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EVALUATION OF SUITABILITY FOR DRINKING, IRRIGATION USES, GROUNDWATER QUALITY AND POLLUTION INDEX IN THE SHADNAGAR WATERSHED, TELANGANA STATE, INDIA

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Abstract

Groundwater is a major valuable resource, which helps to sustain human ecology, particularly in crystalline terrains. Hence, periodic quality monitoring of groundwater is essential in understanding its suitability for drinking and irrigation practices. Fifty-one groundwater samples were collected from the Shadnagar watershedin pre-and post-monsoon seasons during 2019 and evaluated for physical, chemical properties and major ions. The results obtained were compared with the acceptable limits of the Bureau of Indian Standards (BIS, 2012) and World Health Organization (WHO, 2004 & 2011) guidelines which show that more than 80% of the samples in both seasons were unfit for drinking. It is found that most of the samples (80%) were fit for agricultural practices in both seasons. The major water facies were NaCl, mixed $CaNaHCO_3$, $CaHCO_3$ and mixed CaMgCl types in both seasons. The spatial distribution maps of major ions showed high concentrations in the eastern, central, and southern parts. As per the groundwater quality in terms of pollution index (GQPI), most of the study area (63% to 78%) comes under the insignificant zone and the rest(29% to 22%) under the low contamination zone in the pre- and post-monsoon seasons. The chemical variables from factor analysis (FA) have demonstrated the predominance of silicate weathering, dissolution and ion exchange process in controlling groundwater chemistry in the study area.

Keywords: Piper Trilinear, Spatial distribution, Drinking and Irrigation, Groundwater quality Pollution Index (GQPI) and Factor analysis

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