

RIGSS: Field Summary

Lagos State

We gratefully acknowledge the support of:

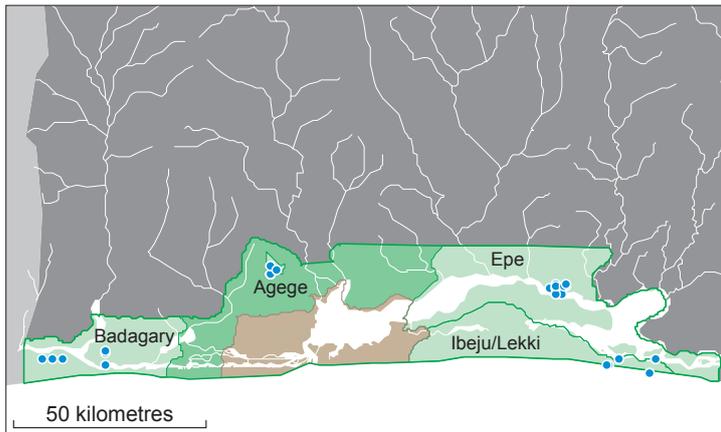
- Lagos State Government, Ministry of Environment
- Local Community Associations in Agege, Badagary, Epe, and Lekki

INTRODUCTION

Water security is one of the most pressing risks facing the world. In rapidly growing urban areas, evidence suggests that increasing numbers of households are choosing to install private boreholes to meet their domestic water needs. The RIGSS project used an innovative interdisciplinary approach to understand the environmental, social, behavioural and institutional reasons for this trend, and its potential implications for individual and community resilience.

STUDY AREA

The field study was carried out in four Local Government Areas (LGAs) within the state of Lagos: Agege, Badagary, Epe, and Lekki.



PRIMARY SOURCES OF WATER

The majority of domestic water comes from **hand dug wells, boreholes, and sachet water**, with little variation in the sources used throughout the year. Rainwater harvesting is occasionally used domestically for non-drinking purposes, and river/stream water is sometimes used for irrigation.

The household surveys and community discussions highlighted that the preferred water sources are motorised boreholes and sachet water, due to the positive perception of these sources in terms of water quality. Some communities use water from hand dug wells for washing and cooking, while sachet water and that from motorised boreholes are used for drinking purposes. In communities like Orile Agege where the hand dug wells are relatively deep, these are also used for drinking purposes.

METHODOLOGY

The Lagos field study involved 2 main activities:

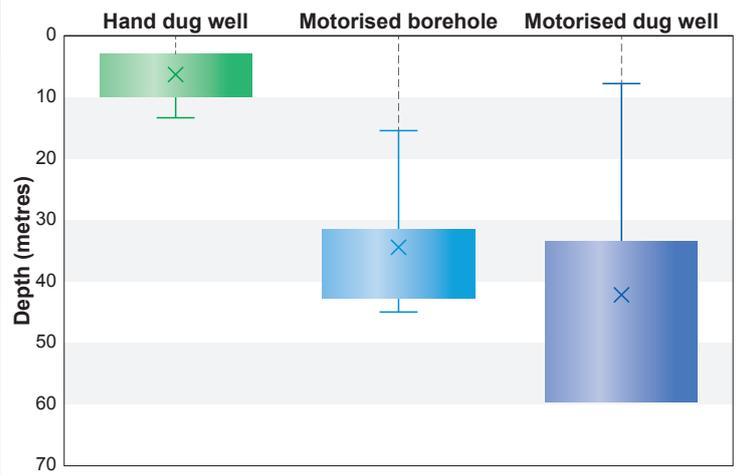
- **Water point surveys** of 40 groundwater sources, including vulnerability and water quality assessments
- **Qualitative interviews** and focus groups to capture the perceptions of community and household water users

The following **groundwater sources** were examined in Lagos:

- 17 hand dug wells (extraction by rope and bucket)
- 4 motorised dug wells (extraction by motorized pumps)
- 9 motorised boreholes (extraction by motorized pumps)

The following data were collected:

- Specific electric conductance (SEC), nitrate and E. Coli concentrations (at all sources)
- Vulnerability scores (at all sources except one motorized borehole)
- Groundwater levels (at 16 hand dug wells, 2 motorised dug wells and 2 motorised boreholes)
- Source depths (at all hand dug wells, 3 motorised dug wells and 6 motorised boreholes)

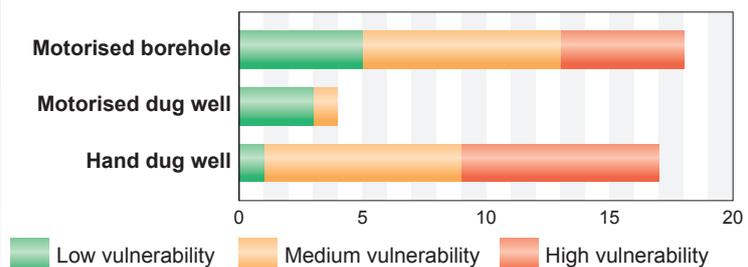


Known or measured source depth

VULNERABILITY OF SOURCES

Vulnerability assessments give a score between zero (low vulnerability) and seven (high vulnerability). The factors considered include: pollution sources within 10m of the water point, poor drainage causing ponding within 2m, insufficient concrete apron and lack of covers/fencing.

