

## HYDROGEOLOGICAL ZONES AND HYDROCHEMICAL CHARACTERISTICS IN INDIA

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### **Abstract**

Quality of groundwater determines its usability for various purposes. Several factors control groundwater chemistry and quality evolution, - climate and rainfall, soil condition, geology, land use, topography, groundwater flow conditions, and its residence time in host rocks, the primary one being hydrogeology. India is subdivided into two major hydrogeological zones, namely alluvial plains and peninsular shield of crystallines and volcanics. Mineralogical composition of the rocks is crucial for ionic concentrations. Groundwater quality evolves during its passage through the rocks by dissolution and chemical reactions. Bicarbonate type of water is prevalent in most parts of the country, except in arid, semi-arid and coastal tracts where bicarbonate- chloride and chloride- bicarbonate types prevail. The coastal areas are characterized by delicate hydrochemical and hydrodynamic balance of saline and freshwater aquifers. However, groundwater also possesses some special characteristics like high arsenic in Lower Bengal delta, high fluoride in arid and overexploited tracts of Rajasthan or Anantapur district of Andhra, and high nitrate in pockets from agricultural chemicals. The paper narrates the hydrogeological zones and groundwater quality variations in different parts of the country, and broadly discusses the characteristic features.

*Keywords:* Groundwater Province, Saline and Fresh water, Mineralogical composition, Base exchange, Oxidation Reduction.