

Assessment of Water Quality Status by Using Water Quality Index (WQI) Method in Narmada River in Jabalpur Madhya Pradesh

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Abstract— The River Narmada along with its tributaries is considered the lifeline of the State of Madhya Pradesh India. In the recent times the ecology of River Narmada is seriously affected by the domestic sewage discharge, effluents from different industries located near the banks and by dam formation. The objective of this work is the study of various water pollutants available in Narmada River. This study requires the rigorous literature review along with lab testing. Sampling stations were selected at the area of Jabalpur. The water samples collected were analyzed, as per standard methods parameters such as pH, EC, Turbidity, Alkalinity, Total Hardness were measured. Raised values of physico-chemical parameters indicate the pollution of river in water due to domestic wastes, municipal sewage, industrial effluent and agricultural run-off that influence the water quality directly or indirectly.

Key words: BOD (Biological oxygen demand), pH, Chloride, TDS (Total dissolved solids), Dissolve Oxygen (DO)

I. INTRODUCTION

THE Narmada river basin lies in the central part of India, between 72°32'E–81°45'E long and 21°20'N–23°45'N lat., with a drainage area of 98796 sq. km and a mean elevation of 760 m. The total length of the river is 1312 km. The catchment area of the river extends in the administrative States of Madhya Pradesh (MP; 86.18%), Gujarat (11.6%), Maharashtra (1.5%) and Chhattisgarh (0.72%). While Jabalpur is located at 23°10'N 79°57'E and 23.17°N 79.95°E. The city has an average elevation of 411 meters from sea level.

Narmada river water is the main resource for domestic and irrigation purposes in the study area. So it is very important to estimate the superiority of water in the study area. In the present study water sample of Narmada River from different sites has been assessed physico-chemically to evaluate its suitability for domestic and irrigation purposes. Many researchers have done work on physico-chemical evaluation of water. Also many good research papers have published on Narmada River.

Water quality index is defined as a rating reflecting the composite influence of different water quality parameters on the overall quality of water.

The physicochemical characteristics like pH, Temperature, Turbidity, Conductivity, COD, BOD, Dissolved oxygen, Total Alkalinity, Total Hardness, Chloride contents etc.

II. MATERIAL AND METHODS

Water samples were collected in from the sampling sites like Jantara ghat, Gwarighat, Lalpur near intake well, Tilwaraghat, lametaghat and Panchvatighat. In the evaluation of physico-chemical parameter of water, standard methods

approved in available literature were used. Temperature, turbidity, pH, conductivity, TDS, suspended solid, alkalinity, total hardness, chloride, dissolve oxygen and BOD were determined in the laboratory. The Physico-Chemical parameters of water were determined as per standard methods of APHA (2002) and by Indian standard-2296 (1982). pH of water sample measured by pH meter using standard solutions, Temperature of water sample measured by thermometer, Conductivity measured by conductivity meter, Turbidity of water sample measured by turbidity meter, TDS (total dissolved solid) measured by TDS meter, total Alkalinity determined by acid-base titration method, value of total Hardness of water sample determined by EDTA method, Chloride measured by titration method, Dissolved Oxygen determine by Winkler method, BOD also analyzed using BOD incubator.

III. RESULTS AND DISCUSSION

The present study was conducted at selected sampling station of Narmada River at Jabalpur town from (Oct./Nov./Dec.) in a year 2016. Physico-chemical parameters were carried out in the samples collected from the study area to study the drinking water quality and pollution level. The average value of all six sample points was located in the Table -2.

According to Water Quality Index the values of all the parameter were found to be within the limits.

