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Asessmesnt of Water Quality of Rapti River Gorakhpur, India

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ASESSMESNT OF WATER QUALITY OF RAPTI RIVER GORAKHPUR, INDIA

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ABSTRACT:

Gorakhpur is situated from bank of Rapti River. Rapti River is joined at Sohgaura with Ami River which is highly polluted as compare to Rapti River. Rapti River has a confluence into Ghaghra River at Kaparwar Ghat. The present study is conducted to determine the water quality of Rapti River using physical and Chemical parameters including pH, Turbidity, Total dissolved solids, Dissolved Oxygen (DO), and Total Hardness by collecting Three sets of samples from five locations from December, 2020 to February, 2021. The results obtained by standard methods were compared with water quality criteria prescribed by Indian Standard/Central Pollution Control Board. The study also reveals that the water quality of Rapti River is highly deteriorated due to anthropogenic activities such as urbanization, construction activities, agricultural activities, discharge of untreated sewage and disposal of solid wastes into river.

KEYWORDS: Rapti River, Physio-chemical parameters, Water quality analysis

INTRODUCTION

Rivers in India are considered sacred. The river is a very important cold water source. In most cases, rivers begin at the highest point in a particular region. Again, it is a very important source for fresh water. It is quite surprising to know that the rivers drain about 75 percent of the earth's land. India is a country dependent on agriculture. Most of our states have agricultural land, which needs fresh water supply. Rivers are the largest source of cold water. States that have their own rivers use water for plantation. As we all depend on water, rivers are the main reason we are still able to manage its increasing demand. If our agriculture had to depend only on rain, there would be serious complications due to change in weather. The river is a blessing to us. It helps us in many ways. Therefore, it is the duty of the government to see that the rivers do not dry up. We have read many river valley projects that have been set up by our government. Dams have been built there to store the water of these rivers. It prevents flooding and helps in agriculture and electricity generation. Sometimes these dams also become the cause of floods when water is released from them in large quantities.

The Rapti river basin in India extends from 26˚12'N28˚N latitude and 81˚39'E- 83˚42'E longitude. The ancient name of East- Uttar Pradesh was also Iravati. The originates in the small Himalayan ranges of Nepal from near Rukumkot, south and then to the west. Thereafter, once again flowing southwards, flowing into the Bahraich, Gonda, Basti and Gorakhpur districts, it joins the Ghaghra river near Barahj. Its total length is 640km. The Rohini river comes from the north side of this river, which is its main tributary.

Then it touches Gorakhpur city and again it flows in south-east. Then it passes near 30 or 35 kilometers. After/ traveling, it is joined by Ami River at Sahagaura and again it flows and confluence into Ghaghra River at Kaparwar Ghat after traveling some kilometers.

The motive of present study is physio-chemical analyses of river water provide a good indicator of the physical as well as chemical state of the river ecosystem. So, qualitative and quantitative analyses of different types of water quality parameters can be used to assess the pollution status. Keeping this in view the study was under taken to assess the physio-chemical characteristics of water in river Rapti at district Gorakhpur, Uttar Pradesh.

STUDY AREA AND METHODOLOGY

SELECTION OF SAMPLING SITES

River water samples were collected on monthly basis from (December 2020 to February 2021) at five different sampling stations in Gorakhpur from Upstream to Downstream side of river flow in sequential manner i.e. Manjharia, Domingarh, Rajghat Bridge, Gida, Jhangha.

For the study of the water quality in the area under consideration the samples of water were collected in the sterilized plastic containers of 2liter capacity from river water The collected samples of the rapti river water were analyzed, for their physical and chemical characteristics, in the Environmental Engineering laboratory of Madan Mohan Malaviya University of Technology, Gorakhpur using the standard methodology.

The following table shows the methods used for analyzing various physio-chemical parameters;

Table A

S. No.	**Parameters**	**Methods**
1.	pH	Digital pH meter
2.	Turbidity	Turbidity meter
3.	Total dissolved solids	TDS meter
4.	Dissolved oxygen	Winkler’s method
5.	Total Hardness	EDTA Method

Drinking water quality as per Indian Standard/CPCB/WHO

Table B

S. No.	**Parameters**	**Limits According to CPCB**
1	pH	6.5-8.5
2	Turbidity	1-50 NTU
3	Total dissolved solids	500 mg/l
4	Dissolved oxygen	Not less than 4mg/l
5	Total Hardness	300 mg/l

OBSERVATION TABLE

Table 1: Value for different parameter of Rapti river at sampling station-1(Manjhria)

