

Water Quality Assessment in Different Festivals at Pariyat River before Its Linkage with Hiran River Jabalpur (M.P.)

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Abstract: Rivers in India regarded as sacred from times immemorial. The River Pariyat and River Hiran are the important main and largest river of M.P. The Pariyat and the Hiran rivers are considered lifeline of the Jabalpur city. So number of Ghats are found in all the cities from where it passes through and large human population is living near its bank. During different festivals very much spiritual and extensive puja activities are performed. A lot of peoples come to the river for bathing, idol immersion, jaware viserjan etc. The main objective of present study was to analyze water quality changes at some festivals. The water samples collected were analyzed, as per standard method parameters such as Physico- chemical parameters like pH, Alkalinity, Total hardness, DO, BOD and Bacterial parameter E coliform and significant changes were observed on the water quality of the Jabalpur region of Hiran and coliform values indicating that river water is not safe for pilgrim's health point of view. Further, the study suggested Pariyat Rivers. Increased pollution load deteriorating the water quality of both rivers day by day. Higher fecal that some eco-friendly water quality management strategy is required during all the festivals at different Ghats to achieve the aim of sustainable development.

Keywords: Physico-chemical parameters. River water quality, Sustainable development.

1. INTRODUCTION

Pollution of surface and ground water is largely a problem due to rapid urbanization, Industrialization. The large scale urban growth due to increase in population or migration of people from rural areas to urban areas has increased domestic effluents, and industrial waste. Once the contaminants enter the water source it is a difficult and expensive to remove them. Water pollution has been seriously affecting the life of humans, plants as well as animals. The eco system of rivers, streams, lakes, seas and oceans is also getting deteriorated due to the contamination of water, through various sources. This condition also leads to the outbreak of numerous diseases, majority of them being lethal and contagious. A number of waterborne diseases are produced by the pathogens present in polluted water, affecting humans and animals alike. Marine life becomes deteriorated due to water pollution. Discharges from power stations reduce the availability of oxygen in the water body, in which they are dumped. The flora and fauna of rivers, sea and oceans is adversely affected by water pollution. Festivals are very important and heartiest to every person of India. Religious human activities also add to the river pollution. According to Telang et al (2009) Due to mass gathering and improper sanitation facilities, the human excreta and other waste increase the Coliform numbers alarmingly. There is need to educated the people through mass awareness programs for bringing the awareness among the common citizens about water pollution and its possible impact on the environment and mankind. Washing of cloths and vehicals, bathing of cattle and other such activities should be stopped at bank of the river to reduce the water pollution. 2.Mehta (2014) stated that with growing magnitude of the religious activities pollution load is bound to be increased in many folds. Therefore generating awareness about reducing pollution due to festival waste will help in conserving the ecosystem of Shukla and Patel (2015) load due to worship remains is significant and so, specific eco friendly worship places are required to be constructed in every city/town for the environmental management.3. The rivers in India have been considered sacred from ancient times. people take holy dip in river with the faith that water washes away their sin.4.

Jabalpur is located at 23⁰10'N 79⁰ 56'E. in India. It has an average elevation of 411 meters (1,348 feet). It is the third largest urban agglomeration in M.P. and the 26th largest urban agglomeration in India as per the 2011 census statistics. The town is surrounded by several lakes and water tanks. The area is rich in limestone, refractory clay, bauxite, iron ore, manganese and other deposits. There are few industries connected with above minerals in the area. 5. Pariyat Dam on the river Pariyat is used for irrigation, water supply and power generation. Jabalpur has a humid subtropical climate, in summer season average temperature reaching about 45⁰ C whereas coldest temperature in 15⁰C in winter season. In monsoon season a total precipitation of nearly 1386 mm.

Most of the puja activities and festivals are performed on Ghats situated on the banks of river there are four major ghats of Pariyat River and its linkage with Hiran River at Jabalpur. In the present study six festivals from January to October have been considered. Many melas or fairs are held on Makara Sankranti the most famous being the Mela, held every years at all ghats. God Parsuram Jayanti is celebrated on Parsuram Kund by a number of pilgrims and villagers. Annually in the month of Sawan , The Kavar Procession is held by thousands of devotees of lord Shiva. The procession begins from Amarkantak which goes to Jabalpur and conclude in a Shiva Temple situated in a place called Matamer . After Jalabhishek (Offering of holy water to the lord in the temple).The waste products like flowers and other materials is disposed of in the Parsuram Kund and because of this , the water gets polluted. Chaitra Navratri is celebrated in the first month of Hindu calendar and Ram Navami, the birthday of Lord Rama, falls on the ninth day during Navaratri. Qwar Navratri or Durga Pooja is celebrated in the tenth month of Hindu calendar. Qwar Navratri is celebrated to form of Durga Pooja.

