Environmental Impact And Assessment Quality Testing on Water Resources

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Abstract- *The purpose of this Water Sample Testing Environmental Project is to find out, how the water sample can test. The report starts with introduction and ends with conclusion with experiment report. The report defines the detailed information about water testing with various examples. The report also explains about the quantity of the samples and types of the samples. The Sampling Methods consists of Manual sampling, which explain the details of water testing. The physical and chemical properties of drinking water vary from top to bottom of the depth of the earth, and the time from morning to night. The two ponds across the street can have different Physical and Chemical Characteristics even through they are separated by only a few Feet. It is therefore difficult to obtain a truly representative sample. We need water for different purposes; we need water for drinking, industry, irrigation, swimming, fishing, etc. Water for various purposes requirements for the composition and purity, and each body of water must be tested regularly to confirm the suitability. The analytical process demands sampling and sample storage since changes in composition of water do not stop once the sampling has been taken. Screening is done to ensure that water reaches the laboratory, the same composition as it has occurred during sampling. In this work, samples of water were collected from Five different River at two different times of the year.*

I. PARAMETERS

The parameter which are analyzed as follows:

- Total Dissolved Solids
- Total Suspended Solids
- Conductivity
- Turbidity
- Determination of pH
- Determination of Sulphate content
- Determination of Chloride content
- Manganese content
- Determination of Hardness

TOTAL DISSOLVED SOLIDS

- A measure of the combined content of all inorganic and organic substances contained in a liquid in molecular, ionized or micro-granular suspended form is called Total Dissolved Solids (TDS).
- Gravimetry and conductivity are the two important methods of measuring total dissolved solids.
- Total Dissolved Solids are directly associated with the quality and purity of water, particularly in water purification systems.
- According to IS:10500-2012, The Acceptable Limit of Total Dissolved Solid is **500 mg/lit** & the Permissible Limit is **2000 mg/lit**.

TOTAL SUSPENDED SOLID

- Total Suspended Solids (TSS) is the portion of fine particulate matter that remains in suspension in water. It measures a similar property to turbidity, but provides an actual weight of particulate matter for a given volume of sample (usually mg/lit).
- TSS are particles that are larger than 2 microns found in the water column.
- The majority of suspended solids are made up of inorganic materials, although bacteria and algae can contribute to total solid levels.
- According to IS:10500-2012, The Acceptable Limit of Total Suspended Solid is **20 mg/lit** & the Permissible Limit is **50 mg/lit**.

CONDUCTIVITY

- Conductivity is the measure of the ability of an electrolyte solution to conduct electricity. Conductivity is also referred to as specific conductance. The SI unit of conductivity is siemens per meter (S/m).
- Conductivity is the measure of the ability at which an electric charge or heat can pass through a material.
- A conductor is a material which gives very little resistance to the flow of an electric current or thermal energy.

- Materials are classified as metals, semiconductors, and insulators.
- According to IS:10500-2012, The Acceptable Limit of Conductivity is **200(S/cm)** & the Permissible Limit is **800 (S/cm)**.

TURBIDITY

- The haziness or cloudiness of a fluid due to various individual particles (TSS or TDS) that can be seen with naked eyes (like smoke in air) is known as turbidity. Its SI unit is Nephelometric Turbidity Units (NTU).
- Turbidity(or haze) is considered in the case of transparent solids such as glass as well.
- In the production of Plastic, the percentage of light that is deflected more than 2.5° from the incoming light direction is known as haze.
- According to IS:10500-2012, The Acceptable Limit of Conductivity is **1 NTU** & the Permissible Limit is **5 NTU**.

DETERMINATION OF Ph

- pHis basically a measure of the acidity or basicity of an aqueous solution. Solutions having pH less equal to 7. It does not have SI Units. pH denoting "potential of hydrogen" or "power of hydrogen".
- At 25 °C, solutions with a pH less than 7 are acidic, and solutions with a pH greater than 7 are basic. Solutions with a pH of 7 at this temperature are neutral (e.g. pure water).
- The pH scale is logarithmic and inversely indicate the concentration of hydrogen ions in the solution.
- According to IS:10500-2012, The Acceptable Limit of pH is **6.5 to 8.5** &**No Relaxation** for Permissible Limit.

