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ASSESSING THE QUALITY OF NATURAL SPRING TO COMBAT URBAN WATER STRESS IN IBADAN, NIGERIA

Grace ADENIJI-OLOUKOI[1] and Tunde AGBOLA[2]

[1]Department of Environmental management, Lead City University, Box, 30678, Ibadan, Nigeria, E-mail: oreofeadeniji@yahoo.com
[2]Department of Urban and Regional Planning, University of Ibadan, Ibadan, Nigeria, E-mail: babatundeagbola@yahoo.com

Introduction

The challenge of water supply shortages is not just in the issue of quantity available per capita per day. The health-related concerns make it necessary to consider the quality of water supply sources to urban dwellers. This is because the human right to water entitles everyone to s**afe and acceptable** water for personal and domestic uses (WHO &UNICEF, 2003).

The study examined the quality of water from natural spring sources in Ibadan city in order to to ascertain that supply sources are safe for consumption.

The Study Context

Ibadan is the capital of Oyo state, Nigeria with population of about 5 million (projected from 2006 census) and annual growth of 2.8%. Water resources includes: Rainfall: 1,500 t0 2,000 mm per annum; about 20 perennial rivers and 25 natural springs are identified. Municipal water supply: Eleiyele Dam, with 30,000m3 capacity commissioned in 1942 and Asejire Dam with 75,000m3 capacity, commissioned in 1972. 22.8% population are served with the municipal water supply system. There is no sewer systems except for research institutions. The development of natural springs for urban uses started in 1996 under the Sustainable Ibadan Project (SIP) to combat water supply crisis in the city.
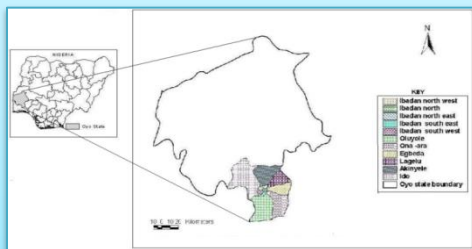
Figure 1: Ibadan in the context of Oyo State, Nigeria

- Four natural springs (Agbadagbudu, Onipasan, Sango and Adegbayi) which were developed at the second stage of Mini water scheme of the SIP were selected.
-Samples of a litre water per source was collected from each spring with Sterile bottles. The analysis include coagulation and titration techniques using the Most Probable Number (MPN) to examine the physical, chemical and bacteriological parameters.
-Bonferroni's Method of ANOVA was adopted to test for variance in the quality of water from the natural springs and the municipal water supply sources (Eleiyele and Asejire) with the WHO standard as a control.

Results

• Adjoining landuses to Onipasan, Adegbayi and Sango spring locations include mechanic workshop, refuse dump site, flowing stream and horticulture sites which are potential pollutants to the spring waters.
• All the sampled spring sources are more acidic. No presence of suspended solid substance
• There are presence of coliform (fecal matters) in Onipasan, Sango and Adegbayi spring indicating that only Agbadagbudu source is potable.
• Zero values of turbidity were obtained for the sampled sources. The alkalinity values obtained for the four springs are higher than the WHO acceptable value of 0.5 – 1.0 (mgl). Hence, more dosage of chemicals are required for disinfection treatments.
• The four springs have allowable chlorine contents while, Sango spring shows a level of higher hardness content.

• Comparison of natural spring sources with the WHO standards for drinking water, the t test indicates that only the Adegbayi spring shows a significance difference at 0.05 alpha level (T > t).
• Comparison with the two municipal water supply sources of Asejire and Eleiyele, Sango natural spring shows a significant difference in term of water quality.

Table 1: Comparisons of Qualitative Characteristic of water in Ibadan Natural Springs Vs Dam

Parameters (mg/ll)	WOS Municipal Supply Sources		Natural Spring Sources				WHO Allowable Level
	Asejire	Eleyele	Agbadagbudu	Onipasan	Adegbayi	Sango	
Physical							
Appearance	Clear	Clear	Clear	Clear	Clear	Clear	Clear
Odour	Fishy	Fishy	Unobjectionable	Objectionable	Objectionable	Objectionable	Objectionable
Colour	1.24	0.5	0	0	0	0	5-50 units
Turbidity	5.0	4.66	0	0	0	0	5-25 units
Total Suspended Solid (TSS)	0	0.15	0	0	0	0	580-1500
PH	7.2	6.8	4.59	5.13	4.70	6.04	7.0 – 8.5
Chemical							
Alkalinity	38	58	20	50	50	65	0.5 – 1.0
Total Hardness	64	84	115	60	45	130	0 – 120
Calcium ion	44	25.6	16	20	6	40	50 – 150
Calcium Hardness	64	64	40	50	15	100	75 – 200
Chloride	17.6	30	60	18	52	91	200 – 600
Bacteriological							
Total Coliform/100ml	0	0	0	170	330	490	0

Conclusion

Urgent sanitary action are to be taken by all the stakeholders. The benefitting communities must work hard to building hygienic environment and proper handling of water at household level in the use of natural spring water.