Most of the festivals are associated with bathing in rivers, idol immersion, Jaware visarjan, float traditional oil lamps etc. They through some materials like food, waste or leaves in the river for spiritualistic reasons. Due to mismanagement of human waste and contaminated water all the areas near the river are polluted. In the present study the water sample was collected from different ghats of Hiran and Pariyat from Jabalpur and lab experiment have been done in the Government Model Science College Jabalpur. On the laboratory work data interpretation was done and finally conclusion is derived with some recommendation 6..

2. MATERIALS AND METHODS

Site location for sampling - In Jabalpur city one can find number of Pariyat river ghats like , Mahgawan, Sarsawa-ghat, Pariyat and Hiran River Linkage point (Ecotone)and Parsuram kund (Matamer) of Pariyat river, visited by thousands of people every year. Makar Sankranti, Chaitra navratri and Ram Navmi Javare visarjan are celebrated in these ghats and Parsuram Jayanti, the Kavar Procession in the month of August, is celebrated in Parsuram kund and Qwar Navratri (Durga Pooja) Javare Visarjan is celebrated in the month of October on Pariyat river. Lot of dairy farmers use to put ash and bones of their dead animals into Pariyat river .Other religious rituals are performed here. Makar Sankranti and Shraavan Mah are the festivals which are celebrated in the form of fair. Parsuram Kund is a famous tourist place, about 25 km. away from jabalpur city on Pariyat River. There are several old temples and monuments around the Matamer Place. Local people and some tourists do visit of parsuram kund.

These ghats are situated in a stretch of 20-30 Kms. from Pariyat River of Jabalpur..For the study samples were collected from all four established stations in the morning (5.00AM-6.00PM.) and evening hours (5.00PM-7.00PM) of the day during festival & special occasions from 12 January 2015 to 28 October 2015. Almost care was taken to avoid spilling of water and bubbling of air during sampling in iodine treated polyethylene bottles. Some of the chemical characteristics of water were analyzed in the laboratory within 4 to 8 hrs. Table 1 shows abbreviations and dates of festivals used in this study.

Table 1:-Station Sample Details

Sample Collection Duration Festivals (Morning and Evening)	Sample Collection Festivals Abbreviated name	Sample Collection Festival Date
MakarSankranti	M.S	14.01.2015
Ramnavmi Javare Visarjan	R.J.V	29.03.2015
Chaitra Navratri	C.N	21.03.2015
Parsuram Jayanti and shraavan mah Kavar Procession	P.J and K.P	09.05.2015
Qwar Navratri(Durga Puja)	Q.N	13.10.2015 to 22.10.2015

Water Quality Analysis: The experiments have been done for Physico-Chemical parameters are pH, Total Hardness, D.O,B.O.D. and Alkalinity were analyzed as per the standard methods. The results were compared with the World Health Organization (WHO) and Indian drinking water standards.

Bacteriological quality: The most probable number (MPN) method was employed for the total and faecal coliforms.

3. RESULT AND DISSCUSSION

The determination of pH shows the alkaline and acidic nature of the water. It governs the solubility of the nutrients. In the present study the variation of pH values of river water was not very significant and it varied between 6.9 (Mahgawa of maker sankranti) to 8.3 (Parsuram kund in Ramnavmi Javare visarjan). The variation is shown in Figure 1.

The total Hardness was found to be high in all water bodies since the river passes through or over deposits such as limestone, the levels of Ca^{2+} · Mg^{2+} and HCO_3^- ions present in the water can greatly increase and cause the water to be classified as hard water. Total hardness is highest (220mg/l of CaCO_2) in Sarsawa site during evening season of Chaitra Navratra and very highest (230 mg/l of CaCO_3) at Parsuram Kund Water ranged between hard to very hard. (Figure 2)

Alkalinity is total measure of the substances in water that have acid neutralizing ability (Hoko,2008). Its level showed greater variation at all sites. The highest alkalinity (250mg/l as CaCO_3) was reported from the site of Sarsawa study site during day time in Makar-Sankranti, and Qwar Navratra whereas the lowest (135 mg/l as CaCO_3) was found to be at Ecotone point during the in Makar –Sankranti. The amount of alkalinity depends on the nature of materials discharged in water bodies (Figure 3).

