

Analysis of Water Quality Index of river Yamuna at Allahabad Region

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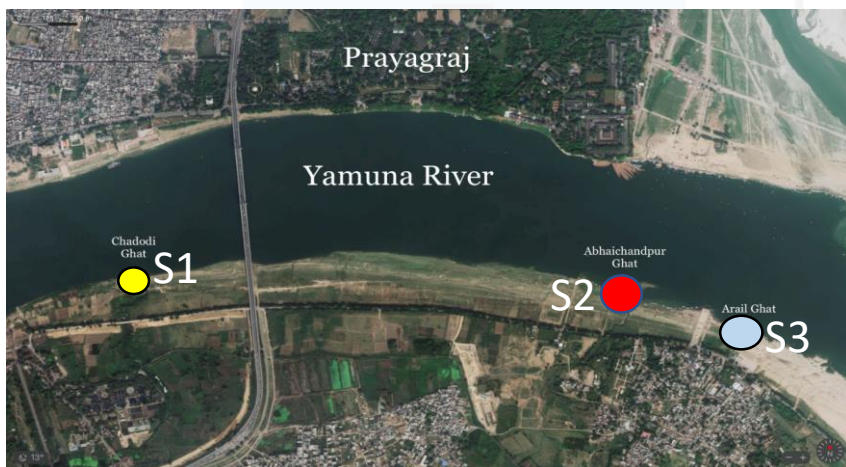
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Introduction

- Yamuna is the second largest tributary river of the Ganga and the most polluted river of the country.
- Excessive river pollution at Allahabad city is the consequence of rapid urbanization, industrialization.
- Yamuna river which is predominantly used for extrusion of sewerage and industrial effluents is under the effect of large-scale pollution.
- One of the major compulsions goes to the tanneries of the city for discharging its hazardous effluents through untreated waste.
- The water quality index (WQI) is an important tool to determine the drinking water quality in urban, rural and industrial area.
- WQI is defined as an index reflecting the composite influence of different water quality parameters which is considered and taken for calculation of water quality index.

Objective

- To analyse the water quality parameters such as pH, TDS, inorganic elements etc
- Calculate Water Quality Index of the river

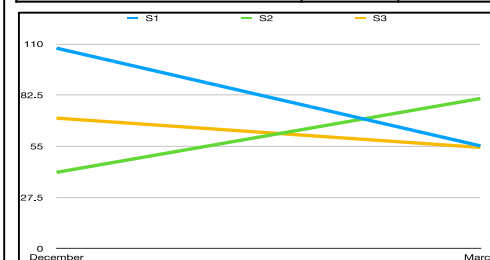


Water quality parameters for March 2020														
	pH	Turbidity (NTU)	TDS (mg/L)	EC (µS/cm)	BOD (mg/L)	COD (mg/L)	TH (mg/L)	Fe ⁻² (mg/L)	TA (mg/L)	SO ₄ ²⁻ (mg/L)	Cl ⁻ (mg/L)	Ca ²⁺ (mg/L)	Mg ²⁺ (mg/L)	DO (mg/L)
S1	8.26	23	480	946	3.8	32	515	0.16	470	111	269	1.6	0.09	5.6
S2	8.41	5	607	915	1.15	64	695	0.22	525	65.8	184	3.6	0.21	6.6
S3	8.49	15	862	955	4.55	32	645	0.16	515	98.7	269	1.2	0.07	6.8

Water quality parameters for December 2019														
	pH	Turbidity (NTU)	TDS (mg/L)	EC (µS/cm)	BOD (mg/L)	COD (mg/L)	TH (mg/L)	Fe ⁻² (mg/L)	TA (mg/L)	SO ₄ ²⁻ (mg/L)	Cl ⁻ (mg/L)	Ca ²⁺ (mg/L)	Mg ²⁺ (mg/L)	DO (mg/L)
S1	7.21	04	542	800	4.62	32	960	0.11	50	7.85	354	6.41	0.38	6.6
S2	7.25	05	570	846	1.08	128	890	0.33	80	7.94	241	10.8	0.65	6.8
S3	7.0	04	555	826	3.80	64	950	0.22	60	102	212	7.21	0.43	5.6

Relative Weight for each parameter

Location	Source	Water Quality Index	
		December	March
Arail Yamuna Ghat	Source S3	70.13	54.41
Abhaichandpur Yamuna Ghat	Source S2	41	80.67
Chadodi Yamuna Ghat	Source S1	107.73	55.23



It can be clearly seen from the graph that there was a decrease seen in the water quality index for the location S1 and S3, but an increase in the location S2. Location S2 has the tunnel from the bioremediation plant that drains into the river body.

Conclusion

- Fourteen water quality parameters are considered to assess the quality of river water from the three locations (Arail Ghat, Chadodi Yamuna Ghat, Abhaichandpur Yamuna Ghat)
- We can see that the value of Turbidity of the Arail Ghat region in the month of December is 04 NTU and in March 23 NTU, due to deposition of waste material or agricultural runoff.
- In the Month of December hardness ranges for three locations from 835 to 990 mg/l which is higher than the permissible limits whereas in the month of March the value ranges from 515-645 mg/L which is also higher than the permissible limit.
- The values of WQI found out for the three regions suggest falls in the range of 50-100 which shows water is of good quality except one location which has trending towards higher value greater than 100 shows the quality of water is poor.
- Results suggest that purification of water may be necessary. This study recommends the pressing need for continuous monitoring of river water for determining the factors affecting pollution and its impact on water quality are instructive.

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