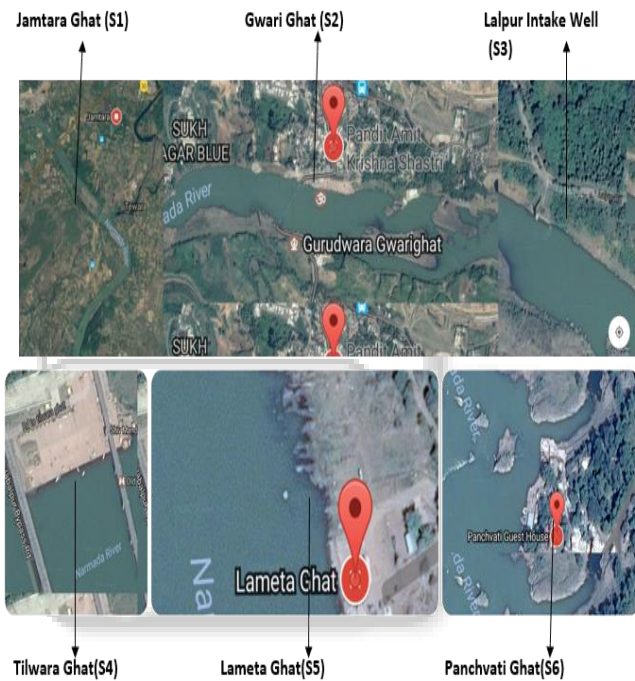
Parameters	WHO Standard	ISO Standard
Temperature	-----	
pH	7.0 – 8.0	6.5-8.5
Electrical Conductivity (µs / cm)	1400	
Total Dissolved Solid (mg/L)	1000	500
Total Hardness (mg/L)	100	200
Alkalinity (mg/L)	120	200
Chloride(mg/L)	250	250
D.O.(mg/L)	4	4
B.O.D(mg/L)	2	2

