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APPLICATION OF WATER QUALITY INDEX FOR GROUNDWATER QUALITY ASSESSMENT IN CHUNNAKAM AND JAFFNA TOWN

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Abstract:

Jaffna peninsula is completely dependent on groundwater resources for all its needs. The quality of groundwater has been progressively declining largely due to sea water intrusion - salinity development and inorganic agricultural inputs such as fertilizer and pesticides. The suitability of groundwater for human consumption is a need through assessment of its physical, chemical and biological characteristics. The Water Quality Index (WQI) is simple tool and compound indicator, aggregates information from several water quality parameters to convey water quality information in single value to planners, policy makers and the public. For this study, Chunnakam was sampled to represent a predominantly agricultural area and the Jaffna town representing a residential and coastal area. Secondary data of groundwater quality parameters from December 2010 to April 2011 were used for this application. Twenty dug wells were chosen in each site. This study aims at assessing WQI for determine the suitability of groundwater for drinking purpose. Nine critical parameters such as pH, turbidity, total alkalinity, total hardness, phosphate, chlorides, nitrate-N, total coli forms and sulphate were used to calculate WQI. The calculated WQI value varies from 1.7 to 75.5 in Chunnakam and 10% wells in December 2010 and 5% wells in January 2011 are shown 'Poor' WQI ranking. In Jaffna town area WQI value varies from 1.2 to 64.6 and only 5% wells in December 2010 are shown 'poor' WQI ranking. In Chunnakam 20% wells are 'excellent' WQI ranking and 70% wells are 'good' WQI ranking and in Jaffna town, 90% wells are ranked in to 'good' WQI ranking. Calculated WQI values were 'fair' or 'marginal' ranking during rainy months and 'excellent' or 'good' ranking in dry months. The WQI value increased in December 2010 and the quality declined because rainwater recharging groundwater with soluble ions.

Keywords: Jaffna, Groundwater, Water quality, Water Quality Index