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Experimental Investigation & Assessment of Water Quality Index of Different Locations of Wainganga River at Chhapara, Seoni, M. P., India – A Review

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Abstract: ***Water pollution is a environmental issue in India. The largest source of water pollution in India is untreated sewage. Other sources of pollution include agricultural runoff and unregulated small-scale industry. Most rivers, lakes and surface water in India are polluted due to industries, untreated sewage and solid wastes. The Wainganga is a river in India originating in the Mahadeo Hills in Mundara near the village Gopalganj in Seoni, Madhya Pradesh. It is a key tributary of the Godavari. The river flows south in a winding course through the states of Madhya Pradesh and Maharashtra. We are find out water quality index of different locations of wainganga river.***

I. INTRODUCTION

Madhya Pradesh state is blessed with 13 major rivers, numerous lakes and ponds. The cities Seoni, Balaghat of Madhya Pradesh state and Bhandara of Maharastra state is blessed with Wainganga river. Wainganga river is lifeline for these cities and for nearest village. This river covers the village for the live life and purpose like drinking, irrigation, fishing, boating and farming. And this river is maximum polluted by the bathing, washing of clothes, throw of clothes, waste water flow. River Wainganga originates from Talab of Village Mundara District Seoni, having an elevation of 1048m (3438ft) and passes through Chhapara, Keolari towns of Seoni District and then enter in Balaghat District and act as the lifeline of these places. Also, it is considered the holy river of the Hindus. The river highly polluted by flow of the wastewater in to the river and throw of waste. River around the last point with the poor quality of the water.

In the proposed research an experimental study has been done for the assessment of water quality index of different locations of Wainganga River at Chhapara, Seoni, M. P., India. The specific objectives of the present study are:

- To identify various sample available in the study area and find out status of water quality and to isolate some of more important factors that influenced water quality as physio- chemically, by determining water quality parameters.
- To compare all examined water quality parameters with water quality standards.

II. LITERATURE REVIEW

P.K.Srivastava, S. Mukherjee, M. Gupta, S.K. Singh, 2011, "Characterizing Monsoonal Variation on Water Quality Index of River Mahi in India using Geographical Information System" The results from this study it was observed that the main pollution of the Mahi River Basin is due to discharge of effluent from industries and through domestic and agricultural runoff. River stretch near urban area is mainly contaminated due to municipal waste and unchecked water uses (abstraction of fresh water and return of wastewater and irrigation waters) increase the mineralization of the river water, especially during the low flow period in the summer, but it counts for only lower percentage of contamination than industrial area. In the study the project area both point and nonpoint sources of pollution are dominant. The reduction of these sources is the first and necessary step to improve river water quality. Wetlands may be used as a final step in the wastewater treatment process as they can be utilized to reduce pollutant concentrations to a level safe for the receiving environment. Ponds, reservoirs, levees and increased vegetation cover and land conservation activities can be other alternatives that are believed to be responsible for the trapping of pollutants in the upper reaches.

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Deepshikha Sharma, Arun Kansal, 2011, "Water quality analysis of River Yamuna using water quality index in the national capital territory, India (2000–2009)" The entire capital city must be sewered and all the wastewater even in low-lying areas near the river should be sent (through pumps if necessary) for treatment and disposal insuring 'zero' discharge in the river. It can be done by upgrading the existing STPs, which do not meet the required disposal standards. The excess sewage entering directly into the river must be tapped and treated. This can be achieved by establishing alternative drainage systems like canals or bandha (a kind of retaining wall or dam extending from a few meters below the riverbed to the river's flood level) on either or both sides of the river, to dispose of the entire wastewater on the river's d/s without lowering the DO levels in the river.

Tirkey Poonam, Bhattacharya Tanushree, ChakrabortySukalyan et al (2015) it is clear that Water quality is a significant criterion in matching water demand and supply. To represent water quality in a lucid way different water quality index for water quality assessment are used which aim at giving a single value to the water quality of a source reducing great number of parameters into a simpler expression and enabling easy interpretation of monitoring data.

