Introduction

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Loading and mobility of faecal contaminants in shallow groundwater systems in Lukaya Town Council, Kalungu District, Central Uganda: sustaining urban water supplies

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1 Background

Lukaya Town Council in central Uganda covers an area of 38km^2 with a population density of 604.39 persons/km^2 has conjunctive use of the subsurface as a source of water and a repository of faecal matter. Groundwater is the main source of water where majority of the population depend on hand pumped shallow wells and unprotected springs. Sanitation facilities are unlined elevated pit latrines which are shallow due to a shallow water table and unlined waste disposal sites that put groundwater at a risk of being contaminated.


Unprotected spring


Hand pump shallow wells, one flooded during rainy seasons


Elevated pit latrine


Waste damp site

Water sources
Well census of Lukaya Town Council

Type	Deep wells(>30m)	Shallow wells (<30)	Springs
No.	8	59	9 (Unprotected)
Users	20, institutions, 20 communal & 14 individual		

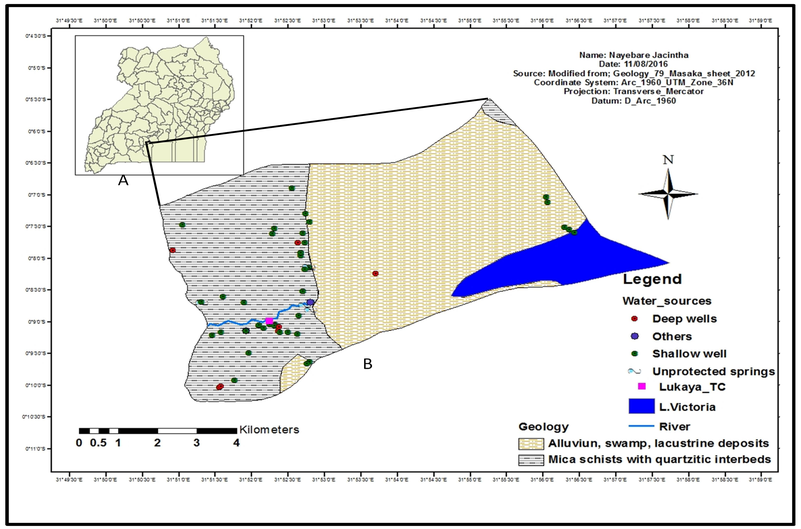
2 Objectives

1. Map and characterize urban aquifer (lithology and architecture), water supply sources and on-site sanitation system;

2. Assess the vulnerability of the urban aquifer to faecal contaminants;

3. Evaluate current and projected faecal contaminant load and pathways from on-site sanitation facilities (e.g. pit latrines, septic tanks) to groundwater;

4. Identify health risks to humans posed by susceptible groundwater sources to faecal contaminants and generate a groundwater conceptual model with respect to pathways of faecal contaminant.



Groundwater sources around Lukaya Town Council

3 Hydrogeological Characteristics in Lukaya

Geology comprises deeply weathered Precambrian crystalline rocks and Recent alluvial deposits. The hydrogeological formation is largely deeply weathered saprolite and alluvial sediments with a shallow water table.

Summary statistics of aquifer geometrical characteristics from borehole lithological logs of Lukaya Town Council.

District	Min	Max	Mean	Standard error
Total drilled depth (mbgl)	90.8	117.8	102.0	4.3
Depth to bed rock (mbgl)	33.0	90.6	57.9	9.3
Static water level (mbgl)	0.5	9.0	4.5	1.6
Constant discharge yield (m^3h^{-1})	0.5	1.5	0.9	0.2

4 Methodology

- Systematic digital mapping of water sources and sanitation facilities.
- Geophysical survey and installation of groundwater observatories.
- Administration of pre-designed questionnaire to selected households and sanitary inspection of water sources and sanitation facilities.
- Collection of soil, sediment, rock cuttings and raw water samples.
- Physicochemical and microbiological determination.

5 Findings and Acknowledgment

- A high demand for groundwater with sources proximate to sanitation facilities.
- Poor sanitation systems with unlined pit latrines and open waste disposal sites increasing vulnerability of groundwater sources to contamination.

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6 References

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