

Abstract

Groundwater is one of the world's most important sources of fresh water. But, due to excessive extraction declination of groundwater level is being observed nowadays. Groundwater pollution is also going to be a global concern as well as in India. The present study was carried out in the upper Silabati-Joypanda basin located in Bankura, Purulia and West Medinipur districts of West Bengal state in India. The objective of the study was to find the groundwater potential zone map using the Geographical Information system (GIS), Analytical Hierarchy Process (AHP) and Remote sensing (RS) approach and to validate the same using a Geophysical survey and groundwater level data of the study area. AHP criteria weight has been calculated for fourteen parameters namely Drainage Density, Geology, Geomorphology, Land Use and Land Cover, Distance from Lineament, Porosity of soil, Runoff, Rainfall, Soil type, Distance from Wells with High Yield, Relative Relief, Permeability of soil, Slope, Water Holding Capacity. The final groundwater potential map was classified into five categories: very low potential, low potential, moderate potential, high potential, and very high potential covering 2.84%, 39.66%, 38.14%, 17.48%, and 1.87% of the total area respectively of Silabati river basin and covering 60.43%, 28.87%, 9.07%, 1.63% and 0% of the total area respectively of Joypanda river basin. The result was validated using field-based groundwater level survey data. The groundwater potential map was also validated using the Vertical Electrical Sounding Survey by Schlumberger array method. Different Soil parameters were estimated and sieve analysis was performed in the laboratory to get the soil characteristics of the basin. Groundwater samples were collected from different locations of the basin and testing of different General water Quality Parameters was performed in the laboratory. Then, Water Quality Index was estimated by the Weighted Arithmetic mean method to get a complete scenario of the subsurface water quality of the study area.