

## A Case Study on “Water Quality Assessment and Physicochemical Parameter of Ground Water” In Namakkal District in Tamilnadu

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**Abstract:** This case study is intended surroundings and health impacts of untreated or inadequately treated wastewater effluents. The quality of wastewater effluents is responsible for the degradation of the receiving water bodies. Due to use of contaminated water, human population suffers from water borne diseases. In this paper Namakkal in around areas ground water pollution to agriculture soil due to the natural shale value of heavy metals in soil system Water is one of the vital needs of all living beings. The quality of water usually described according to its physical, chemical and biological characteristics. Hence it becomes necessary to find the suitability of water for drinking, irrigation and Industry purpose. The reuse of treated effluent (for agriculture and as supplement for drinking water needs) is currently receiving attention as a reliable water source. Parameters that may be tested include temperature, pH, turbidity, salinity, nitrates, TDS, Anions and phosphates. In extension, recreational water users and anyone else coming into contact with the infected water is at risk. In order to comply with wastewater legislations and guidelines, there is a need for adequate treatment before discharge. This can be achieved through the application of appropriate treatment processes, which will help to minimize the risks to public health and the environment. To achieve unpolluted wastewater discharge into receiving water bodies, careful planning, adequate and suitable treatment, regular monitoring and appropriate legislations are necessary.

**Keywords:** Ground water, drinking water, Municipal wastewater, Water quality parameters, Namakkal Town.

### I. Introduction

Ground water, surface water (rivers, streams and ponds), atmospheric water (rain-water, snow and hail) and springs are the main source of water available to the people in general. The qualities of these water bodies vary widely depending on the location and environmental factors. The major source of ground water is precipitation that infiltrates the ground and moves through the soil and pore spaces of rocks. Other sources include water infiltrating from lakes and streams, recharge ponds and waste-water treatment system. As ground water moves through soil, sediment and rocks, many impurities such as disease-causing micro-organisms are filtered out. Many water resources in developing countries are unhealthy because they contain harmful physical, chemical and biological agents. To maintain a good health however, water should be safe to drink and meet the local standards and international standards to taste, odour and appearance. Now required as much importance as water quality According to WHO, about 80% of all the diseases in human beings are caused by contaminated water. Once the groundwater is polluted, its quality cannot be renovated by stopping the pollutants from the source. It is therefore vital to regularly monitor the quality of groundwater. Groundwater pollution by heavy metals has been given much attention due to their low biodegradability and toxic effects. The water from the sources viz., streams, falls, lake, hand pump, open well and bore well are contaminated with domestic, agricultural and industrial wastes and likely to cause water related diseases. Similarly, Bullard inferred that polluted surface water always results in an unhealthy socio-economic environment. In this study, physicochemical parameters are determined to draw a conclusion on the quality of water whether it is good or unfit for drinking purpose.

### II. Objectives

The objectives of this case study were

1. To evaluate the ground water quality in Namakkal Town, Namakkal District, Tamilnadu, India.
2. To determine the quantity of various physical and chemical parameters of groundwater in the study area.
3. To evaluate the suitability of groundwater for drinking purpose and to estimate the Water Quality Index.

### III. Materials And Methods

#### Study Area

Tamil nadu state is located in the southern part of india.in this study, Namakkal Taluka of Namakkal district area is selected. The namakkal District is located (Between 11.2840<sup>0</sup> North latitude and between 78.1108° East longitude) in Tamil nadu .The study was conducted in pre-monsoon season .Total 21 samples from different localities of Namakkal Taluk were collected .A multifactorial correlation analysis of the data was Made to study the inter-relationship of the 07 parameters.

#### WATER QUALITY INDEX (WQI)

Water Quality Index (WQI) is defined as a technique of rating that provides the composite influence of individual water quality parameters on the overall quality of water. It reduces the large amount of water quality data to a single numerical value. It is calculated from the point of view of human consumption. Water quality and its suitability for drinking purpose have been considered for the calculation of WQI. In this method the weight age for various water quality parameters is assigned to be inversely proportional to the recommended standards for the corresponding parameters as shown in table 1. Water quality index is computed by following formula

$$WQI = \text{Antilog} [ \sum W_n \cdot 10^{q_n} ]$$

WQI	Quality of water
0-24	Excellent
25-49	Good
50-74	Poor
75-100	Very poor
>100	Unfit for drinking

### IV. Results And Discussion

The analytical results of a case study on water quality assessment and physicochemical parameter of ground water in Namakkal Town, Namakkal District, Tamilnadu, India.

