

# Quality Analysis of Ground Water in Cuddalore District Neyveli Block using Conventional Method

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**Abstract-** This paper aims to assess the spatial distribution of ground water quality of the neyveli block. Over exploitation of ground water has become a major challenge block. Over exploitation of ground water has become a major challenge not only to the present civilization and also for the future generations.

The Ground water samples around Neyveli was collected. Samples were collected at ten different places to determine the following parameters like Color, pH, Turbidity, Calcium, Magnesium, Nitrate, Chloride, fluoride, sulphate, phosphate, Total Hardness, Total Dissolved Solids (TDS). Water samples were collected to know the groundwater quality using Water Quality Index (WQI). Ground water will fulfill their day – to – day water need.

**Key words-** Groundwater, Neyveli block, Parameters.

## I .INTRODUCTION

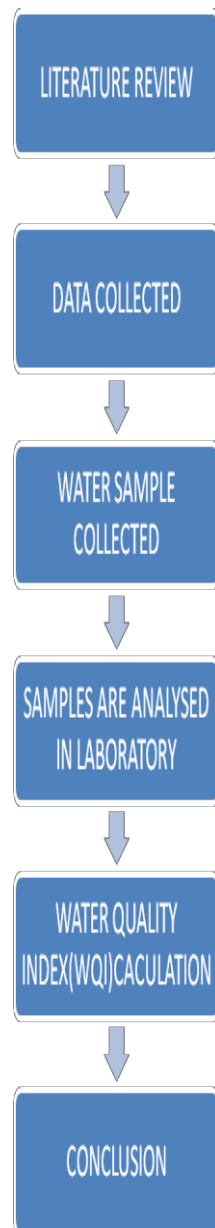
The main aims of this investigation are to provide an overview of present groundwater quality for parameters such as calcium, magnesium, nitrate, sodium, potassium, pH, TDS, total hardness,

alkalinity, and fluoride levels. The over dependency on groundwater has led to 66 million people in 22 states at risk due to excessive fluoride and around 10 million at risk due to arsenic in six states in India

In India several ground water related studies have been conducted to determine potential sites for groundwater evaluation and groundwater recharge zones are distributed in small patches and used as sources of contaminant migration to groundwater

## II METHODOLOGY

- 1.The Primary data based on the samples that we have collected around Neyveli.
- 2.The Secondary data is based on data collected like rainfall data, relative weight for 4 WQI (Water quality index), Drinking water standards.
- 3.The samples were subjected to physio – chemical analysis using standard procedure.
- 4.Reports are collected and analyzed.
- 5.WQI for water sample is prepared and analyzed.
- 6.The data`s are loaded in the WGS 1984 co-ordinate system. Hence they can be queried and analyzed.
- 7.These data`s can be manipulated for water quality mapping of a neyveli



### III.MATERIAL AND METHODS

**2.1. MATERIAL** pH meter,Electrical conductivity meter, spectrophoto meter, Burette and pipette titration, oven,Burner, Filter paper, crucible.

#### 2.2. PROCEDURE

##### 2.1Physical examination

As per IS 10500 : 2012 the water quality should be colourless. The physical examination was done at the time of the sample collection by simply examine the collected sample.

##### 2.2Appearance after filtration

As per IS 10500 : 2012 the water quality should be clear and all the samples are found to be clear. The appearance after filtration was made in the labo

ratory by filtering the collected sample to remove floating materials.

##### 2.3Colour

Waters which obtain their colour from natural organic matter usually pose no health hazard. However, because of the yellowish brown appearance of such waters, the consumers may not find the water aesthetically acceptable. Consumers of highly coloured but already properly treated water may not. As per IS 10500 : 2012 the water quality has the value of 2TCU.

##### 2.4Turbidity

Turbidity is a measure of the water`s lack of clarity. Highly turbid water reduces light penetration therefore affecting levels of photosynthesis. Warming is increased due to absorption of sunlight and it is generally aesthetically upleasing. Strom water

contributes to increased turbidity because of sediments and phytoplankton suspended in it as per IS 10500:2012 the water quality of turbidity is 2.0 NTU.

