Risks and resilience of private boreholes in Lagos, Nigeria

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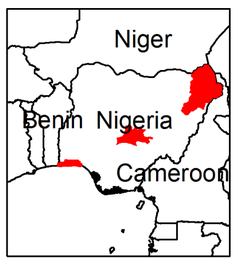
Water security is one of the most pressing risks facing the world. In urban areas, rapidly growing population coupled with rising incomes, falling costs, and often an absent or unreliable public water supply, mean that increasing numbers of households are choosing to install private boreholes to meet their domestic water needs. This trend is particularly prevalent in emerging global mega-cities such as Lagos, Nigeria.

This multidisciplinary study begins to address the question: **Does the proliferation of private boreholes strengthen or weaken the resilience of Lagos and its residents to future environmental shocks?**

Methodology

The study brought together geographers, journalists, psychologists and hydrogeologists to carry out a range of research activities across Lagos State (Figure 1). Research was also carried out in Borno State (around Maiduguri), and Nasarawa State (around Lafia) to provide a comparative assessment. The results presented here focus only on Lagos.



A **Pilot Field Study** involved 3 main activities:

1. Water point survey of 40 groundwater sources
2. Household surveys
3. Interviews with community groups and key stakeholders

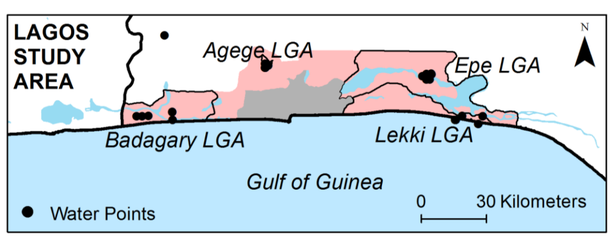
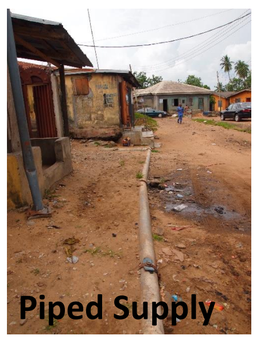
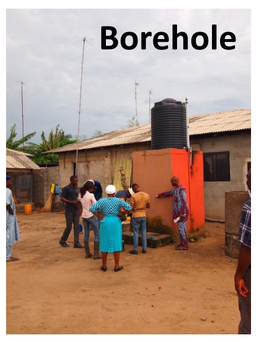


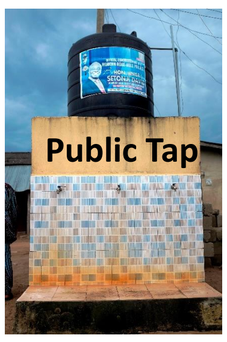
Figure 1 Location of study in Lagos State

A large-scale **Survey of 500 Households** was also conducted via the internet to determine how people use, access, and perceive different water sources across Lagos State.

Water Use in Lagos







33% use **public supply** piped into home on a daily basis

68% use **private borehole** on a daily basis

41% use **shared borehole** on a daily basis

95% use **sachet/bottled** water at least once per week

17% use water from **open well** at least once per week

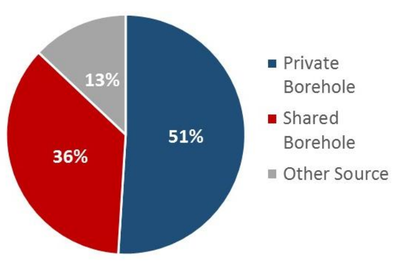


Figure 2 *Primary* source of household water: individual supply augments public supply

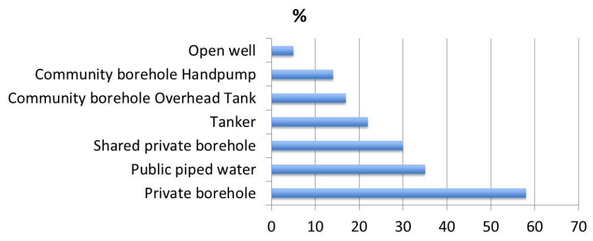


Figure 3 Propensity to *drink* by source: boreholes and sachet water preferred; other sources are often used for other domestic purposes.

Notable exception to this is in Orile Agege LGA where deep hand dug wells are also used for drinking.

