

# Ground Water Quality Assessment in Cheyyar Region

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**Abstract:** The sample of Ground water from ten locations have been collected from Cheyyar region and analysed for pH, TDS and Alkalinity. Interpretation of these water qualities of chemical parameters indicates that ground water available in most of the places of Cheyyar region is not suitable for drinking and agricultural purposes. The extent of ground water quality in Cheyyar region has been presented in this paper.

**Keywords:** Ground water- quality, Physico-Chemical Characteristics, Pollution.

## Introduction

Water is the basic constituent of all living beings, The ground water of Cheyyar region which flows through Chengam Taluk of Tiruvannamalai district. The river receives most of its water from the Northeast and Southwest monsoon rains and is the major source of irrigation for the villages, including the Cheyyar, Vandavasi along its banks. The cheyyar cooperative sugar mills is situated in Anapatthur village nearer to Cheyyar ,and also Sipcot Industrial Shoe Factory(Nike) its situated in Maangal.

The rapid development of industrial, urban and agricultural sectors is adding contamination to the water resources system at an increasing rate. In some situations these contaminations join the aquifers and cause quality of ground water problems<sup>1-3</sup>. This necessities and accurate prediction of time and rate of deterioration of ground water quality for effective pollution control. In many places continuous discharge of effluents over a period, which probably exceeds assimilative capacity of environment leads to accumulation of pollutants in ground water and soil. A study has been carried out to ascertain the ground water quality<sup>4-7</sup> of Cheyyar region.

## Methodology

The Ground water samples were collected from ten locations from Cheyyar region and analysed for pH, TDS, Chlorides and Alkalinity<sup>8,9</sup>. The samples are collected in cleaned Polyethene bottles from the dug wells or tube well. Before sampling, the plastic bottles were cleaned thoroughly to remove all surface contamination, rinsed with distilled water and dried. The sampling locations were selected is given below :

Sample No	Sampling locations
1	Cheyyarventram
2	Sivapuram
3	Anakavur
4	Thoyipedu
5	Parasur
6	Perumpallum
7	Vinayagapuram
8	Arakavur
9	Anapatthur
10	Maangal

The samples were analyzed for major physical and chemical water quality parameters like pH, The procedures were followed from standard books and

lab manual. Before measuring the pH of the sample water, pH meter standardized using pH buffer of 4.0 and 9.0. According to WHO Standard values PH value is 6-8.5 is taken as permissible limit.

The pH of the samples were determined using digital pH meter. In **Fig.1**, the samples from one to eight shows normal pH values falls on permissible limits ,except the sample number 9 and 10 which shows high pH in water sample. The reason found to be the sample number 9 it shows variation of pH in water is 9.2 because of the sugar mill present in Anapathur. The Sipcot shoe industry(Nike) present in Maangal the pH of water is 10 it shows discharge of industrial effluent in ground, pH of water is more than permissible limit.

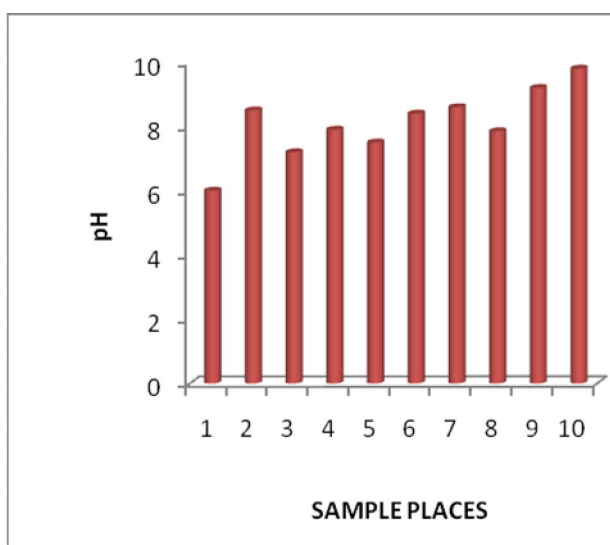
The Total Dissolved Salt (**TDS**) were analysed, Out of 10 samples collected in our study area four samples(**Fig.2**, sample number 3,4, 9 and 10) were found to be the highest value of TDS above the permissible limit of 400 to 1500 mg/L.