The water quality varies according to the type of use. Furthermore, the criterion of an 'acceptable water quality' varies from region to region and from time to time depending upon the prevailing conditions.

This, in turn, is essential for comparing the water quality of different sources and in monitoring the changes in the water quality of a given source as a function of time and other influencing factors.

M. Mamatha et al, 2017 the WQI for Kapila river water has been calculated for the samples using WAWQI and was found to be 51.33 and 53.72 for S1and S2 respectively. The study reveals that the quality of water is poor. These results reveal that water quality of river is getting deteriorated, mainly due to run-off and sewage water from the town. As the surrounding villagers are dependent on the river water for drinking and domestic purposes so it should be made free from the impurities before some serious health issues are reported.

E. E. Etim, R. Odoh, A. U. Itodo, S. D. Umoh, U. Lawal1et al, 2013, found Water quality of different sources of water (stream, borehole and pipe born water) in the Niger Delta region of Nigeria was evaluated by Water Quality Index (WQI) technique.In their study, WQI was determined on the basis of various physico-chemical parameters like pH, total alkalinity, chlorides, sulphate, nitrate, total hardness, calcium, magnesium, electrical conductivity, dissolved oxygen, biochemical oxygen demand, total dissolved solids and total suspended solids. The results obtained for the WQI from the different sampling stations were found to be varied from 34.80 to 36.26 for pipe borne water, 38.52 to 48.67 for borehole water and 55.05 to 84.94 for stream water. The results indicate that the different water samples analysed from pipe born and borehole water are safe for safe for human consumption and for other domestic purposes while the samples analysed from stream water are not safe for human consumption.

R.C. Gupta, Ajay K. Gupta and R.K. Shrivastava et al (2012), they assessed the water quality of holy river Kshipra river in Ujjain using Parameters namely Temperature, pH, Turbidity, Total Solids, Dissolved Oxygen (DO), Biochemical Oxygen Demand(BOD), Phosphate, Ammonia and Fecal Coliform (F.C.) were determined at important locations of River Khan and Kshipra for summer, monsoon and winter seasons in the year 2010. Assessment was made through Water Quality Index (WQI),a single number representing large quantities of data. US National Sanitation Foundation WQI was calculated for each set of data with and without Phosphate parameter. The study showed that Kshipra River water is of medium to bad quality and Khan River water is the major cause of pollution in Kshipra River. The study also revealed that Kshipra River water is unsuitable even for bathing.

K. Yogendra and E.T Puttaiah (2008) et al, in his study he calculates WQI using WAWQI method to ascertain the quality of water body for human consumption. They analysed the water body in different season i.e., Rainy Season, Summer Season, Winter Season are 96,101.7, 106.3 respectively that clearly indicate poor water quality. And unfit for human consumption.

Lakshmi. E, Dr. G. Madhu et al, 2014, they assessed the WQI of Periyar river using CCMEWQI using pH, conductivity, Total dissolved solids, Total hardness, Dissolved Oxygen, Chemical Oxygen Demand, Calcium, Magnesium, Sulphates, Chlorides, Nitrate-N, Iron, Fluoride, and Phenol. All sampling sites under investigation fell under the poor-quality index range, with kuzhikandam site exhibiting the lowest. Water quality deteriorated, as river flows downstream especially towards the Eloor Ferry. Regression analysis of the water quality index with factors (F1, F2, and F3) shows that the number of parameters that exceeds the guideline (Scope, F1) and the number of times the parameter exceeding the guideline (Frequency, F2) affects the water quality index of the river while the extent to which each parameter exceeding the guideline (Amplitude, F3) does not affect the water quality index.

