CHAPTER – VII
SUMMARY AND CONCLUSIONS

7.1. Summary

Safe and pure drinking water is one of the basic necessities for healthy human life, because 80% of infectious diseases prevail in the world are water related. Water resources around the globe are getting contaminated gradually by the addition of surrounding foreign materials, including saline input, industrial, sewage and other surface effluents. In the developing countries like India, the water quantity along with its quality is a greater issue, especially in densely populated areas. In this context, the studies on water quantity and quality become unavoidable to monitor the groundwater condition in an area. In the present study, the groundwater assessment was carried out in Agastheeswaram taluk of Kanniyakumari district, which covers two important towns (Nagercoil and Kanniyakumari). The appraisal of groundwater was done by combined geoelectrical and geochemical study. The geoelectrical study carried out in 58 stations shows that the majority of the aquifers in the study area are affected by salinity. Notably in the regions surrounding the Palayar River and coast of Agastheeswaram Taluk, the groundwater seems to be highly polluted. Good and productive aquifers are also seen in the study area, which is to be monitored and maintained properly for future prospecting.

The groundwater samples collected from the study area are subjected to geochemical analysis during both the post-monsoon and pre-monsoon season. The results obtained from the geochemical analysis shows that the calcium (Ca$^{2+}$) is the leading cation followed by sodium (Na$^{+}$) in both seasons. Chloride (Cl$^{-}$) and bi-carbonate are found as the dominant anions in post and pre monsoon seasons respectively. The geochemical analytical results also reveals that the
groundwater from the wells 14, 41, 51, 52, 54, 61, 68 and 69 corresponding to Nallur, Koilvilai, Manakudy, Puthalam, Rajakkamangalam, Pallam and Thengamputhoor areas have high TDS, EC, sodium (Na⁺), chloride (Cl⁻) and hardness (TH) content and these areas are identified as polluted. The combined analysis of geoelectrical and geochemical data also holds good for portraying the groundwater scenario of the study area.

**7.2. Conclusions**

The conclusions drawn from the geoelectrical and geochemical assessment of groundwater in parts of Kanniyakumari District, Tamil Nadu are presented below,

1. The geoelectrical study has demarcated the hydro-stratigraphy of the Agastheeswaram Taluk. It also reveals the aquifer characteristics such as resistivity and thickness, from which the potentiality and the quality of the aquifers are inferred.

2. The areal distribution of both lateral and vertical variation of resistivity on the subsurface of the study area was projected and studied.

3. Majority of the aquifers are found to be affected by salinity problem due to salt water incursion from sea, saline backwaters from Pazhayar River and other anthropogenic activities in the inland areas.

4. The nearby litholog data is also coinciding with the obtained layer parameters, which highlights the reliability of this method.

5. A total of 69 groundwater samples from hand pumps, open wells and tube wells at different depth were also collected and studied for geochemical analysis.
6. The suitability of groundwater for drinking and irrigation purposes is also studied, and it was found that some of the wells are contaminated by chemical species. The spatial variations of different chemical parameters are clearly depicted in the study area.

7. The relationship between the aquifer resistivity obtained from geoelectrical survey depicts a close relationship with the electrical conductivity of the groundwater samples collected near to the VES stations.

8. It can be finally concluded that the VES soundings combined with geochemical study can be used successfully to identify the potential aquifers and to delineate the groundwater contaminated areas.
REFERENCES


Bobachev, C., 2002. IPI2Win: A windows software for an automatic interpretation of resistivity sounding data, Ph.D., Moscow State University.


Eaton, F.M., 1950. Significance of carbonate in irrigation water, soil sciences, vol 69


Kumar, M., Ramanathan, A.L., Rao, M.S., Bhism Kumar., 2006. Identification and evaluation of hydrogeochemical process in the groundwater environment of Delhi, India. Envir Geol.


PWD., 2005. Groundwater perspectives: a profile of Kanyakumari district, Tamil Nadu. Tamil Nadu Public Works Department, India


Schoeller, H., 1965. Qualitative evaluation of groundwater resources. In Methods and techniques of ground-water investigations and development (pp. 54–83). UNESCO.


Teshome, M.A., 1999. Hydrogeological studies of Rishkesh and Mohand areas in Doon valley using electrical and seismic refraction methods, Case study.


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ANNEXURE

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