Table 1: Water Quality Parameter Standards Given By WHO and ISO

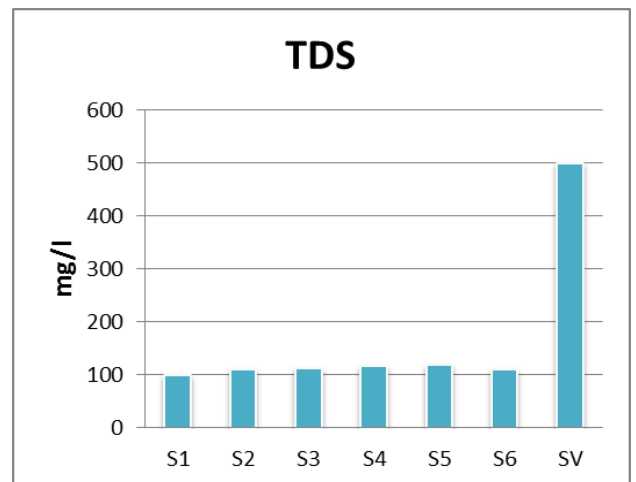
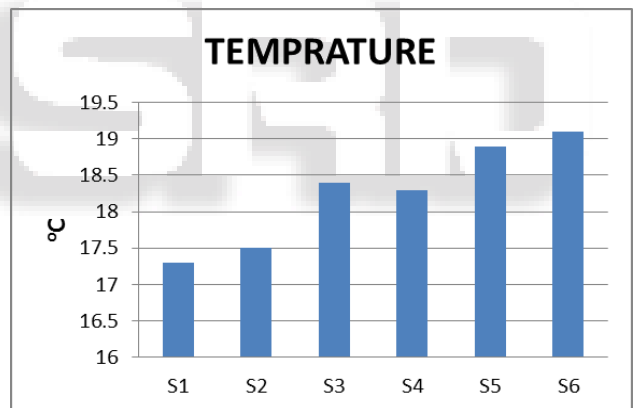
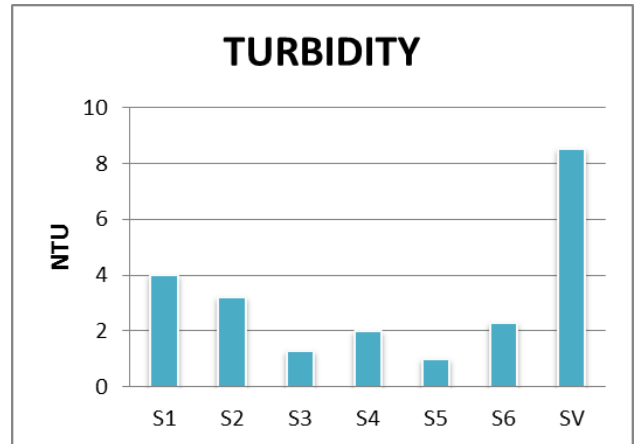
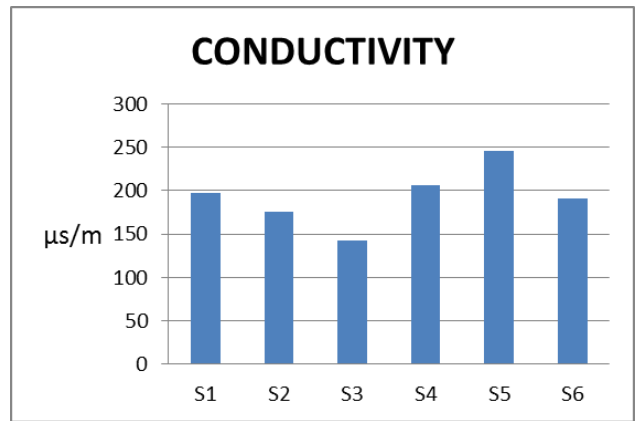
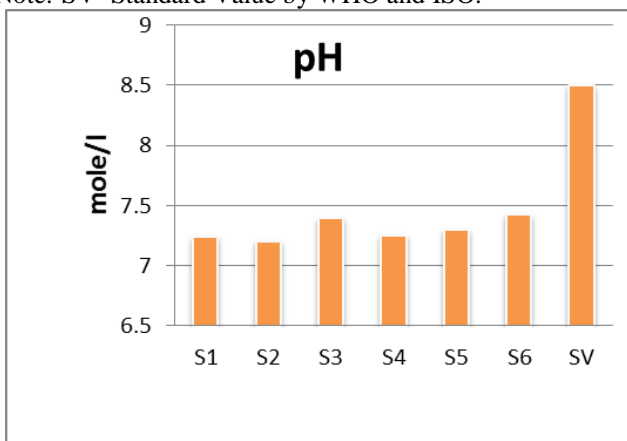
S. No.	Parameters	S-1	S-2	S-3	S-4	S-5	S-6
1.	pH	7.2 4	7.2	7.4	7.2 5	7.3	7.4 3
2.	Temperatur e(°C)	17. 3	17. 5	18. 4	18. 3	18. 9	19. 1
3.	Conductivit y (µs/m)	19 8	175 .7	142 .3	205 .8	245 .8	190 .7
4.	Turbidity (NTU)	4	3.2	1.3	2	1	2.3