Almost **50% of hand-dug wells** are classified as **highly vulnerable**, compared to only 28% of boreholes. Only **6% of hand dug wells** are considered to have **low vulnerability**, compared to 28% of boreholes.



Number of sources classed as low, medium and high vulnerability

WATER QUALITY

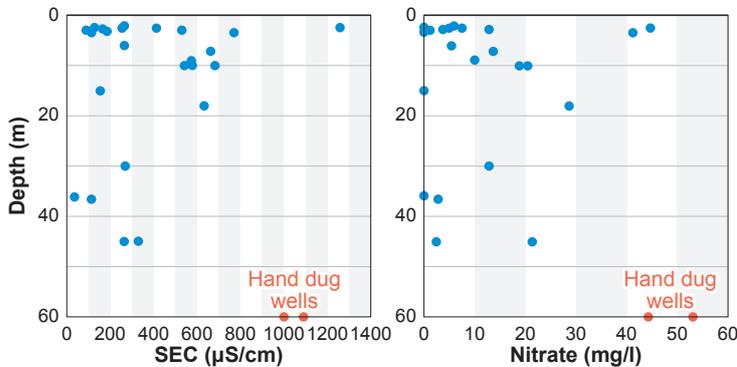
Specific Electrical Conductance (SEC) gives a measure of the dissolved material in groundwater and can be elevated by natural or anthropogenic processes. **Nitrate** in groundwater is often derived from municipal or domestic waste. **E. Coli** is a coliform bacteria indicative of faecal contamination in groundwater.

Sampling of groundwater sources in Lagos shows that **water quality is generally poorer in shallow hand dug wells** compared to deeper boreholes, showing elevated SEC, nitrate and E. Coli. Notable exceptions to this are the deep hand dug wells in Orile Agege, which show elevated SEC and nitrate, and boreholes in Lekki, which have higher SEC, possibly caused by saline intrusion.

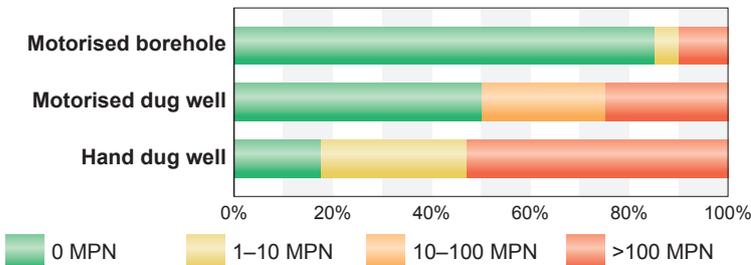
According to the World Health Organization Drinking Water Guidelines for E. Coli, the water quality analysis shows that:

- 21 sources were considered safe (17 motorized boreholes, 2 motorized dug wells and 2 hand dug wells)
- 6 sources were considered intermediate risk (5 hand dug wells and 1 motorized borehole)
- 13 sources were considered high or very high risk (9 hand dug wells, 2 motorized dug wells and 2 boreholes)

6 sachet water were also analysed, all of which had safe levels of SEC, nitrate and E. Coli.



SEC and nitrate concentrations at groundwater sources across the Lagos field study area

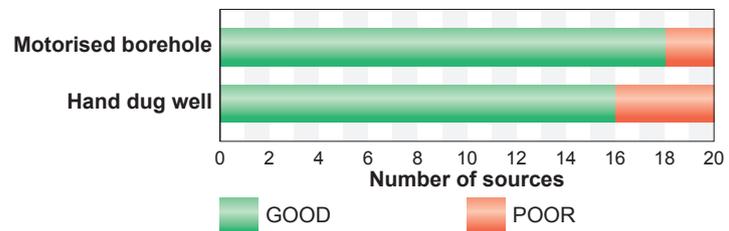


Source risk as indicated by the E. Coli MPN method and World Health Organisation Guidelines for Drinking Water Quality (low risk: 0 MPN; intermediate risk: 1-10 MPN; high risk: 10-100 MPN; very high risk: >100 MPN)



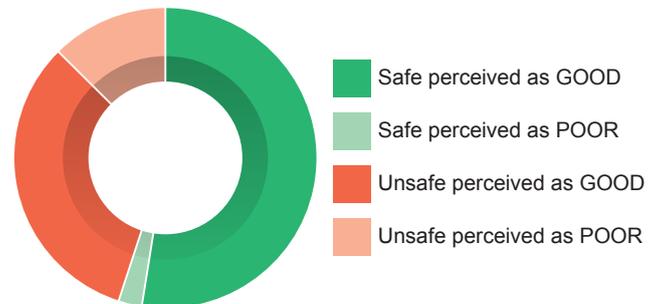
USER PERCEPTIONS

Water point users were asked whether they perceived the quality of water from the source as good or poor. 90% of boreholes and 80% of hand dug wells (including motorised dug wells) are perceived as good quality.



User perceptions of groundwater sources

However, people's perceptions of water quality from a source do not necessarily reflect the safety of water for drinking. Of the 34 sources perceived as good quality, 13 (almost 40%) are classed as unsafe for drinking, according to the measured levels of E. Coli. The majority of these (12 out of 13) are hand dug wells.



Comparing user perceptions and measured water quality for E. Coli