

## Assessment of Groundwater Quality for Drinking and Irrigation Purposes in Chhatna Block, Bankura District, West Bengal

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### Abstract

Hydrochemical study of groundwater was carried out from the Chhatna Block of Bankura district, West Bengal, to unravel its quality and suitability for drinking, domestic and irrigation purposes. Total 21 groundwater samples were collected and analysed for various physical and chemical parameters such as pH, electrical conductivity (EC), total dissolved solids (TDS), Na, K, Ca, Mg, Fe, Cl, HCO<sub>3</sub>, SO<sub>4</sub> and F. Sodium Adsorption Ratio (SAR), Soluble Sodium Percentage (SSP), Residual Sodium Carbonate (RSC), Magnesium Ratio (MR), Total Hardness (TH), and Permeability Index (PI) were calculated as derived parameters, to investigate the ionic toxicity. Based on the analytical results, groundwater in the study area is found to be fresh and hard to very hard in nature. The abundance of major ions in groundwater is HCO<sub>3</sub> > Cl > SO<sub>4</sub> and Ca > Mg > Na > K > Fe. The bicarbonate ions (HCO<sub>3</sub><sup>-</sup>) dominate the other anions (Cl<sup>-</sup> and SO<sub>4</sub><sup>2-</sup>). The groundwater samples fall in the rock dominance field of Gibb's diagrams signifying that the chemical quality of groundwater is related to the lithology of the area. Assessment of groundwater samples from various methods indicate that groundwater in the study area is suitable for drinking and agricultural uses. Fluoride is within the permissible limits for human consumption as per the WHO and Bureau of Indian standards.

**Keywords:** Hydrochemistry, water quality, domestic and irrigation suitability, spatial distribution, Chhatna block, Bankura district