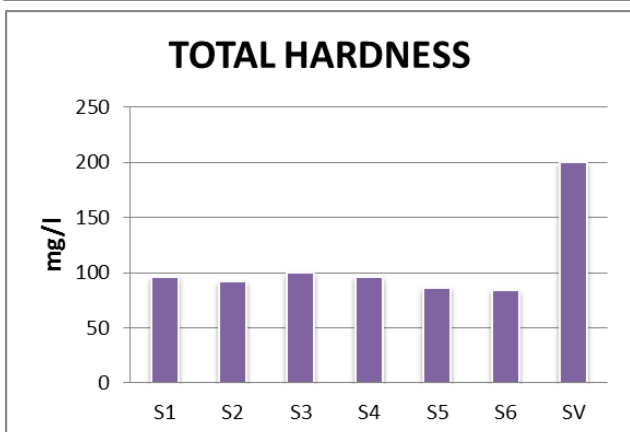
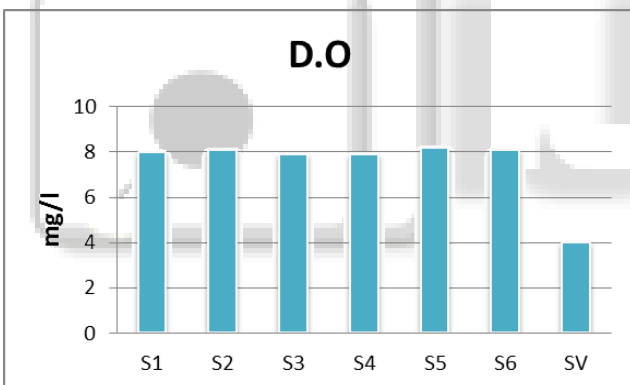
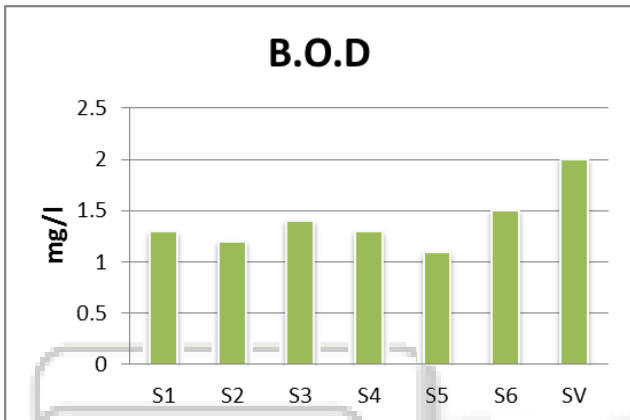
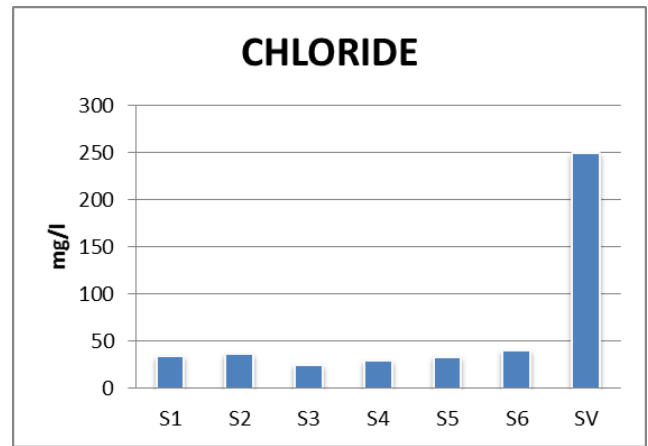
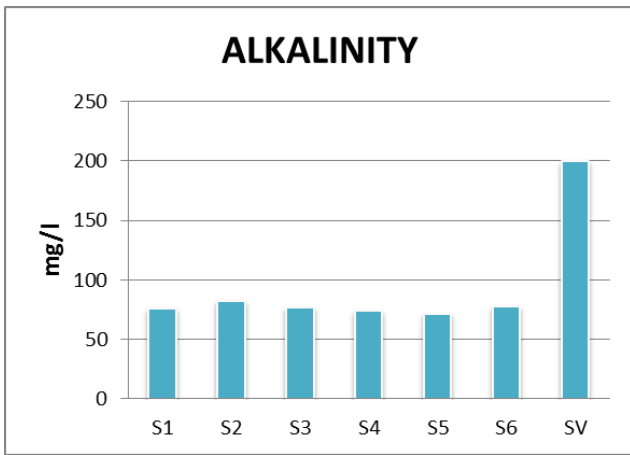
5.	T.D.S. (mg/l)	100	110	113	117	120	110
6.	Alkalinity (mg/l)	76	82	77	74	71	78
7.	Total hardness(mg/l)	96	92	100	96	86	84
8.	Chloride (mg/l)	35	37	25	30	33	40
9.	Dissolve Oxygen (mg/l)	8.0	8.1	7.9	7.9	8.2	8.1
10.	B.O.D. (mg/l)	1.3	1.2	1.4	1.3	1.1	1.5

Table 2: Water quality parameter of Narmada River Sample from Study area



Note: -SV=Standard Value by WHO and ISO.





IV. CONCLUSION

The quality parameters determined for sources of the area show that the water of Narmada River at all the locations was quite within the acceptable range and shows that the overall quality of water is suitable and safe for domestic and irrigation purposes.

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