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Assessment of drinking water quality of domestic wells in Chunnakam and Vadamaradchi, Jaffna peninsula

*S. Suvendran and W.M.D.N. Wijeyaratne**

Department of Zoology and Environmental Management, Faculty of Science, University of Kelaniya

An assessment of the quality of drinking water was carried out by measuring 12 selected physico-chemical parameters for selected domestic wells in Chunnakam and Vadamaradchi areas of Jaffna. Vadamaradchi is used as the reference site, as this area is considered to have the best fresh water in Jaffna peninsula. The measured physico-chemical parameters of water from selected domestic wells were compared with the standards established by World Health Organisation (WHO) and Sri Lanka Standards Institution (SLSI) for drinking water. Spatial and temporal variation of parameters among sites was analysed using Two-way ANOVA. The characteristic water quality parameters of the sampling sites were identified using Principal Component Analysis (PCA). Significantly high concentrations of nitrate and oil & grease were recorded in Chunnakam ($p<0.05$), whereas significantly high dissolved oxygen (DO) and pH were recorded in Vadamaradchi. Nitrate concentration of the wells ranged between 0.021 – 40.1 mg/L, while 30% of these wells exceeded WHO permitted nitrate standard level, 11mg/L. Oil & grease (OG) of the wells ranged from 0.011 to 0.373mg/L, while 70% of wells in Chunnakam exceeded the SLSI permitted standard limit for OG, 0.2mg/L. A significant temporal variation of DO, total solids and total hardness was recorded in Chunnakam, while pH, DO and total phosphorus showed significant ($p<0.05$) temporal variations in Vadamaradchi. The wells in Vadamaradchi were characterized by high DO, low nitrate, and low OG, while the wells in Chunnakam were characterized by high nitrate and OG. The values recorded in the current study can serve as baseline values for future water quality monitoring and management studies in Chunnakam and Vadamaradchi.

Keywords: Limestone aquifer, Contamination, Crude oil, Potability, Fertilizers

dimuthu.wijeyaratne@kln.ac.lk 072200500