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STUDY OF SEASONAL VARIATION AND CORRELATION OF CERTAIN PHYSICO-CHEMICAL PARAMETERS IN WAINGANGA RIVER MARKANDA, DISTRICT GADCHIROLI, (MS), INDIA.

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ABSTRACT

Current investigation was taken into consideration for a period of March 2023 to February 2024 in Wainganga River to identify the range of a certain physico-chemical parameters and their relationship with each other. Temperature, pH, Dissolved Oxygen, Biochemical Oxygen Demand, Total Dissolved Solids and Electrical Conductivity were recorded at 4 different sites. Seasonal values and coefficient of correlation among them were also calculated. Values that are found and calculated show that normal river water at first station gets polluted at 2 different stations and thereby deteriorates its quality. Our study points out the involvement of anthropogenic factors for lowering the river water quality

Keywords: Wainganga river, coefficient of correlation and anthropogenic factors

1. INTRODUCTION

Rivers are the major sources of fresh water in India. Since ancient times, they are followed by humans for settlements, agriculture and pisciculture. Maintenance of good quality of the river water is of primary importance since it is used for drinking, household usage, industrial work, irrigation in agriculture, and even for the stability of river ecosystem. Concerns has always been there in regard to pollution as it is responsible for deterioration of river water quality which in turn affects the purposes it is used for. Many rivers in India are polluted or on the verge of getting polluted.

Earlier findings show the probable reasons of this pollution. Watkar et al., (2017) found moderate pollution in Kolar river in the basis of various physico-chemical parameters. Similarly, Bidwai et al., (2019) reported pollution in Gandhavi river due to human activities. Also, Gharpure et al., (2017) concluded moderate pollution in Vena river because of various human activities nearby. Additionally, Sharma et al., (2022) have found various reasons behind Indian river water pollution. Current investigation is undertaken to check the water quality of Wainganga river with the help of a few physico-chemical parameters and to determine if they signal any significant changes pointing to the river water pollution

2. MATERIALS AND METHODS:

The period March 2023 to February 2024 was taken into consideration for this investigation. Four stations (W1, W2, W3 and W4) were located in Wainganga River for the river water sample collection. Temperature, pH, Dissolved Oxygen, Biochemical Oxygen Demand, Total Dissolved Solids, and Electrical Conductivity were considered for this investigation. The samples were taken and the readings were recorded by standard methods prescribed by APHA, AWWA and WEF (1992). Seasonal values and Pearson's coefficient of correlation, tables and graphs were generated in Salsat2 Software.

3. RESULTS AND DISCUSSION:

The values of findings given below in the table number 1, 2 and figure number 1 to 6. Total dissolved solids and electrical conductivity in all the seasons were found lowest at station W1, but were high at station W2 and W3, though a bit lowered at station W4, still higher than station W1. They both are found strong positively correlated with each other in all seasons. Dissolved oxygen and pH were found highest at station W4 in all seasons but were lowest at station W2. Dissolved oxygen and pH are found strong positively correlated with each other. Biochemical oxygen demand was found lowest at station W4 in all seasons and was highest at station W2. Dissolved oxygen and biochemical oxygen demand were found strong negatively correlated with each other. Also, pH and biochemical oxygen demand were found strong negatively correlated with each other. Dissolved oxygen and pH were found to be strong negatively correlated with total dissolved solids and electrical conductivity. Water temperature of the river was moderate at all stations in all seasons and was found to create no significant impact on other physico-chemical parameters.

It seems from this discussion that station W2 and W3 are the most polluted ones. River water was good at station W1, but received moderate pollution further, as river water flows from station W1 to station W4 via station W2 and

W3. Station W2 and W3 are nearest to the human settlements and in the reach of people. So, the chance of human interference and pollution is justified which can be seen from the data. Similar reports have been noted by Sawant et al., (2023), Singh et al., (2022), and Krishan et al., (2022).

Table No. 1: Seasonal values of physico-chemical parameters at station W1, W2, W3 and W4 in Wainganga River at Markanda, district Gadchiroli, (MS), India.

