

How safe are drinking water sources in developing urban settings? A case study of Aba, Nigeria

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INTRODUCTION

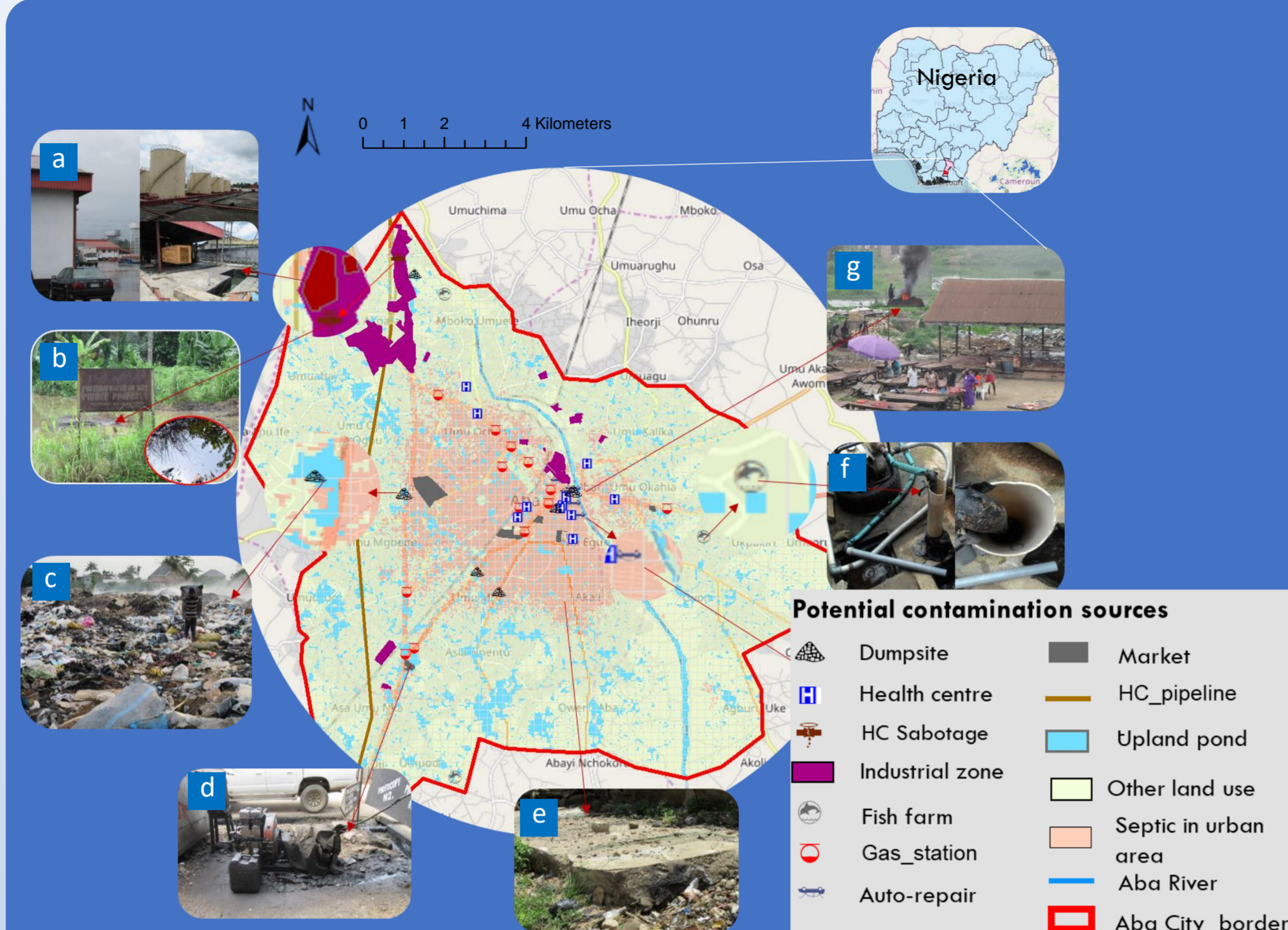
In the global South, the increasing trends in urbanization and population of developing urban settings has been accompanied by poor land-use and environmental practices which are disturbing natural resources.

In Nigeria, most urban areas have struggling public amenities such as dysfunctional public drinking water supply and lack a central sewage system to manage municipal effluents.

Urban plan implementation is often weak and this affects the quality of the environment, especially the natural water source.

