World Academy of Science, Engineering and Technology
International Journal of Geological and Environmental Engineering
Vol:18, No:11, 2024

Assessment of Groundwater Quality in Kaltungo Local Government Area of Gombe State

Authors : Rasaq Bello, Grace Akintola Sunday, Yemi Sikiru Onifade

Abstract : Groundwater is required for the continuity of life and sustainability of the ecosystem. Hence, this research was purposed to assess groundwater quality for domestic use in Kaltungo Local Government Area, Gombe State. The work was also aimed at determining the thickness and resistivity of the topsoil, areas suitable for borehole construction, quality and potentials of groundwater in the study area. The study area extends from latitude N10015’38” - E11008’01” and longitude N10019’29” - E11013’05”. The data was acquired using the Vertical Electrical Sounding (VES) method and processed using IP12win software. Twenty (20) Vertical Electrical Soundings were carried out with a maximum current electrode separation (AB) of 150m. The VES curves generated from the data reveal that all the VES points have five to six subsurface layers. The first layer has a resistivity value of 7.5 to 364.1 Ωm and a thickness ranging from 0.8 to 7.4m, and the second layer has a resistivity value of 1.8 to 600.3 Ωm thickness ranging from 2.6 to 31.4m, the third layer has resistivity value of 23.3 to 564.4 Ωm thickness ranging from 10.3 to 77.8m, the fourth layer has resistivity value of 19.7 to 640.2 Ωm thickness ranging from 8.2m to 120.0m, the fifth layer has resistivity value of 27 to 234 Ωm thickness ranging from 8.2 to 53.7m and the six-layer is the layer that extended beyond the probing depth. The VES curves generated from the data revealed KQHA curve type for VES 1, HKQQ curve for VES 4, HKQ curve for VES 5, KHA curve for VES 11, QQHK curve for VES 12, HAA curve for VES 6 and VES 19, HAKH curve for VES 7, VES 8, VES 10 and VES 18, HKH curve for VES 2, VES 3, VES 9, VES 13, VES 14, VES 15, VES 16, VES 17 and VES 20. Values of the Coefficient of Anisotropy, Reflection Coefficient, and Resistivity Contrast obtained from the Dar-Zarrouk parameters indicated good water prospects for all the VES points in this study, with VES points 4, 9 and 18 having the highest prospects for groundwater exploration.

Keywords : formation parameters, groundwater, resistivity, resistivity contrast, vertical electrical sounding
Conference Title : ICGG 2024 : International Conference on Geology and Geophysics
Conference Location : Jeddah, Saudi Arabia
Conference Dates : November 11-12, 2024