Assessment of the Sustainability of a Borehole for a Small Town Water Supply Scheme in Mim-Kyemfre in the Kwahu Afram Plains, North District, Ghana

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Abstract

Despite the construction of the Mim-Kyemfre Small Town Water Supply Scheme, significant time is spent by the inhabitants to fetch water for their daily domestic activities. The whole day could be wasted in collection of water for household use. This situation also results in low productivity which has a significant impact on their overall standard of living and retards development. This project work was therefore carried out to estimate the hydraulic properties, the composition of groundwater in the borehole, to quantify the yield of the borehole water source, to evaluate whether the water source can sustain the scheme and to assess the quality of the groundwater. Straight-Line Time-Drawdown (Cooper Jacob XL V.1, 1946 software) method was used to analyse the constant rate pumping test data and transmissivity of 307.26 m^2/day was obtained, indicating that the aquifer has a high permeability and can transmit enough water to the borehole to balance the current and future withdrawals. The analysis performed indicated that the borehole is able to serve the population's domestic water demand for the next 10 years. Also the water quality results indicated that all the parameters analysed were within WHO and GSB standard guidelines with the exception of colour and total iron. Inferring from the pumping and recovery test analysis, the aquifer is characterised by high permeability which can transmit enough amount of water to the borehole to balance the current and future withdrawal.