RESEARCH OBJECTIVES

- identify major sources of drinking water
- understand how householders perceive quality in drinking water sources
- investigate bacteriological safety in drinking water sources



STUDY AREA

Contamination hotspot map of Aba showing location of some important urban and agricultural land use that directly harm the natural water sources in the area. These include:

- discharging industrial effluents and run-off in cesspools
- spills from vandalised pipeline
- municipal dumpsites
- HC spills from automobile and power generator engines
- use of leaky septic drains and on-site sanitary facilities
- discharging effluents of fish farms direct into the aquifer
- discharging effluents of slaughters into the Aba River

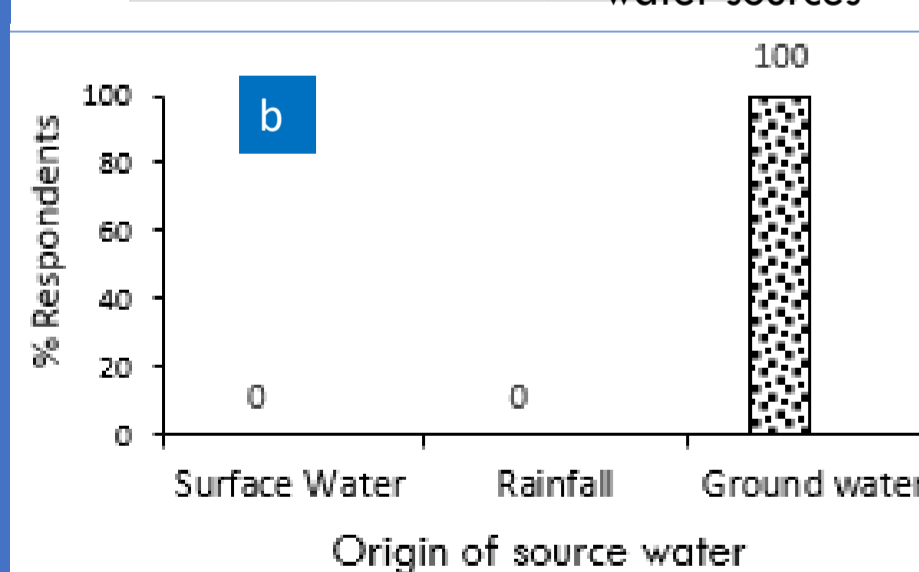
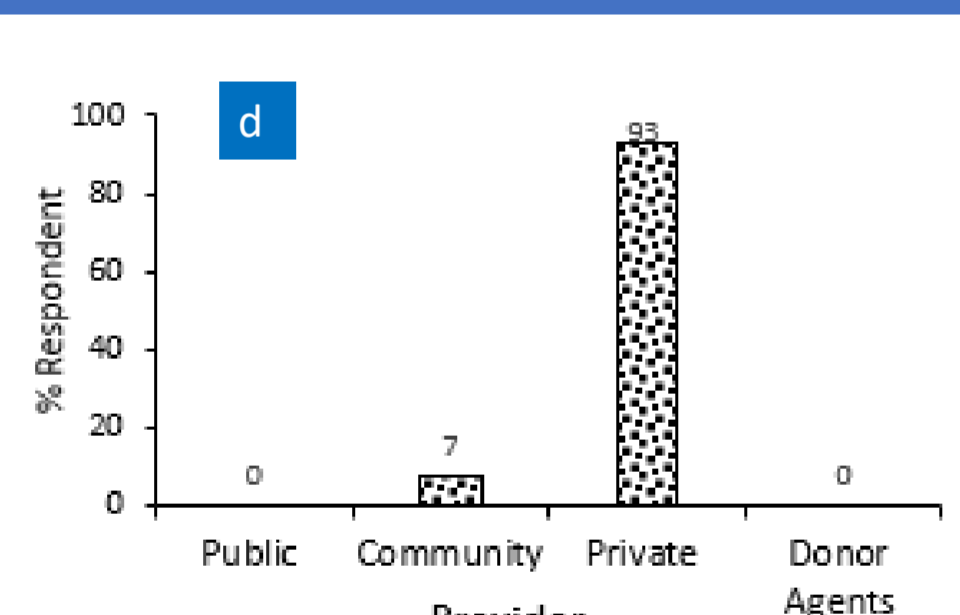
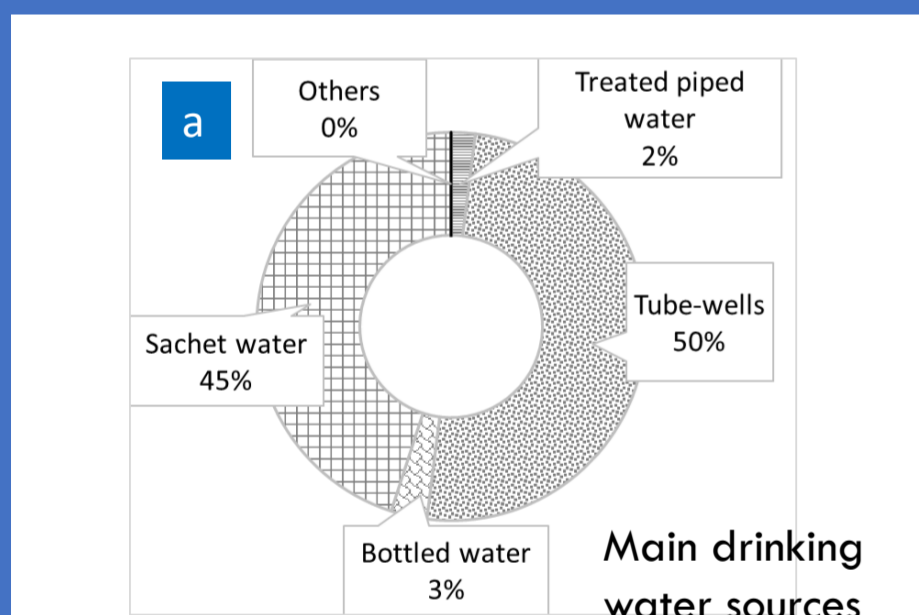
MATERIALS AND METHODS

