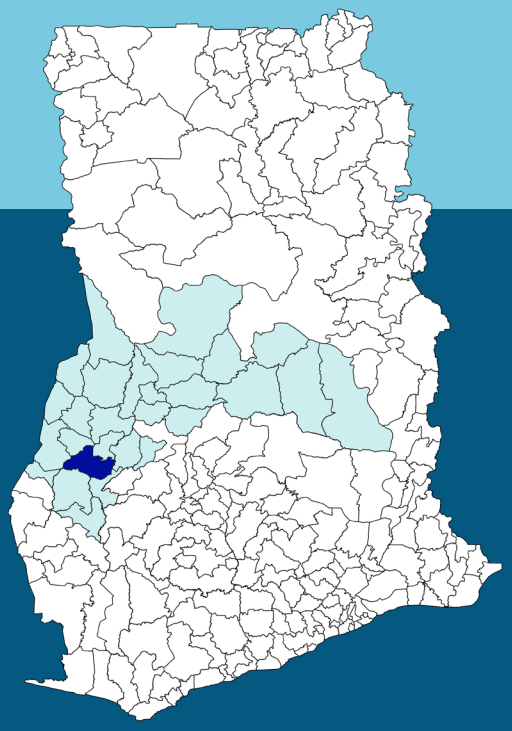
FORMATIVE RESEARCH BRIEF, OCTOBER 2019

WATER SUPPLY LANDSCAPE IN ASUTIFI NORTH, GHANA

SUMMARY

- Fecal contamination in drinking water is widespread in Asutifi North (found in approximately half of water systems), but water supplies are neither treated nor regularly tested. Isolated cases of potentially harmful levels of arsenic and fluoride also exist.
- Some water systems can generate revenue on a consistent basis, but this is particularly challenging for community point sources. There are opportunities to improve revenue generation at all water systems.
- Water management teams are under-capacitated and poorly compensated.
- Focus-group discussions revealed that community members in Asutifi North generally perceive that water from boreholes and piped systems is safe to drink. They did not express strong demand for water quality information.
- The District Assembly (DA) does not provide adequate financial support to communities that struggle to pay for water system repairs. When the DA does provide support, it often takes several months.



Map of Asutifi North District (dark blue), in Brong Ahafo Region (light blue), Ghana

AQUAYA'S MONITORING FOR SAFE WATER ACTION-RESEARCH PROGRAM

With funding from the Conrad N. Hilton Foundation, The Aquaya Institute is collaborating with the Asutifi North District Assembly (DA) and development partners to support their efforts to achieve 100% coverage of safe, sustainable, and equitable drinking water.

Asutifi North is a mostly rural (~68%) district in central Ghana. The local economy is primarily driven by agriculture, but the district also houses an internationally-operated gold mine (Newmont Goldcorp). Of the roughly 65,000 residents of Asutifi North, an estimated 50% have access to "basic[1]" water services.[2] The water infrastructure in Asutifi North includes four small public piped systems, ~10-15 privately-run point sources, and ~165 public point sources (mostly handpumps). The DA is the legal owner of all public water infrastructure, but it delegates management responsibilities to community-based Water and Sanitation Management Teams (WSMTs), which are composed of a few volunteer community members.