Mehra et al., 2017, The objective of the study was to assess the Water Quality Index of different sources of water supply in Jabalpur City. It is evident that from the data analysis water quality of all selected sources of water supply are within permissible limit, but the analysis of Water Quality Index of samples indicates the quality of Pariyat Reservoir and Khandari Reservoir are poor water quality category that lies in the range between 26-50 therefore be treated before use to avoid water related diseases. The WQI of

pariyat, khandari, lalpur and Ramnagra were 63.01, 56.32, 38.85 and 41.59 respectively and clear indicating that water quality of Lalpur and Ramnagra are good. By comparing WQI of four Water Sources used for supply through which i found that best water quality is of Lalpur then ramangra followed by khandari. The poorest water quality among them is of pariyat.

Kosha A. Shahand Geeta S. Joshi, 2017, Evaluation of water quality index for River Sabarmati, Gujarat, India, the average WQI of selected three locations are ranges from 42.71 to 56.43, 80.75 to 86.34 and 85.67 to 95.08. Water quality of all three locations respectively are bad, good and good–excellent. First location in a highly urban area, while second location in a moderately urban area and third location in a moderately rural area. WQI values at these stations indicate that water quality deteriorates as river flows from rural to urbanized area.

Waribam Suraj Devi, Kh. Rajmani Singh and N.Sony Meitei (2015) et al, they calculated the WQI value at four Locations of Nimbol River Manipur by using following water quality parameters. The physico-chemical parameter of water such as water temperature, free Carbon dioxide, Dissolved Oxygen, Alkalinity, pH, Turbidity, BOD, Ammonia, Phosphate, and some metal elements were analysed. The WQI value for theseSamples ranges from 67.878-85.276. The highest WQI value of 85.276 was recorded from Site IV which shows very poor water quality. Their analysis indicates that the water is nearly polluted and not suitable for human consumption. Thus, river needs treatment so as to conserve this water body from future contamination and pollution. These findings have been discussed in the light of recent published literature.

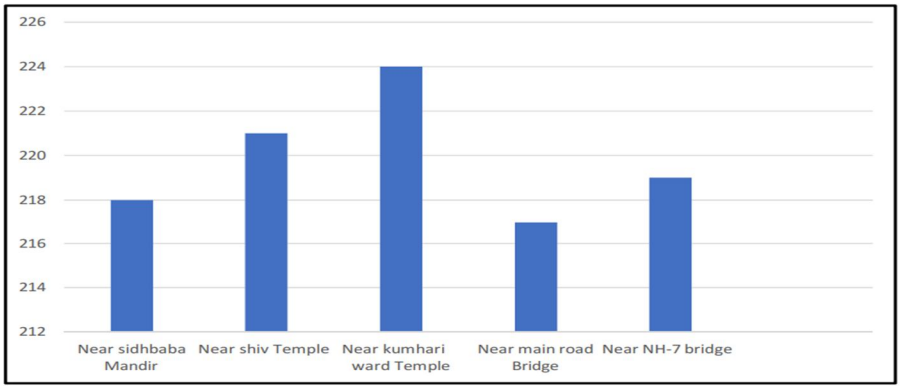
Minakshi Bora and Dulal C. Goswami, 2017, Water quality assessment in terms of water quality index (WQI): case study of the Kolong River, Assam, India, the presentinvestigation represents the first of its type undertaken on the Kolong River of Assam. The case study provides valuable insight into the status of overall suitability of the Kolong River water based on WQI values. It highlights the salient features of various important physico-chemical parameters acting upon the general water quality of the river. The season wise variations in the WQI values were examined based on seasonal water quality analysis data of seven sampling sites distributed along the river channel.

Gurdeep Singh and Rakesh Kant Kamalet al, 2014, they stated that Water quality index (WQI) is valuable and unique rating to depict the overall water quality status in a single term that is helpful for the selection of appropriate treatment technique to meet the concerned issues. They had taken Thirty-Six surface water samples were collected from in and around mining talukas of Goa (India). The quality of surface water was evaluated by testing various physico-chemical parameters such as pH, Total Dissolved Solid (TDS), Total Hardness (TH), Total Suspended Solid (TSS), Calcium, Magnesium, Chloride, Nitrate, Sulphate, Dissolved Oxygen and Biochemical Oxygen Demand (BOD). The WQI for all samples were found in the range of 34 to 107. The highest value of WQI was observed during the monsoon season while the lowest value was during the post monsoon season. They found Most of the water samples within study area are within Good to moderate categories.

