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VULNERABILITY OF THE AQUIFER ADJACENT TO VADAMARADCHCHI LAGOON, JAFFNA PENINSULA USING DRASTIC INDEXK.Gunaalan¹, M. Ranagalage², M. Vithanage³, T. Srivaratharasan⁴ and Saravanan.S⁵*¹Department of Fisheries Science, Faculty of Science, University of Jaffna**²Department of Social Sciences, Faculty of Social Sciences and Humanities, University of Rajarata**³National Institute of Fundamental Studies, Kandy**⁴Faculty of Agriculture, University of Jaffna**⁵National Water Supply and Drainage Board, Jaffna***ABSTRACT**

Groundwater is often a forgotten resource in Sri Lanka, which is the hidden prime resource that is the only source of freshwater in the Jaffna peninsula. Saltwater intrusion is alarmingly increasing making freshwater at risk in the Peninsula. Therefore this study was conducted to assess the aquifer vulnerability at adjacent to the Vadamaradchi lagoon area in Jaffna using a simple modeling technique. Electrical conductivity (EC) of groundwater was measured in 42 dug wells from March to June 2014. The DRASTIC hydrogeologic vulnerability ranking method uses a set of seven hydrogeologic parameters which are assigned a rate and a weight to classify the vulnerability of the aquifer. The parameters are depth to groundwater, net recharge rate, the aquifer media, the soil media, topography, impact of the vadose zone and the hydraulic conductivity of the aquifer. From March to June 2014, the average EC values are 3.8 ± 4.0 , 4.0 ± 4.4 , 6.8 ± 7.5 and 7.3 ± 8.3 mS cm⁻¹ recorded respectively. Calculated DRASTIC Index value is modified by EC rating and weight to assess the potential risk of groundwater to salinization in the study area i.e. Modified DRASTIC Index value. Average Modified DRASTIC Index value is 172 that deviate by ± 3.6 ranging from 170 – 184 and classified as 'High' in vulnerability. Rainfall plays a significant role at recharge of groundwater and also influences solute transport in underground via pours medium. Therefore vulnerability of Modified DRSTIC Index values adjusted and/or validated by different rainfall rating by expected probability of rainfall return period in Jaffna. One year return period of rainfall average index is 177; whereas for two years, the return period of rainfall average index is 181. For 10 years return period of rainfall average index become much higher, 185; and for 25 years it increased to 189. Risk index analyzed with different rainfall probability return period and increased return period showed a positive correlation indicating risk.

Keywords: DRASTIC Index, Electrical Conductivity, Groundwater, Saltwater Intrusion