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POTENTIAL RISK OF GROUNDWATER POLLUTION BY NITRATES IN AND AROUND KANDY

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Two representative environments of Urban and Agricultural background in Kandy were subjected for the study of Nitrate levels in their shallow groundwater. Areas of nearly 9 km^2 extent were selected for the study. Twenty three sampling points including seventeen shallow wells, two fountains and three dug pits were used as the sources of the groundwater sampling. It includes eleven shallow wells and a spring adjacent to the agricultural environment in Menikhinna-Pitawala. Six shallow wells, a spring and three dug pits were selected from the urban area around Deiyannewela-Getambe. Six of them were adjacent to the Mid Cannel and five were from the catchments.

Together with periodic variation of Nitrate-N (NO_3^--N) the parameters of pH, Temperature and the Conductivity of the shallow groundwater were monitored periodically at nearly three weeks interval from September 2003 to February 2004. In support of the data, the variations of phosphate (PO_4^{3-}), Manganese (Mn^{2+}), Magnesium (Mg^{2+}) and the total iron concentrations were examined. The rainfall, Hydrology and the hydrogeological data were used to determine the pathways of collecting Nitrate in to ground water. The variation of the parameters correlated with the environmental, hydrogeological, and seasonal background conditions of the respective areas and the conclusions were drawn.

The probable Nitrate source of the agricultural area is nitrogenous fertilizer and degrading plant and animal remains. That of the urban area is mainly the seepage of the polluted water from surface drains and the unsewaged sanitation practices. The spatial variation of NO_3^--N levels correlate with the ground elevation of the sources. The nature of correlation is attributed to the characteristics of water bearing sources and the agrochemical environment. The observations of the pH, Mn^{2+} and the total ion concentrations are in accordance with the chemical environment and the spatial distribution of the NO_3^--N. The temporal NO_3^--N variation shows a complex local behaviour and long term observations are required to draw more elaborated conclusions. The infiltration and the evaporation rates seem to affect the temporal changes.

The average of the NO_3^--N observed during the study is 5.0 mg/l. Areawise it was 2.5 mg/l in the agricultural and 7.0 mg/l in the urban. Though the averages are well below preferable drinking water standards, they show a higher values of NO_3^--N levels to that of the data in the map of "The distribution of Nitrates in The ground water of Kandy area" (Weerasooriya, S.V.R. and Dissanayake, C.B.,1986). It was revealed that 57 % of the groundwater sources including 100 % of the urban sources are showing some degree of contamination and 13 % already polluted with respect to Nitrate concentrations. The study emphasise the threat of groundwater pollution by nitrate especially in the urban area.