

Assessment of Groundwater Quality in Karakulam Grama Panchayath in Thiruvananthapuram, Kerala State, South India

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Abstract : Groundwater is vital to the livelihoods and health of the majority of the people since it provides almost the entire water resource for domestic, agricultural and industrial uses. Groundwater quality comprises the physical, chemical, and bacteriological qualities. The present investigation was carried out to determine the physicochemical and bacteriological quality of the ground water sources in the residential areas of Karakulam Grama Panchayath in Thiruvananthapuram district, Kerala state in India. Karakulam is located in the eastern suburbs of Thiruvananthapuram city. The major drinking water source of the residents in the study area are wells. The present study aims to assess the portability and irrigational suitability of groundwater in the study area. The water samples were collected from randomly selected dug wells and bore wells in the study area during post monsoon and pre-monsoon seasons of the year 2014 after a preliminary field survey. The physical, chemical and bacteriological parameters of the water samples were analysed following standard procedures. The concentration of heavy metals (Cd, Pb, and Mn) in the acid digested water samples were determined by using an Atomic Absorption Spectrophotometer. The results showed that the pH of well water samples ranged from acidic to the alkaline level. In the majority of well water samples (> 54%) the iron and magnesium content were found high in both the seasons studied, and the values were above the permissible limits of WHO drinking water quality standards. Bacteriological analyses showed that 63% of the wells were contaminated with total coliforms in both the seasons studied. Irrigational suitability of groundwater was assessed by determining the chemical indices like Sodium Percentage (%Na), Sodium Adsorption Ratio (SAR), Residual Sodium Carbonate (RSC), Permeability Index (PI), and the results indicate that the well water in the study area is good for irrigation purposes. Therefore, the study reveals the degradation of drinking water quality groundwater sources in Karakulam Grama Panchayath in Thiruvananthapuram District, Kerala in terms of its chemical and bacteriological characteristics and is not potable without proper treatment. In the study, more than 1/3rd of the wells tested were positive for total coliforms, and the bacterial contamination may pose threats to public health. The study recommends the need for periodic well water quality monitoring in the study area and to conduct awareness programs among the residents.

Keywords : bacteriological, groundwater, irrigational suitability, physicochemical, portability

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