



With funding from the Conrad N. Hilton Foundation, the Aquaya Institute is coordinating longitudinal water quality monitoring in two target districts in Ghana. In September-October 2023, Aquaya conducted surveys and water quality testing at households, water points, schools, and healthcare facilities in Wassa East District. This effort builds upon prior monitoring.

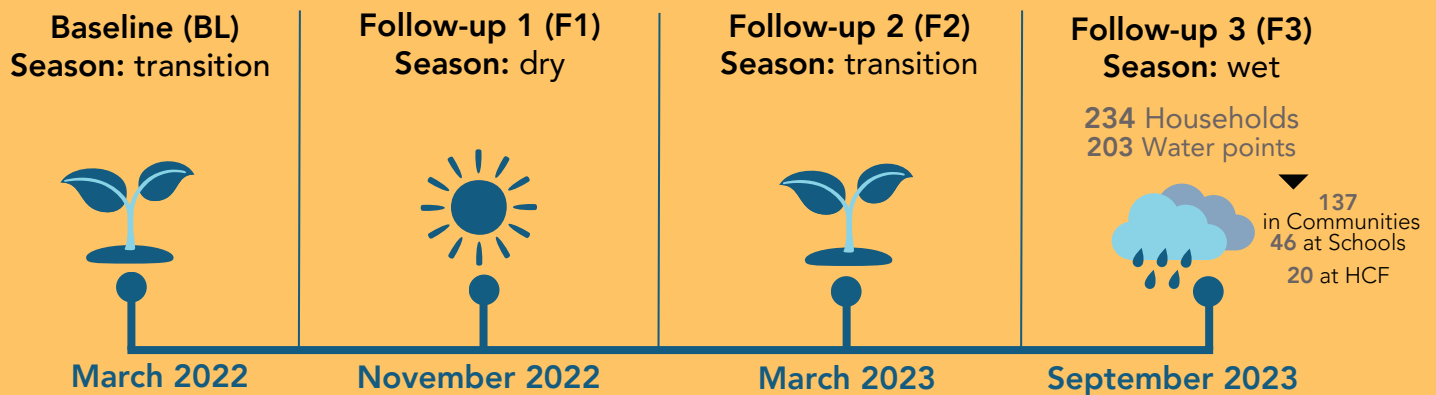
## WaterTRACS

Testing, Research, and Capacity Strengthening Initiative

# WATER QUALITY IN WASSA EAST DISTRICT, GHANA

September - October 2023

## Drinking water samples tested in Wassa East



## SUMMARY

- Water samples from **improved sources were safer** from microbial contamination than those from unimproved sources.
- Very few piped water samples had adequate chlorine levels.
- Wealthier households had safer drinking water, largely because they were more likely to consume packaged water.

## KEY RECOMMENDATIONS

- Piped water systems should be treated with **adequate chlorine, particularly in the wet season.**
- Improved water sources should be more **accessible to the poorest households.**
- **Packaged water** remains a **safer** option for households and institutions but is not always free from fecal contamination.



