

Comparative Assessment Of Groundwater Potentials And Sustainability In Enugu State

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Field and laboratory studies were carried out to evaluate the groundwater potentials of Enugu State. The studies involved evaluation of groundwater data of the area to determine the quantity and quality of groundwater resources potential of the area. A census of existing boreholes was conducted and all available information on each borehole were collected and collated. These included geologic classifications, geophysical data, hydro-geological data and issues on ground-water exploitation. There were a total number of 117 boreholes studied and these were spread all over the state across different geologic formations. The geology of the area was studied to determine the aquifers, aquicludes and aquitards. The hydrologic parameters such as hydraulic conductivity, K , transmissivity, porosity, yields and storage capacity were determined by standard methods, analysed and used to evaluate the groundwater potentials of the area. Three major geologic formations namely the Awgu Formation, Agbani Formation and Ajali Formation were evaluated for their groundwater potentials. Various relationships between geologic parameters and borehole characteristics were determined. These included borehole yields, drill depths, specific capacities, static drawdowns and dynamic drawdowns. The Awgu sandstone presented the least groundwater potentials with yields ranging from

1.07 l/s to 17.69 l/s with an average of about 6.318 l/s. Agbani sandstone showed slightly higher potentials with yields ranging from 10.88 l/s to 11.6 l/s with average yield of about 11.66 l/s while the yields from Ajali sandstone which incidentally is predominant in the area ranged from 5.94 l/s to 97.22 l/s with an average yield of about 22.46 l/s. Groundwater quality parameters were evaluated for the geologic formations in comparison with water quality standards. A total number of twenty (20) water quality parameters were analysed for the various water boreholes. Generally, these parameters were within the limit of acceptable international and national water quality standards. The study also showed that some of the causes of failure of groundwater exploitation include not carrying out pre-drilling investigations; use of incompetent personnel with lack of technical know how; use of improper equipment and machineries for drilling, lack of well development and installation of appurtenances; use of inappropriate appurtenances/accessories as well as improper drilling methods and techniques. In addition to the above is the lack of institutional framework to coordinate and manage groundwater resources and facilities. The study established that Enugu State has adequate groundwater reservoir potentials both in quality and quantity.