

Irrigation water quality based on hydro chemical analysis, Jaffna, Sri Lanka

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Abstract

The hydro chemical study reveals the quality of water and its suitability for drinking, agriculture and industrial purposes. Presence of excessive quantities of salts in groundwater is one of the major constraints in agro-well farming in Jaffna peninsula. Irrigation with poor quality waters may bring undesirable elements to the soil in excessive quantities affecting its fertility. Electrical conductivity (EC), Sodium percentage (Na %), Sodium adsorption ratio (SAR), Residual sodium carbonate (RSC) can be used as a criterion for finding the suitability of irrigation waters. The objective of this study is to evaluate the suitability of the irrigation water quality of the Jaffna peninsula. Major cations; Na⁺, Ca²⁺, Mg²⁺, K⁺ and major anions; Cl⁻, SO₄²⁻, HCO₃⁻, CO₃²⁻ were determined from 34 wells, randomly located in peninsula from October 2008 to April 2009 to assess the hazards of salinity, sodium and bicarbonate. Out of selected wells, based on EC, 44% of the wells have medium salinity water, 47% of the wells have high salinity water and 9% of the wells have very high salinity water. Based on the percent of sodium, 3% of the wells have excellent irrigation water quality, 18% of the wells have good irrigation water quality, 44% of the wells have permissible irrigation water quality, 32% of the wells have doubtful irrigation water quality and 3% of the wells have unsuitable irrigation water quality. Based on SAR, almost all of the wells have the good quality irrigation water. Based on RSC, 61% of the wells have good irrigation water quality, 15% of the wells have doubtful irrigation water quality and 24% of the wells have unsuitable irrigation water quality. In overall assessment of tested wells, 20.6% of the wells have good quality water for irrigation, 44.1% of the wells have permissible to doubtful irrigation water quality, 35.3% of the wells have unsuitable irrigation water quality, in which bicarbonate hazard was identified as major hazard which is due to the influence of carbonate rock dissolution.

Keywords

Irrigation water quality, Salinity hazard, Sodium hazard, Bicarbonate hazard, Jaffna peninsula

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