Neeru – Study and Analysis of Ground and Surface Water Quality

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Abstract - *Water is perhaps the most precious natural resource after air. Though the surface of the earth is mostly consisting of water, only a small part of it is usable, which makes this resource limited. This precious and limited resource, therefore, must be used with care. Over exploitation of water for industrial use has become a major challenge in this Industrialized World. So, it is important to examine the quality of water that we use. Our present study is about the analysis of water quality of both the surface as well as ground water. The water samples are collected from the region of SIPCOT perundurai and their nearby villages where the water is directly used for drinking and irrigation purposes without treating. The major water quality parameters such as PH, Turbidity, hardness, chlorides, Total Dissolved Solids, Electrical Conductivity have been estimated for all the samples and the results were compared with the BIS standards.*

1.Introduction.

Water is one of the basic needs of every life including Humans, animals and plants. Even adult human body contains 60% of water. Ground water and surface water are the two sources which it can be used. Ground water is used for agriculture, corporation and industrial purposes. Overexploitation and management failures will affect the quality of the water in any region. In industrialized regions like SIPCOT, the threat of pollution is extremely high. The disposal of waste in the water changes the nature and properties of the water which is used by the nearby villages. There is no study related to the quality of ground and surface water in and around the region of SIPCOT industrial complex, therefore we decided to analyse the quality of ground and surface water.

2.Methodology

The water samples were collected from 8 different regions in and around the SIPCOT industrial region of Perundurai area. 8 samples of ground water and 8 samples of surface water, totally 16 samples. The location of the sampling is presented in the Table 1. For sampling, one-litre Clean polythene bottles were used. Analysis was conducted for pH, turbidity, colour, odour, Hardness, total dissolved solids, Chlorides and electrical conductivity.

3.Site Location

State Industries Promotion Corporation of Tamilnadu (SIPCOT) Ltd., Perundurai is one of the leading industrialized region which covers the area of around 2000 acres. The exact location is latitude 11°13'14" N and longitude 77°33'22" E. The SIPCOT industrial complex in perundurai consists of 101 industries, including 47 textile industries, 18 tanneries, 12 chemical industries and 24 other general type industries.

Table -1: location

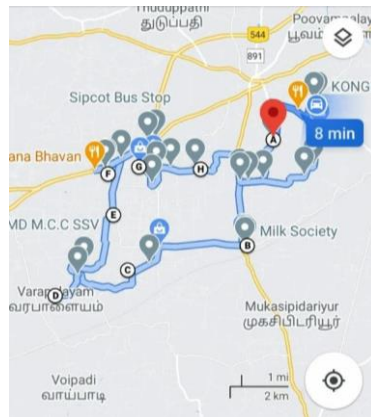| Sample	Location
S1 G1	Panikampalyam
S2 G2	Ingur
S3 G3	Kuttapalayam
S4 G4	Varapalayam
S5 G5	Kasipilampalayam
S6 G6	Saralai
S7 G7	Kaddappamadai
S8 G8	Periyavettuvapalayam

FIG 1: location

4. Results and Analysis

4.1. pH

pH is the scale which helps to specify the sample as acidic or basic.

Table -2: PH

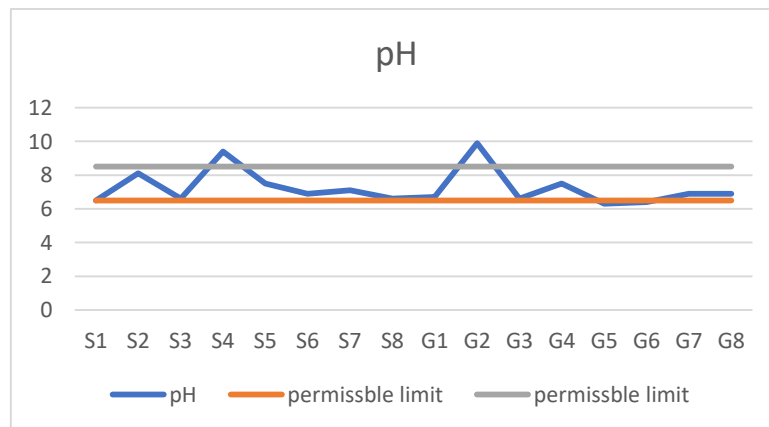| Sample	S1	S2	S3	S4	S5	S6	S7	S8	G1	G2	G3	G4	G5	G6	G7	G8
pH	6.5	8.1	6.6	9.4	7.5	6.9	7.1	6.6	6.7	9.9	6.6	7.5	6.3	6.4	6.9	6.9