## 2.4 pH

The pH level of drinking water reflects how acidic it is. pH stands for “potential of hydrogen,” referring to the amount of hydrogen found in a substance (in this case, water). pH is measured on a scale that runs from 0 to 14. Seven is neutral, meaning there is balance between acid and alkalinity. A measurement below 7 means acid is present and a measurement above 7 is basic (or alkaline). IS 10500:2022 limit is 6.5 to 8.5.

## 2.5 Total Dissolved Solids

TDS stands for total dissolved solids, and represents the total concentration of dissolved substance in water. TDS is made up of inorganic salts, as well as a small amount of organic matter. Common inorganic salts that can be found in water include calcium, magnesium, potassium and sodium, which are all cations, and carbonates, nitrates, bicarbonates, chlorides and sulphates, which are all anions as per IS 10500 : 2012 limit is 100.

## 2.6 Total hardness

Hard water is water that has high mineral content. Mainly calcium and magnesium. Some studies have shown a weak inverse relationship between water hardness and cardiovascular disease in

men, up to a level of 170 mg calcium carbonate per litre of water. The World Health Organization has reviewed the evidence the data were inadequate to allow for accommodation for a level of hardness.

Some studies correlate domestic hard water usage with increased eczema in children.

## 2.7 Calcium hardness

As per IS 10500 :2012 the limit is 75 mg/l.

## 2.8 Magnesium Hardness

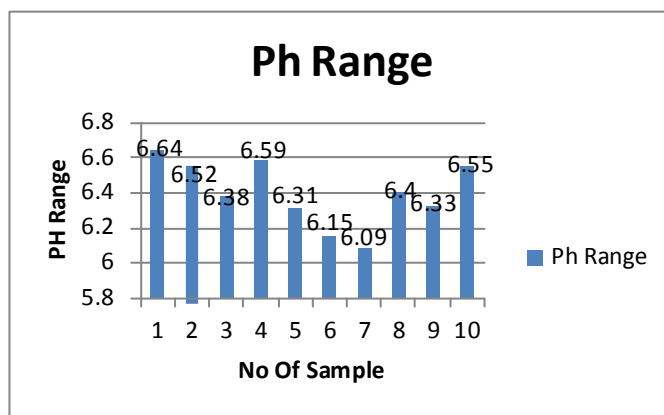
Carbonate hardness, or carbonate alkalinity is a measure of the alkalinity of water caused by the presence of carbonate. Hardness is usually expressed either as parts per million. As per IS 10500:2012 the limit is 30 mg/l.

## 2.9 Calcium

Calcium is major constituent of various types of rocks. Calcium is a cause for hardness in water and incrustation in boilers. The permissible limit of calcium in drinking water is 75mg/l. The calcium concentration in water samples collected from the study area ranged between 8-72 mg/l. So, all the samples were within the permissible limit.

## 2.10 Magnesium

If the concentration of magnesium in drinking water is more than the permissible limit, it causes unpleasant taste to the water. In ground water, generally magnesium content will be less than calcium content. Human body contains less amount of magnesium than that of calcium. The acceptable limit of CPHEEO standard is 30 mg/l. High does of



magnesium in medicine and food supplements may cause muscle slackening, nerve problems, depressions and personality changes as per IS 10500 : 2012 the limit is nil.

**2.11 Sulphate**

Sulphate occurs naturally in water as a result of leaching from gypsum and other common minerals. Discharge of industrial wastes and domestic sewage was tend to increase its concentration. Sulphate may also contribute to the corrosion of distribution system. In the light of the above considerations, no health – based guideline value for sulphate in drinking water is proposed as per IS 10500:2012 the limit is 300,g/l.

