Groundwater Development and Quality Management Through Integrated Geophysical and Hydrological Approach in Southern Granulite Terrain of India

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Portable drinking water problem in groundwater sector especially in semi-arid climatic areas in Indian subcontinent is a major national concern. Due to irregular monsoon, changing climatic conditions, over exploitation for industrial / agricultural needs etc., regional water table has been drastically affected and is constantly under stress. Also the quality of groundwater in terms of drinking water standards has deteriorated in time both due to anthropogenic and geogenic cause. In this paper the authors have attempted to sustain the groundwater quality and developed a

suitable strategy for portable drinking water supply to the rural areas on a pilot scale in a small area of ~2sq.km in Nalgonda district of Andhra Pradesh. Andhra Pradesh in INDIA is one of the 28 states were more than 7000+ habitations are consuming drinking water based on groundwater supply with excess fluoride. Several defluoridation methods had been adopted but all these high technology based treatment ended up with several constraints. Site identification for groundwater exploration, subsurface mapping for understanding the hydrogeological setup in an

area demands suitable geophysical exploration. Several surface geophysical techniques are developed and are extensively used in hydrological science since late 1920's. Resistivity investigations in integration with other geophysical techniques and correlation with hydrological and tracer experiments facilitated in understanding and recommending appropriate recharge strategies in the study area. As a result the fluoride concentration of > 3.5 mg/l in groundwater was brought down to < 1.5 mg/l, which is appreciably within the WHO norms for drinking water

standard. Site suitability and proper understanding of the subsurface through an integrated approach of near surface geophysics and hydrological investigations can enable in solving the problem of excess fluoride in drinking water supply over similar geomorphological terrain.

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