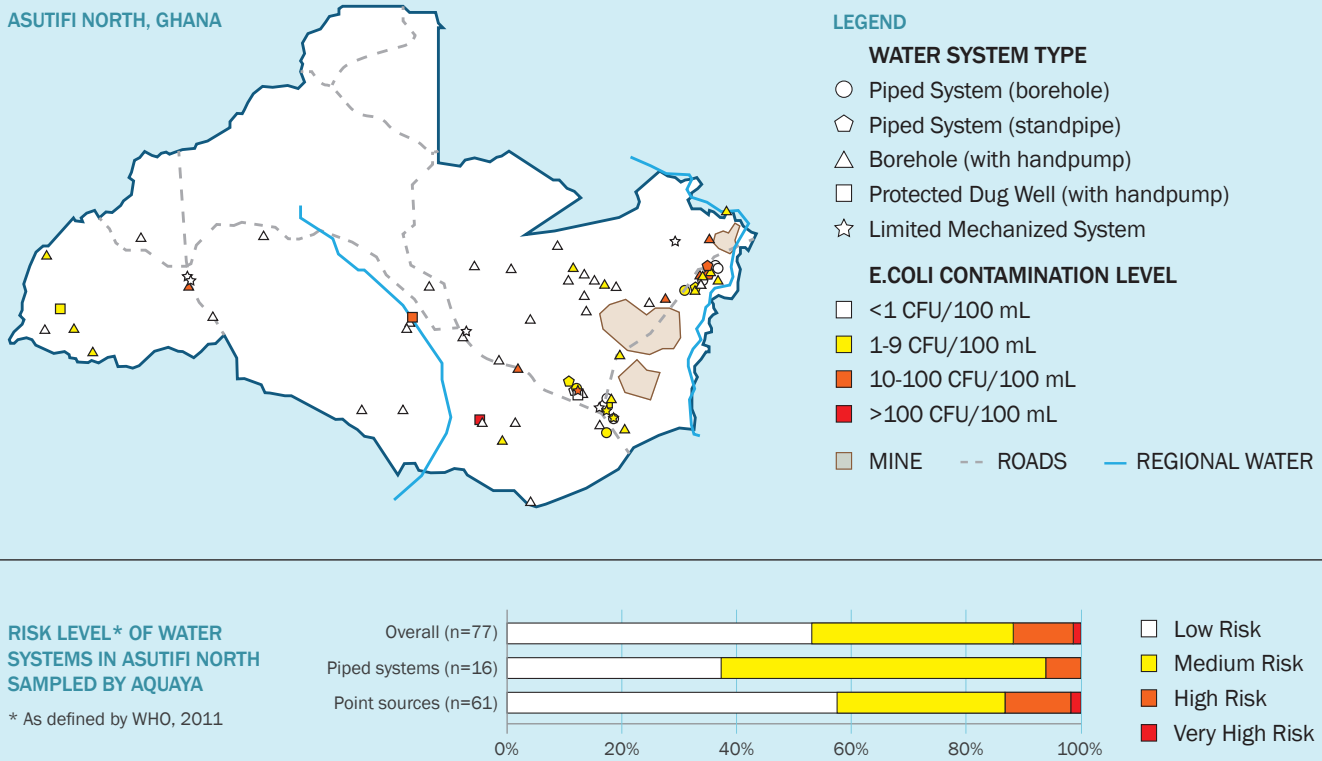
Aquaya's five-year (2017-2022) Monitoring for Safe Water II (MfSW II) research program develops context-specific strategies for building actionable and sustainable water safety management systems that comply with national regulations. To meet this objective in Asutifi North, Aquaya conducted formative research to understand the water supply and water quality landscape. This brief summarizes Aquaya's findings with respect to:

1. The quality of water sources
2. The economics of water service provision in Asutifi North
3. The capacity and motivation of water system managers
4. The perceptions and expectations of community members with respect to water quality
5. The roles and capacities of the DA in water service provision

[1]Drinking water from an improved source, provided collection time is not more than 30 minutes for a roundtrip including queuing
[2]Water, Sanitation, and Hygiene (WASH) Masterplan. Asutifi North District, Ghana 2018.

FIGURE 1:

MICROBIAL WATER QUALITY TEST RESULTS AT 77 WATER SOURCES IN ASUTIFI NORTH



RISK LEVEL* OF WATER SYSTEMS IN ASUTIFI NORTH SAMPLED BY AQUAYA

* As defined by WHO, 2011

RESEARCH DESIGN

The formative research consisted of:

- 13 in-depth interviews with water system managers (of public piped systems, public handpumps, and private boreholes)
- 7 focus group discussions with community members
- 65 surveys with members of water management teams from randomly selected water systems
- 77 water quality tests (fecal indicator, fluoride, arsenic)
- Informal interviews and conversations with DA officers over 5 months
- Analysis of water system financial records
- Secondary analysis of data collected on WASH coverage in Asutifi North