**2.12 Chloride**

Chloride is one of the major inorganic anion in water. Chlorides are important in detection the contamination of groundwater by waste water. The permissible limit of chloride in drinking water is 200 mg/l. As per IS 10500:2012 the limit is 300g/l.

**IV.RESULT AND DISCUSSION**

**4.1 pH**



**pH value is recorded for the entire sample using the pH meter**

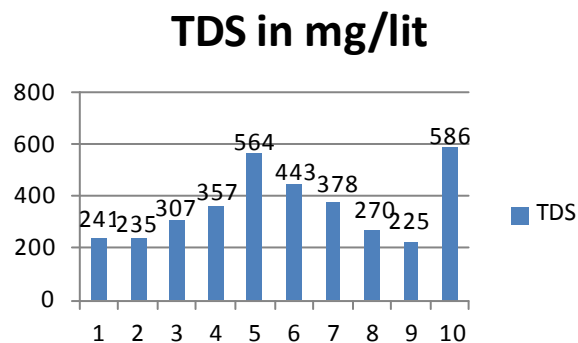
From this graph easily to identify the acid or base of water. All samples range between 5.8 -6.8 .So all the samples are alkalinity.

**4.2 Turbidity**



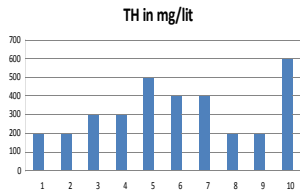
More over all the samples are have permissible turbidity value. But sample one have high turbidity value ranges 21.2 NTU. Because of are present in the water.

**4.3 Total Dissolved solids**



This graph shows max.TDS value is 586 mg/L and min value of 216 mg/L. Mean average value of 358 and standard deviation of 116.45. Hence it is not affected.

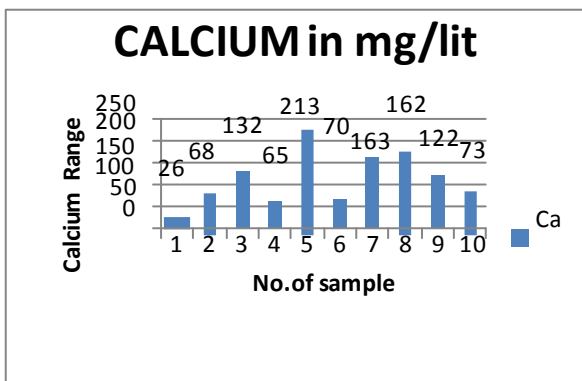
#### 4.4 Total hardness



This graph shows max. TH value is 473 mg/L and min value of 192 mg/L Mean average value of 289.6 and standard deviation of 137.

#### 4.5 Calcium

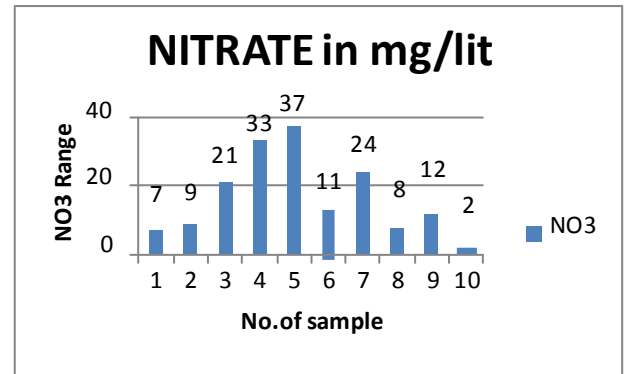
Max.  $\text{Ca}^{2+}$  value is 213 mg/L and min value of 26 mg/L. Mean average value of 109.4 and standard deviation of 71.889. In this one sample have slightly more range than permissible limit, so it want to treat use suitable treatment before use.