	W1			**W2**		
	Summer	**Monsoon**	**Winter**	**Summer**	**Monsoon**	**Winter**
TDS	269.1	208.975	103.6	282.575	222.4	116.95
EC	431.725	337.875	173.15	441.2	347.3	182.5
Temp	26.05	23.8	21.45	26.05	23.8	21.45
DO	5.925	6.15	7.275	5.625	5.85	6.975
BOD	5.175	4.05	3.2	5.375	4.25	3.4
pH	7.575	7.75	8.275	7.275	7.45	7.975
	W3			**W4**		
	Summer	**Monsoon**	**Winter**	**Summer**	**Monsoon**	**Winter**
TDS	271.125	210.925	105.55	265.875	205.875	100.8
EC	433.75	339.825	175.1	429.5	335.775	171.35
Temp	26.05	23.8	21.45	26.05	23.8	21.45
DO	5.825	6.05	7.175	6.025	6.25	7.375
BOD	5.275	4.15	3.3	4.975	3.85	3
pH	7.475	7.65	8.175	7.675	7.85	8.375

Table No. 2: Pearson's coefficient of correlation (r-value) physico-chemical parameters in Wainganga River at Markanda, district Gadchiroli, (MS), India.

	TDS	**EC**	**Temperature**	**DO**	**BOD**	**pH**
TDS	1					
EC	0.9999	1				
Temperature	0.9159	0.9159	1			
DO	-0.9261	-0.9262	-0.8945	1		
BOD	0.8896	0.8893	0.9117	-0.8723	1	
pH	-0.9243	-0.9244	-0.8919	0.9815	-0.864	1

Figure no. 1: Seasonal investigation of TDS at station W1, W2, W3 and W4 in Wainganga river.

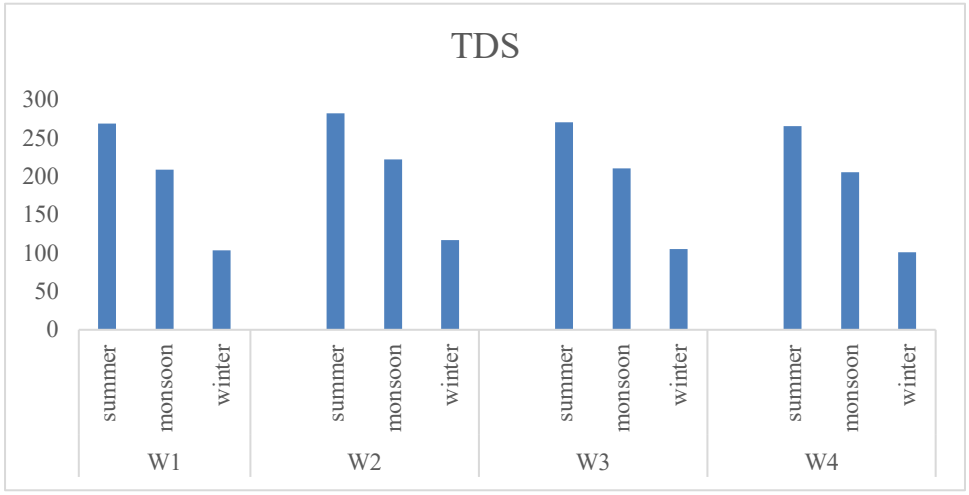


Figure no. 2: Seasonal investigation of EC at station W1, W2, W3 and W4 in Wainganga river

