

Ground Water Quality in Adjoining Areas of River Yamuna at Delhi

C. K. Jain

ABSTRACT

The ground water quality of adjoining areas of river Yamuna in Delhi has been assessed to see the suitability of ground water for irrigation and domestic applications. Thirty eight ground water samples from shallow and deep wells were collected each during pre-monsoon and post-monsoon seasons in the month of June and November 2000 respectively. Various physico-chemical, trace elements and bacteriological parameters have been determined. The data was analyzed with reference to BIS and WHO standards, ionic relationships were studied, hydrochemical facies were determined and water types identified. The study has clearly indicated higher concentration of total dissolved solids, electrical conductivity, nitrate, sulphate and sodium. The presence of total coli forms indicates bacterial contamination in ground water. The presence of heavy metals in ground water though recorded in many samples but these were not significantly higher. The water quality standards have been violated for TDS, nitrate, sulphate and sodium at few places.

An attempt has also been made to classify the ground water on the basis of different classification schemes, viz., Stiff, Piper trilinear and U.S. Salinity Laboratory classifications. As per the Stiff classification majority of the samples fall under sodium bicarbonate type followed by sodium sulphate and sodium chloride type. In the Piper trilinear and modified diagram, majority of the samples falls in Na-K-C1-SO₄ followed by Na-K-HCO₃ and Ca-Mg-Cl-SO₄ hydrochemical facies. According to U.S. Salinity Laboratory classification of irrigation water, more than 50% samples fall under water type C3-S1 (high salinity and low SAR) such water cannot be used on soils with restricted drainage. Even with adequate drainage special management for salinity control may be required and plants with good tolerance should be selected. About 30% samples fall under water type C3-S2 (high salinity and medium SAR) such water will induce an appreciable sodium hazard in fine textured soils having good cation exchange capacity, especially under low leaching conditions.

The qualitative analysis of data depicted higher concentration of various physico-chemical and bacteriological parameters in the western side of river Yamuna even in deep aquifers. However, due to paucity of hydro-chemical, geological and water level data no specific

inferences could be drawn regarding the probable impact of river water quality on ground water. Further studies are being planned to investigate the impact of Yamuna river water quality on ground water system.