The excess TDS values could be due to the dissolved solid waste originated from the discharge of effluents from the Cooperative sugar mills and Shoe factory-particularly the water sample which is collected in Anapattur and Maangal showed high TDS value in the range of 2100 mg/L & 2300 mg/L respectively. Moreover the excess TDS values and contaminate the

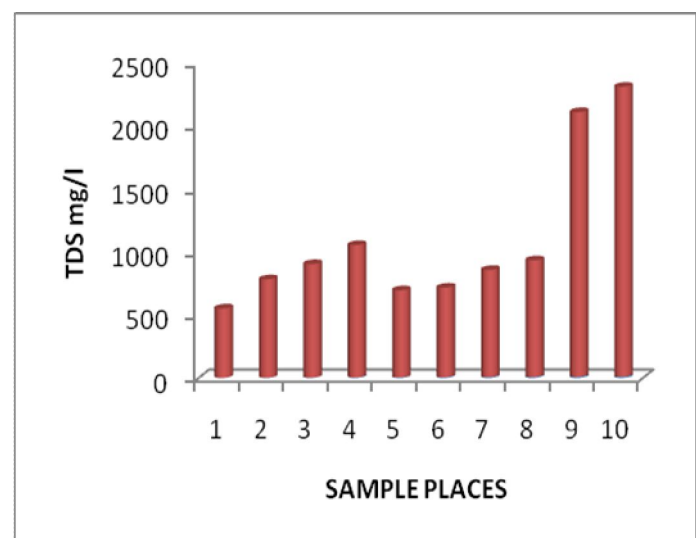
ground water pollution particularly in the Maangal . High values of TDS in ground water are generally not harmful to human beings but high concentration of these may affect persons, who are suffering from kidney and other diseases.

In **Fig.3** samples study of pH values ranges from 6.00 to 8.5 with the mean value of 8.05 suggesting the alkaline nature of the ground water in the study area. Thus a slight variation was recorded due to the alkalinity of effluent. However the pH value of all the samples falls within the permissible limit. The alkalinity values are found to vary from 150 to 650 mg/L. The alkalinity of ground water samples (samples 4,6,9 and 10) in Thoyipedu, Perumpallam, Anapatthur, Maangal found to be greater than 610 mg/L. .

In **Fig. 4** shows the variation of Total Hardness(**TH**) present in the water sample which contain hardness causing ions like Calcium & Magnesium were analysed. The samples sites from 1 to7 Calcium values falls within permissible limit except three samples 8 to 10 collected at Arakavur, Anapatthur and Maangal. Calcium concentrations varied from 250 to 300 mg/L in the study area. Magnesium usually occurs in lesser concentration than calcium , the Magnesium concentrations varied from 50 to 220mg/L in the study area.