- An empirical study was conducted among 150 randomly selected households using multi-stage sampling in the densest residential part using questionnaires
- Drinking water from different sources (wells, sachet water, beverages) were analyzed for the presence of indicator organisms (bacteriological contamination) according to ISO 7704:1985



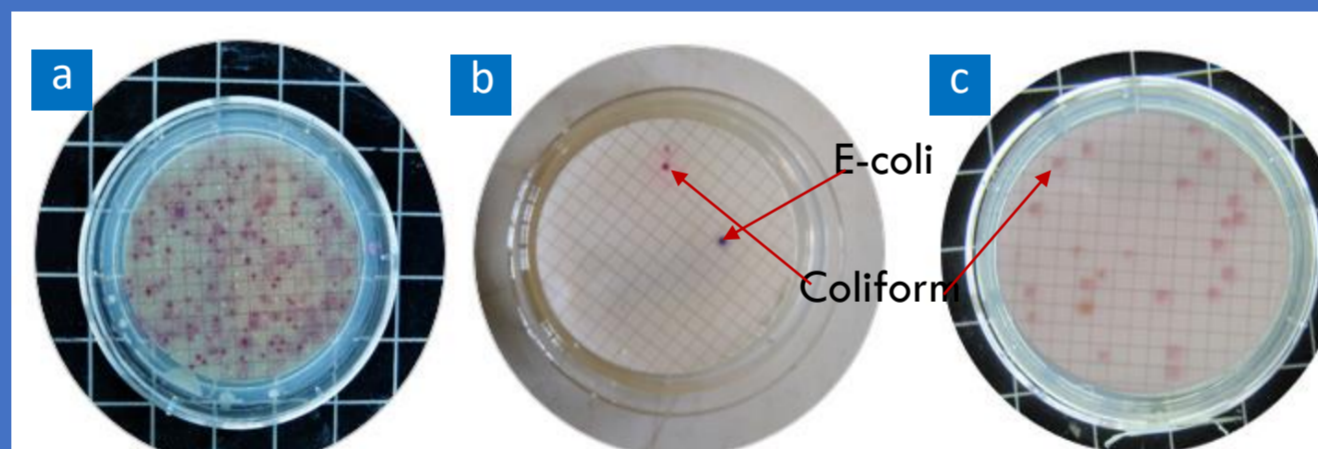
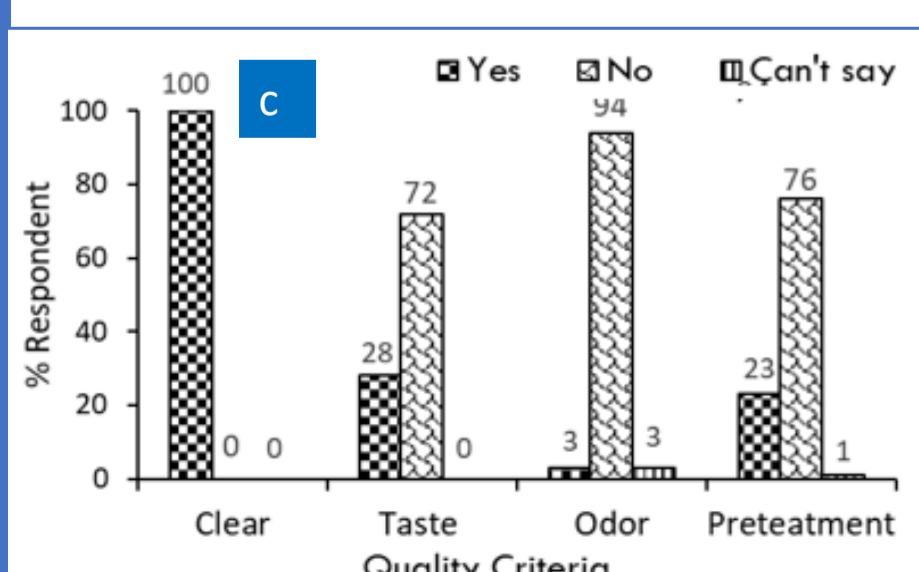
Some photos of drinking water samples (natural and alternative (N=36))