Attitudes to Groundwater

Attitudes to groundwater are overwhelmingly positive, with a majority considering boreholes a reliable water source in terms of quality and quantity.

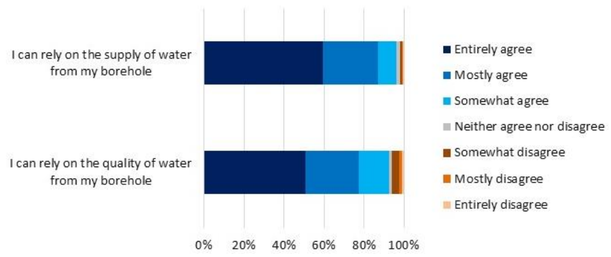


Figure 4 *Perceptions* of private boreholes

Perceived benefits of borehole ownership include: independence, control, security, quality, convenience and cost-effectiveness

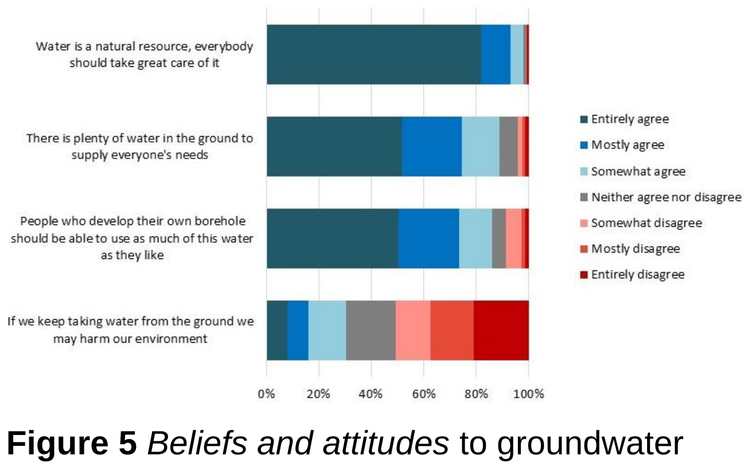


Figure 5 *Beliefs and attitudes* to groundwater

The majority view water as a resource that should be protected. However, most also believe that groundwater is abundant and perceive no risks to supply due to over-abstraction.

Perceived and Observed Water Quality

The pilot study revealed that 80% of hand dug wells and 90% of boreholes are perceived as good quality. This is not always reflected in the observed water quality: almost 40% of sources *perceived* as good quality have unsafe levels of E. Coli and 15% have iron concentrations above WHO guidelines for drinking water.

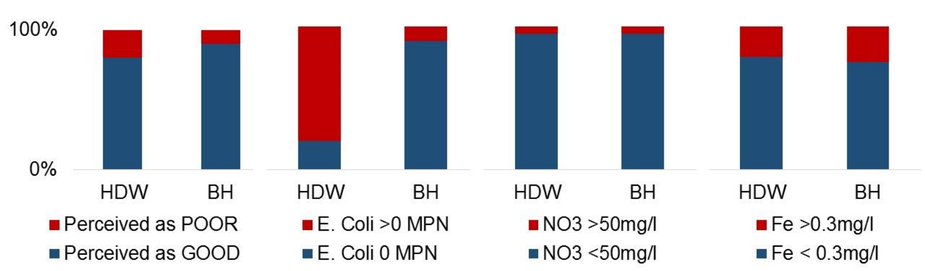


Figure 6 *Perceived and observed* water quality from 20 hand dug wells (HDW) and 20 boreholes (BH)

Risks and Resilience

Private boreholes provide water security in the absence of adequate public supply

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Increases individual resilience

Lack of groundwater management & monitoring

Over abstraction

Contamination

Lack of Awareness

⇩

Decreases community resilience in future?

90% of those surveyed agree that most people would prefer a private borehole and 89% agree that more people have private boreholes now than 10 years ago. This collective enthusiasm for unlimited and expanding groundwater extraction in the city of Lagos increases individual resilience to water shortage in the present. However, coupled with a demonstrated lack of groundwater governance and regulation, this may reach a tipping point where vulnerability is transferred to the wider community or to the future. Understanding the role of agency and communicating the potential risks associated with uncontrolled groundwater development, across a range of actors and agencies, may be critical to avoid future conflict between individual and societal resilience to environmental shocks.

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This work is supported by the Natural Environment Research Council Grant number: NE/P01545X/1