DETERMINATIONOFSULPHATE

- Sulphates are a combination of Sulphur and oxygen and are a part of naturally occurring minerals in some soil and rock formations that contain groundwater. The SI Unit of Sulphate is mg/lit.
- The mineral dissolves over time and is released into groundwater.
- Sulphates of potassium, magnesium and sodium are highly soluble in water, while barium and calcium sulfates and various other heavy metal sulfates are little less soluble.
- According to IS:10500-2012, The Acceptable Limit of Sulphate is **200 mg/lit** & the Permissible Limit is **600 mg/lit**.

DETERMINATIONOFCHLORIDE

- Chlorides are found as salts such as sodium chloride (NaCl), potassium chloride (KCl), and calcium chloride (CaCl2). Chlorides are leached from different rocks into soil and water due to weathering. The SI Unit of Chloride is mg/lit.
- Chloride in water may be significantly increased by treatment processes in which chlorine or chloride is used.
- According to IS:10500-2012, The Acceptable Limit of Chloride is **250 mg/lit** & the Permissible Limit is **1000 mg/lit**.

MAGNESIUMCONTENT

- Manganese can be termed as a metal which is one of the most abundant on earth. The SI Unit of Magnesium of mg/lit.
- Magnesium compounds are usually removed from water, because of the role magnesium plays in water hardness. This is achieved by means of water softening.
- Magnesium hydroxide is applied as a flocculant in water purification. Literature and the other elements and their interaction with water.
- According to IS:10500-2012, The Acceptable Limit of Chloride is **100 mg/lit** & the Permissible Limit is **300 mg/lit**.

DETERMINATIONOFHARDNESS

- Hardness is the amount of dissolved calcium and magnesium in the water. Hard water is high in dissolved minerals, largely calcium and magnesium. The SI Unit of Magnesium of mg/lit.
- Hardness is caused by compounds of calcium and magnesium, and by a variety of other metals.
- Water systems using groundwater as a source are concerned with water hardness, since as water moves through soil and rock it dissolves small amounts of naturally-occurring minerals and carries them into the groundwater supply.
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- According to IS:10500-2012, The Acceptable Limit of Hardness is **200 mg/lit** & the Permissible Limit is **1000 mg/lit**.

II. RESULT

Sample1: PaperMill(CauveryRS):

Property	Samplecollectedin December,2022	SampleCollectedinFebruary, 2023	DesirableLimit
Total SuspendedSolids	20.0mg/litre	12.0mg/litre	Notmorethan50mg/l
Total DissolvedSolids	292.0mg/litre	1188.0mg/litre	Notmore than2000mg/l
pH	8.29	7.64	6.5–8.5
Conductivity	415.0S/cm	1680.0 S/cm	200 -800 S/cm
Turbidity	7NTU	8NTU	Notmorethan5NTU
Sulphatecontent	14.0mg/l	95.0 mg/l	Notmorethan200mg/l
Chloridecontent	42.0mg/l	352.0mg/l	Notmorethan250mg/l
Hardness	136.0mg/l	260.0mg/l	Not more than1000mg/l
Manganese content	12.6 mg/l	27.0 mg/l	Not more than 300 mg/l

Table5.19(Papermill)

Sample2:

- Kooduthurai:

Property	Samplecollected inDecember,2022	SampleCollected in February,2023	DesirableLimit
Total SuspendedSolids	8.0mg/litre	4.0mg/litre	Notmorethan50mg/l
TotalDissolved Solids	272.0mg/litre	372.0mg/litre	Notmore than2000mg/l
pH	8.07	7.75	6.5–8.5
Conductivity	397.0 S/cm	498.0 S/cm	200 -800 S/cm
Turbidity	4NTU	1.6NTU	Notmorethan5NTU
Sulphatecontent	15.0 mg/l	22.0 mg/l	Notmorethan200mg/l
Chloridecontent	32.0 mg/l	38.0 mg/l	Notmorethan250mg/l
Hardness	126.0mg/l	172.0mg/l	Not more than1000mg/l
Manganesecontent	12.6 mg/l	24.0 mg/l	Not more than300mg/l

Table5.20(Kooduthurai)

Sample3:

- **RNPudhur:**

Property	Samplecollectedin December,2022	SampleCollectedinFebruary, 2023	DesirableLimit
TotalSuspended Solids	24.0mg/litre	8.0mg/litre	Notmorethan50mg/l
TotalDissolved Solids	296.0mg/litre	468.0mg/litre	Not morethan2000 mg/l
pH	6.0	5.6	6.5–8.5
Conductivity	412.0 S/cm	582.0 S/cm	200 -800 S/cm
Turbidity	6NTU	5.6NTU	Notmorethan5NTU
Sulphatecontent	15.0 mg/l	34.0 mg/l	Notmorethan200mg/l
Chloridecontent	36.0 mg/l	93.0 mg/l	Notmorethan250mg/l
Hardness	154.0mg/l	160.0mg/l	Not more than1000mg/l
Manganesecontent	17.0 mg/l	19.0 mg/l	Not more than300mg/l

Table5.21(RNPudur)

Sample4:

- Vairapalayam:

Property	Samplecollected inDecember,2022	SampleCollected in February,2023	DesirableLimit
Total SuspendedSolids	20.0mg/litre	4.0mg/litre	Notmorethan50mg/l
Total DissolvedSolids	308.0mg/litre	724.0mg/litre	Notmore than2000mg/l
pH	8.07	7.4	6.5–8.5
Conductivity	351.0 S/cm	449.0 S/cm	200 -800 S/cm
Turbidity	5.0NTU	10.3NTU	Notmorethan5NTU
Sulphatecontent	6.2mg/l	23.0 mg/l	Notmorethan200mg/l
Chloridecontent	30.0 mg/l	48.0 mg/l	Notmorethan250mg/l
Hardness	96.0 mg/l	144.0mg/l	Not more than1000mg/l
Managanesecontent	5.34 mg/l	25.0 mg/l	Not more than300mg/l

Table5.22(vairapalayam)

Sample5:

Pallipalayam:

Property	Samplecollectedin December,2022	SampleCollectedinFebruary, 2023	DesirableLimit
TotalSuspended Solids	8.0mg/litre	4.0mg/litre	Notmorethan50mg/l
Total DissolvedSolids	264.0mg/litre	364.0mg/litre	Notmore than2000mg/l
pH	8.21	8.1	6.5–8.5
Conductivity	412.0 S/cm	582.0 S/cm	200 -800 S/cm
Turbidity	6NTU	5.6NTU	Notmorethan5NTU
Sulphatecontent	15.0 mg/l	34.0 mg/l	Notmorethan200mg/l
Chloridecontent	36.0 mg/l	93.0 mg/l	Notmorethan250mg/l
Hardness	154.0mg/l	160.0mg/l	Not more than1000mg/l
Managanesecontent	17.0 mg/l	19.0 mg/l	Not more than300mg/l

Table5.23(Pallipalayam)

Observations:

Total Dissolved Solids:

TheamountofTDShasincreasedfromDecember,2022to February,2023inall the Five Rivers. The reason was the Lower Flow Volume and Evaporation in Summer.

Total Suspended Solids:

The amount of TSS has increased from December,2022 to February,2023 in all the Five Rivers. The Reason was the dirt particles which are more Significant in the Summer season than in the Rainy Season.

Conductivity:

The Conductivity value has increased from December,2022 to February,2023 in all the Five Rivers. The Reason was the Evaporation and Lower Flow Volume in the summer season.

Turbidity:

The Turbidity value has decreased from December,2022 to February,2023 in all the Five Rivers. The Reason was the Lower values in Total Suspended Solids.

pH Value:

The pH value has decreased from December,2022 to February,2023 in all the Five Rivers. In December the pH is High whereas in the February it is Low.

Sulphate and Chloride:

The Sulphate and Chloride value has increased from December,2022 to February,2023 in all the Five Rivers. The Reason was Total Dissolved Solids increased, so the amount of Salts Dissolved in water.

Magnesium content:

The Magnesium content has increased from December,2022 to February, 2023 in all the Five Rivers. The Reason was Exposure to excess level of Magnesium in drinking water.

Hardness:

The Magnesium content has increased from December,2022 to February, 2023 in all the Five Rivers. The Reason was the Solid deposits of Calcium Carbonate can for

CONCLUSION

The purpose of this project is to better understand environmental impacts of our actions on the local streams and rivers, the scientific studies of water quality and the understanding is to make the significance of the results. Water analysis and monitoring is a very important aspect of water conservation and protection. Water is a vital resource that runs more quickly over time. To ensure continued supply of safe, clean drinking water, we must work together as a community to protect and to this vital resource.

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