HH	d) If not, what's the problem?
SP	HH	e) If not, how long has is it not been functional (in weeks)?

Primary investigation method	Triangulation	Handpump is functional and provides basic level of service according to national policy
SP	HH	a) Does the handpump meet the criteria for water quality?
SP	HH	b) Does the handpump meet the criteria for quantity?
SP	HH	c) Does the handpump meet the criteria in terms of accessibility (distance from household, crowding at water point, ease of use for women, disabled, children and the elderly)?
SP	HH	d) Is the handpump designed, constructed, and maintained so as to ensure ease of use by potentially marginalised populations (poor, elderly, women, children, disabled, etc.)?

Primary investigation method	Triangulation	Handpump complies with standards and norms in terms of siting and public health risk
SP		a) Handpump complies with national/local norms with regard to siting (e.g. distance from nearest latrine, open water, potential pollution source, uphill/gradient from latrine). *(Verify*)
SP		b) Handpump has a sanitary surrounding that complies with national/local norms (e.g. including well seals, apron with a minimum diameter of one meter and without cracks, and fencing to prevent animal access. *(Verify)*
SP		c) Drainage is controlled to minimise standing water and control disease vectors. (*Verify)*
SP		d) The location of the borehole is not at risk of flooding. *(Verify)*

Primary investigation method	Triangulation	Knowledge and spare parts are available to conduct maintenance and repairs in a timely manner
SP		a) Are there service provider staff available for basic repairs?
SP		b) Can spare parts be obtained?
SP		c) Are there national/local norms for repair times?
SP	HH	d) Are repairs always achieved within the national/local norms for repair times?

Primary investigation method	Triangulation	National environmental protection standards are established and applied to WASH services
N		a) Do national standards exist to protect the natural environment in the design, sizing and siting of water supply systems?
N		b) Do national standards exist to mitigate the environmental impact of constructing water supply infrastructure?
N	D	c) Are the roles and responsibilities clear with regard to the monitoring and enforcement of environmental impact mitigation standards for water supply services?
N	D	d) Are these standards available, widely disseminated and enforced?

Primary investigation Method	Triangulation	National integrated water resources management plan is in place, updated regularly and applied to WASH services planning
N		a) Do district water supply plans comply with the national water resources management plans?
N	D	b) Is monitoring data collected at the district level sent to the national level on at least an annual basis?
N	D	c) Is the national water resources management plan updated based on revised water use and hydrologic data including climate change projections (with the frequency stipulated by national/local guidelines)?
N	D	d) Is the national water resources management plan publicly available and are steps taken to educate district water offices and WASH service providers and water users about it?

Primary investigation Method	Triangulation	Local watershed management plan is in place, updated regularly and applied to WASH services planning
D		a) Do district water supply plans comply with local watershed management plans?
D	SP	b) Was the local watershed management plan developed with active participation of WASH actors (including government, private sector and civil society)?
D		c) Is the local watershed management plan updated based on revised water use and hydrologic data including climate change projections (with the frequency stipulated by national/local guidelines)?
D	SP	d) Is the local watershed management plan publicly available and are steps taken to educate water supply service providers and water users about it?

Primary Investigation Method	Triangulation	Natural resources are managed to support sustainable WASH service delivery
D	N	a) Has the water supply service provider or district support entity identified and assessed ecosystem-related risks to drinking water quality (e.g., water safety planning, etc.) and has vulnerability to climate-related impacts (including droughts and floods) been assessed for the domestic water supply service?
D	N	b) Have identified risks been addressed through management of source watersheds and/or aquifers?
D	N	c) Is water demand controlled so that the sustainable yield of local water resources (e.g. groundwater, surface water, springs) is not compromised (i.e. extraction is less than recharge), are competing water demands (e.g. domestic vs. productive) being considered and is planning taking place to address potential areas of conflict?
D	N	d) Have climate-related adaptation measures been incorporated in the development of water supply services (including design, sizing, and siting of built infrastructure, management of water resources and the environment, etc.)?