

# Impacts of Low Sanitation to Groundwater Resources in some Parts of Dar Es Salaam City TANZANIA.

BY HUDSON NKOTAGU

UNIVERSITY OF DAR ES SALAAM TANZANIA. E mail :hudson@udsm.ac.tz

## Basic research questions included:

- To What extent is poor sanitation affecting groundwater resources in the study area?
- How is domestic sewage effluents related to groundwater water quality from both shallow wells and boreholes?
- To what extent has improvement in sanitation improving the quality of groundwater in the area?
- What are the mechanisms responsible for groundwater pollution in intergranular aquifers system in semi humid regions?

Fig 1.0 Location of the study area:

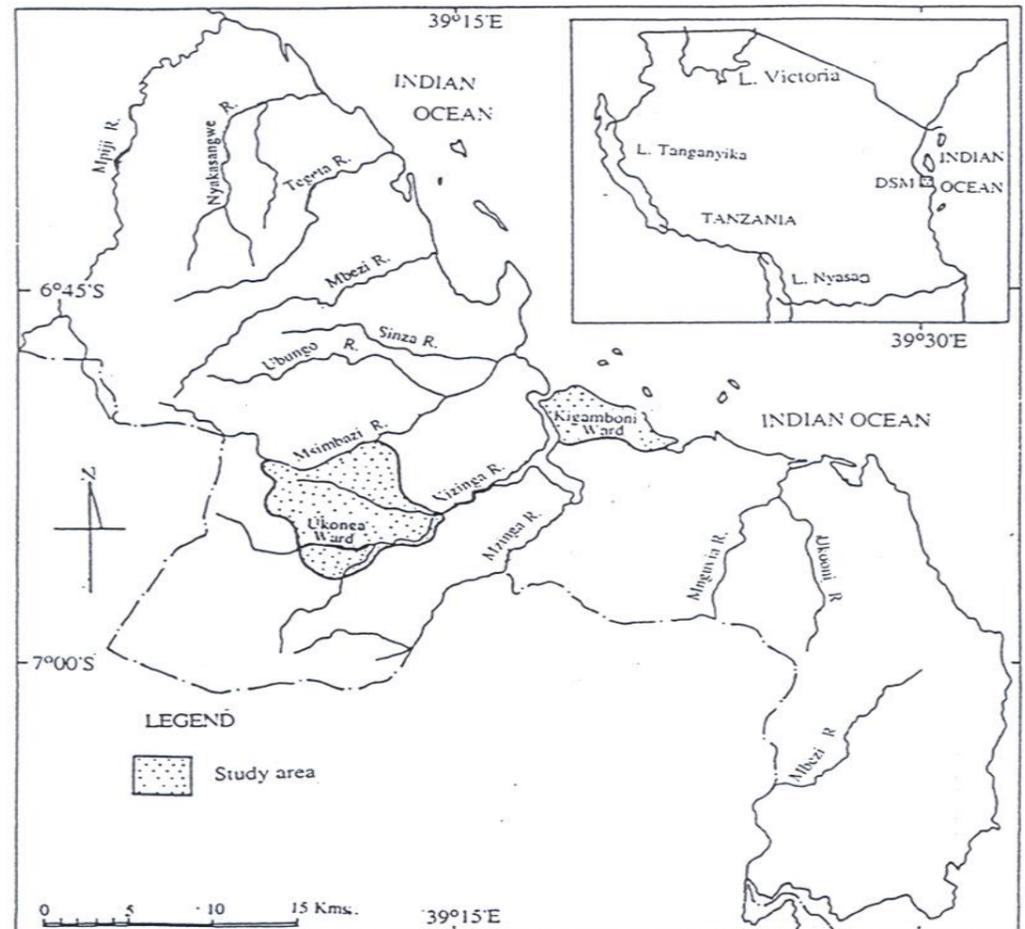
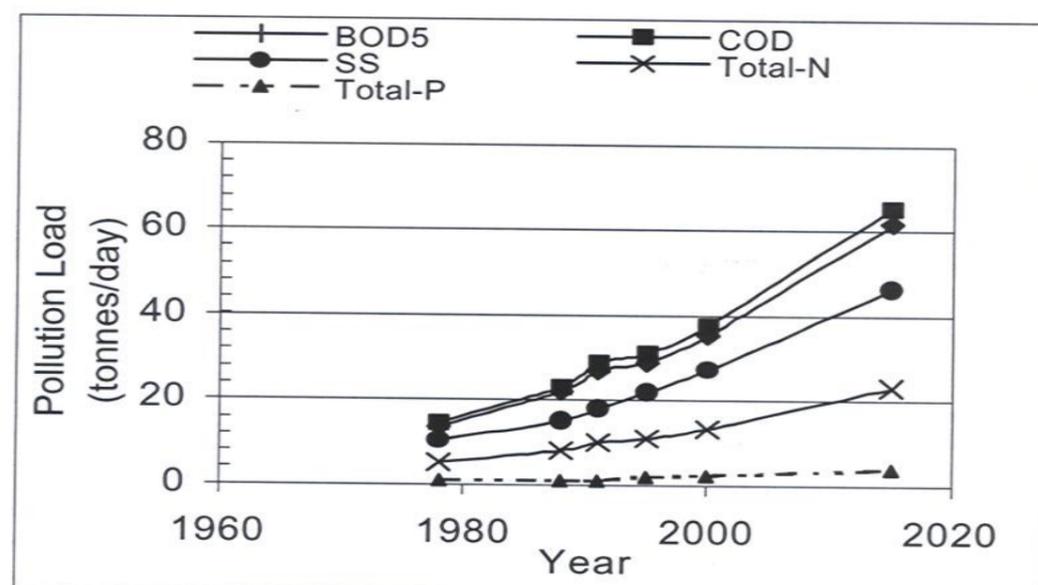