Dissolved oxygen (DO) is probably the most crucial and important water quality variable in fresh water body. In present study, dissolved oxygen fluctuated in the range of 6.0 mg/l-1 at Parsuram Kund in Chaitra Navratra , Parsuram Jayanti and Kawar Procession and Highest value in Qwar Navratra (D.P.) is (Figure4) 11.3mg/l.

The Biochemical oxygen demand also indicates the amount of organic compounds in water as measured by the volume of oxygen required by the bacteria to metabolise it under aerobic condition. For more organic matter , more oxygen is required by bacteria for its decomposition. This results in release of organic nutrients in water bodies resulting in death of organisms thriving on water 8.. The highest degree of biochemical oxygen demand (8.2 mg/l-1) was reported from Parsuram Kund study site while lowest level (3.5 mg/l-1) was observed also from Parsuram Kund and Sarsawa study site in Ram Navmi Jaware Visajan (Figure 5).

The microbial analysis was also conducted in terms of most probable number (MPN) of total coliforms in water sample and its highest value 2400 MPN per 100 ml sample water was reported from Parsuram Kund site of Pariyat River at Parsuram Jayanti and Kawar Procession. Total Coliform were found above the standard limit of all the festivals makes water unfit for drinking and bathing purpose.

4. CONCLUSION

On the basis of the study it was observed that due to religious activities at river, organic pollution load is increased and it affects the water quality and ecosystem adversely in downstream area.

pH in Water Samples					
	M.S.	C.N	R.J.V.	P.J. and K.P.	Q.N.(D.P.)
Mahgawa	6.9	7.5	7.8	7.5	7.1
Sarsawa	7.0	7.5	7.6	8.0	7.0
Pariyat & Hiran River Linkage (Ecotone)	7.2	7.2	7.5	7.4	7.1
Parsuramkund	6.8	6.8	6.7	8.3	6.2

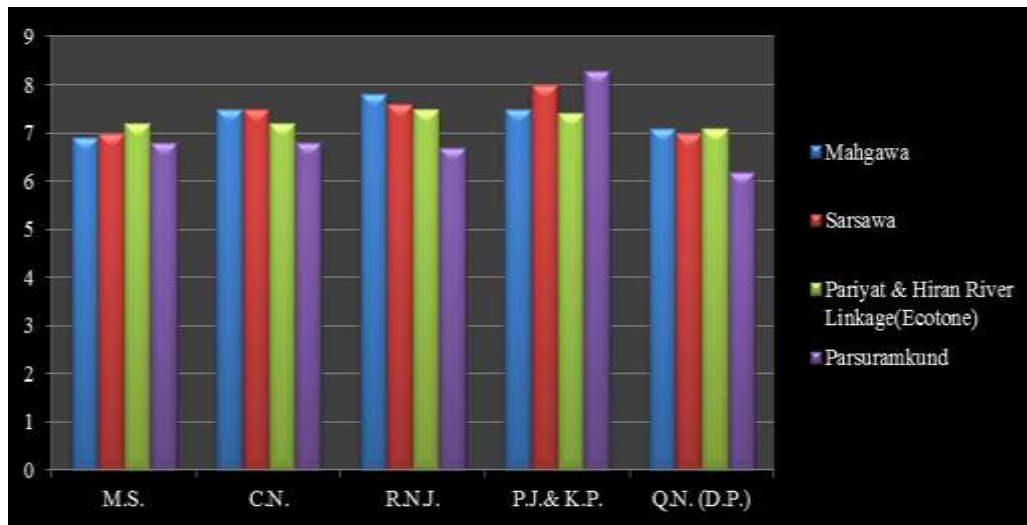


Figure 1 : Variation in the values of pH at different study sites in the all ghats.