#### 4.8 Nitrate

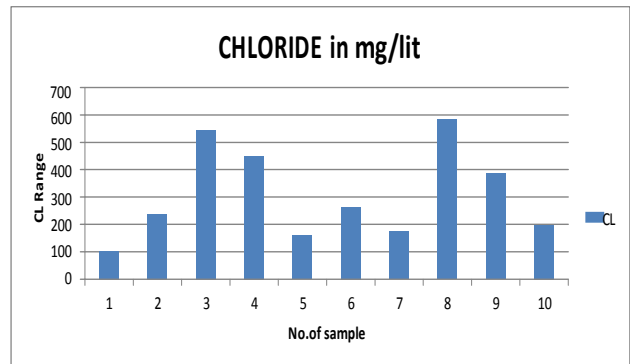
max.  $\text{NO}_3$  value is 38 mg/L and min value of 2 mg/L. Mean average value of 16.4 and standard deviation of 11

Usually nitrate concentration should not be higher and hence drinking with care should be taken.



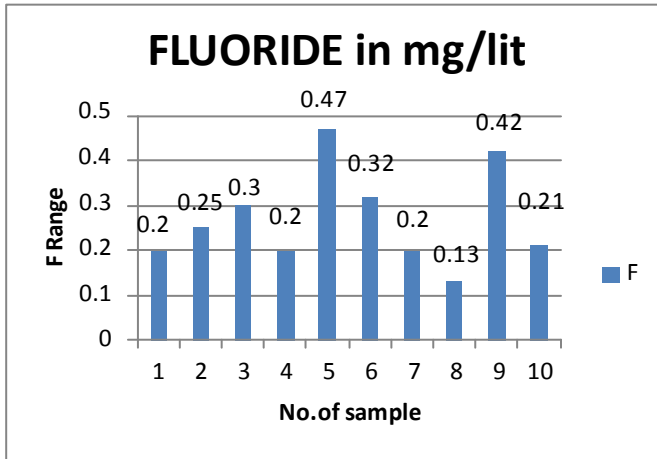
#### 4.6 Chloride

Max. Cl value is 583 mg/L and min value of 104 mg/L Mean average value of 310.7 and standard deviation of 201

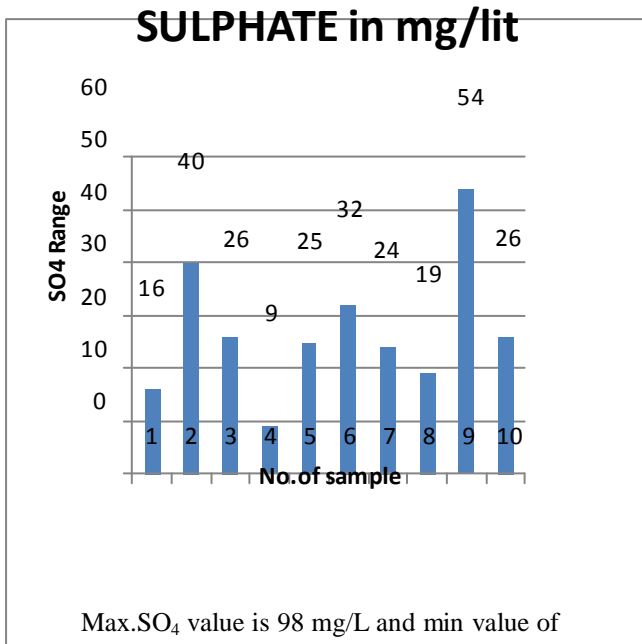


#### 4.9 Fluoride

Max. F value is 0.47 mg/L and min value of 0.13 mg/L Mean average value of 0.27 and standard deviation of 0.145. Fluoride concentration is within acceptable limits.

