

WATER SUPPLY LANDSCAPE IN KABAROLE DISTRICT, UGANDA

SUMMARY

- Roles and responsibilities for water service provision in Uganda are evolving, creating a dynamic water supply landscape in Kabarole district. The District Water Office has the responsibility to coordinate water service development, considering the priorities of the Ministry of Water and Environment, the Local Government, and the needs of citizens.
- Rural water systems in Kabarole district struggle with operational and financial management. Rural service providers lack adequate capacity and support to ensure reliable service delivery. According to a 2017 water point inventory, 65% of rural water systems in Kabarole are unreliable (i.e., non-functional >10 days in the preceding year) [3]. Low user willingness-to-pay for water compounds these challenges.
- Fecal contamination of drinking water is widespread throughout Kabarole district. Approximately 65% of rural water sources do not meet national microbial water quality standards. Most water users are unaware of contamination and subsequent risks.
- Presently, the majority of Kabarole's water supply systems receive no treatment or regular testing; however, the importance of water quality is gaining recognition amongst district authorities, which is an opportunity to promote water safety management practices.



Map of Kabarole district (dark blue) in western Uganda.

AQUAYA'S "MONITORING FOR SAFE WATER" ACTION RESEARCH PROGRAM

In Uganda, with funding from the Conrad N. Hilton Foundation, The Aquaya Institute (Aquaya) is supporting the Kabarole District Government in their efforts to achieve 100% coverage of safe, sustainable, and equitable drinking water supplies.

Kabarole is a mostly rural (~70%) district in western Uganda with a population of approximately 325,000 residents [1]. Kabarole is comprised of one municipality (Fort Portal), four town councils, and eleven sub-counties. The local economy is primarily driven by small-scale agriculture, but the district also houses several commercial tea production and processing operations.

Aquaya's five-year (2017-2022) Monitoring for Safe Water II research program develops context-specific strategies for building actionable and sustainable water safety management systems that comply with national regulations. To meet this

objective in Kabarole, Aquaya conducted formative research to understand the water supply and water quality landscape in the district. This brief summarizes Aquaya's findings and is organized in the following sections:

1. *Landscaping activities*: summary of data collection activities
2. *Institutional framework*: outline of roles and responsibilities for water service provision
3. *Water system inventory*: overview of water supply systems
4. *Water quality*: overview of primary concerns related to water quality
5. *Water safety management*: characterization of current water safety management structures
6. *Looking forward*: implications for future work

1. LANDSCAPING ACTIVITIES

Aquaya conducted the following data collection activities:

- 12 in-depth interviews with national and district government officials and water service providers
- One focus group discussion (FGD) with the Kabarole District Handpump Mechanic Association (7 members)
- Seven focus group discussions with rural water users (56 total participants; 30 females)
- Informal interviews and meetings with Kabarole district WASH stakeholders over 12 months
- Secondary analysis of data collected on WASH services in Kabarole district
- Review of Kabarole district WASH budget as well as government and non-government WASH sector reports

2. INSTITUTIONAL FRAMEWORK

The Local Government Act (1997) [2] devolves the responsibility for the provision and management of water services to local governments (districts, municipalities, town councils, sub-counties). At the district level, the District Water Office (DWO) is the central institution coordinating water and sanitation services. The DWO is responsible for planning, implementing, and monitoring all water supply activities in the district. However, the DWO does not directly manage water supply facilities. The DWO's primary responsibilities include:

- Developing a district-wide water and sanitation plan.
- Managing contracts with private operators.
- Managing funds for the provision of water services and utilization of District Water and Sanitation Conditional Grants.
- Reporting to the District Council and Ministry of Water and Environment.