Total Hardness of Water Samples					
	M.S.	C.N	R.J.V.	P.J. and K.P.	Q.N.(D.P.)
Mahgawa	175	180	170	180	160
Sarsawa	190	220	190	220	170
Pariyat and Hiran River Linkage point (Ecotone)	180	190	180	200	180
Parsuram kund	220	200	230	220	200

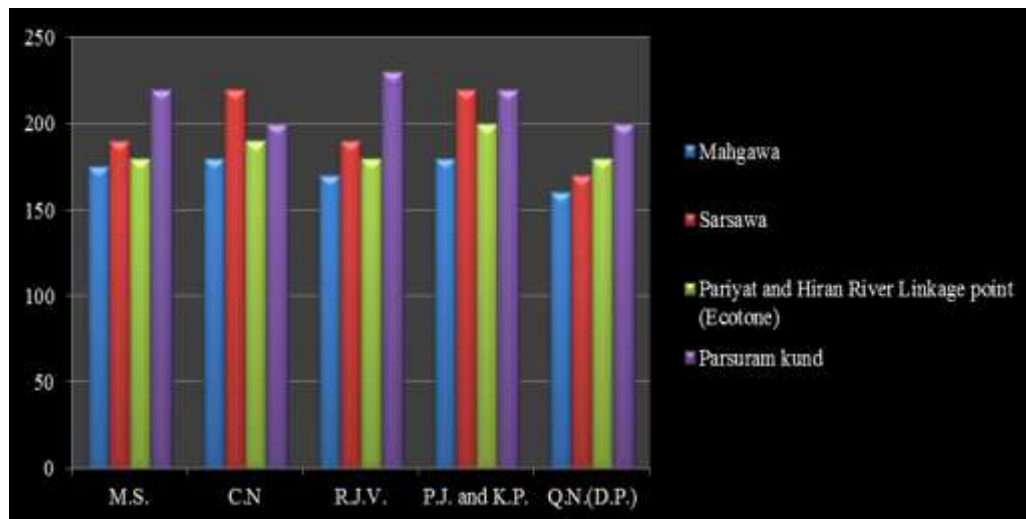


Figure 2 : Total Hardness in all the Ghats in all the ghats.

Alkalinity of Water Samples					
	M.S.	C.N	R.J.V.	P.J. & K.P.	Q.N. (D.P.)
Mahgawa	200	210	190	180	190
Sarsawa	250	200	180	190	250
Pariyat and Hiran River Linkage Point (Ecotone)	135	190	190	180	200
Parsuramkund	150	160	150	170	240

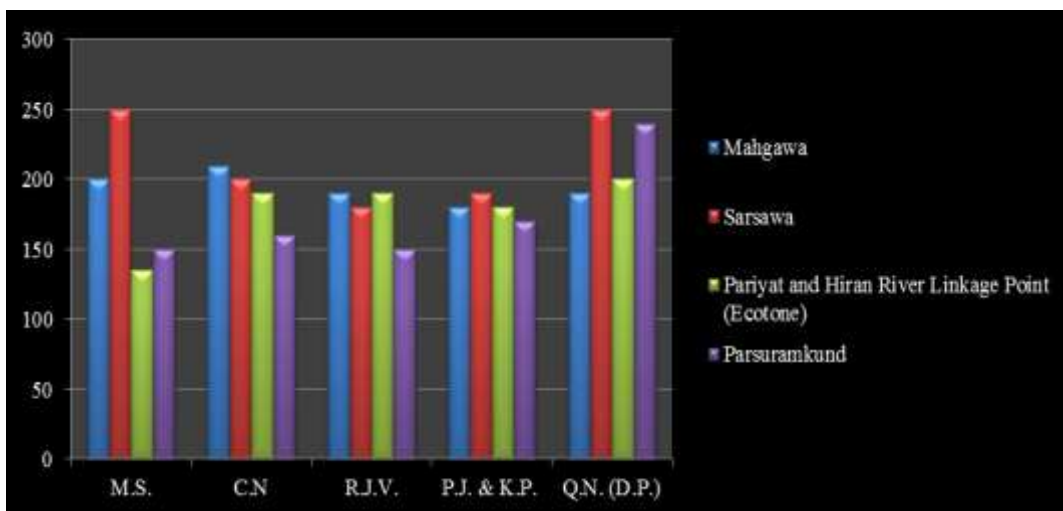


Figure 3 : All variation in Alkalinity during different festival in all ghats.