WATER QUALITY

We found indicators of fecal contamination in 47% (36/77) of water samples (Figure 1). Though three of the piped systems occasionally outsourced water quality testing to a regional laboratory, none of the public water systems conducted water quality testing at the frequencies specified by national regulations3,4 (point sources: 2 samples/year, piped system networks: 1 sample/month/5000 people served). None of the water system management teams performed disinfection. Water management teams from communities in close proximity to a dammed lake constructed by Newmont Goldcorp reported that the mining company periodically shock-chlorinated their boreholes. We also detected arsenic above nationally acceptable limits (10 µg/L) in two water systems (45 and 95 µg/L) and fluoride concentrations above nationally acceptable limits (1.5 mg/L) in five water systems (5.0, 3.1, 2.9, 2.5, and 1.6 mg/L).

[3]Community Water and Sanitation Agency, 2011. Legislative Instrument 2007, Accra, Ghana: CWSA.
[4]Ghana Standards Authority, 2013. Ghana standard GS175-1:2013, 4th Ed., Accra, Ghana: GSA.
[5]We used an approximate exchange rate of 1 USD = 5 GHS.

FIGURE 2:

REPORTED PAYMENT STRUCTURES FOR COMMUNITY POINT SOURCES IN ASUTIFI NORTH (N=51)

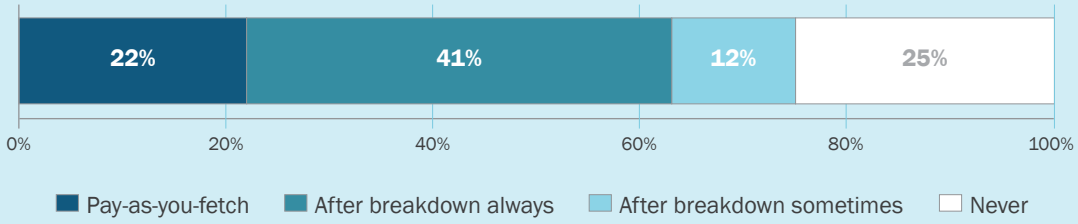
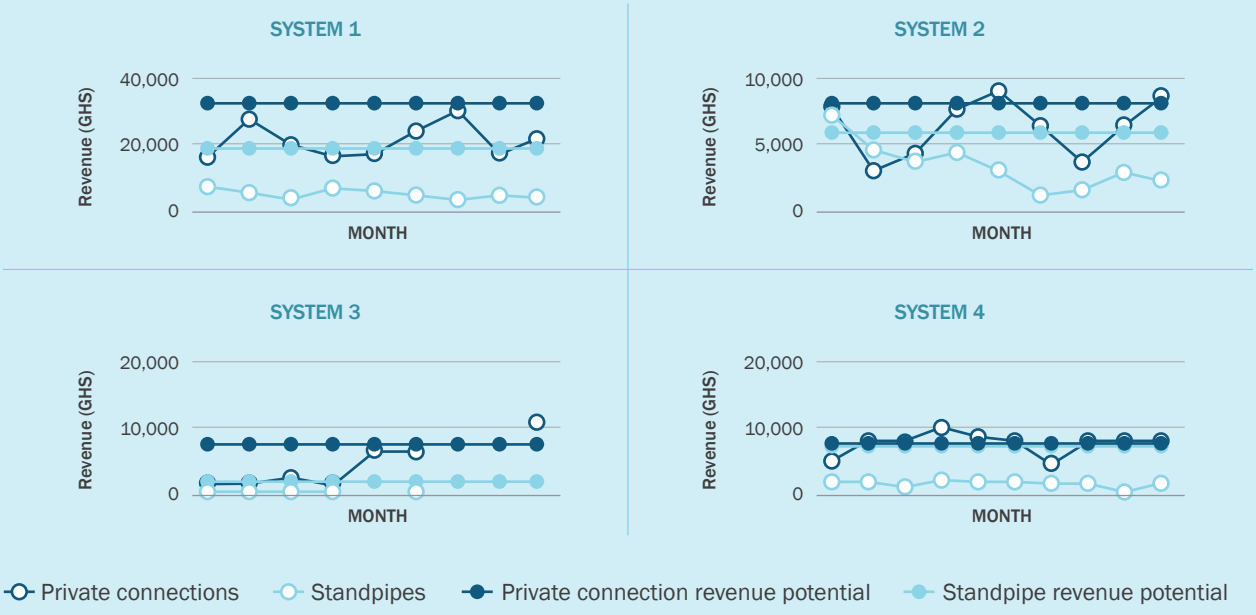


