

Conservation of groundwater to its sustainable use in Jaffna Peninsula of Sri Lanka

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Abstract

Groundwater has been life blood of Jaffna Peninsula of Sri Lanka and other sources are inaccessible to meet the requirements of water except seasonal rainfall. At times, concern has been raised on the deterioration of groundwater. This study was conducted to analyze the quality of groundwater in water supply wells, domestic and farm wells. Of the parameters of all water supply wells measured, values ranged within the permissible level of Sri Lankan Standards during the driest months of a year; are color (10-30 pt Co), turbidity (0.43-11.90 NTU), pH (7.40-8.39), electrical conductivity (730-1780 $\mu\text{s}/\text{cm}$), nitrate nitrogen (0.3-8.3 mg/l), nitrite (0.001-0.048 mg/l), total hardness (330-585 mg/l), chloride (237-731 mg/l), Iron (0.02-0.46 mg/l), sulfur (32-75 mg/l), alkalinity (210-320 mg/l) and total dissolved solids (332-1176 mg/l). The nitrate content of domestic and farm wells showed that 54% were waters with nitrate nitrogen content of less than 8 mg/l and 23% were within the critical range of 8 mg/l to 10 mg/l and 23% were with values above 10 mg/l. Thus, 46% of the samples were waters with critical conditions. Even some of the wells showed double the value than the WHO recommended value. The results showed that mostly intensive agricultural areas have high nitrate nitrogen content in the groundwater. Although fertilizer nitrogen makes a great contribution to an increase in crop yields, excess fertilizer nitrogen is polluting the groundwater with nitrate. Hence conserving rainfall in available ponds to increase the artificial recharge to the limestone aquifer and reducing the indiscriminate usage of inorganic soluble fertilizers by promoting organic farming would help towards sustainable agriculture.

Keywords

Groundwater, Nitrate pollution, Groundwater management

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