

APPLICATION OF WATER QUALITY INDEX FOR ASSESSMENT OF GROUNDWATER QUALITY IN WARDHA SUB-BASIN, MAHARASHTRA, INDIA

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Abstract

Water Quality Index (WQI) reflecting the composite influence of different water quality parameters was used to assess the groundwater quality in WR-7 watershed of Wardha sub - basin, Maharashtra, India. 283 groundwater samples were collected over a period of three seasons from 106 wells and analysed for 15 water quality parameters namely pH, EC, TDS, TA, TH, Ca⁺⁺, Mg⁺⁺, Na⁺, K⁺, CO₃⁻, HCO₃⁻, Cl⁻, SO₄⁻, NO₃⁻ and F⁻ ions. The results obtained for pH and aggregate parameters such as TA, TH, EC and TDS has suggest that groundwater in the area is alkaline as well as very hard in nature and undergone moderate degree of mineralization. The WQI data computed for groundwater samples for nine parameters have revealed that groundwater in more than 66% of wells monitored is of poor quality. The parameters TDS, TA, TH, Mg⁺⁺, NO₃⁻ and F⁻ were found to be contributing significantly towards deterioration in groundwater quality. High TDS and the concentrations of NO₃⁻ and F⁻ beyond the acceptable limits of 45 mg/L and 1.0 mg/L respectively as specified in BIS drinking water standards have rendered groundwater in a majority of the wells unfit for drinking purpose. Shallow aquifers were found to be more vulnerable for contamination as compared to the deeper aquifers. Seasonal variations in groundwater quality indicate that groundwater quality has undergone more deterioration during the post monsoon season as compared to the pre - monsoon season. Deterioration in groundwater quality is possibly due to surface anthropogenic activities and the conditions favoring more dissolution of minerals and salts in groundwater from geological media. Remedial measures such as improvement in sanitation conditions in villages and proper disposal and treatment of domestic waste and wastewater generated from surface anthropogenic activities can protect groundwater from contamination. The periodic assessment of groundwater quality is required to check further deterioration in groundwater quality in the area.

Keywords: Water Quality Index, Groundwater, Water Quality Parameters, Seasonal Variation