#### DETERMINATION OF POTENTIAL OF HYDROGEN (pH)

Table No: 4.1 DETERMINATION OF POTENTIAL OF HYDROGEN

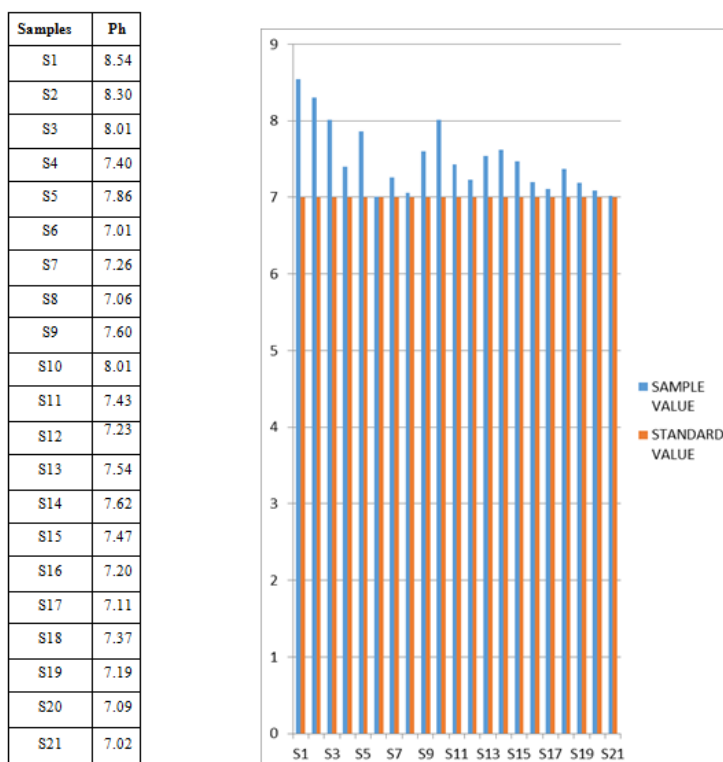
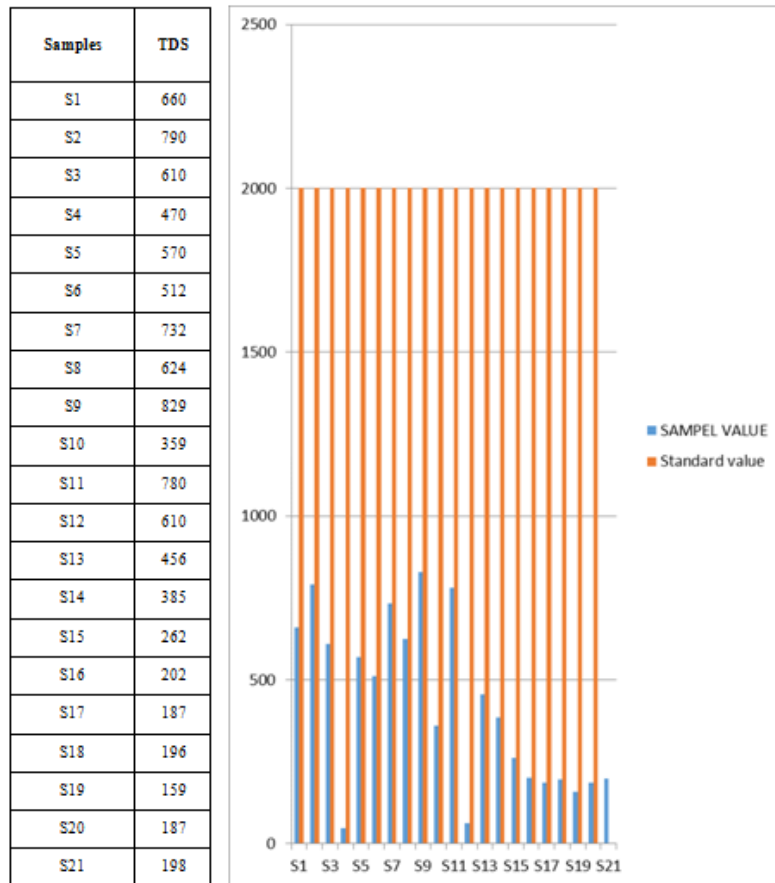