S. No.	Parameters	December,2020	January, 2021	February, 2021
1.	pH	7.4	7.5	7.7
2.	Turbidity	3.03	3.31	3.1
3.	Total dissolved solids	243	238	253
4.	Dissolved oxygen	6.7	6.1	7.2
5.	Total Hardness	180	176	179

Table 1: Value for different parameter of Rapti river at sampling station-1(Manjhria)

S. No.	Parameters	December,2020	January, 2021	February, 2021
1.	pH	7.62	7.92	7.62
2.	Turbidity	3.1	3.0	3.05
3.	Total dissolved solids	236	234	242
4.	Dissolved oxygen	6.2	6.5	7.2
5.	Total Hardness	196	206	198

Table 2: Value for different parameter of Rapti river at sampling station-1(Domingarh)

S. No.	Parameters	December,2020	January, 2021	February, 2021
1.	pH	6.67	7.1	7.3
2.	Turbidity	3.52	3.42	3.66
3.	Total dissolved solids	252	273	263
4.	Dissolved oxygen	7.1	6.9	6.7
5.	Total Hardness	204	209	210

Table 3: Value for different parameter of Rapti river at sampling station-1(Rajghat Bridge)

S. No.	Parameters	December,2020	January, 2021	February, 2021
1.	pH	7.1	7.3	6.9
2.	Turbidity	4.97	4.72	4.92
3.	Total dissolved solids	237	225	251
4.	Dissolved oxygen	6.2	6.8	6.5
5.	Total Hardness	200	199	223

Table 4: Value for different parameter of Rapti river at sampling station-1(Gida)

S. No.	Parameters	December,2020	January, 2021	February, 2021
1.	pH	7.81	7.43	7.5
2.	Turbidity	1.6	3.1	2.5
3.	Total dissolved solids	217	232	239
4.	Dissolved oxygen	6.5	6.4	6.6
5.	Total Hardness	220	215	236

Table 5: Value for different parameter of Rapti river at sampling station-1(Dharampur)

RESULT AND DISCUSSION

1. pH

pH is an primary parameter for water quality measurement. It is a measure of the alkalinity or acidity of the water. It can also be recognize as the measure of hydrogen ion concentration. The pH scale ranges lies from 0 to 14.

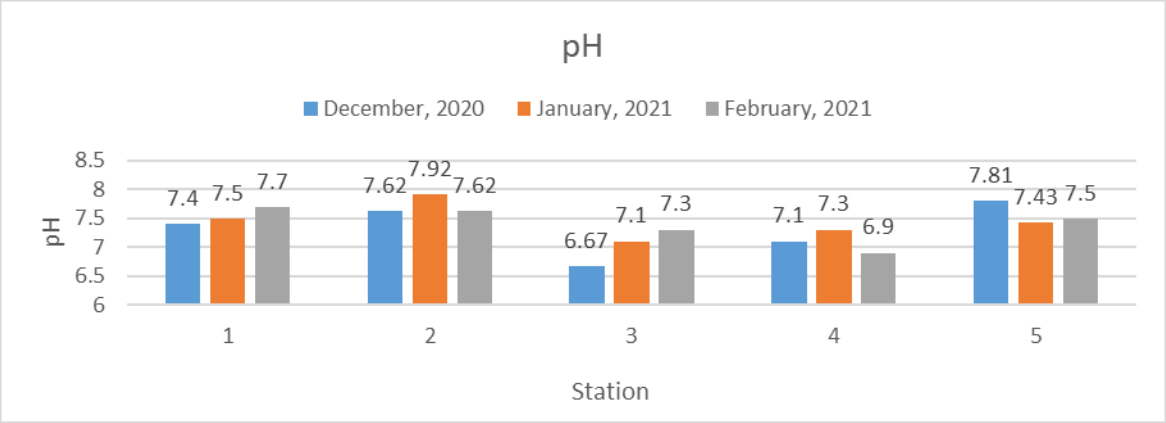

Fig.1: Ph Vs Station

2. Turbidity

Turbidity is the dusky of a water which is caused by large numbers of particles that are generally unseeable to the naked eye, similar to smoke in air. The measurement of turbidity is a physical test of water quality. Water with high turbidity is cloudy. Turbidity is calculated by Nephelometric Turbidity Units (NTU). The turbidity of river water is usually between 1 and 50.