Chart -1: PH

As per IS 10500 : 2012, permissible limit of pH for drinking water is 6.5-8.5. Here sample G5, G6 are acidic in nature and S4, G2 are basic in nature, which are not recommended for drinking.

4.2. Turbidity

Turbidity is the cloudiness nature of the water sample.

Table -3: Turbidity

Sample	S1	S2	S3	S4	S5	S6	S7	S8	G1	G2	G3	G4	G5	G6	G7	G8
Turbidity	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

There is no turbidity found in any of the samples.

4.3. Colour

Table -4: Colour

Sample	S1	S2	S3	S4	S5	S6	S7	S8	G1	G2	G3	G4	G5	G6	G7	G8
Colour	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

The samples we collected are colourless, no colour changes are identified in any of the samples.

4.4. Odour

Table -5: Odour

Sample	S1	S2	S3	S4	S5	S6	S7	S8	G1	G2	G3	G4	G5	G6	G7	G8
Odour	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

The sample we collected are odourless.

4.5. Total Dissolved Solids

Table -6: Total Dissolved Solids

Sample	S1	S2	S3	S4	S5	S6	S7	S8
T.S	2050	2950	1800	5450	3650	250	1200	1450
D.S	1760	2790	1320	3970	2630	240	930	1220
S.S	290	160	480	1480	1020	10	270	230

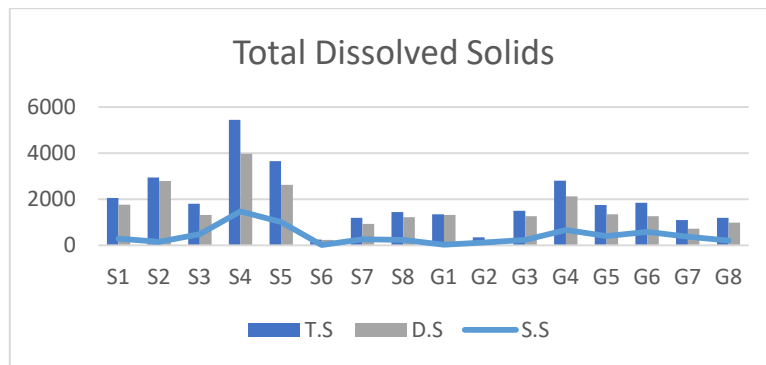| Sample	G1	G2	G3	G4	G5	G6	G7	G8
T.S	1350	350	1500	2800	1750	1850	1100	1200
D.S	1320	230	1260	2130	1350	1270	720	990
S.S	30	120	240	670	400	580	380	210

Chart -2: Total Dissolved Solids

As per IS 10500 : 2012, permissible limit for Total Dissolved Solids is 500-2000mg/l. our samples have the values in range of 250-5450mg/l. The samples having TDS content above the permissible limit are not recommended for drinking.

