URBAN WATER QUALITY AND EFFICIENCY ASSESSMENT IN GHANA

SUMMARY

Rapid urbanization is straining Ghana's water supply systems. This study of the urban water systems in Kumasi and Tamale will assess three core challenges faced by Ghana Water Company Limited (GWCL): water quality, equity, and non-revenue water. This study will undertake data collection, including household water sampling, interviews with staff and community members, and organizational capacity rating, as well as a review of existing literature and historic GWCL data. Findings will be used to identify opportunities and design pilot interventions to improve urban water service delivery.

WHY THIS MATTERS

Ghana's urban population has more than tripled over the last three decades.[1] Rapid urbanization is outstripping the expansion of urban water infrastructure: approximately 40% of Ghana's urban population does not have access to safely managed water supply.[2] The national urban water utility, Ghana Water Company Limited (GWCL), has a limited production capacity, which covers about 60% of the estimated potable water demand in urban areas.[1] Production costs for a portion of this water, called "non-revenue water" (NRW), cannot be recovered due to issues such as leaks, unauthorized connections, or billing inaccuracies.

With insufficient public supply of safe water, consumers must cope with high levels of contamination, intermittent service delivery, and water rationing.[3] For the reasons above, they commonly turn to unregulated water sources, such as informal vendors and private boreholes, which may be contaminated, more expensive, or less accessible.[4]

The study will help GWCL address core challenges including ensuring good water quality, equitably distributing water supplies, and minimizing water losses. The vision is to enable a sustainable future for utility operations, the environment, and Ghanaian citizens.

How does this research connect to USAID's Action Research Initiative?

USAID's Global Water Strategy Action Research Initiative generates evidence to improve the effectiveness of its investments in water, sanitation, and hygiene (WASH) and water resources management, as well as that of programs by partner governments, other funders, and practitioners.

Under this initiative, the Urban Resilience by Building Partnerships and Applying New Evidence in WASH (URBAN WASH) project is partnering with local, regional, and global stakeholders to conduct research on the enabling environment for improved city-wide water quality and sanitation. URBAN WASH is supporting USAID/Ghana and the Urban Water Utility of Ghana to conduct research and pilot new urban drinking water interventions.

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METHODOLOGY

Initial research activities will target two urban centers in Ghana where GWCL operates the water systems: Tamale and Kumasi. City selection criteria included location, leadership buy-in, data availability, and piped water network condition and scale.

Research questions will address the three main challenges faced by GWCL:

1. **Are GWCL's water quality monitoring and management processes optimized?** The research will investigate existing distribution system monitoring, water safety planning,[5] contamination risks, and measures to address risks. It will also compare GWCL water quality to other water sources and identify the most cost-effective future management approaches.

2. **Do connection fee and tariff structures support inclusive water access?** The research will examine the ability to pay for water among the poor and vulnerable, options for connection and tariff subsidy arrangements, and GWCL's financial sustainability under different scenarios.

3. **How can GWCL minimize non-revenue water (NRW) or water losses?** The research will first confirm whether NRW can be reliably defined, measured, or estimated to characterize sources and drivers. It will then assess to what extent preventive measures (such as theft detection, account collection, and prepaid meters) have been effective, and what factors could support further improvements.

STUDY DESIGN

To understand **water quality management**, researchers will undertake a needs assessment and a drinking water quality assessment. The needs assessment will review literature, interview GWCL staff and water user association leaders, and then carry out a water capacity rating assessment (WaterCaRD[6]) using this information. The drinking water quality assessment will revisit historical GWCL water quality data while conducting additional household water quality testing among GWCL customers and non-customers.

To understand **equity and affordability**, researchers will conduct financial assessments at both the household and institutional levels. For households, a literature review, interviews with GWCL staff and low-income community leaders, and low-income household surveys and focus group discussions will elicit information. For GWCL, assessment methods will include a regulatory framework review, cost versus revenue analysis, and financial viability modeling.

To understand **water efficiency**, researchers will use a desk review of literature, onsite GWCL data review, and interviews with GWCL staff and other rural service providers. They will visit NRW-reduction projects as well as bulk and customer water meters.

A laboratory assistant preparing her workstation for microbial testing of water quality samples collected from Kumasi households.

NEXT STEPS

Following the planned investigations, the research team will collaborate with stakeholders including GWCL, national and local government units, and others working in Kumasi and Tamale to develop an action plan for each research area. Partners will weigh the financial, operational, and political implications of proposed pilot solutions to co-create, design, and monitor interventions.

GWCL staff lead site visit of the Owabi water treatment plant in Ashanti region (sedimentation tanks pictured here).

REFERENCES

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