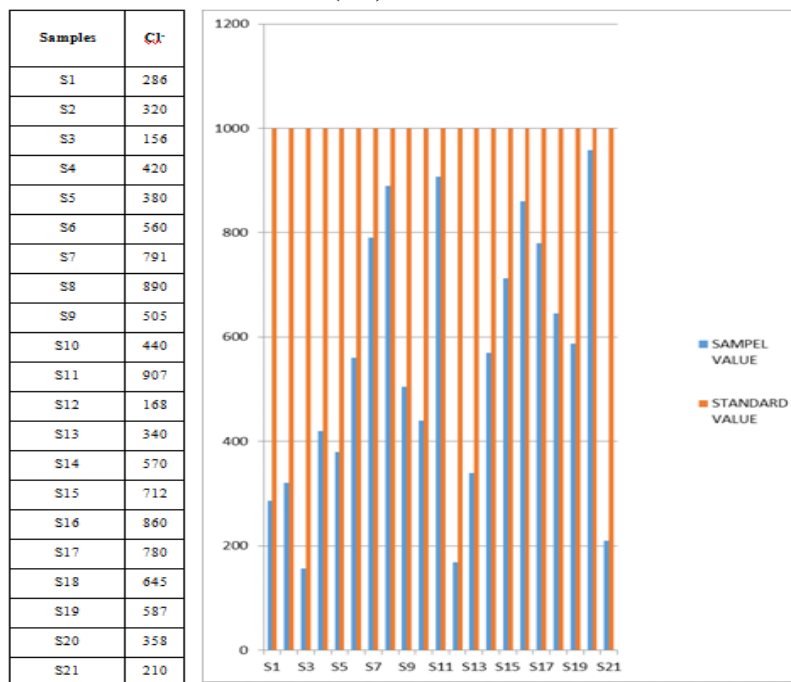
Fig: 4.1 CAMPARISION CHART OF POTENTIAL OF HYDROGEN

**DETERMINATION OF TOTAL DISSOLVED SOLIDS (TDS) Table No: 4.2  
DETERMINATION OF TOTAL DISSOLVED SOLIDS**



**Fig: 4.2 CAMPARISION CHART OF TOTAL DISSOLVED SOLIDS**

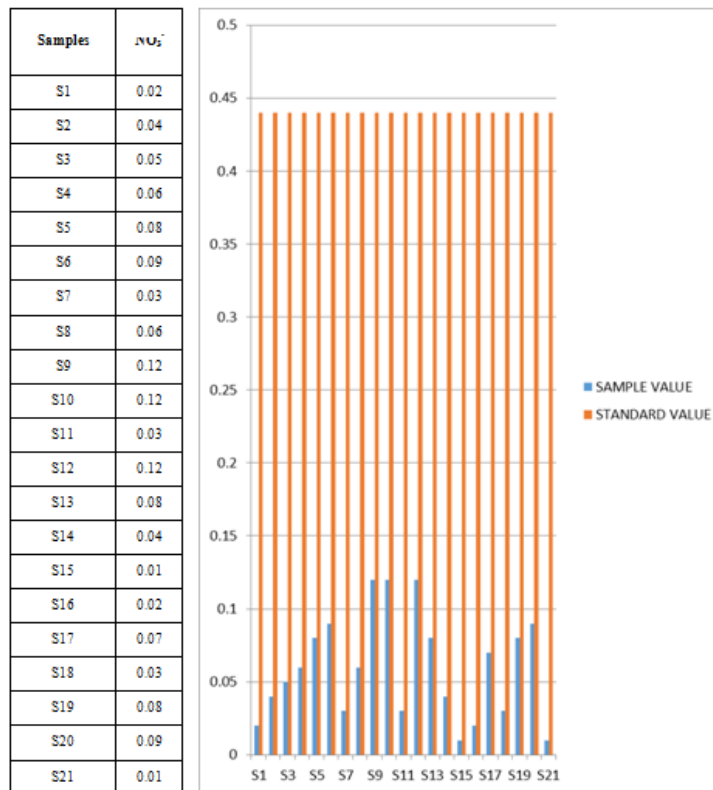
**DETERMINATION OF CHLORIDE (Cl-) Table No: 4.3 DETERMINATION OF CHLORIDE**



