

Numerical Simulation of Groundwater Flow in a Weathered Hard Rock Aquifer: A Case Study

N.C. MONDAL¹ and V.S. SINGH¹

¹*National Geophysical Research Institute, Hyderabad-500 007, India*

Numerical simulation of groundwater flow in weathered hard rock aquifer is a valuable tool to assess the groundwater resources and to understand its hydrodynamics. One such study was carried out in and around Dindigul town, Tamilnadu, India. Recurring droughts and increased exploitation of groundwater to meet the growing needs of drinking water and irrigation had resulted in the decline of regional groundwater levels. In last three decades, regional groundwater levels have gone more than 10 m below the previous state at different parts of the area. It also causes the deterioration of groundwater quality. In order to evolve future pumping schemes, a preliminary mathematical model of phreatic aquifer was conceptualized, constructed and calibrated in two stages viz., steady and transient conditions. The calibrated model was then used to predict the aquifer behaviour for the next twenty years. The model study indicates that the phreatic aquifer can sustain the present withdrawal of 23×10^6 m³/year without further decline of water level. Any additional increase of withdrawal in the shallow aquifer will result in progressive decline of water level, as the average annual dynamic reserve is only about 23×10^6 m³. If the present model is refined and validated through additional field data, then optimal utilization schemes can be evolved.

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