Chapter 2
GIS-based Multi-Criteria Analysis for Delineation of Groundwater Potential Zones: A Case Study from Jodhpur District, Rajasthan, India

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ABSTRACT

In the present study, delineation of ground water potential in Jodhpur district, Rajasthan is framed by using geospatial technique (i.e., remote sensing and GIS) and with multi-criteria leadership (MCDM) procedure. The analytical network process (ANP) is one of the suitable strategies that makes the research workable for delineation methodically, and corporate the analytic hierarchy process (AHP) as an uncommon case. For proper value to recognize the ground water potential zone in Jodhpur, Rajasthan, the AHP and ANP methods are utilized to decide the values of different parameters and their classes. The AHP values are then connected in a direct mix into raster calculator to get five distinctive groundwater potential zones in the investigation region, to be specific as 'very poor' (2052.0 km2), 'poor' (4225.9 km2), 'moderate' (6355.1 km2), 'good' (6451.2 km2), and 'very good' (3301.7 km2). It has been presumed that about 9752.9 km^2 area of Jodhpur district has very good to good groundwater potential, which is about 43.56% of the complete study area.

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INTRODUCTION

Water scarcity is a major issue in all over the countries of world, mostly in developing countries. As per day to day expansion of human population water utilization has significantly expanded as seen throughout the most recent couple of decades. From the survey of food and agriculture organization (FAO 2015), the rate of growth of human population is as much that it cans twice the world's requirement for water. India is the second largest populated country in the world and the fresh water for many purposes is increasing day by day and also having facing water crisis in some part of India due to developing country. The people present in the field of water assets the board are confronting about various problems and issues including water quality, environmental changes, and water supply demand increments. Dry and semiarid districts are mainly facing the water scarcity and soil moisture declination, which hamper the agricultural fields and fail to fulfill the required amount of water supply to the demand raised. The spatial– temporal precipitation data convict the real difficulties and erratic precipitation designs prompts aridity and climate disaster conditions. These issues influence the yield generation and expanding sustainable hazards. One most possible way for relieving this water crisis can be done by the water harvesting structure. All the water boards must make a feasible by the agribusiness part which is crucial for sustenance emergency and also for financial improvement of the nation. For the battle with water scarcity in the dry and semidry districts issues for a huge number of years is a promising elective wellspring or water harvesting structure for enhancing water. Recharge water harvesting (RWH) can be frame for the proper rationing water overflow for horticulture, and incredibly significant particularly in dry region where it all fulfill the water shortage issues and make a good to very good groundwater extraction, trimming danger and increment in crop yield. RWH enhance groundwater for saves and builds water accessibility and improve socio-economic problems facing by the districts (Ammar et.al. 2016). Many techniques and devices are utilized in past for the research of groundwater potential in a area but at present Geographic information system and remote sensing program are advance version for the delineation of groundwater potential zone. Adaption of remote sensing with GIS technology has made easier to identify the hydrological potential in a region. GIS based water models are very suggesting techniques and additionally devices. MCA (AHP) model offers high potential to the GIS technique for RWH sites zoning for the information of poor groundwater zone and good quality of groundwater zone (Ziadat et.al, 2012; Bulcock and Jewitt 2013).

The physical and financial qualities were considered best due to GIS process. GIS and remote sensing access the remote area where on field is difficult to reach but at present due to modern technique it is easy to develop the remotely area, and the water scarcity and fulfilling of water demand properly made easy with GIS