In large and medium urban centers (such as Fort Portal), National Water and Sewerage Corporation (NWSC) is responsible for piped water provision and for ensuring that quantity and quality standards are met. NWSC is expanding: from only serving Fort Portal municipality in 2015, the parastatal company's network now extends 40 km out of Fort Portal with branches in three of the four town councils. Outside of NWSC's jurisdiction, Local Councils¹ act as water service authorities, though they often delegate responsibilities for water supply to service providers. In small urban centers,

historically, Local Councils would delegate the management of piped systems to appointed Water Supply and Sanitation Boards (WSSBs) who were then supposed to contract private operators. In recent years, this role has shifted to the Ministry of Water and Environment's Umbrella Authorities, who previously supported WSSBs in water quality monitoring and technical assistance.

In rural areas, water infrastructure operation and management are the responsibility of elected, usually volunteer, water user committees. Local handpump mechanics provide maintenance services. Kabarole district has a Handpump Mechanic Association comprised of 25 members with representatives from each sub-county. The Association has a Memorandum of Understanding with the District to perform rural water system maintenance repairs and rehabilitations; however, this does not guarantee that the Association will receive contracts. In reality, their work is not steady and they face competition from private, non-association handpump mechanics.

3. WATER SYSTEM INVENTORY

An estimated 52% of Kabarole's population have access to basic² water services [3]. An overview of water service provision in Kabarole district is provided in Table 1. Groundwater point sources are the predominant water supply infrastructure in the district, dominated by shallow wells (n=500), protected springs (n=252), and boreholes (n=42) [3]. Most shallow wells and boreholes are fitted with India Mark II handpumps. Kabarole also has 13 piped water systems, in addition to unprotected dug wells and rainwater harvesting.

Few groundwater point sources in Kabarole district have an active water user committee (~30% as reported in a water point inventory conducted by IRC³ in 2017) and the majority do not provide reliable water services. FGD participants noted experiencing breakdowns ranging from several days to several months. Communities are financially responsible for minor repairs (<200,000 UGX or ~54 USD) and can request the assistance of the DWO for major breakdowns (>200,00 UGX or ~54 USD). In theory, water users should pay regular fees to the water user committee, who should in turn manage and allocate funds as necessary to maintain the water system. Our FGDs revealed that in practice, user contributions are generally only collected after breakdowns, if at all. Similarly, IRC's 2017 inventory found that only 7% of water points received regular payments. Interviews with local WASH stakeholders and FGDs with water users indicated that low willingness-to-pay is largely

¹ In Uganda's local government system, Local Councils are formed in each administrative unit (with the exception of counties). Local councils, headed by a democratically elected chairperson and comprised of politically appointed members, have planning and policy authority and are responsible for service delivery in their respective jurisdictions.

² Drinking water from an improved source, provided collection time is not more than 30 minutes roundtrip including queuing

³ IRC is Netherlands-based independent, non-profit organization dedicated to understanding and strengthening WASH systems for achieving sustainable service delivery. IRC has been active in Uganda since 2005 and in Kabarole district since 2010, and is committed to helping Kabarole achieve universal access to WASH services by 2030.

