PHYSICAL AND CHEMICAL HYDROGEOLOGYOF CHENAB NAGAR, CHINIOT, PUNJAB

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DEDICATED TO

MOTHERS AND HYDROGEOLOGISTS

ABSTRACT

The study area is located in Chenab Nagar, Chiniot,Punjab. Groundwater has been explored using electrical resistivity survey, physicochemical and isotopic analysis. Groundwater table depth and subsurface geology has been studied by acquiring the subsurface resistivity data using ABEM SAS 4000 terrameter up to 100m by Schlumberger configuration and interpreted with the help of resistivity curves generated in IX1D software. The groundwater samples have been collected from the already present water wells as per guidelines given by the American Public Health Association (APHA). The samples have been analyzed for turbidity, pH, Electrical Conductivity (EC), Total Dissolved Solids (TDS), Calcium (Ca), Magnesium (Mg), Sodium (Na), Potassium (K), Bicarbonate (HCO_3), Chloride (Cl),and Sulphate (SO_4) from the Pakistan Institute of Nuclear Science and Technology (PINSTECH), Nilore, Islamabad. The lithologies determined by the electrical resistivity surveysuggest presence of confined and unconfined aquifers made up of Quaternary sand depositsseparated by the clay confining layers. The water table is present at relatively shallow depth 10 to 45 m that makes it susceptible to contamination.The physicochemical parameters furnished that the groundwater quality is poor to marginal according to the World Health Organization (WHO).Correlation analysis of major cations and anions with TDS (Total Dissolved Solids)revealed that groundwater recharge source is similar for all samples. With the study of stable environmental isotopes (δ^2H, $\delta^{18}O$) recharge source is identified as precipitation. Groundwater present in this area can be brought to use for public with the setup of proper treatment plants that do not add toxic materials to water.

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