

Well Water Quality in the Abetifi and Mpraeso Townships of the Eastern Region of Ghana

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ABSTRACT

The study was conducted to monitor well water quality in Abetifi and Mpraeso towns; the district capitals for Kwahu East and Kwahu South respectively. The research was conducted from December to March in the dry season when most of the residents depended on water from wells because of erratic flow of treated pipe borne water. The study involved reconnaissance surveys, physico-chemical, nutrient and chemical parameters, bacteriological assessment and social surveys. The study determined the concentration level of trace metals in well water, the microbial water quality of wells and finally established the perception of people on the impact of human activities on water bodies and the quality of water they consume from wells.

Well water quality was monitored along three main dimensions, namely physico-chemical, nutrient and chemical, and microbial parameters. In all, fourteen sampling sites (seven at Mpraeso and seven at Abetifi) were considered. The various water quality parameters determined from the well water were compared to Ghana Standard GS175-1:2008 and World Health Organization WHO (1993) guideline limits.

Some of the physico-chemical parameters determined such as temperature, TDS, total hardness, salinity, nitrate, sulphate, phosphate, chloride, sodium, potassium and other trace elements were generally within the WHO/GS 175 and WHO guideline limits. From the study, it was discovered that water quality parameters such as pH, turbidity, conductivity, iron, manganese and calcium exceeded GS 175 and WHO guideline limits. The pH of well water in both districts was slightly acidic. The mean conductivity recorded at Abetifi site 2 (815.5 μ S/cm) exceeded the guideline limit. Turbidity values from most well water far exceeded the WHO guideline limit. Turbidity recorded at Abetifi ranged from a minimum of 9.14 FAU in December to a maximum of 18.71 FAU in March, values increased from December to March.

The mean iron concentrations in Mpraeso varied from a minimum of 0.5825mg/l to a maximum of 3.2168mg/l, indicating that the district is characterized by relatively high iron concentrations

and exceeded the GS 175 and WHO maximum acceptable limits for portable and domestic water.

Well water obtained from the two towns was microbiologically poor with the levels of total and faecal coliforms exceeding the GS 175 and WHO acceptable limits. The detection of coliforms in well water was due to poor construction of wells, without proper physical barriers, location of these wells close to sanitation facilities, and poor maintenance of wells.

The research on social survey did not only consider the perception of people on the impact of human activities on well water but other sources of drinking water in the two districts were also taken into consideration. The social survey showed that majority of residents depended on wells especially in the dry season for the reason of its availability, accessibility and proximity. Majority of residents perceived the water they consumed to be of poor quality and attributed the poor quality to the effects of human activities on water bodies. Farming close to water bodies and wastewater from car washing bays were observed as the major human activities polluting water bodies.

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