FIGURE 3:

MONTHLY REVENUE OF PIPED SYSTEMS IN ASUTIFI NORTH BETWEEN JANUARY AND OCTOBER 2018



ECONOMICS OF WATER SERVICE PROVISION

Few community point sources generated revenue on a regular basis: only 22% (11/51) of point sources that we visited had a pay-as-you-fetch structure in place (Figure 2). Among the 16 (31%) point sources that maintained financial records, the median annual revenue was 480 GHS (96 USD5) (max: 3600 GHS or 720 USD, min: 0 GHS or 0 USD), while the median cost of handpump repairs was ~300 GHS (60 USD) (max 12,000 GHS or 2,400 USD). Thus, most communities rely on financial support from the DA when their water systems break down.

In 2018, the four piped systems each generated sufficient revenue to cover their expenses (electricity, salaries, maintenance, repairs), but operated below their revenue potential because tariffs were not enforced (Figure 3).

We estimated that revenue from their standpipes could increase up to 5-fold if tariffs were enforced. Tariffs at the piped systems ranged from 4.5 GHS/m^3 to 7.5 GHS/m^3 (0.90-1.50 USD/m^3) at standpipes and from 4.5 GHS/m^3 to 7 GHS/m^3 (0.90-1.40 USD/m^3) for private connections, all of which were higher than the water tariffs in Accra (standpipes: 3.3 GHS or 0.66 USD/m^3, private connections: 3 GHS or 0.60 USD/m^3 and 5 GHS or 1 USD/m^3 after 5 m^3). Revenue collected by the four piped systems ranged from 59% to 92% of the amounts billed to their customers with private connections, resulting in cumulative arrears of 3,200-174,000 GHS (640 - 34,000 USD). We determined that three out of the four piped systems would struggle to support the cost of an unexpected major repair (>2500 GHS or 500 USD).

FIGURE 4:
FACTORS INFLUENCING WILLINGNESS TO PAY FOR WATER, AS IDENTIFIED IN FOCUS GROUPS

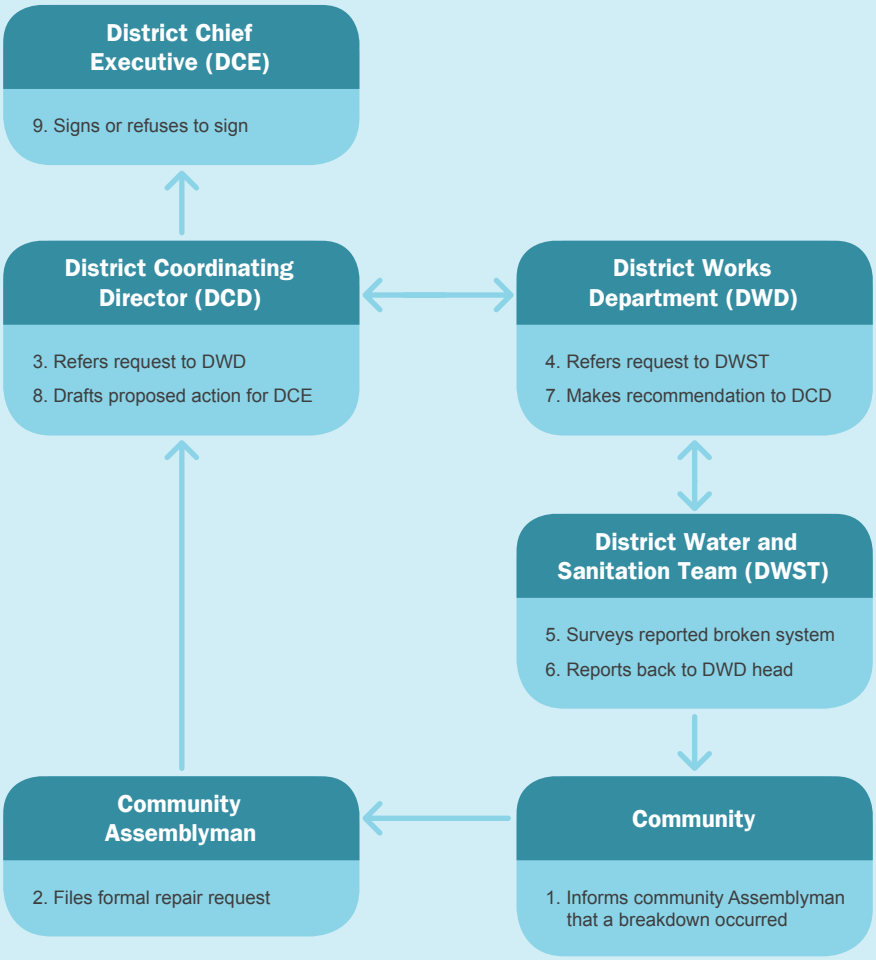
CAPACITY AND MOTIVATION OF WATER SYSTEM MANGERS