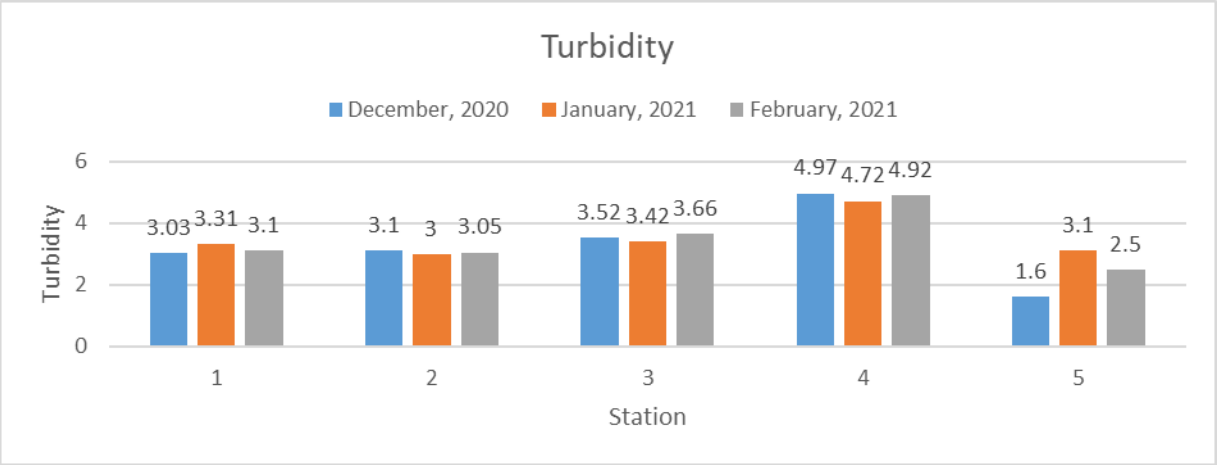

Fig.2: Turbidity Vs Station

3. Total dissolved solid

Total dissolved solids (TDS) is defined as organic and inorganic matter which is contained in water. TDS is the sum of the anions and cations in water. The simplest test of TDS is to filter the sample of water through a standard glass fibre filter, The filtered liquid is then added to a preweighed ceramic dish. When the sample dries and the temperature is increased to 180 C then it removed an occluded water. The increase in weight of the oven dish represents the TDS of water. TDS is reported in mg/L.

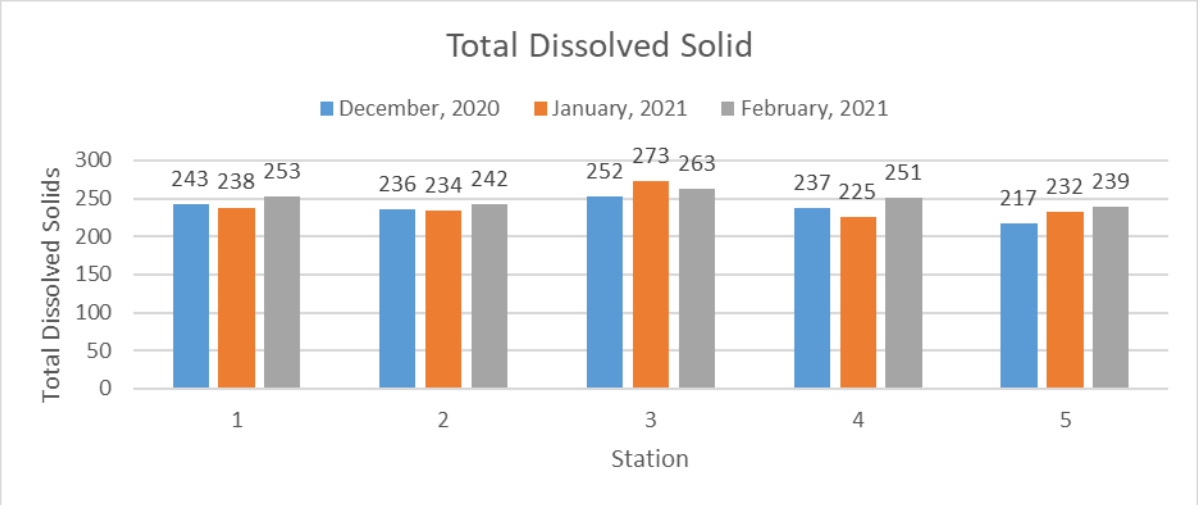

Fig.3: TDS Vs Station

4. Dissolved Oxygen

The dissolved oxygen (DO) is the amount of gaseous oxygen which is dissolved in water. It is a test of how much oxygen is dissolved in the water. The amount of oxygen is necessary to living aquatic organisms. analysis of dissolved oxygen is a measure of dissolved gaseous oxygen in a water and oxygen is mixed with the diffusion of surrounding air in water, momentum and waste generated by light configuration. Only the samples taken should be used to test the dissolved oxygen and the analysis should be done immidiately. therefore this test should be spot on- field only.

