

Physico-chemical analysis of groundwater from Rugende II well, Rwamagana district, Rwanda

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Abstract

Ground water is vital and most appropriate fresh water resource for human consumption in both urban as well as rural areas. Some of the major quality issues faced by the ground water supply are due to domestic sewage, solid waste dump and the substandard pipe materials used in wells construction. The aim of this study was therefore to monitor the ground water quality at Rugende II well after the aesthetic complaint raised by the consumers. The Rugende II water well is a 40 meters depth well located in Rwamagana district, Rwanda. The well is sandwiched between the Rugende wetland and Rugende slums respectively at a distance of 10 m and 15 m. The quality was studied in terms of physicochemical parameters for a period of eight weeks with four samples in total, where each sample was collected at the study area every two weeks. Parameters measured included: pH, TSS, TDS, electrical conductivity, hardness, manganese, copper and iron. The results showed values that were above the prescribed limits by the World Health Organization and the Rwanda Bureau of Standards, with mean concentration for Turbidity 226.0 NTU, TSS 83.5 mg/L, water hardness 568.8 mg/L, Mn 7.50 mg/L, Fe 288.33 mg/L and pH 5.28. The other parameters were in the range of the mentioned drinking water standards: TDS 177.25 mg/L, EC 367.25 $\mu\text{S}/\text{cm}$, Cu 1.03 mg/L, SO_4^{2-} 7.75 mg/L and Cl^- 118.63 mg/L. From the analysis, the Rugende II water well is not suitable for human consumption due to the values which were above the standard limits. The high iron and turbidity concentrations could be attributed to the corrosion of metal pipes used in constructing the wells.

Key words: Ground water quality, wells, physicochemical, Rwamagana