**Fig: 4.3 CAMPARISION CHART OF CHLORIDE**

**DETERMINATION OF NITRATE (NO<sub>3</sub><sup>-</sup>)**

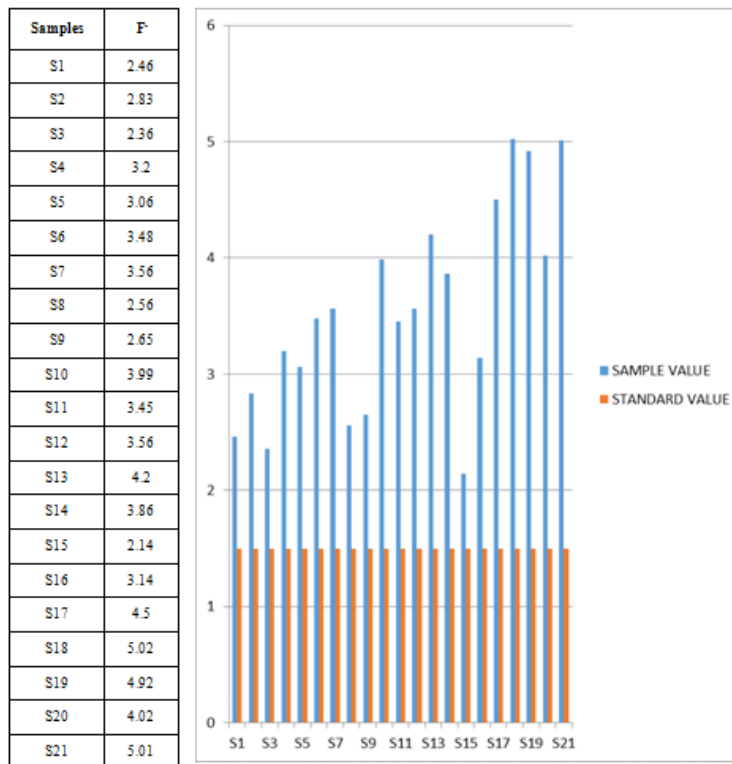
**Table No: 4.4 DETERMINATION OF NITRATE**



**Fig: 4.4 CAMPARISION CHART OF NITRATE**

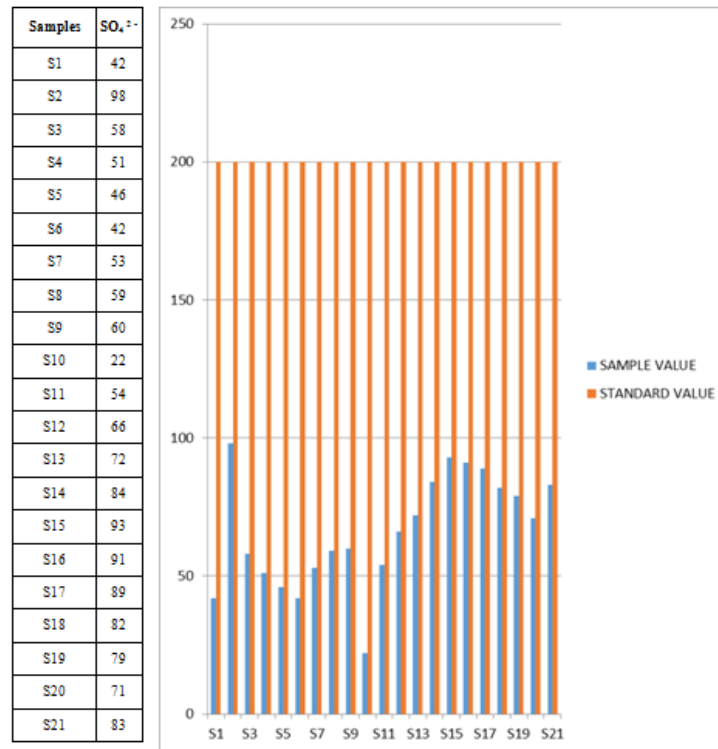
**DETERMINATION OF FLUORINE (F<sup>-</sup>)**