**TABLE 1:
SUMMARY OF WATER SERVICE PROVISION IN KABAROLE DISTRICT**

Service provider model	Community Based Management System	Water Supply and Sanitation Boards	Mid-Western Umbrella Authority	National Water and Sewerage Corporation
Water service authority	Local Council	Local Council	MWUA	NWSC
Management and O&M	Water user committee/ handpump mechanics	WSSB/scheme attendants	MWUA	NWSC
Setting*	Rural growth centers and rural settlements	Rural growth centers and rural settlements	Small towns and rural growth centers	Large towns and small towns
Systems	794 point sources: • 500 shallow wells • 252 protected springs • 42 boreholes	7 piped systems: • All gravity flow schemes (GFS) • 226 tap stands	4 piped systems: • 2 GFS • 2 groundwater schemes • ~514 total connections (includes 3 out of 4 systems)	2 piped systems: • 1 surface water (Fort Portal) • 1 GFS (Mugusu) • 292 tap stands • ~8000 total connections
Population served (2017)	~124,000	~18,000	~11,000	~56,000
Treatment	None	None	Inline chlorine dosing unit on one GFS	Conventional water treatment for surface water system flocculation + chlorination at GFS
Functionality rate	66%	Tap stands: 52%	Tap stands: 69%	Tap stands: 78%
Tariffs	Ad-hoc (usually after breakdowns): up to 100,000 UGX/ community Pay as You Fetch: 50-100 UGX/20-L jerrycan Monthly: 300-500 UGX/household	Ad-hoc (usually after breakdowns): up to 100,000 UGX/ community Monthly: 3000-4000 UGX/household	Tap stands: 3000 UGX/ household/month; 100 UGX/20-L jerrycan Private connections: 1000-4000 UGX/m3 (tariff varies based on system type, e.g., gravity flow vs pumping)	Tap stands: 1060 UGX/m3 Private connections: 2500-4220 UGX/m3 (tariff varies based on connection type, e.g., domestic vs commercial)

* Rural settlement: <500 people; Rural growth center: 500-5,000 people; Small town: 5,001-15,000 people; Large town: >15,000 people

Data sources: stakeholder interviews; Kabarole District WASH Masterplan; Utility Performance Monitoring and Information System (UPMiS); Uganda Water Supply Atlas
1 USD= 3700 UGX

due to political interference, a lack of trust in water user committees, low value assigned to preventative maintenance, and presence of alternative water sources.

Piped water systems are managed by three service providers: NWSC (two systems), Mid-Western Umbrella Authority (MWUA) (four systems), and WSSBs (seven systems) (Table 1). The management capacity at Kabarole's piped systems varies considerably. NWSC is a well-established utility guided by formal management practices and capacitated staff. The MWUA became a regional, public utility in 2017 and is slowly developing management capacity for direct water service provision. Finally, the WSSBs are intended to delegate management to private operators and play an oversight role; in practice, private operators are not utilized and the WSSBs do

not exist or lack professional, paid staff to adequately manage water supply, leaving seven piped systems in Kabarole with no formal management structure.

