

**SHALLOW AQUIFER CHARACTERISTICS IN A  
TROPICAL CRYSTALLINE ROCK ENVIRONMENT:  
A CASE STUDY OF ABEOKUTA CITY,  
SOUTHWESTERN NIGERIA**

**O.A. IDOWU, O. MARTINS AND M.A. ADETONA**

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Department of Water Resources Management and Agrometeorology,  
University of Agriculture, Abeokuta. Nigeria

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**ABSTRACT**

Shallow aquifer, constituted by the weathered material which overlies the fresh base-ment in the city of Abeokuta, southwestern Nigeria is studied by analyzing constant pumping tests from 32 hand dug wells and major ion constituents of water samples collected from the wells. Assessed are the characteristics of the wells and the hy-draulic characteristics of the shallow aquifer for the pumping and the recovery re-gimes. The transmissivities range between  $1.42 \times 10^{-4}$  m/s to  $7.03 \times 10^{-4}$  m/s for the pumping phase and between  $1.21 \times 10^{-4}$  m/s to  $12.25 \times 10^{-4}$  m/s for the recovery phase, while the specific yields range from 0.092 to 0.61 and from 0.02 to 0.647 for pumping and recovery regimes respectively. Two major recharge areas are identifi-able from study area and the groundwater flow directions indicate a possible mixture of the two water types from the recharge areas in the central part. In addition to high nitrate concentration, indication of aquifer pollution from domestic, agricultural and industrial sources is also provided by the high concentrations of cadmium ion in the groundwater. The average concentration of nitrate and cadmium ions are 88 ppm and 0.014 ppm, respectively.

**Keywords:** Transmissivity, specific yield, groundwater flow, groundwater pollution.