

Electrical Geophysical and Physiochemical Assessment of the Impact of Environmental Pollution on the Groundwater Potential of a Waste Land fill at Tudun Murtala in Nassarawa Local Government Area, Kano State, Nigeria

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Abstract : The study assessed the impact of environmental pollution on groundwater potential at Tudun Murtala waste land fill using electrical resistivity, induced polarization and Physiochemical methods. The study area is located between latitude 12.023678N and longitude 8.573676 E. Geophysical data were collected at maximum length of 140m along twelve profiles using ABEM Terrameter SAS 1000. Results from the Geophysical analysis showed that the profiles were underlain by three lithological layers; the top layer consisting of Loamy and Sand soils, alluvium, granite, shale and sandstone. The second and third layers were predominantly made of weathered and fractured basements respectively. The potential groundwater water bearing zones of the study area occurred at VES2, VES4, VES5, VES6 and VES7. The thicknesses of the sounding points were found to be 20.8m at VES2; 25.2m at VES4; 13.2m at VES5; 50.8m at VES6 and 13.3m at VES7. The corresponding depths for the sounding points were 20.8m at VES2; 27.9m at VES4; 26.7m at VES5; 51.6m at VES6 and 24.9m at VES7 respectively. The Physiochemical study of selected groundwater samples assessed parameters such as the Electrical Conductivity, EC (288dS/m to 1365dS/m), TDS (170.8mg/L to 820mg/L) Pb (0.546mg/l to 0.629mg/l), Cu (-0.001mg/l to 0.004mg/l), and Cd (0.031mg/l to 0.092mg/l). The physiochemical results showed that the groundwater around the dumpsite may have been contaminated, especially in Dumpsite Hole 1 and Hole 2 at VES4 and VES6 respectively. There are indications for suspected leachate mitigation around the two VES points. Even though, the pH values of 6.4 and 6.2 at the two sounding points were considered to be within the permissible pH range (6.5 to 6.8). The values of other elements present in the groundwater for the samples at other VES points were found to be above permissible WHO and Nigerian Standards for Drinking Water.

Keywords : resistivity induced polarization, chargeability, landfill, leachate, contamination

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