

The Impact of Septic Tank Effluent on Underground Water Quality of Some Communities in the Ga West District, Ghana

FRIMPONG BRIGHT

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ABSTRACT

Investigations were conducted to assess the quality of borehole water and wells in relation to distance from septic tanks in residential households in Ga West District, Ghana. The geographical locations of the boreholes, hand dug wells and the nearest septic tanks were determined using global positioning satellite (GPS). Water quality analyses of some physico-chemical and bacteriological variables were carried out on water samples collected from boreholes and wells using processes outlined in the standard methods for the examination of water and wastewater and the examination of water for pollution control (WHO). Water sampled from boreholes showed the following variations in physico-chemical and bacteriological parameters with distance from their nearest septic tanks over a three month period; conductivity; 2035-2830 μ S/cm (0-15m); 2500-3872 μ S/cm (16-30m), 870-1020 μ S/cm (>30m); cr. 315-345mg/l (0-15m), 460.5-520mg/l (16-30m), 63.7-95.1mg/l (>30m); N03-N; 6.9-23.4mg/l (0-15m), 13.4-25.6mg/l (16-30), 5.1-7.3mg/l (>30m); FC; 40-80cfu/100ml (0-15m), 0-20cfu/100ml (16-30m), 0-10cfu (>30m). The results of the hand-dug wells include: conductivity; 3125-6243 μ S/cm (0-15m), 1050-4568 μ S/cm (16-30m), 428-965 μ S/cm (>30m); Cr; 193.81-401.5mg/l (0-15m), 665.7-1235mg/l (16-30m), 95.1-72.6mg/l (>30m); N03-N; 6.9-13mg/l (0-15m), 13.4-25.6mg/l (16-30), 4.6-7.6mg/l (>30m); Fe; 30- 210cfu/100ml (0-15m), 20-120cfu/100ml (16-30m), 0-10cfu/100ml (>30m)

The study revealed that, the concentrations of the physico-chemical and bacteriological parameters such as conductivity, total dissolved solids, sulphate, nitrate, phosphate, chloride, faecal coliform and total coliform in water samples at distances between 0-30m from the nearest septic tank for both boreholes and wells exceeded the WHO permissible limit for drinking water and other domestic needs as compared to the concentrations in the water samples at control distances (>30m). Sodium, potassium, total suspended solids, nitrite and ammonia concentrations were below the WHO guideline permissible limit. The high faecal coliform and total coliform and detection of *Escherichia-coli* in most sampled water is an indication of possible influence by septic sewage from the septic tank close to them. The views of the

respondents on relevant issues of water and sanitation in the District were also sought through the administration of questionnaire. The social survey revealed that about 64% of the respondents were not aware of the possible impacts of their septic tank sewage system in relation to distance to their water source. Besides, all the wells and boreholes sampled had a septic tank within the distance 11 to 41 m close to them. This study accentuates the need for the district assembly to set standards for the sitting of wells and boreholes from septic tanks considering all possible sources of contamination. Owners of the wells and boreholes should also treat the ground water before use.

Supervisors

Prof. K. Nyame

Dr. Opoku Pabi