The majority of water system managers (70%, 43/61) had not received relevant training, and 28% (5/18) of those who had received training reported that more than 5 years had passed since the training. Water system management was not a sufficient source of income, so almost all water system management staff held other primary occupations. In general, managers of community point sources were not able to perform the basic duties expected of management teams (e.g., raising money to support repairs, making minor repairs, contacting an area mechanic to do repairs).

PERCEPTIONS AND EXPECTATIONS AROUND WATER QUALITY

Participants in our focus group discussions usually believed that water from boreholes and piped systems was safe to drink. Thus, they did not express demand for water quality information. However, focus group participants stated that they would be willing to contribute financially to remediation efforts if contamination was discovered. Our focus groups also identified a number of factors that may influence consumers' willingness to pay for water services (Figure 4): quality of service, financial transparency, and perception of a mandate. People with disabilities and the elderly were usually exempt from paying. Communities for which Newmont Gold Corp installed and maintained hand pumps did not pay for water. While there was limited willingness to pay for water from public water systems in most communities, we found that the consumption of sachet water (0.2 GHS or 0.04 USD/500mL sachet) was common even in rural communities. Community members reported valuing sachet water because it was convenient and cold.

FIGURE 5:
PROCESS FOR FUND AUTHORIZATION FROM THE DA TO WATER SYSTEMS



ROLES AND CAPACITIES OF THE DISTRICT ASSEMBLY

We found that the DA expected the piped systems to be financially independent. Community point sources, however, depended heavily on the DA for financial support. Nevertheless, the process for the DA to allocate funds to help with repairs was slow, often taking 6+ months (Figure 5). Furthermore, the budget allocated to support infrastructure repairs was generally insufficient (~70,000 GHS (~14,000 USD) in 2017, <1% of the total budget). While the DA recognized that it must assist community point sources with major repairs, procedures for doing so were largely ad hoc: the District Water and Sanitation Team rarely made trips to the field to diagnose issues, district information management systems were disorganized, and there was no formal accountability mechanism for the DA in this role.

LOOKING FORWARD

Our landscaping activities revealed that while fecal contamination should be a primary concern, the DA and most WSMTs are not presently in a strong position to financially or technically support water quality monitoring in Asutifi North. However, we learned that a few water systems generate enough revenue to implement some water safety measures even though they aren't currently doing so. Furthermore, most water systems have not yet realized their revenue potentials, which if reached, could make water testing and treatment affordable. Thus, Aquaya is focusing future efforts on enhancing revenue generation, leveraging the DA's authority, and utilizing existing water testing laboratories to establish and test a sustainable water safety management approach.