## WATER POINTS

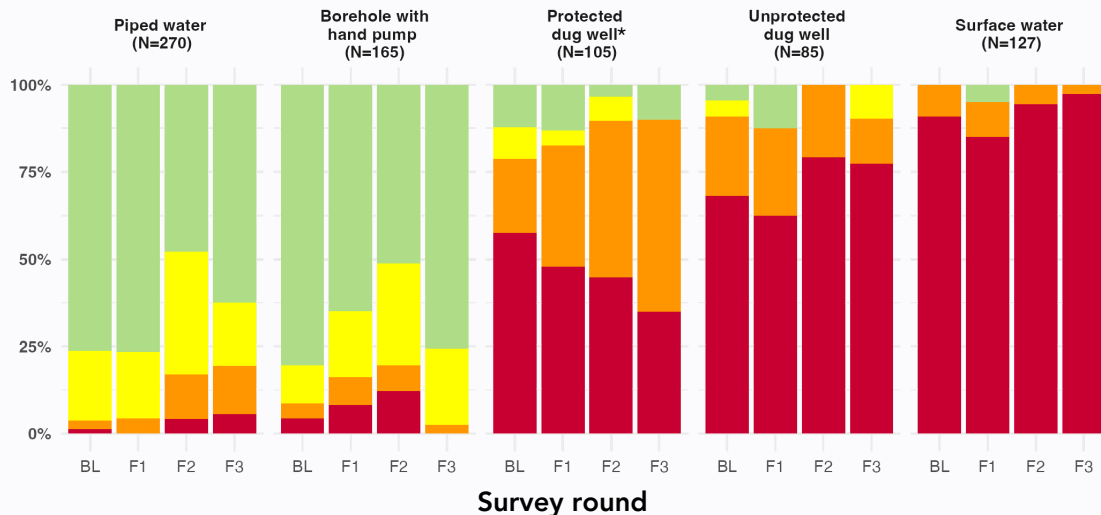
Water from piped systems and boreholes with handpumps was safer than water from dug wells and surface water. In the most recent round, we conducted surveys and tested *E. coli* at 203 water points. Overall, 39% were free from microbial contamination, defined as *E. coli* <1 CFU/100 mL. Water was consistently safest from piped systems and boreholes with handpumps (67% were free from *E. coli*) and less safe from dug wells and surface water (2% were free from *E. coli*) (Figure 1). Across all survey rounds, piped water was safest in the dry season (F1 and samples collected before the start of rain in the transitional seasons).

In the most recent survey, only 6% of taps from piped systems met the Ghana National Drinking Water Standard for free chlorine residual (0.2-5.0 mg/L). Free chlorine residual protects water from recontamination during transport and storage, and chlorination was associated with lower microbial contamination. All piped water samples with detectable free chlorine residual were free from *E. coli*, compared to 60% of samples with no detectable chlorine.



**Image 1.** An enumerator (left) conducts a household survey at a residence in Wassa East, Ghana.

### Water Point Samples



Excludes Rainwater (n<5 total across all survey rounds).  
Sample sizes shown are totals across all survey rounds.

\*Includes some with hand pumps.

#### *E. coli* risk categories

 Low <1 CFU/100mL  Medium 1 - 10 CFU/100mL  High 11 - 100 CFU/100mL  Very high >100 CFU/100mL

**Figure 1:** *E. coli* risk levels from water point samples collected at BL (N=215), F1 (N=135), F2 (N=202), and F3 (N=203) survey rounds.



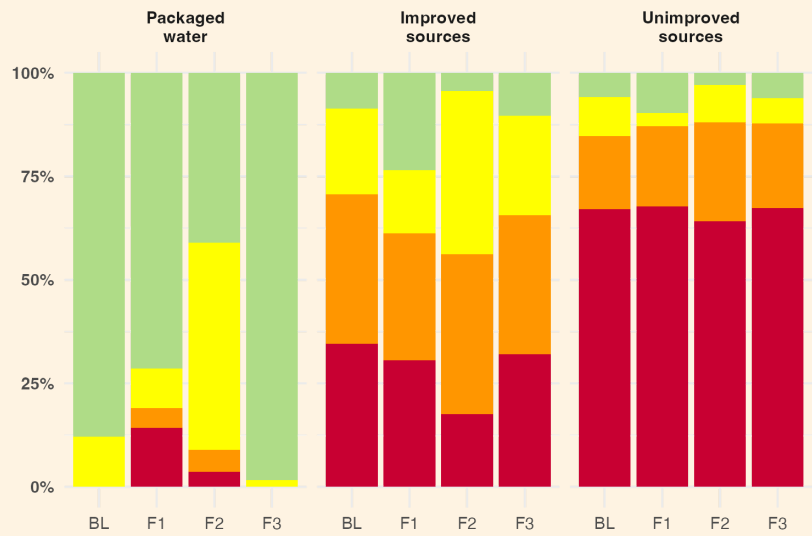
## Household Samples

### HOUSEHOLDS

In the most recent survey, 26% of households provided packaged water (sachet or bottled) as a drinking water sample; 53% provided water from improved water points like piped systems, boreholes, and rainwater; and 21% provided water from unimproved water points like unprotected wells and surface water. Overall, 32% of the 234 drinking water samples were free from *E. coli*, and microbial water quality depended on the source of water.