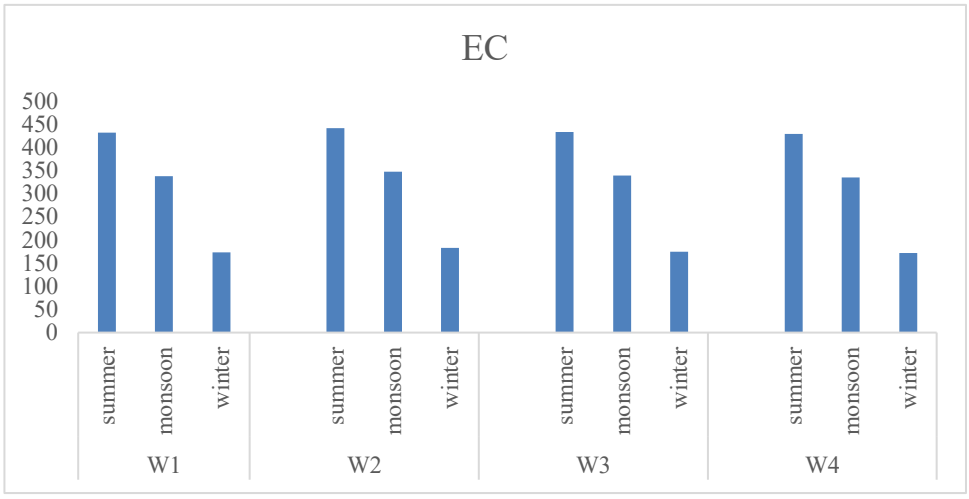


Figure no. 3: Seasonal investigation of Temperature at station W1, W2, W3 and W4 in Wainganga river.

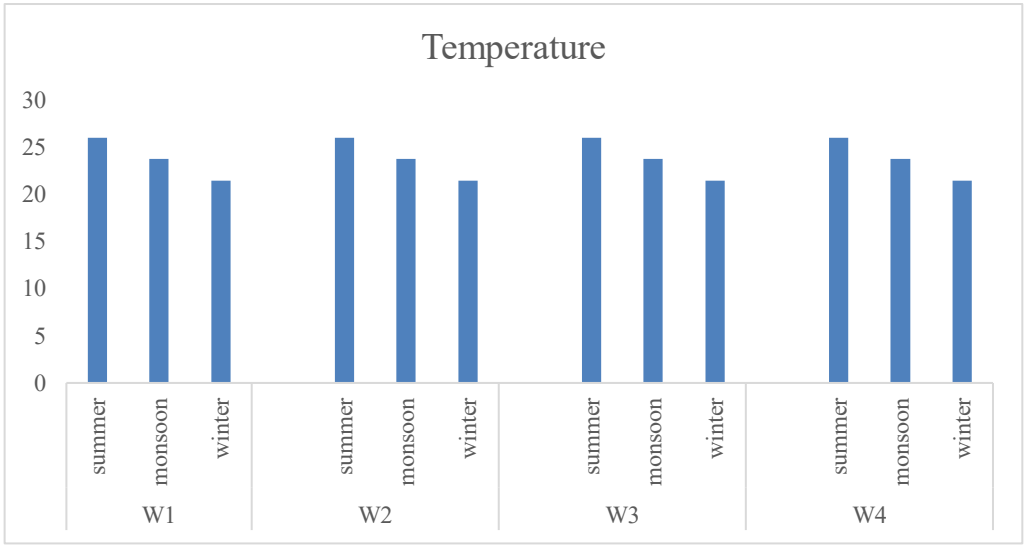


Figure no. 4: Seasonal investigation of DO at station W1, W2, W3 and W4 in Wainganga river.

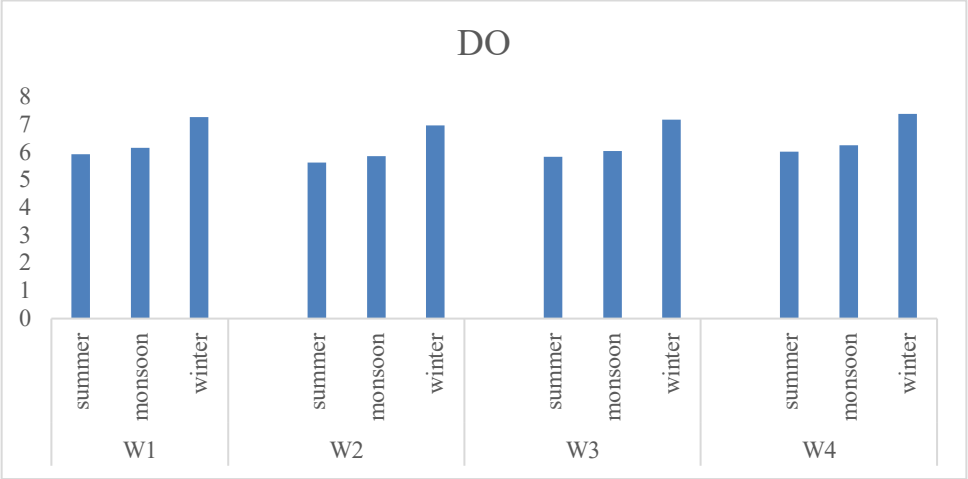


Figure no. 5: Seasonal investigation of BOD at station W1, W2, W3 and W4 in Wainganga river

