

Geology and the underground water resources of Valigamam region in the Jaffna Peninsula

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Abstract

The Jaffna Peninsula including the Valigamam region totally depends on groundwater to meet its agricultural, industrial and domestic needs since the other sources of water are seasonal. Therefore concerns have been expressed on the quantity and the quality of water stored in the aquifers. Since 1965, a number of groundwater studies have been carried out in the Jaffna Peninsula, related to hydrogeology and hydro geochemistry. Vast amount of data, including monthly reading have been collected. In the present study, carried out in 1997, seven hydrochemical parameters were (Chloride, total hardness, electrical conductance, pH, nitrate, sulphate and fluoride) determined and studied with the available secondary data mentioned above. The Valigamam region, experiences problems related to high concentrations of chloride, total hardness and nitrate. High concentration of Chloride mainly occurs in the coastal areas where the area is covered by sandy formations. The spatial distribution patterns of Chloride and total hardness are irregular and such levels in groundwater reaches a maximum after the rains. Also a high chloride concentration zone occurs along the Valukai aru lineament. The major contributory factor for salinity is the excessive extraction of groundwater which results in intrusion of seawater from the lagoons/sea. Additionally, high lagoonal tides, spraying of salts from the coast and human activities contribute to this adverse condition. The total hardness levels are high in the region due to the significant role played by the limestone aquifers. The similarity in the spatial distribution pattern of total hardness to Chloride is due to the cumulative effects with the concentrations of Cl^- with total hardness. The nitrate levels are high due to the intensive agricultural practices involving high inputs of artificial fertilizers and the improper construction of latrine soakage pits, without maintaining the recommended minimum distance between both. pH values of groundwater are generally above 7.0 reflecting the alkaline nature of the limestone region. Fluoride values are very low, again due to limestone geology causing precipitation of calcium Fluoride.