III. RESULTS

A. Total Hardness

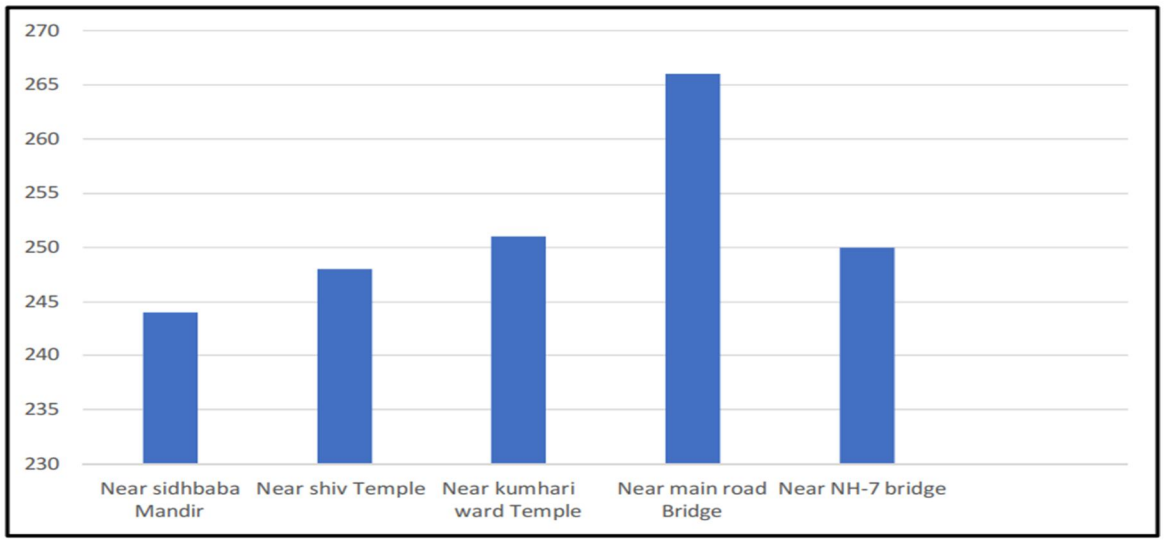
Hardness is caused due to presence of cations like Ca+2, Mg+2, Fe+3 etc. This is the property of water to precipitate soap by formation of complex with calcium, magnesium present on water. Total Hardness studied rivers are found value is recorded 218 mg/l, 221 mg/l, 224 mg/l, 217 mg/l, and 219 mg/l in measured in near sidhbaba Mandir, near shiv Temple, near kumhari ward Temple, near main road Bridge and near NH-7 bridge respectively.



