

MICROWAVE AND VISIBLE SPECTRAL MEASUREMENT VARIATIONS INFER GROUNDWATER RECHARGE POTENTIALITY

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ABSTRACT

Analysis of soil samples from disused brick kilns of Masoodpur (South Delhi) were done by conventional remote sensing methods as well as by measuring dielectric constants. Because of repeated high temperature in brick kiln areas, dried up soil shows low permeability, reduced porosity, low moisture content and high dielectric constant. This is one of the reasons of low infiltration of rainwater in this area. Soil properties and land use pattern are major contributing factors to hydromorphogeology of particular area. With the help of Dielectric constant and X-ray diffraction, soil properties are correlated with each other for soil moisture content and other parameters which influence the hydromorphogeology. Landuse pattern also play an important role which influences the parameters related to rainwater harvesting in an urban sprawl. Consideration of soil moisture in terms of percentage of field capacity of the soils for the minimization of textural dependence of microwave emission/backscatter of soils has been studied by several investigators using experimental data and also theoretical procedures. Their conclusions seem to be not in agreement with each other, thus giving way for further investigations into the problem. To derive information on the choice of parameter through which the textural dependence of microwave emission can be minimized are calculated using theoretical approaches. In this method, the actual admittance of the aperture terminated by a sample is evaluated from the measured reflection co-efficient. Rapid urbanisation of Delhi has an adverse impact on the groundwater resources of the area. Water table have declined by 2 to 8 meters in most parts during past decade. Masoodpur is the recharge area for the JNU campus. The water level at that location had declined as much as 4 meters. In Basantgaon, which is also affected by Masoodpur recharge area, the water level had gone down to 6 meters. The normal trend in the JNU campus is that water level rises during the months of September and October but declines during the months of July and August. Geological heterogeneity affect the inter-relationship between regional and local flow system, the pattern of recharge and discharge areas and the quantity of groundwater that flows through the system. The SPOT satellite data shows the change in land-use pattern that has adversely affected the infiltration of rainwater which feeds the groundwater table. The high albedo of a semicircular structure was inferred as underused brick kilns that have been in operation for the last 55 years. The brick kiln complex covers approximately 6.885 square kilometer in area. In certain localized stretches, the clay content is high as well as change in soil texture was noted. This was due to repeated heating and cooling in these brick kiln complexes. Selective lowering of the groundwater level in NNE direction of these high albedo and high dielectric constant structures further supports the relation of changed land use pattern with the groundwater environment.