Table 1.0 Rotated Matrix for the two selected sites in Dar Es Salaam city (Ukonga & Kigamboni)

Variable	Factor			
	1	2	3	4
pH	0.232	0.126	-0.088	0.941
TDS (mg/l)	0.928	0.237	0.253	0.081
Ca <sup>2+</sup> (mg/l)	0.457	0.202	0.719	-0.284
Mg <sup>2+</sup> (mg/l)	0.207	0.321	0.747	-0.121
Na <sup>+</sup> (mg/l)	0.947	0.076	-0.138	0.200
K <sup>+</sup> (mg/l)	-0.081	0.071	0.884	0.068
HCO <sub>3</sub> <sup>-</sup> (mg/l)	0.600	0.553	0.121	-0.312
Cl <sup>-</sup> (mg/l)	0.919	0.056	0.280	0.157
SO <sub>4</sub> <sup>2+</sup> (mg/l)	0.601	0.578	0.192	0.103
NO <sub>3</sub> <sup>-</sup> (mg/l)	0.091	0.922	0.132	0.186
F <sup>-</sup> (mg/l)	0.587	-0.358	-0.416	-0.153
FC (N/100ml)	0.087	0.918	0.171	-0.011
FS (N/100ml)	0.039	0.865	0.401	-0.003

**Methodology:** Water samples were collected from shallow wells and deep wells. ICP for major cation and chromatograph for major anions and membrane count for Faecal Coli (FC) and Faecal Streptococci (FS). XY plots along with statistical analysis for data analysis were used.

Fig. 2.0 Estimates of pollution loads from domestic wastewater reaching groundwater in Dar es Salaam (After Haskoning and M-Konsult, 1989)



## Conclusions:

- Domestic sewage effluents pollutes groundwater in the study area.
- Improving sanitation improves groundwater quality
- Leaching of Domestic sewage effluents through near surface soil sets as a mechanism to groundwater pollution.

## Key references:

- Haskoning and M-Konsult Ltd (1989) Master plan of solid Waste Management in Dar es Salaam Volume I: Main Report and Volume II: Annexes, Tanzania.
- Kaiser, H.F. (1958) The varimax criterion for analytical rotation in factor analysis, *Psychom.* Vol. 23,187-200.
- WHO (1985) Guidelines for Drinking Water Quality. Drinking Water Quality Control in Small Community Supplies, Geneva.