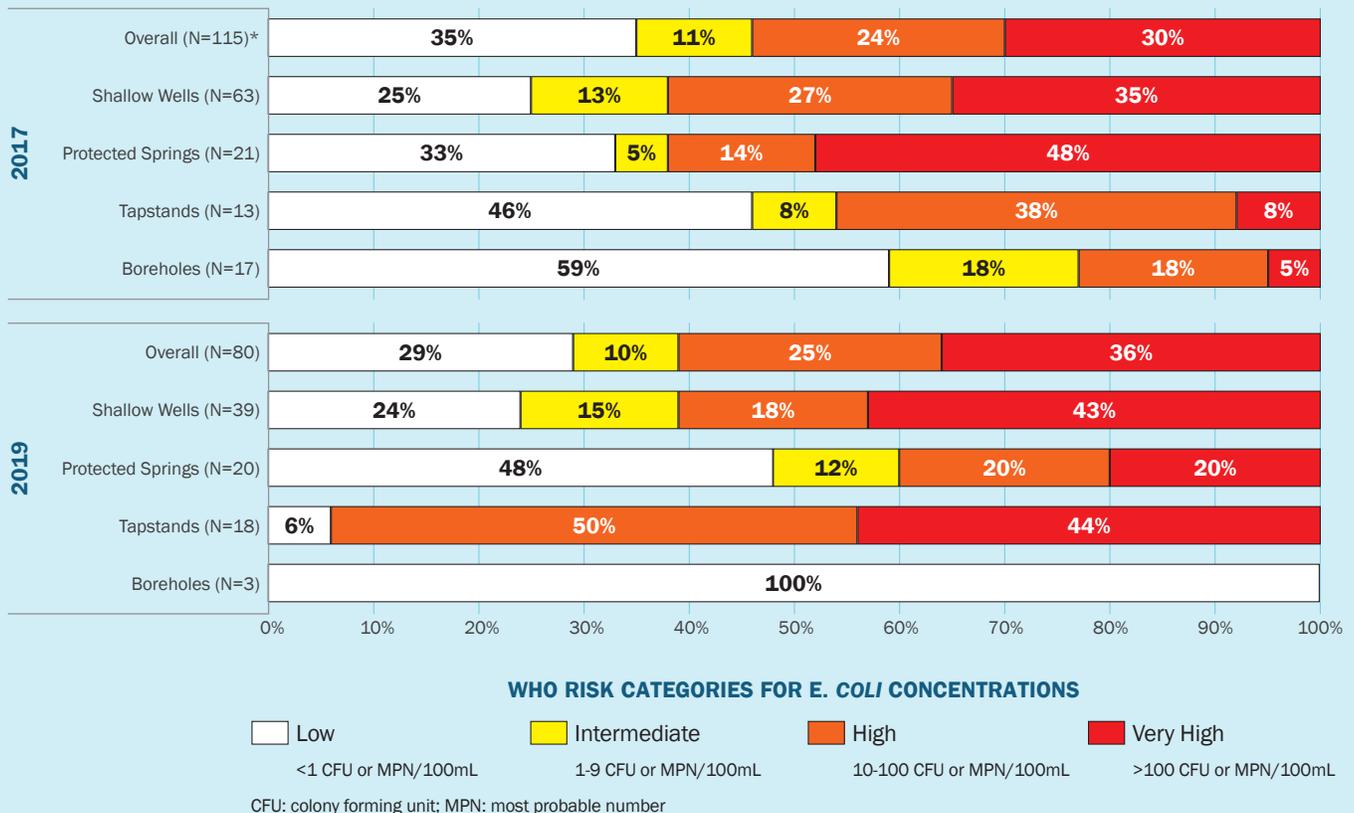
The financial health of piped systems managed by the MWUA and WSSBs is currently poor. In Kabarole, the MWUA is failing to collect sufficient revenue to cover operating expenses and regular user payments are almost non-existent at WSSB systems. Weak management structures undermine tariff collection at these systems and perpetuate low service levels. In contrast, NWSC's monthly revenue collection in Fort Portal regularly exceeds operating costs. The additional revenue is pooled at the national level and used to cross-subsidize NWSC's smaller systems that are not financially self-sufficient.

FIGURE 1:

E. COLI CONTAMINATION OF WATER SOURCES IN KABAROLE DISTRICT

(SOURCE: IRC-SPONSORED WATER QUALITY SURVEYS)

* RESULT FROM ONE RAINWATER HARVESTING SYSTEM NOT SHOWN. E. COLI WAS NOT FOUND IN THIS SOURCE.



4. WATER QUALITY

IRC-sponsored water quality surveys conducted in 2017 and 2019 found indicators of fecal contamination (*E. coli*) in 65% (75/115) and 71% (57/80) of water sources, respectively (Figure 1). Both of these surveys also found fluoride levels above the nationally acceptable limit (1.5 mg/L) in 5% of samples.

Our FGDs with rural residents revealed mixed perceptions and levels of awareness regarding water quality. In all FGDs, participants reported an aesthetic change in water quality between the dry and wet seasons. The majority noted that water is often turbid (or cloudy) in the wet season, which leads some to change their primary drinking water source. Most participants are aware that water contamination can cause diseases but do not perceive this as an imminent risk to their household. Additionally, interviews and FGDs with WASH stakeholders revealed that point-of-use water treatment is uncommon in Kabarole, despite wide promotion of boiling (and some promotion of filtration and chlorination).