SOME RESULTS AND DISCUSSION

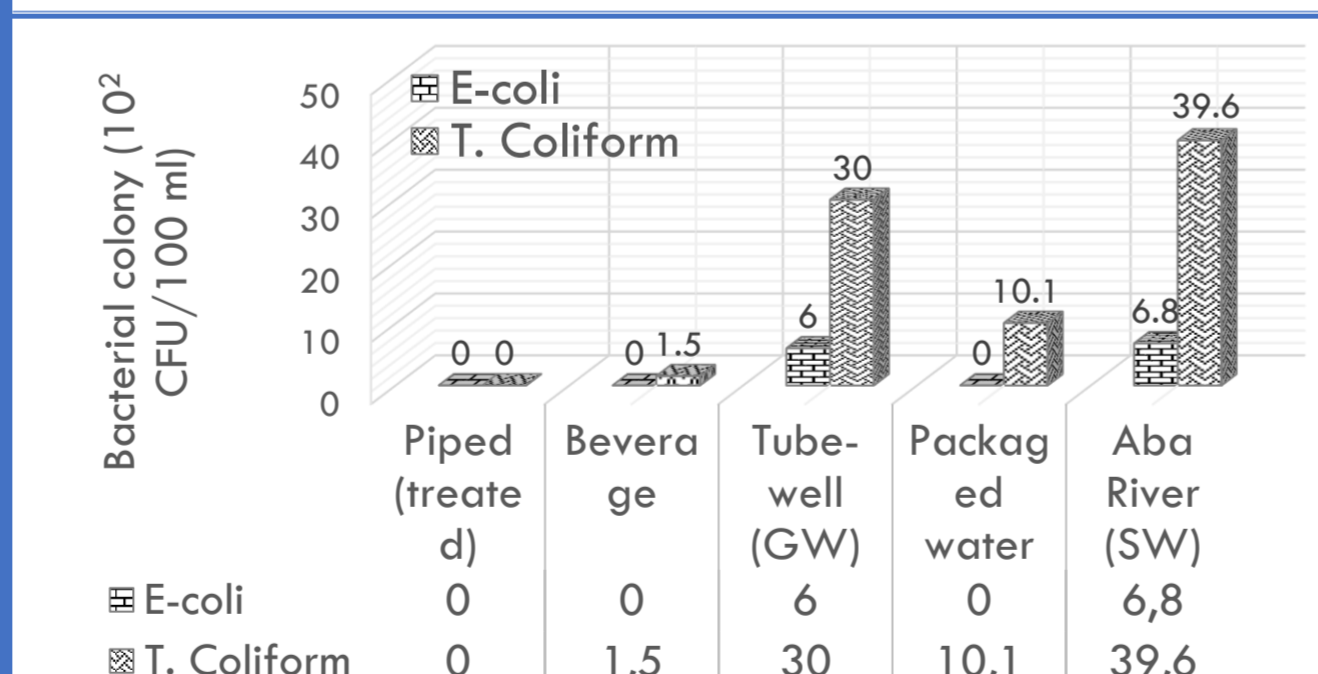


Results from the questionnaire:

- Main drinking water sources in the area are tube-wells and sachet water
- However, the origin for all drinking water sources is groundwater
- The quality perception of the drinking water is acceptable.
- However, 76% of the people drink untreated water
- The supply provider is mostly private



Presence of indicator organisms in water samples from (a) Aba River, (b) groundwater (tube well), (c) water in sachet



Health risk indicator
 $< 1 \text{ CFU}/100 \text{ ml E-coli}$
 $< 10 \text{ CFU}/100 \text{ ml Total Coliform}$
 (Max. allowable risk)

- 30.5% of samples tested positive for Total Coliform
- Presence of *E-coli* suggest direct human influence in the natural water sources



Some examples of observed urban and agricultural practices that increase the bacteriological load of natural water sources (surface and groundwater) in the area.

- use of leaky septic drain and on-site sanitary facilities
- unregulated municipal dumpsite
- rearing livestock along water course
- direct discharge of fish farm effluents in the aquifer

CONCLUSION

The findings revealed that groundwater is the main source of drinking water in Aba City. The water is extracted in private tube-wells and also sold as sachet water. Uncontrolled and unsuitable siting of these tube-wells around the potential contamination hotspots increases the bacteriological load and reduces the quality of this important source.

BIBLIOGRAPHIC REFERENCE

Ijioma, U.D., 2021. Evaluation of water situation and development of drinking water management plan for Aba City, Southeast Nigeria. PhD-Thesis, Brandenburg University of Technology Cottbus-Senftenberg, Cottbus.