**Fig 1. pH values of water samples**



**Fig 2. TDS values of water samples**

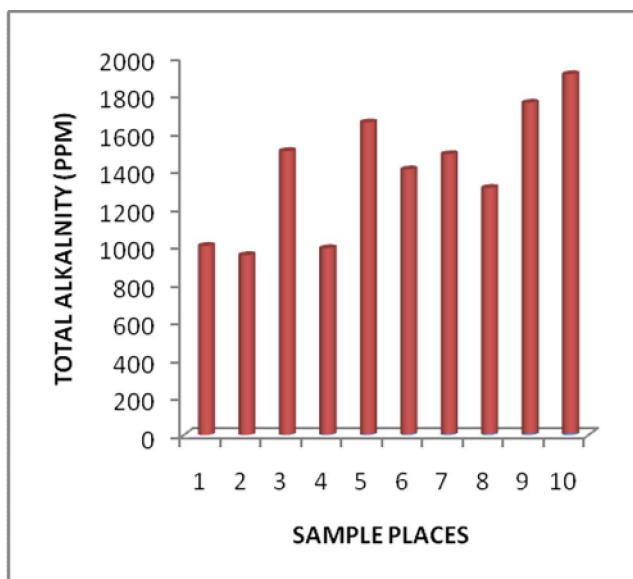


Fig 3. Alkalinity values of water samples

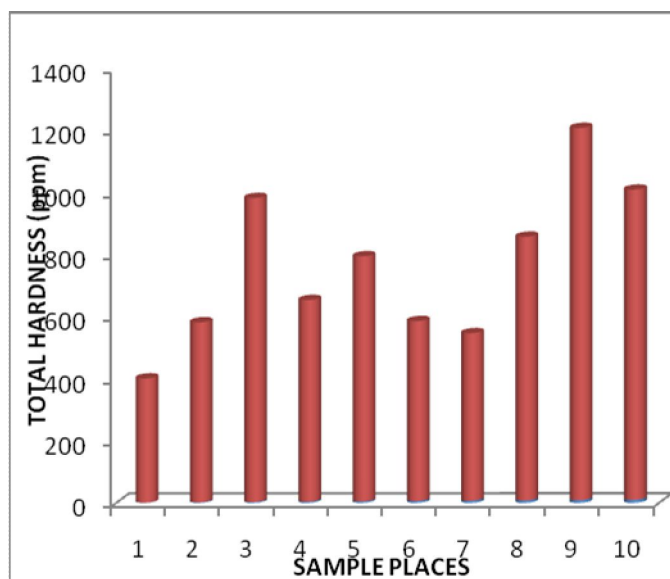


Fig 4. TH values of water samples

All values lies within the desirable limit from samples 1 to 7 except few samples like 8 to 10. The desirable magnesium value for drinking water prescribed by WHO is 150 mg/L. The water samples are collected from Anakavur , Anapatthur and Maangal was found to have 160, 175 & 200 mg/L of Mg concentration respectively.

### Conclusions

Drinking-water reserves, because of their importance to public health, are a collective concern. It is everyone's duty to ensure that they are properly safeguarded and protected. The main causes to pollute the ground water are solid waste disposal, domestic and industrial sewage drainage, so in order to avoid possible water contamination. Pollution is mainly due to industrial effluents which are spread in and around Cheyyar region. These industries mix their untreated

waste water into the Cheyyar region which is a main source of water. A systematic study and analysis of ten water samples were analyzed. It was found that two samples (samples 9 and 10) are contaminated the ground water through soil porosity, permeability because of discharge of industrial sewage. As a result it should be proper disposal of industrial effluents after treatment as well as recycling of waste water along with periodical monitoring of the underground water. Finally our study concludes that the underground water quality for future generation can be improved by removing the waste after proper treatment.

### Acknowledgements

SS,SR thank the Chancellor, Director , Principal and Dean of Vel Tech University, Chennai for their constant support and encouragement.

### References

1. K.V.Ellis "Water disinfection: a review with some consideration of the requirements of the third world" Environ Control 20, 341-407 (1991).
2. C.P.Kumar, "Estimation of Natural Ground Water Recharge". ISH Journal of Hydraulic Engineering, 3, 61 (1977).
3. D.Schoenen, "Role of disinfection in suppressing the spread of pathogens with drinking water: possibilities and limitations" Water Res 36, 3874-3888 (2002).
4. S. Chandra, "Estimation and measurement of recharge to ground water for rainfall, irrigation and influent seepage" - International seminar on development and management of ground water resources" (November 5-20, 1979).
5. M.D.Sobsey "Drinking water and health research: a look to the future in the United States and globally". J Water Health 4, 17-21 (2006).
6. W.M. Baird, L.A. Hooven, B. Mahadevan,

- “Carcinogenic polycyclic aromatic hydrocarbon-DNA adducts and mechanism of action” *Environ Mol Mutagen* 45, 106–114 (2005).
7. B.M.Afzal, “Drinking water and women’s health” *J. Women’s Health* 51, 12–18 (2006).
  8. S.Gupta, A.Kumar, C.K.Ojha, G.Singh, *J. Env. Science & Engg.*, 46(1), 74-78 (2004).
  9. N.Thacker, J.Bassin, V.Deshpande, “Trends of orga-nochlorine pesticides in drinking water supplies” *Environ Monit Assess* 137, 295–299 (2008).

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