4.6. Hardness

Table -7: Hardness

Sample	S1	S2	S3	S4	S5	S6	S7	S8
Hardness	2140	580	2280	1760	2360	2140	1760	2140

Sample	G1	G2	G3	G4	G5	G6	G7	G8
Hardness	2660	1860	2940	4500	3980	940	1900	2560

As per IS 10500 : 2012, permissible limit for hardness is 200-600ppm. The only sample which comes under the permissible limit is S2. Other samples have more hardness content in it.
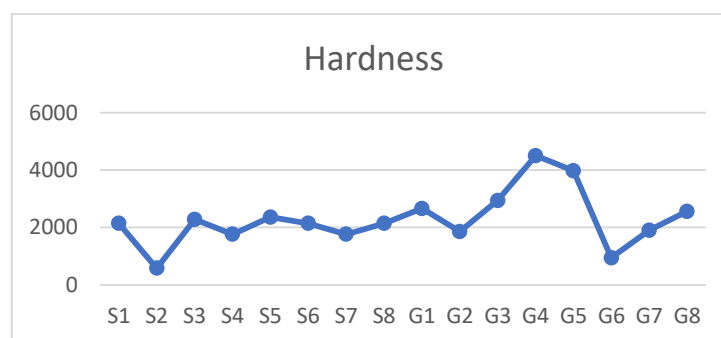

Chart -3: Hardness

4.7. Chlorides

Table -8: Chlorides

Sample	S1	S2	S3	S4	S5	S6	S7	S8
Chlorides	690	95	755	1105	710	555	125	375

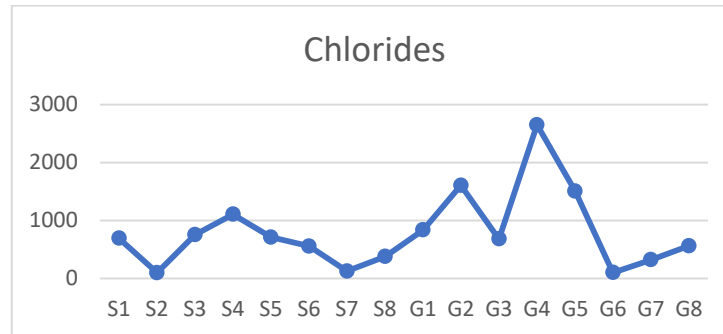| Sample	G1	G2	G3	G4	G5	G6	G7	G8
Chlorides	835	1605	680	2650	1505	100	320	560

Chart -4: Chlorides

As per IS 10500 : 2012, acceptable limit for chlorides is 250mg/l. The samples having a greater value than the acceptable limit is considered to be unfit for drinking.

4.8. Electrical Conductivity

Table -9: Electrical conductivity

Sample	S1	S2	S3	S4	S5	S6	S7	S8
E.C	0.4	0.64	0.29	0.9	0.6	0.12	0.2	0.27

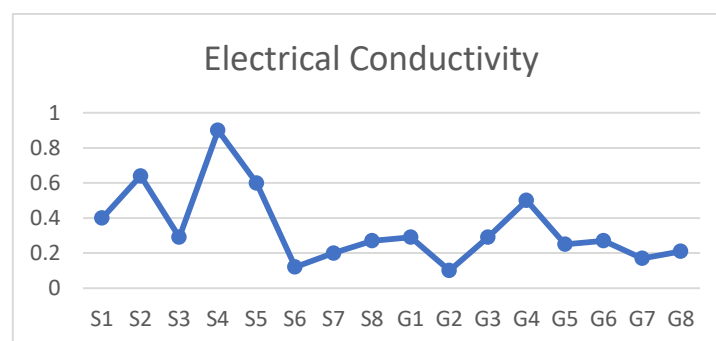| Sample	G1	G2	G3	G4	G5	G6	G7	G8
E.C	0.29	0.1	0.29	0.5	0.25	0.27	0.17	0.21

Chart -5: Electrical conductivity

Conductivity is the measure of water's capability to pass electrical flow. Higher amount of any impurities will lead to higher conductivity.

5. Conclusion

Most of the samples which we collected are not fit for drinking purpose. Almost every region near the SIPCOPT industrial complex is already in alarming position. Industrial effluents are the major source for this contamination. Proper treatment should be made mandatory for the industries which cause these

contaminations. If this treatment doesn't happen, people in those regions will face a critical situation and in some cases, will lose their lives too.

6. Reference

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