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Groundwater Appraisal of the Uma River Basin, Akola District, Maharashtra with Reference to Environmental Management

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ABSTRACT

Detailed hydro-geological and hydro-geochemical investigations have been carried out for the Uma River Basin, Akola district, Maharashtra with an aim to understand the hydro-geochemical, geological, geomorphologic and environmental control on the groundwater regime of the region. The study area is characterized by the presence of alluvial tract which is underlined by the horizontal sequence of lava flows which can be divided into simple and compound units based on their field characters, textual parameters and geomorphic expression. Major element chemistry of groundwater samples from dug wells and bore wells from 125 selected sites from the Uma River basin has been analyzed during pre-monsoon and post-monsoon periods to understand the groundwater quality and its impact on the environment. Various thematic maps showing the distribution of various elements and their ratios along with iso-contour maps of physico-chemical parameters have been utilized to understand the water quality management of the region.

In the present study, an attempt has been made to investigate the Uma river basin exposed near Murtizapur and Karanja regions in the Akola district of Maharashtra. (Figure 17(a)). The Uma river basin experiences sub-tropical to tropical monsoon climate in the area of investigation. Undulating relief marks the study area with the presence 230 m, thick lava pile. The general slope of country is from north to south and the area is characterized by typical Deccan trap topography and alluvial tract (Figure 17(b)). The present study outlines the specific features and requirements of the groundwater regime with its properties and aims to focus attention to the need for integrated planning and development of water resource in the Uma river basin, with a special reference to saline groundwater zone. Hydro-geological, geochemical and meteorological investigations have been carried out for the Uma river basin exposed near the Murtizapur region, Akola district, Maharashtra to understand the nature of the groundwater regime and water level fluctuations. Further various erosional surfaces have been demarcated by utilizing flatness, consistency in the height of the ridges and sloping characters.

For assessing the suitability of groundwater for drinking and irrigation purposes, water samples were collected from 150 dug wells and analysed for various parameters like Residual Sodium Carbonate (RSC), Electrical Conductivity (EC), SAR, pH, HCO_3, TDS, Chlorides etc. The results obtained were plotted and isocon and SAR maps were prepared to understand the water quality of the region (Figures 18 and 19; Table 3).

Detailed environmental analysis was carried out to understand the groundwater quality and water level fluctuations. Suitable remedial measures were suggested for the water resource management of the region.