#### Packaged water was safer than other household drinking water sources.

Nearly all (98%) packaged water samples – mostly sachet samples – were free from *E. coli*, while only 10% of samples from improved water points and 6% from unimproved water points were free from *E. coli*. Packaged water, however, had higher microbial contamination levels in prior survey rounds (Figure 2). Improved water point sources, which include piped water, were safest in the dry season (F1).



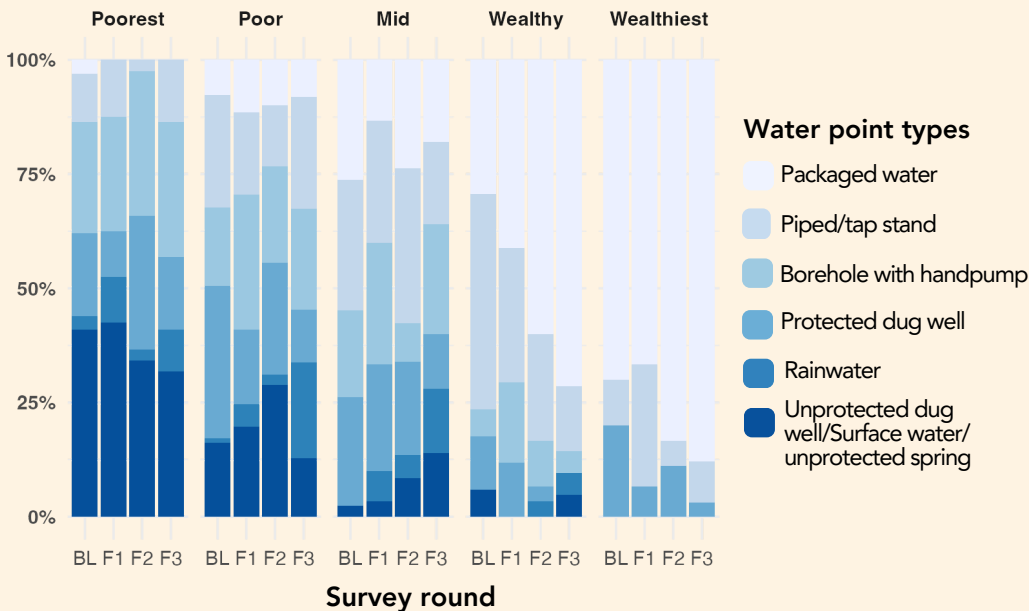
Survey round

*E. coli* risk categories

- Low <1 CFU/100mL
- Medium 1 - 10 CFU/100mL
- High 11 - 100 CFU/100mL
- Very high >100 CFU/100mL

**Figure 2:** *E. coli* risk levels in household drinking water samples collected at BL (N=234), F1 (N=146), F2 (N=238), and F3 (N=234) survey rounds. Results are displayed by water source type.

## Household Samples



Excludes 'multiple sources' n<5 per survey round.

**Figure 3:** Sources of household drinking water samples across wealth quintiles collected at BL (N=234), F1 (N=146), F2 (N=238), and F3 (N=234) survey rounds.

#### Wealthier households had safer drinking water and were more likely to consume sachet water than poorer households.

Overall, 88% of households in the wealthiest quintile had water free from *E. coli*, while only 7% households in the poorest did. This is largely attributable to bottled and sachet water being more prevalent among wealthy households, particularly during the wet season (F3) (Figure 3).