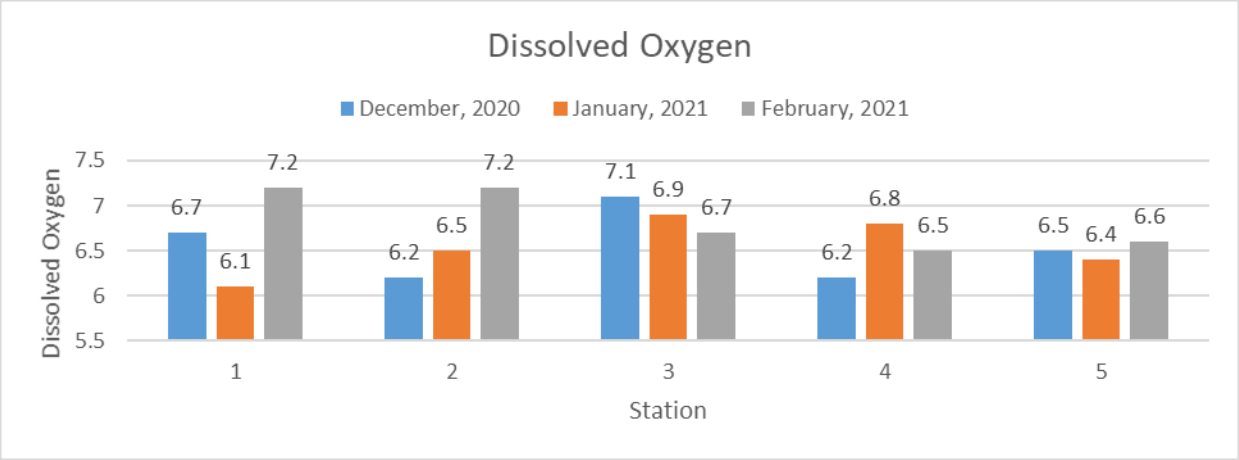

Fig.4: DO Vs Station

5. Total Hardness

Total hardness is a type of water test which is the mineral content in a water sample that is irreversible by boiling. So, total hardness can be equivalent to the total calcium and magnesium hardness.

Total hardness is determined by the magnesium and calcium cations' concentrations present in water. Hard water is that type of water which has high mineral content. Generally, calcium enters into the water as either calcium carbonate (CaCO3), in the form of chalk and limestone, or calcium sulfate (CaSO4), in the form of other mineral deposits. The primary source of magnesium is dolomite (CaMg(CO3)2). Hard water is usually not harmful.

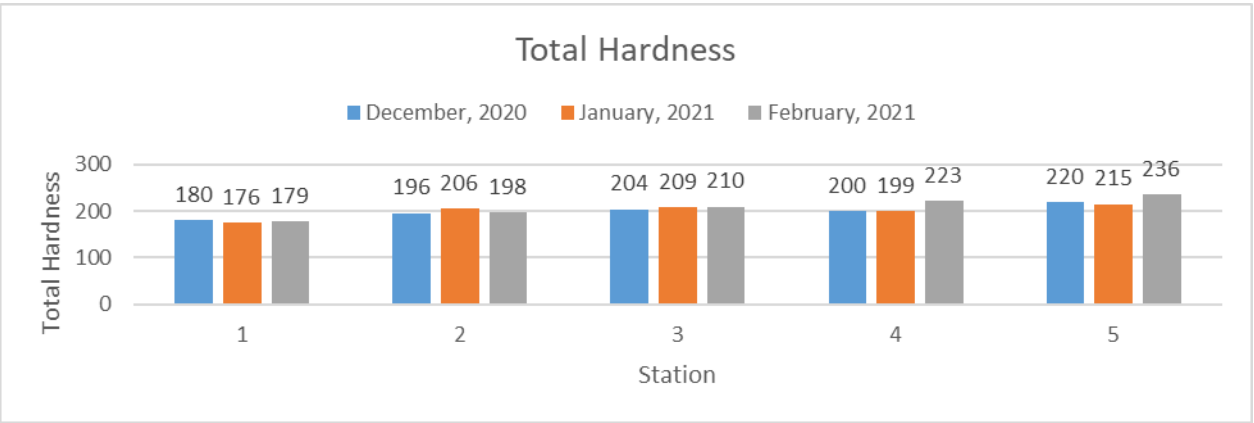

Fig.5: Total Hardness Vs Station

1. CONCLUSION

River pollution is a serious community problem, which affects public health and environment. For continueous development, assessment and monitoring of water quality of rivers is important. Effective pollution control measures have to be taken to save the river from more pollution. People, who living on the river bank has to be educated about river pollution and its effect on human and environment.

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