DO Content in Water Samples					
	M.S.	C.N.	R.J.V.	P.J. and K.P.	Q.N. (D.P.)
Mahgawa	9.0	11.0	7.1	7.2	11.2
Sarsawa	10.2	11.2	7.3	7.1	11.3
Pariyat and Hiran River Linkage Point (Ecotone)	7.2	9.7	6.3	6.1	9.0
Parsuramkund	6.1	6.0	6.2	6.0	11.2

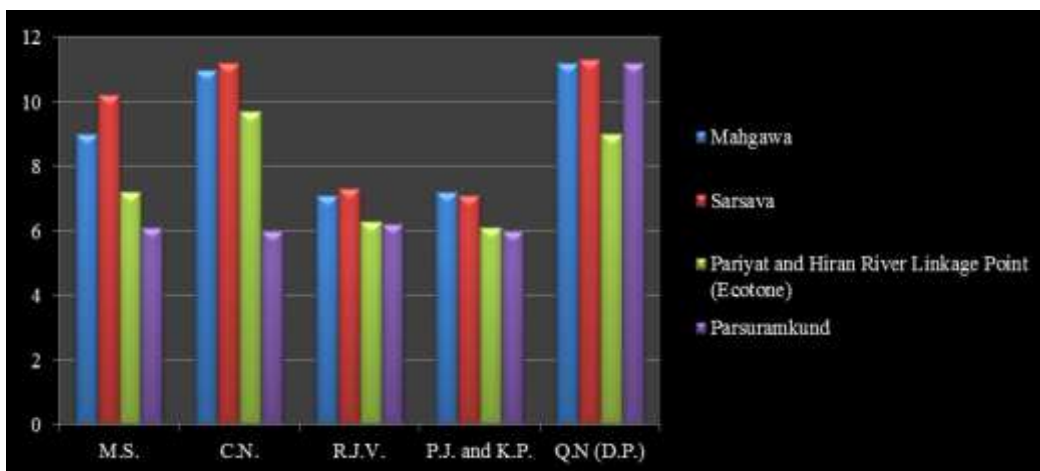


Figure 4:- All DO Content During different festival in all ghats

BOD Values of Water Samples					
	M.S.	C.N.	R.N.J.	P.J. and K.P.	Q.N. (D.P.)
Mahgawa	6.0	6.5	4.1	4.5	6.8
Sarsawa	7.0	6.9	3.5	5.1	7.7
Pariyat and Hiran River Linkage Point (Ecotone)	4.8	5.5	6.9	4.5	7.4
Parsuramkund	3.5	3.5	3.5	3.8	8.2

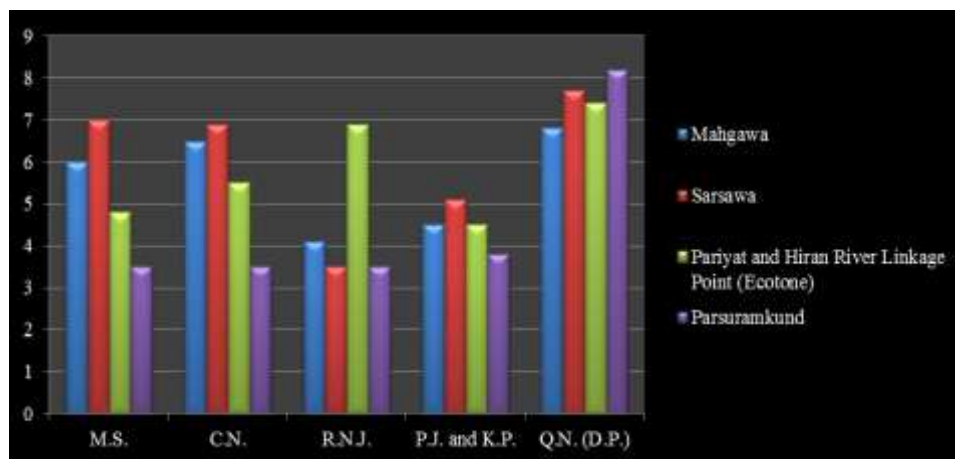


Figure 5 : BOD Values of Different Water Samples

It is evident from the above data analysis that the worship remain is being done at important Ghats and its value is significant increased during the festivals. This study provides an informative data on water quality and helps to understand the pollution in many places of Pariyat river at different festivals. In the present study it was found that physico-chemical characteristics of a few the river water sample crossed the maximum permissible limit, during the festivals due to the religious activities. A sustainable development and management is required at all the ghats that lead to the eco-friendly worship places. The concept of an eco-friendly puja ghat is to create separate ponds on the bank of river by simulating the river flow in the pond. The eco-friendly worship places should be of sufficient capacity with proper arrangements of Filters and pumping to manage the flow. Besides awareness among the people and society about the waste disposal into the river due to different religious activities must be created through the posters, media, newspaper will help in conserving these water bodies. There is an urgent need to develop a proper guideline based on social, religious, scientific and environmental efficient techniques during festivals to achieve the aim of sustainable development of water resources in terms of quantity and quality.

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