

# Groundwater quality in Samia area of Busia county, Western Kenya

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## Abstract:

This study focuses on the groundwater quality in Samia area, western Kenya. It also investigates the aquifer types and their possible impacts on the water quality. The geology of the area comprises granite-greenstone terrane of Archaean age. The Archaean rocks include the Nyanzian "supergroup" intruded by igneous complexes and calc-alkaline plutons which comprise the Samia series and acid volcanic units which include the banded iron formation of the Samia hills. The lithological composition of these rocks appear to have profound effects on water quality. The results of this study show that the groundwater is fairly neutral with pH between 6.5 and 7.5. The minor elements like zinc, manganese and iron are within the World Health Organization (WHO) potable water guidelines; similarly fluorides, chlorides, nitrates and sulphate are within safe limits. Chemical analyses of the water indicate geological influence and the hydrochemical facies in the area can be divided into at least two zones; Calcium bicarbonate type in the southern and Sodium-potassium bicarbonate type in the northern parts of the area. As the groundwater flows from the recharge to the discharge areas, it increases in Total Dissolved Solids (TDS), which is interrupted by geological structures such as fissures, shears or cracks which could be natural, hence altering the water chemistry. Although the waters from most of the drilled boreholes and wells are suitable for most purposes like domestic, agricultural and industrial, the presence of some mineral components (e.g., Ca and Mg) above the required guidelines in some wells make water from these few boreholes unsuitable for laundry and other domestic purposes including cooking. It was noted from this study that for all the drilled wells, the water rest level was above the water struck level providing strong evidence for semi-confined aquifer fields. The water struck level in the area ranges from 28 to 68 m while the water rest level ranges from 10.2 to 30.34 m in depth from the ground surface.