Graph 5 shows Total Hardness values variaton of all locations

B. Total Dissolved Solids

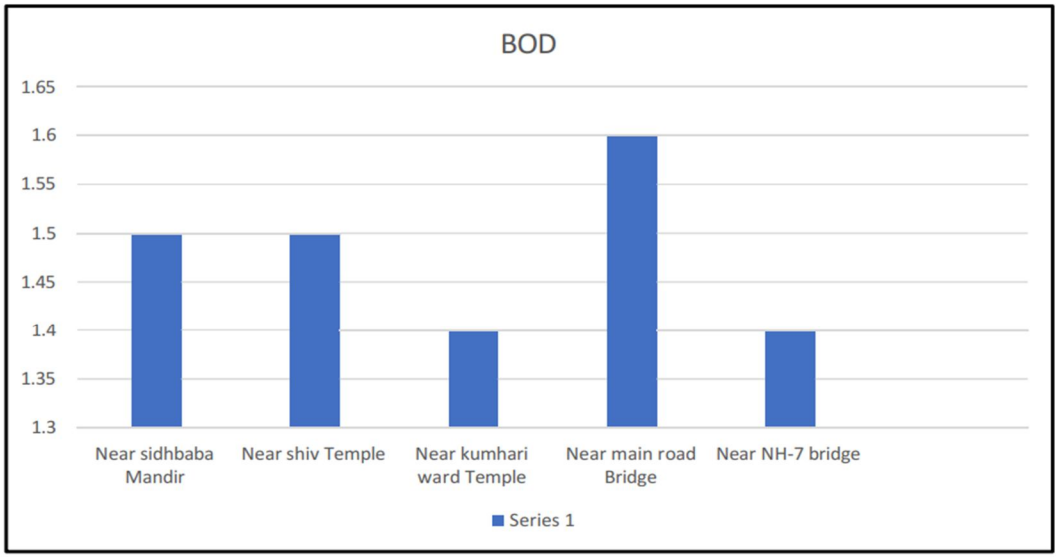
The highest Total Dissolved Solids was observed as 266 mg/lnear main road Bridge due to the addition of dead organic substances contributed by the decomposition of aquatic plants and animals which may be related to the water dilution caused by evaporation at high temperature during summerNTU and then in decreasing order 251 mg/l, near kumhari ward temple, 250 mg/l, near NH7 bridge, near shiv temple 244 mg/l and last lowest value is in the location of near sidhbaba mandir 244mg/l.



Graph 8 shows Total Dissolved solids values variaton of all locations

C. Biochemical Oxygen Demand (BOD)

BOD is a measure of the amount of oxygen that bacteria will consume while decomposing organic matter under aerobic condition. The BOD value of river water was 1.5 mg/l, 1.5 mg/l, 1.4 mg/l, 1.6 mg/l and 1.4 mg/l measured in near sidhbaba Mandir, near shiv Temple, near kumhari ward Temple, near main road Bridge and near NH-7 bridge respectively which is lower then value 6 requirement limit by WHO.



