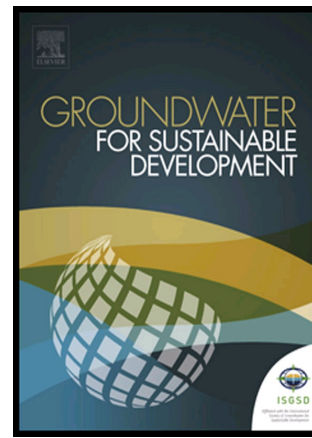


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## Geoinformatics based groundwater quality assessment for domestic and irrigation uses of the Western Doon valley, Uttarakhand, India

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### Abstract

Hydrogeochemical investigation was carried out in the Western Doon valley, to understand the geochemistry of the groundwater and to assess the overall physico-chemical characteristics. To attempt this goal, 50 groundwater samples of dug well and tube well were collected using pre-cleaned polyethylene containers from the different geological formations of the study area. The physical and chemical parameters of the analytical results of groundwater samples were compared with the standard guideline values recommended by the World Health Organization for drinking and public health standards. Thematic layers pertaining to  $\text{Ca}^{2+}$ ,  $\text{Mg}^{2+}$ ,  $\text{NO}_3^-$  and total hardness (TH) were generated using GIS platform. The hydrochemistry of groundwater quality for drinking purpose was evaluated by plotting the cations, anions in the Piper's Trilinear diagram, which indicates the alkaline and weak acids dominance, and carbonate hardness exceeds 50%. Expanded durov diagram implies  $\text{Ca}^{2+}$ - $\text{HCO}_3^-$  dominance, indicating recharging of water in sandstone aquifer. Based on the hydrogeochemical analysis for irrigation quality, certain parameters like carbonate hardness, sodium adsorption ratio, sodium percent, salinity hazard, residual sodium carbonate, Kelley's ratio, index of base exchange and permeability index were calculated. Besides this, a comparison of the groundwater quality in relation to drinking water quality standards shows that most of the groundwater samples are good for drinking as well as irrigation purposes and controlled by lithology apart from other local environmental conditions as the concentration of the cations and anion increases in the post-monsoon season. The results of hydrogeochemical are helpful to generate the baseline information and roadmap for future research on groundwater resources to assess the water quality in relation to agricultural and domestic uses in the Western Doon valley.

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