

# RIGSS: Field Summary

## Lafia and Nasarawa State

We gratefully acknowledge the support of:

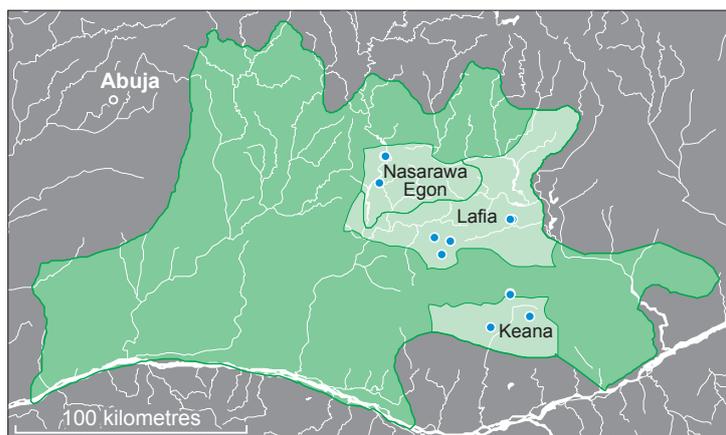
- Lafia State Government
- Alhaji Khana
- Dr. Aisha Khana, Nasarawa State University, Keffi

### 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 study was carried out in eight towns and villages across the Local Government Areas of: Keana, Lafia and Nasarawa Egon.



Nasarawa State, Nigeria Nigeria



### METHODOLOGY

The Lafia field study involved two main activities:

- **Detailed water point surveys** of 16 groundwater sources, including vulnerability and water quality assessments
- **Qualitative interviews** and focus groups to capture the perceptions of community and household water users

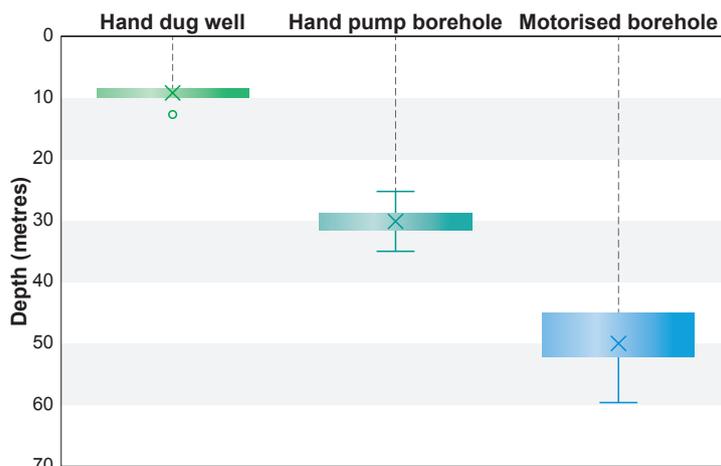
The following **groundwater sources** were examined in Nasarawa State:

- 4 motorised boreholes
- 4 hand pump boreholes
- 6 hand dug wells
- 1 spring and 1 undeveloped borehole

Four of the sources (2 motorised boreholes and 2 hand dug wells) were private; the remainder were public, funded by the communities themselves (4 sources), government (6 sources) and NGOs (2 sources).

The following data were collected:

- Specific electric conductance, SEC (at all 16 sources)
- E. Coli concentrations (at 13 sources – all except 3 hand dug wells)
- Vulnerability scores (at 13 sources – all except 2 hand dug wells and the undeveloped borehole)
- Groundwater levels and source depths (at all relevant sources)



Known or measured source depth

### PRIMARY SOURCES OF WATER

Water in this study area is primarily used for domestic purposes (drinking, hygiene and sanitation). Water choices are relatively limited, and are summarised in the table below.