Graph 12 shows Biochemical Oxygen Demand (BOD)values variaton of all locations

IV. CONCLUSION

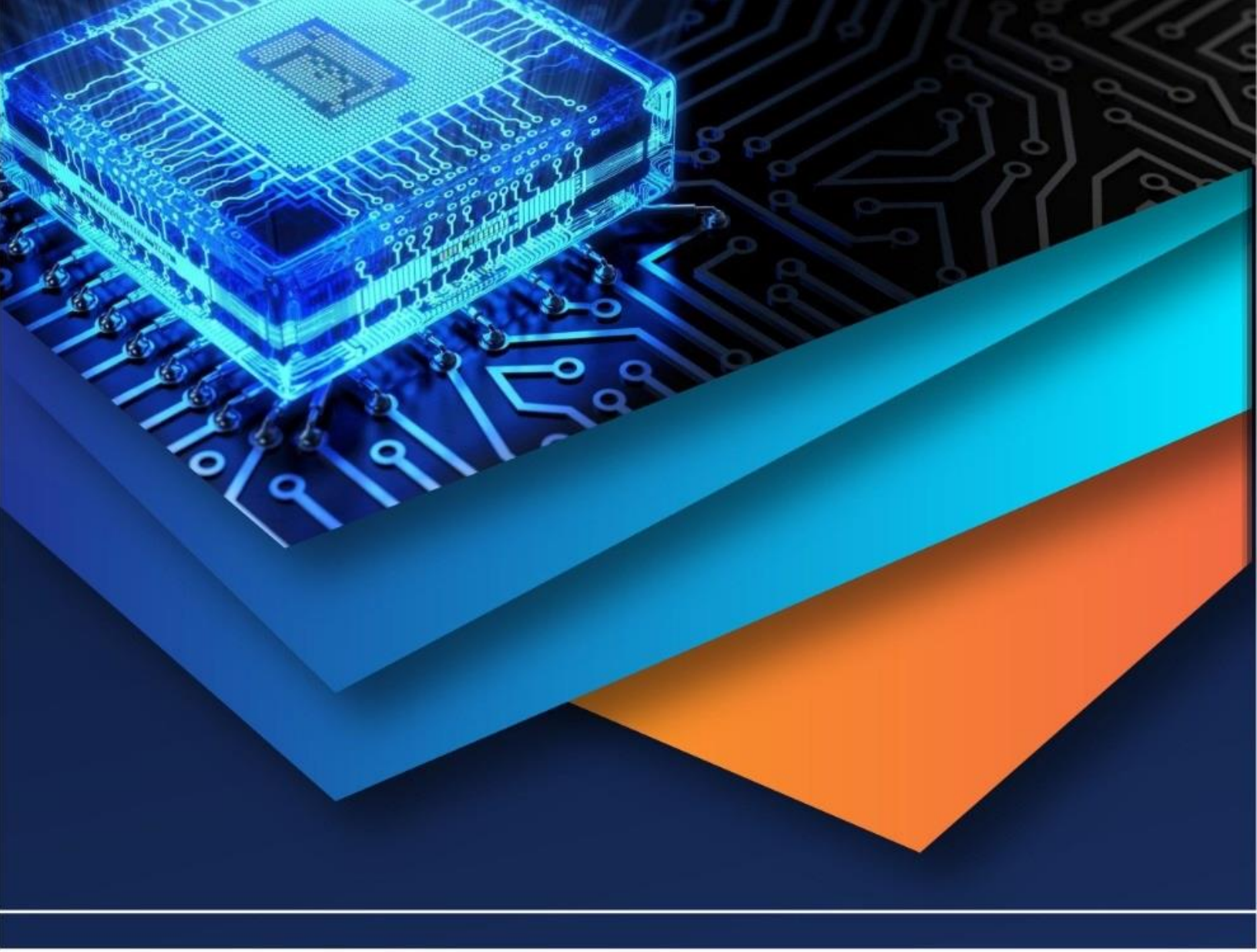
The objective of the study was to assess the Water Quality Index of different locations of water supply in Chhapara, District - Seoni. It is evident that from the data analysis water quality of all selected locations of water supply are within permissible limit, but the analysis of Water Quality Index of samples indicates the quality of near main road bridge and near NH -7 bridge are poor water quality category that lies in the range between 51 - 75 therefore be treated before use to avoid water related diseases. The WQI of near sidhbaba Mandir, near shiv Temple, near kumhari ward Temple, near main road Bridge and near NH-7 bridge were 35.23, 34.59, 45.24, 59.58 and 53.57 respectively and clear indicating that water quality near sidhbaba Mandir, near shiv Temple and near kumhari ward Temple are good. By comparing WQI of five Water locations of the river near sidhbaba Mandir, near shiv Temple, and near kumhari ward Temple are of good quality WQI status because of the less disturbance and the water in these locations are still by natural flow. The poorest water quality among them is of near main road Bridge and near NH-7 bridge.

This is our very and foremost bad habits we use our important things and not dispose properly and in a proper manner these things which is covered in our useful things so these things created pollution in our water bodies because ultimately we discharge our domestic waste and sewage without any proper treatment of waste so they create pollution in the stream.

In this study we found that water quality status of are good through WQI calculation showing that Near main road Bridge having 59.58 and Near NH-7 bridge having 53.57 WQI value. There is high value of WQI at Near main road Bridge due to anthropogenic activities like murti visharjan, throw of clothes and bathingsetc at near of samshanghat, leads to small deterioration in water quality. In The wainganga River there is direct flow of water with polluted water containing septic tanks over flow / Sullage etc meet to the river, water quality is likely to be degraded nallah slowly deterioting the water quality at presently. But in future if proper action not taken that ruined drinking water quality in future.

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