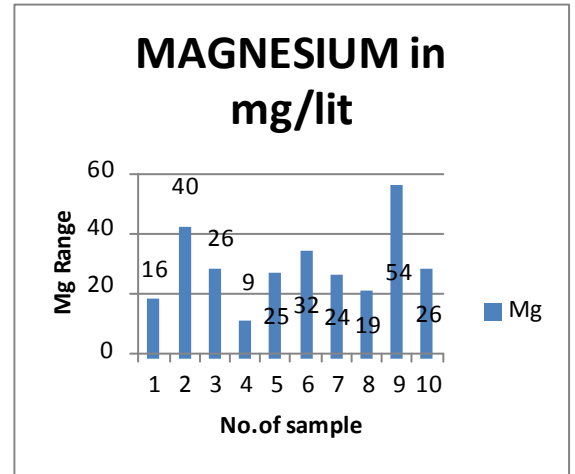


#### 4.9 Sulphate



Max. SO<sub>4</sub> value is 98 mg/L and min value of 5 mg/L Mean average value of 17.8 and standard deviation of 3.5.

#### 4.10 Magnesium

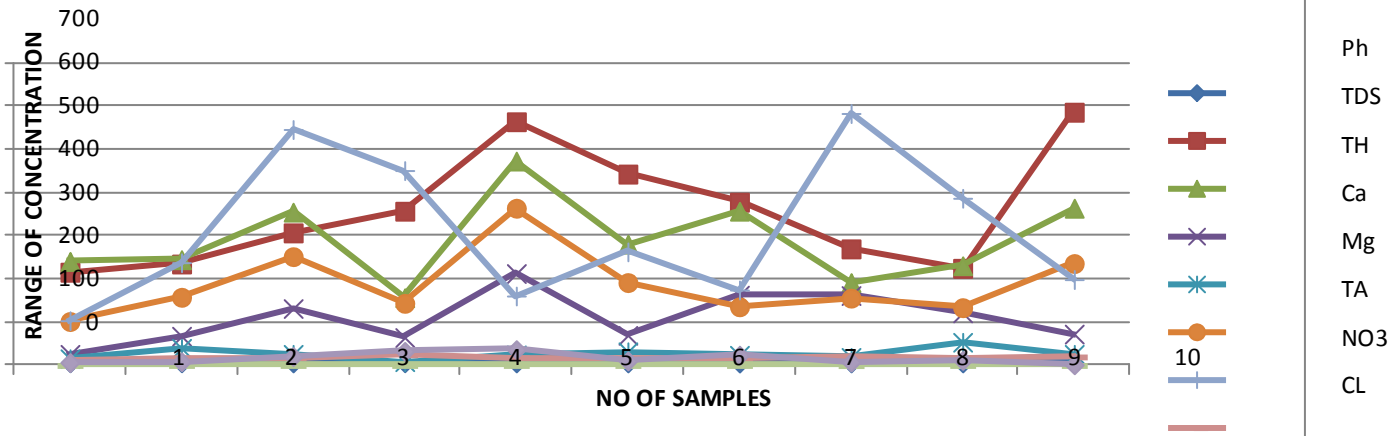


This graph shows max .Mg<sup>2+</sup> value is 54 mg/L and min value of 9 mg/L. Mean average value of 27.1 and standard deviation of 17.889.

#### 2.11 Comparison chart

Thus all the parameters are compared.

## COMPARISON CHART



### V.CONCLUSION

The physio chemical parameters are examined and the characteristic values are analysed for water quality index (WQI). The datas are loaded in the WGS 1984 co-ordinate system. Hence they can be queried and analysed the data. The scope of this study would create a base water quality map using the physical parameters like pH, TDS, TH, CA<sup>2+</sup>, MG<sup>2+</sup>, TA, Cl<sup>-</sup>, SO<sub>4</sub>-2, F<sup>-</sup>, NO<sub>3</sub><sup>+</sup>.

Using of various parameter chat to know the variation in the samples and also check for it is portable one or not. With the result analysis, every properties of the collected sample are compared with each others. By using of water quality index method to find that water quality range and the overall comparison char which is used to show parameter variation in collected sample. For these data can be manipulated for water quality mapping of a neyveli around village with increasing the number of sample points. Form this experiment we analysis the actual quality of ground water which can be took from various place.

### VI.REFERENCES

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