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Assessment of natural groundwater recharge in Sonar sub-basin using HELP3 model: A case study

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ABSTRACT

Groundwater is one of the most significant natural resources of the country. The unconstrained exploration and non-judicious use of groundwater is causing a fall down in water table in different areas of the country. However, the situation is more severe in arid and semi-arid areas of the country. Therefore, in order to replenish depleting ground water resources, there is a need for site explicit artificial groundwater recharge by isolating suitable sites in different regions of the country. In this study, an effort was made in this course to estimate groundwater recharge for Sonar sub-basin in central India. The study was conceded out for a period of 38 years during 1972-2010. The HELP3 (Hydrologic Evaluation of Landfill Performance version 3.0) model based on water balance method was used for study. The groundwater recharge was assessed for 12 identified sites located in Sonar sub-basin on the basis of soil types and geology. The soil profile prepared for HELP3 model using well-logs was used to estimate site-specific groundwater recharge as well as for whole Sonar sub-basin. The study reveals that about 4.627% of cumulative average annual precipitation is added to groundwater recharge, which is not adequate to replenish groundwater. Therefore, it is essential that this depletion to groundwater, if not rejuvenated artificially, will cause water table to fall down which will affect hydrological processes and socio-economic life of people residing in Sonar sub-basin.