

WATER QUALITY IN DERA WOREDA, ETHIOPIA

(AUGUST-SEPTEMBER 2022)



With funding from the Conrad N. Hilton Foundation, the Aquaya Institute is coordinating longitudinal water quality monitoring in three target woredas (districts) in Ethiopia. **In August - September 2022, Aquaya conducted surveys and water quality testing at households, water points, schools, and healthcare facilities in Dera woreda, in collaboration with Stanford University and Performance Monitoring for Action Ethiopia (PMA)**

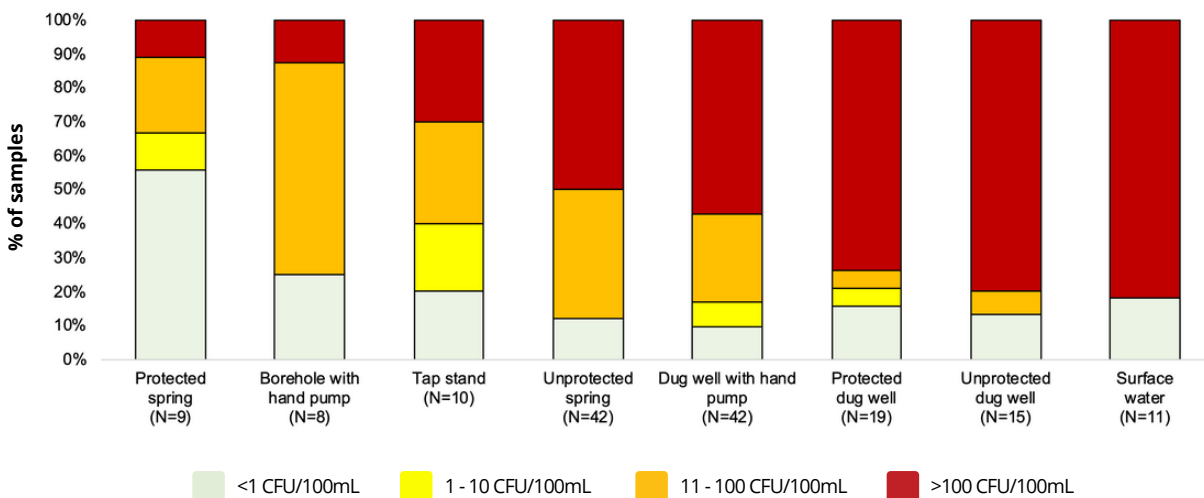
DRINKING WATER SAMPLES TESTED IN DERA



WATER POINTS

We conducted surveys and tested *E. coli* at 158 water points, including improved and unimproved types. Only 16% of water points were free from *E. coli* contamination (<1 CFU/100 mL). **Water was microbially safest from protected springs and boreholes with hand pumps (41% free from *E. coli*), and least safe from dug wells and surface water (16% 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 Dera woreda, displayed by water point type (N=158).

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

- All samples met the Ethiopia Drinking Water Standard for electrical conductivity (<2000 µS/cm). The taste of water is affected if electrical conductivity is too high.
- 40% of samples met the Ethiopia Drinking Water Standard for turbidity (<5 NTU). If turbidity is too high, water is aesthetically less acceptable to people, and chlorine treatment is less effective.
- 28% met the Ethiopia Drinking Water Standard for pH (6.5-8.5). Many groundwater samples were below the range, which indicates potential for water point corrosion but is not dangerous to health.
- No piped system taps (N=10) met the Ethiopia Drinking Water Standard for free chlorine residual (0.2-0.5 mg/L). Free chlorine protects against re-contamination during transport and storage.

HOUSEHOLDS

We detected *E. coli* in 90% of stored household water samples, and nearly three-quarters were in the very high-risk category (>100 CFU/100mL). **Household samples from an improved source like a hand pump or protected spring had safer water (23% free from *E. coli*) than those collected from unimproved sources (6% free from *E. coli*)** (Figure 2); however, the majority of households had water from an unimproved source.