5. WATER SAFETY MANAGEMENT

In Kabarole district, there are four institutions with a mandate in water quality monitoring: Albert Water Management Zone (AWMZ), the DWO, the MWUA, and NWSC. However, with the exception of NWSC, routine water quality monitoring in Kabarole is currently limited. NGOs sporadically fund water quality testing activities, but there are substantial financial and capacity gaps that hinder the institutionalization of water quality testing. For example, though the DWO is responsible for monitoring community point sources [4], meeting the national testing requirements would cost 2-3 times of the DWO’s WASH “operations” budget (which includes but is not limited to water quality monitoring). In recent years, Kabarole district has allocated less than 1% of its WASH budget to monitoring.

**TABLE 2:
SUMMARY OF WATERCARD SCORES IN THE CRITICAL FACTORS FOR SUCCESSFUL
MONITORING PROGRAMS AMONG MANDATED INSTITUTIONS IN KABAROLE DISTRICT**

Capacity Factor	Institution			
	DWO	AWMZ	MWUA	NWSC
Water Quality Leadership: Does the institution’s leadership prioritize water quality monitoring?	2	3	3	3
Knowledge and Experience: Does staff have practical experience and theoretical knowledge of water testing?	1	1	1	3
Motivation: Does staff understand the importance of water quality monitoring and internalize this responsibility?	0	1	1	3

KEY

■ 0. No capacity
 ■ 1. Low capacity
 ■ 2. Moderate capacity
 ■ 3. High capacity

DWO: District Water Office; AWMZ: Albert Water Management Zone; MWUA: Mid-Western Umbrella Authority; NWSC: National Water and Sewerage Corporation

Insufficient institutional capacity is another barrier to water quality monitoring in the district. We used Aquaya’s WaterCaRD (Water Capacity Rating Diagnostic)⁴ to evaluate each institution’s strengths and weaknesses with respect to water quality monitoring (Table 2). We found that NWSC is strong in all the critical factors for successful monitoring programs: leadership, knowledge, and motivation [5]. Institutional capacity for water quality monitoring is mixed at the AWMZ and the MWUA, who both have strong leadership but limited knowledge and motivation. The DWO has the lowest institutional capacity, lacking all the critical factors.

With the exception of NWSC piped systems and one MWUA gravity flow scheme (which received an inline chlorine dosing unit in 2018), rural water systems in Kabarole currently receive no treatment (Table 1). Our interviews with District officials, AWMZ, and the MWUA, however, indicated a strong interest in strategies for mitigating water contamination. Additionally, IRC supported the development of water safety plans at 34 point sources in 2018 and extended the program to an additional 45 sources in 2019. As part of this approach, sub-county extension staff (health assistants and community development officers) helped communities to identify water safety hazards and introduce protective measures at several water points, but, generally, water safety management efforts have been limited.

6. LOOKING FORWARD

Our landscaping activities revealed that the DWO is not presently in a strong position to financially or technically support water quality monitoring in Kabarole. We learned that limited political interest and lack of incentives exacerbate the challenge, and the revenue potential of most water systems is not sufficient to independently support testing. Nevertheless, poor microbial water quality is widespread throughout Kabarole district and authorities recognize this as an imposing health risk to the local population. Interventions that directly address water quality issues will likely meet political support and can potentially be leveraged to increase interest in other water safety management activities, such as water quality monitoring. Thus, Aquaya will focus future efforts on testing approaches to introduce and finance water treatment at rural water systems.

⁴ WaterCaRD is a validated diagnostic tool developed by Aquaya that involves a detailed assessment of 27 factors which reflect five main institutional elements that influence an institution’s monitoring capacity. Each factor is assigned a score between 0 (lowest) and 3 (highest), and the scores are summed to give a capacity rating expressed as a percent of the total possible score. Aquaya’s previous research involving 26 water suppliers and surveillance agencies in six African countries showed a positive relationship between WaterCaRD scores and monitoring performance.

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INSTITUTIONAL ACRONYMS

AWMZ	Albert Water Management Zone
DWO	District Water Office
MWUA	Mid-Western Umbrella Authority
NWSC	National Water and Sewerage Corporation
WSSB	Water Supply and Sanitation Board