GROUNDWATER POLLUTION AND ITS EFFECTS ON PUBLIC HEALTH IN A HIGHLY POPULATED AREA: A CASE STUDY IN SAINTHAMARUTHU IN KALMUNAI M.C

BY

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ABSTRACT

Water is the one of the vital basic need for all living beings. Safe and clean water becomes scares in many parts of the world due to various reasons. Increasing population is one of the factors contributing, directly and indirectly, to the extinct of this precious natural resource. Groundwater is the traditional and safe modes of good quality water and is the main water source for drinking and other domestic purposes in the coastal areas of Ampara district. High population density along with lack of proper drainage systems and improper excreta disposal methods in the sandy regosols soils are some factors directly affect the shallow aquifers. In addition to these chronic undesired factors, acute natural disasters like tsunami, cyclones and flood too are aggravating the conditions. Proper understanding and appropriate approaching will certainly improve the lifestyle of the people. In view of the above, Sainthamaruthu, a highly populated south-eastern semi-urban place was selected. Primary and secondary data on basic infrastructure facilities, water related disease records and other relevant information were collected. Further, 26 representative wells from all over Sainthamaruthu were selected for assessing the quality of groundwater for one year period from July 2004 to June 2005. Important quality parameters such as *E. coli* bacteria, nitrate concentration, and EC with depth to the water table were measured on every other week during the study period.

Analysis of the data collected revealed that there are water related diseases prevail in the region and it has obvious relations to the lack of basic needs, such as safe water and excreta disposal systems. All the wells are found less than 15 m distance from the septic tanks due to the low land availability for a family. Average family size is 4-5.

Diarrhoea is the most frequent diseases reported at the hospital followed by typhoid and other intestinal infectious diseases. Field study on water characteristics showed that the water table fluctuates according to the availability of rainfall and had impact on the water quality parameters. Laboratory studies showed that the water table and *E. coli* were higher in the wet season and lower in the dry season. Almost all the wells are contaminated with *E. coli*. This was due to the rise of groundwater level in the wet season. Nitrate was within the allowable limits in most wells except well numbers 6, 9, 10 and 15, but a variation between the dry and wet seasons was noticed. The EC values too varied between seasons, where the higher values were found in wells close to sea during the dry period. *E. coli* counts were higher during the wet season than that of the dry season with exceptions in 3 wells (high in both season).

Tsunami had a very high impact on Sainthamaruthu both to human lives and to the infrastructure, aggravates the existing problems on water, sanitation and health. The rate of recovery of the affected groundwater depends on types of treatment process, hydraulic conductivity of the soil and its variability, thickness of the aquifers, the influence of actual rainfall, and the amounts and patterns of pumping, *etc.*

The overall results imply that many of the well waters analysed were not conforming to the SLSI standards. Continuous monitoring is necessary with respect to faecal contamination as this problem was already in place in Sainthamaruthu. Accordingly, the public living in this area has to be advised to take necessary protective measures to maintain hygienic conditions against any possible health hazards due to water contamination problems by tested parameters in this study. Potable water supply and central sewerage treatment systems could be the best alternative to any further contamination.