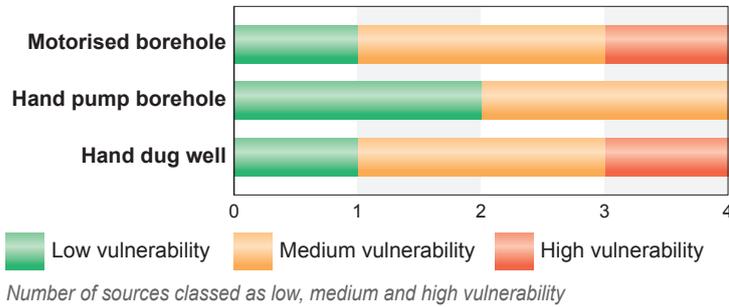
Source type	Communities (dry season)	Communities (wet season)
Borehole	7	7
Rainwater collection	7	7
River/stream	7	6
Unprotected hand dug well	6	6
Spring	4	4
Cart with small tank	2	2
Bottled/sachet water	2	1

Number of communities accessing different source types during the wet and dry season in Nasarawa State

## 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.

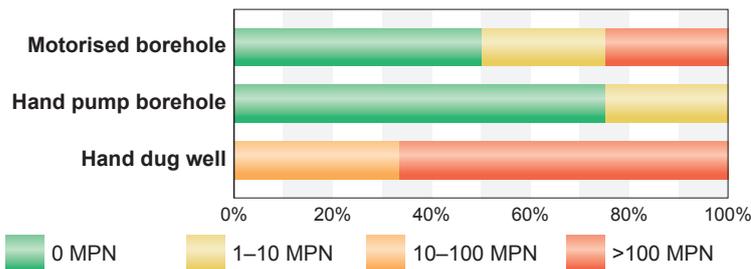
The majority of sources in Nasarawa State were classed as **low to medium vulnerability**, with two highly vulnerable sources: one hand dug well and one motorised borehole.



## 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.

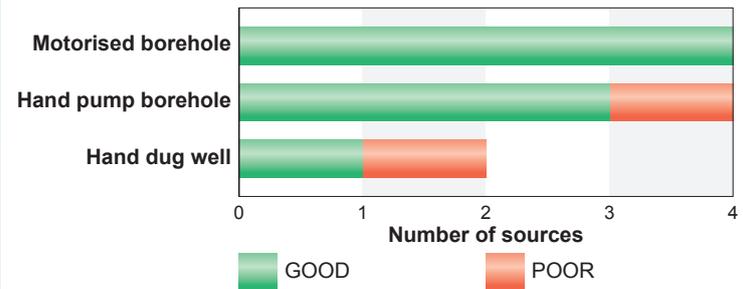
Sampling of groundwater sources in Lafia shows that SEC was slightly elevated in the deeper boreholes relative to the shallow hand-dug wells, suggesting a natural rather than anthropogenic source. Conversely, according to the World Health Organization Drinking Water Guidelines for E. Coli, the water quality analysis shows that all hand dug wells were classed as high or very high risk, while the majority of boreholes have safe levels of E. Coli.



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)

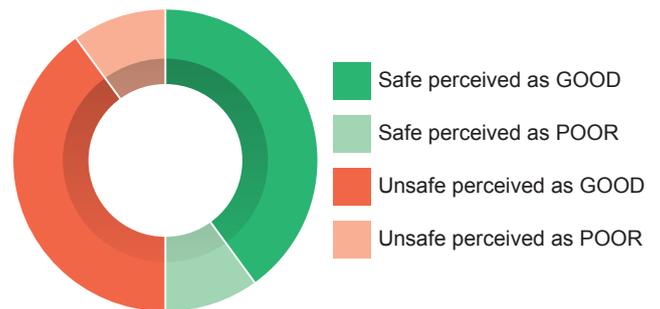
## USER PERCEPTIONS

Water point users at 10 of the groundwater sources were asked whether they perceived the quality of water from the source as good or poor. 50% of hand dug wells, 75% of hand pump boreholes, and all motorised boreholes 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 sources perceived as good quality, 50% are classed as unsafe for drinking, according to the measured levels of E. Coli.



Comparing user perceptions and measured water quality for E. Coli



British Geological Survey  
Expert | Impartial | Innovative



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

For further information contact Adrian Healy: [Healya2@cardiff.ac.uk](mailto:Healya2@cardiff.ac.uk)