**Table No: 4.5 DETERMINATION OF FLUORINE**



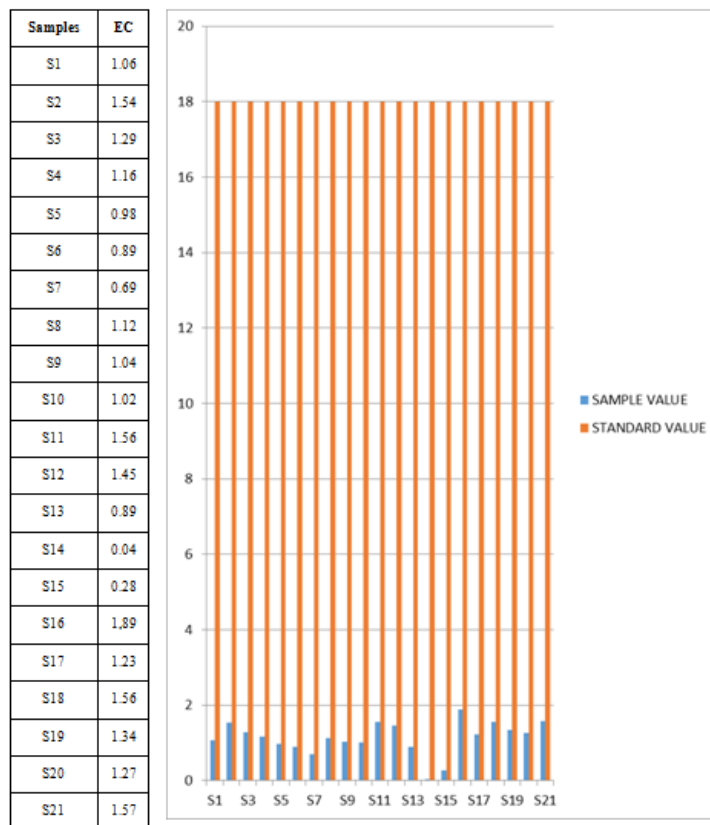
**Fig: 4.5 CAMPARISION CHART OF FLUORINE**

**DETERMINATION OF SULFATE ION ( $SO_4^{2-}$ ) Table No: 4.6 DETERMINATION OF SULFATE ION**



**Fig: 4.6 CAMPARISION CHART OF SULFATE ION**

**DETERMINATION OF ELECTRICAL CONDUCTIVITY (EC) Table No: 4.7 DETERMINATION OF ELECTRICAL CONDUCTIVITY**



**Fig: 4.7 CAMPARISION CHART OF ELECTRICAL CONDUCTIVITY**

## V. Conclusion

Wastewater effluents are major contributors to a variety of water pollution problems. Some of these problems include eutrophication, which can stimulate the growth of algae, increased water purification cost, interference with the recreational value of water, health risks to humans and livestock, excessive loss of oxygen and undesirable changes in aquatic populations. Since large amount of wastewater effluents are passed through sewage there is a need to rectify and diminish the overall impact of these effluents in water bodies. In order to comply with wastewater legislations and guidelines, wastewater must be treated before discharge. This can be achieved through the application of appropriate treatment processes, which will help minimize the risks to public health and the environment. To achieve unpolluted wastewater discharge into receiving water bodies, there is the need for careful planning, adequate and suitable treatment, regular monitoring and appropriate legislation. This will enhance science-based decisions and ensure the sustainability of the environment and the health of plants and animals. There is also a need to ensure that effluent standards and limitations, as set by regulatory bodies are not compromised.

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