

Isotope and Geophysical Techniques for Delineation of Groundwater Quality – Select case studies in India

H. CHANDRASEKHARAN¹, ANIMA BISWAL¹, S. V. NAVADA² and U. P. KULKARNI²

¹*Water Technology Centre, Indian Agricultural Research Institute*

²*Isotope Division, Bhabha Atomic Research Centre*

Deterioration of groundwater quality in the unconfined condition is an oft-occurring phenomenon caused by various natural and man-made activities in different parts of the country. Such deterioration may occur either alone or as a combination of physical or chemical or biological contamination. Conventional approaches for studying the groundwater quality got impetus with the advent of tracer techniques involving applications of stable and/or radioisotopes in soil-water systems. In these approaches, the basic principle has been to understand the physical contrasts in the subsurface systems through measurable physical parameters. In this regard, the spatial variations of environmental stable isotopes of water (measured as δH and δO) from different sources have been used to solve certain hydrological problems which are not possible, at times by conventional methods. Geophysical and hydrochemical data aid in the interpretation of isotopic data.

In this paper, we discuss the integration of geophysical, geochemical and the corresponding isotopic data of water samples to delineate shallow ground water zones at Siwana basin and Lunkaransar Farm (both from arid), IARI Farm, New Delhi (semi-arid) and Barapani, Shillong (humid) areas. Analyses of field and the laboratory measured data could help us to,

- 1) delineate groundwater quality in the northern part of Siwana town, Rajasthan,
- 2) understand possible mechanism of salinization in the perched water that led to water logging and salinity, at State Agricultural Farm, Lunkaransar
- 3) delineate natural springs and location of site for construction of a dug well at ICAR Farm, Barapani and
- 4) delineation and location of potential groundwater zones at IARI Farm, New Delhi.