

WATER QUALITY IN LIRA DISTRICT, UGANDA

(APRIL-MAY 2022)



With funding from the Conrad N. Hilton Foundation, the Aquaya Institute is coordinating longitudinal water quality monitoring in two target districts in Uganda. **In April - May 2022, Aquaya conducted surveys and water quality testing at households, water points, schools, and healthcare facilities in Lira District, in collaboration with Stanford University and International Growth Research & Evaluation Center (IGREC).**

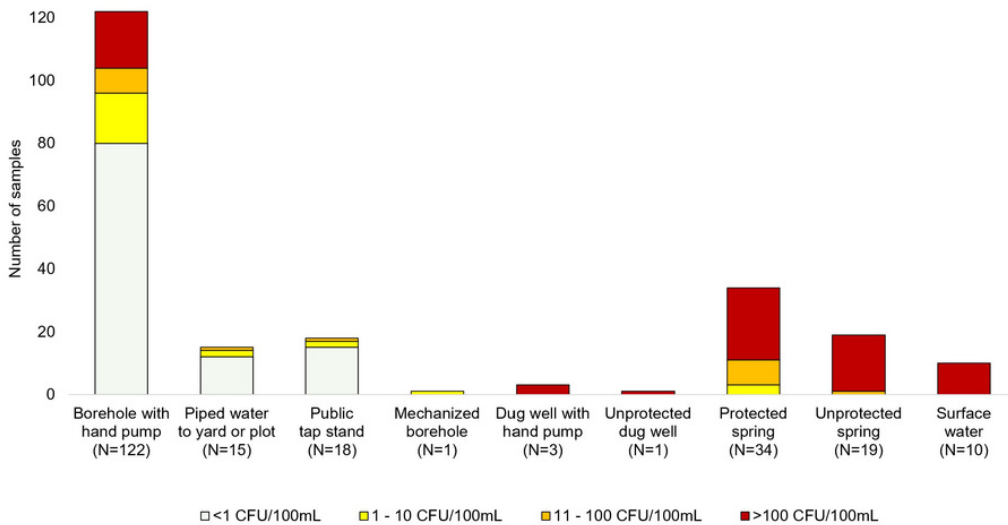
DRINKING WATER SAMPLES TESTED IN LIRA DISTRICT (March-April 2022)



WATER POINTS

We conducted surveys and tested *E. coli* at 223 water points, including improved and unimproved types. About half of water points (48%) were free from *E. coli* contamination (<1 CFU/100 mL). **Water was microbially safest from piped systems and boreholes with hand pumps (79% and 66% free from *E. coli*, respectively), and less safe from unprotected springs and surface water (0% free from *E. coli*)** (Figure 1).

Water Point Samples



E. coli is an indicator of fecal contamination in drinking water. Increased *E. coli* concentrations suggest an increased risk of diarrheal disease – particularly for children under 5 and immunocompromised people.

Figure 1. *E. coli* levels in Lira District, displayed by water point type (N=223).

Analyzing **physical-chemical parameters** in 223 water point samples showed that:

- All samples met the Uganda National Drinking Water Standard for electrical conductivity (<1500 $\mu\text{S}/\text{cm}$ for treated water and <2500 $\mu\text{S}/\text{cm}$ for natural water). High electrical conductivity alters the taste of water.
- All samples from piped system taps met the Uganda National Drinking Water Standard for turbidity (<5 NTU), and 78% of the natural water samples met the standard (<25 NTU). If turbidity is too high, water is aesthetically less acceptable to people, and chlorine is less effective.
- 95% of samples met the Uganda National Drinking Water Standards for pH (5.5-9.5 for treated water and 6.5-8.5 for natural water). The rest were below the range, which indicates potential for corrosion but is not dangerous to health.
- 24% of piped system taps (N=34) met the Uganda National Drinking Water Standards for free chlorine residual (≥ 0.2 mg/L), meaning the water was protected from re-contamination during transport and storage.

HOUSEHOLDS

Household stored water had higher concentrations of *E. coli* than samples collected from water points.

We detected *E. coli* in 96% of household stored water samples, compared to 63% of samples taken directly from water points (Figure 2). There was no significant association between *E. coli* concentration and safe storage or household treatment habits, though both were reported in a small portion of households. Most households (84%) used storage containers with wide openings and were observed to scoop water out, which can introduce contamination to the stored water.

Community Water Point and Household Samples

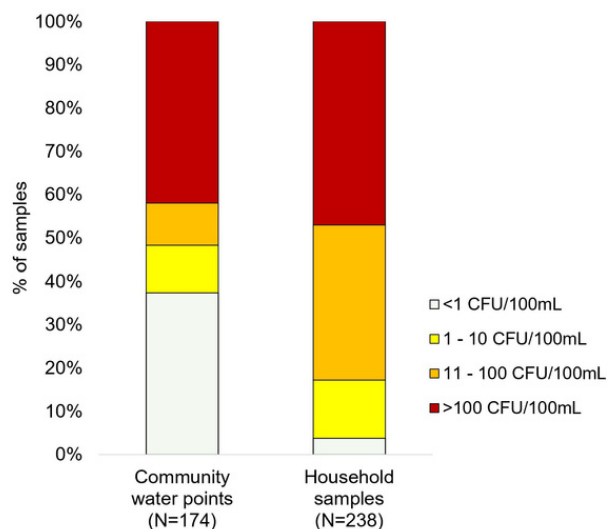


Figure 2. *E. coli* levels in community water point samples and household samples in Lira District.

SCHOOLS AND HEALTHCARE FACILITIES

We conducted surveys at 50 schools and 11 healthcare facilities, and tested *E. coli* from water points where water was available: at 40 schools and 9 healthcare facilities. Overall, **83% of school water points and 100% of healthcare facility water points were free from *E. coli*** (Figure 3).

Institutional Water Point Samples

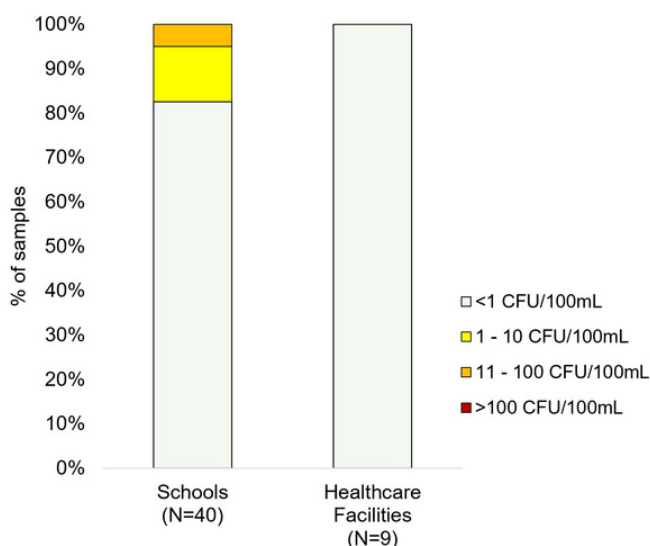


Figure 3. *E. coli* levels at schools (N=40) and healthcare facilities (N=9) in Lira District.

All schools and healthcare facilities had improved water points like tap stands and boreholes with hand pumps, though some were located off-site.

Overall, 80% of schools (n=50) and 36% of healthcare facilities (n=11) had a basic water service: an improved water point on premises with water available.