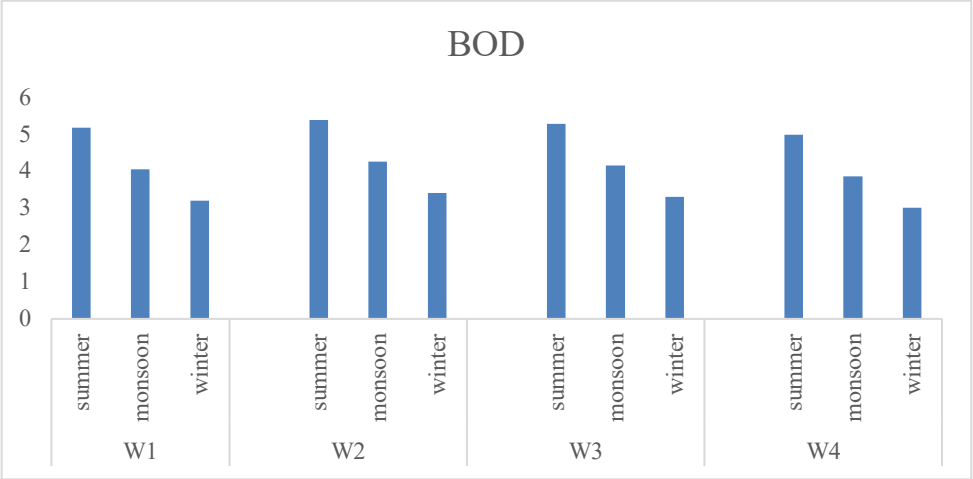
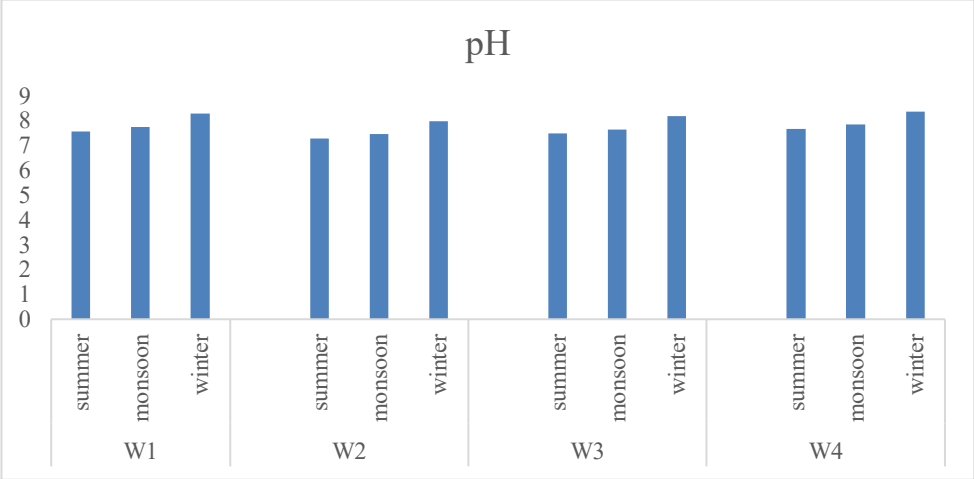


Figure no. 6: Seasonal investigation of pH at station W1, W2, W3 and W4 in Wainganga river.



4. CONCLUSION:

The current study of physicochemical properties of Wainganga River water in the region around Markanda (Gadchiroli) shows that the overall quality of water is mostly within acceptable ranges of normal freshwater applications with variation in seasons due to the local anthropogenic processes and the natural hydrological events. Anthropogenic factors are responsible for lowering the water quality at station W2 and W3. The results reveal the necessity to have consistent monitoring and improved management of domestic and agricultural contributions within the catchment to ensure that the future river health is not going to be further damaged and to have sustainable utilization of the valuable water resource.

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