There was no significant association between *E. coli* concentration and safe storage or household treatment habits. While most households (84%) stored water safely in covered containers with a narrow opening, none treated water in the home.

SCHOOLS AND HEALTHCARE FACILITIES

We conducted surveys at 50 schools and 20 healthcare facilities and tested *E. coli* from water points where water was available: at 22 schools and 11 healthcare facilities. Water points at **18% of schools and 36% of healthcare facilities were free from *E. coli*** (Figure 3).

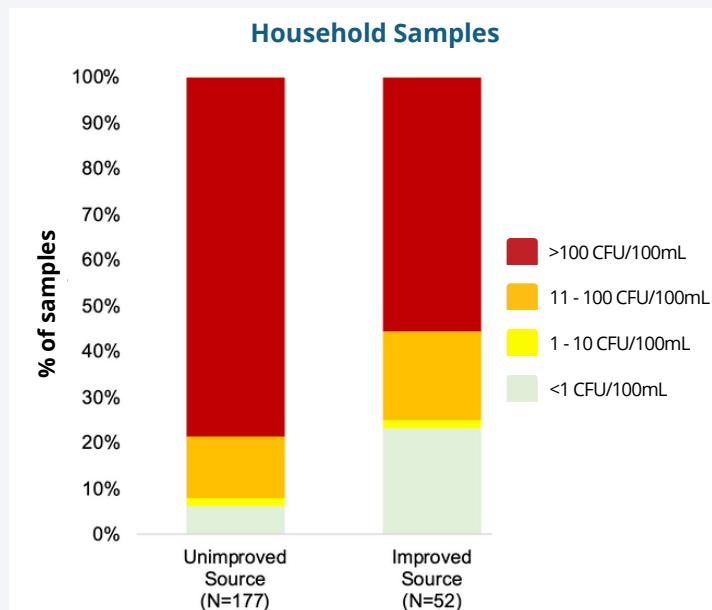


Figure 2. *E. coli* levels in household samples in Dera woreda. Samples are sorted by the reported source type they were collected from.

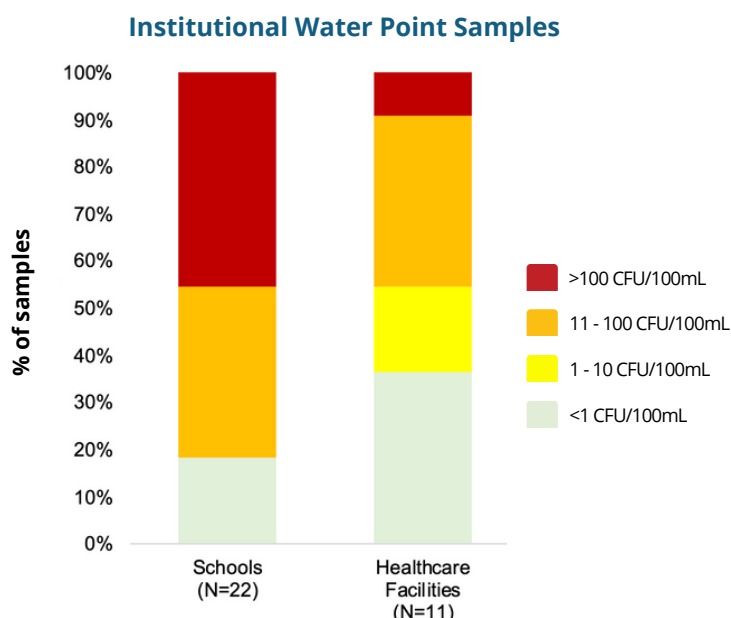


Figure 3. *E. coli* levels at schools (N=22) and healthcare facilities (N=11) in Dera woreda.

Three-quarters of schools and half of healthcare facilities had improved water points like tap stands and dug wells with hand pumps, though several were located off-site or had no water available.

Overall, 40% of schools (n=50) and 16% of healthcare facilities (n=20) had a basic water service: an improved water point on premises with water available.