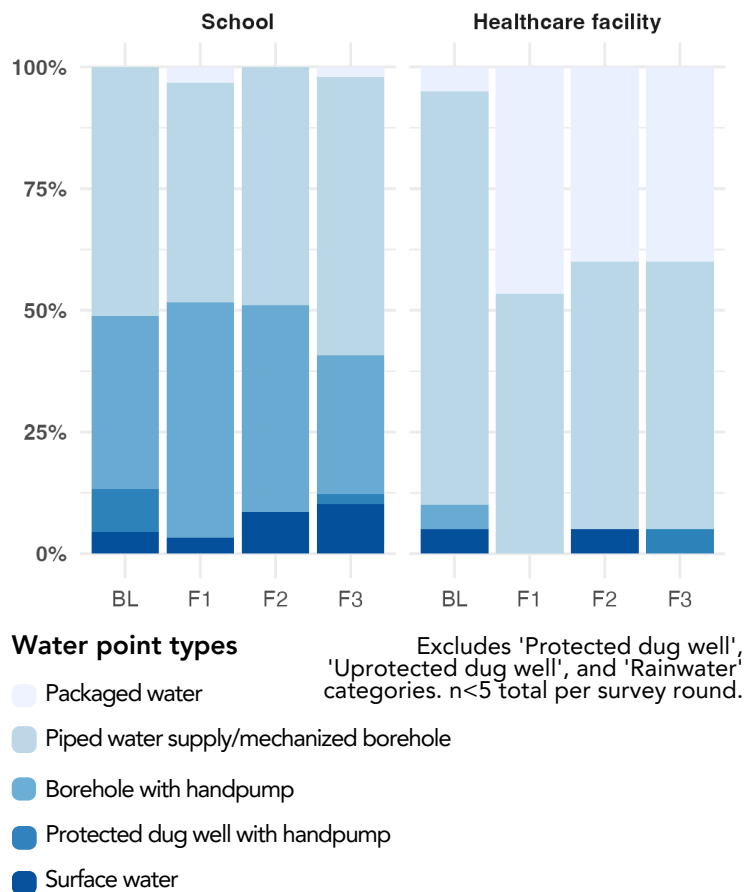
## INSTITUTIONS

In the most recent survey, we tested *E. coli* from water points at 46 schools and 20 healthcare facilities. About 83% of schools and all healthcare facilities used improved water points, and 82% had basic water service (i.e., had an improved water point on premises with water available).

**Healthcare facilities shifted** from using piped water to packaged water for drinking after baseline and have remained consistent since then (Figure 4). No such transition took place in schools.

**Packaged water was safer than other water point sources available on site.** Among sampled packaged water (sachet water), 100% were free from *E. coli* compared to 45% of other water point samples in the same institutions and elsewhere. Half (52%) of samples from improved water points were free from *E. coli* compared to none from unimproved water points.

## Institutional Drinking Water Sources



**Figure 4:** Primary drinking water sources reportedly used by schools at BL (N=47), F1 (N=27), F2 (N=45), and F3 (N=46) and healthcare facilities at BL (N=20), F1 (N=13), F2 (N=19), and F3 (N=20) survey rounds.

## RECOMMENDATIONS

- 1 Piped water systems should be treated with adequate chlorine** to maintain a residual of >0.2 mg/L at all tap stands in the water distribution system, particularly in the wet season. This could improve water quality at both the point of collection and the point of use.
- 2 Water sources with lower levels of microbial contamination, such as boreholes and piped water systems with adequate treatment, should be made more accessible** to households with the lowest socioeconomic status. This may include the provision of reduced tariffs.
- 3 For households and institutions that can afford it, packaged water remains a safer option to minimize the risk of infection** until water quality improves in other water sources. However, packaged water is not always free from fecal contamination.
- 4 Continued monitoring should be performed with seasonality in mind** to better assess different water quality conditions and needs in wet, dry, and transitional seasons.

