

AN ATTEMPT TO CLASSIFY THE AQUIFERS BASED ON GEOCHEMICAL NATURE OF GROUNDWATER USING GIS

R. Thilagavathi¹, S. Chidambaram¹, M.V. Prasanna^{2*}, C. Thivya³, K. Tirumalesh⁴ and S. Pethaperumal⁵

¹*Department of Earth Sciences, Annamalai University, Annamalai Nagar, India.*

²*Department of Applied Geology, Faculty of Engineering and Science, Curtin University Sarawak, CDT 250, 98009 Miri, Sarawak, Malaysia.*

³*Department of Geology University of Madras, India*

⁴*Isotope Applications Division, Bhabha Atomic Research Centre, Mumbai, India.*

⁵*State Groundwater Unit and Soil Conservation, Department of Agriculture, Pondicherry, India.*

*E-mail: geoprasanna@gmail.com

Abstract

There are several methods adopted to study the vulnerability of groundwater. One such method has been adopted in this study by collecting a total of 324 samples from Alluvium, Upper Cuddalore, Lower Cuddalore and Cretaceous aquifers in Pondicherry region during four different seasons (Pre monsoon, South West Monsoon, North East Monsoon and Post Monsoon). The samples collected were analyzed for major cations and anions. The spatial maps for EC, Na, Ca, Mg, SO₄, HCO₃ and DOC were prepared and categorized as Permissible, Vulnerable and Unsuitable. Later all these maps were reclassified and integrated together by addition image technique for preparing the vulnerability map of for one particular season in an aquifer. Subsequently all the spatial maps of different seasons for the same aquifers were added to find out the resultant vulnerability map of the specific aquifer. This study points out that east and south eastern region in Alluvial and Upper Cuddalore sandstone are vulnerable. The Lower Cuddalore aquifers show that the southern part is vulnerable. The Cretaceous aquifer shows that the south-west and north-eastern regions are more vulnerable to anthropogenic activities which may affect groundwater quality of the region.

Keywords: Groundwater, Vulnerability, Spatial maps, Aquifers.