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Delineation of the Groundwater Potential Zone in Kantli River Basin, Jhunjhunu District, Rajasthan: A Geospatial Approach

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Abstract

Remote sensing and GIS are advanced techniques and tools that have been used for various researches including groundwater geology. The Landsat and the IRS satellite datasets have been utilized to extract information on the hydrogeomorphic and groundwater related features of a semi-arid Precambrian hard rock terrain in the Kantli River Basin of Jhunjhunu District, Rajasthan, India. It is the upper part of the Shekhawati River. The study area is covering about 2313.2013 km^2 in the Jhunjhunu District, Rajasthan. In the present study, the groundwater potential zone is identified by the GIS overlay techniques using the spatial analyst tool in ArcGIS 10.2. The developed methodology is demonstrated in the Kantli River Basin of Rajasthan, western India. Originally, nine thematic layers, viz. topographic elevation, land slope, geomorphology, geology, soil, pre and post-monsoon groundwater depths, annual net recharge, annual rainfall and proximity to surface water bodies were considered in this study. Therefore, five groundwater potential zones were identified and distinguished in the study area, viz. 'very good', 'good', 'moderate', 'poor' and 'very poor' based on groundwater potential index values, which will enable the local bodies for the future planning and management of the groundwater resource. Severe groundwater contamination has been found occasionally in the study area. Every year during the summer, the region is facing a lot of problems with portable groundwater. As the study area is semi-desert, the influences of salinity have been increasing day by day in the groundwater.

Keywords: Groundwater, Remote Sensing, Kantli River, Satellite Images, GIS, Potential zone

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