

An analysis of ground water quality in a water stressed urban centre: a case of Gweru city, Zimbabwe

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Abstract

Ground water quality conformance to the World Health Organisation standards for drinking water was carried out and inferred to the health risks associated with use of such quality of water. Water samples were collected thrice a month, from nine boreholes, over a period of twelve months and analysed for physical, chemical and biological parameters. Chemical parameters were tested using UV-Vis photometry. Physical parameters were measured using HI9829 waterproof portable logging multi-parameter meter and biological parameters were determined using the Minimal Media ONRG-MUG test and the Membrane Filtration Method (MF). Results shows that total hardness and Fe concentration were above limit in 78% and 56% of the sampled boreholes, respectively. pH, EC, Ca, Cl, F, Mn, Mg and Turbidity were within the acceptable WHO limits. Of the sampled boreholes, 67% were not conforming to the Escherichia coli loads recommended for drinking water. Parametric correlations showed strong and significant correlations between chlorides and fluorides ($r = 0.68$; $p < 0.05$), Nitrates and Sulphates ($r = 0.78$; $p < 0.05$). There is need to treat borehole water to eliminate E. coli and reduce nitrates and total hardness. Furthermore, analysis and monitoring systems to determine temporal variability and health risks, respectively, needs to be put in place.