ASSESSMENT THE CHANGES IN WATER QUALITY OF RIVER GODAVARI DURING NASHIK KUMBH MELA 2015

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Abstract: The present study is related with the study of water quality of Godavari River by the various activities held during Kumbh Mela at Nasik, India. This study provides an idea about the water quality of the Godavari River has slightly polluted by the various activities held during Kumbh Mela. The water sample collection done by Grab sampling method at various durations like before starting, during and after Kumbh Mela schedule, the locations of sample collection are Kushawart Kund (Trimbakeshwar, Nashik), Ram Kund (Nashik). The study highlights the various physical and chemical water parameters which were analyzed in laboratory by various methods at Post Graduate Department of Environment Management, Chhatrapati Shahu Institute of Business Education and Research (CSIBER), Kolhapur. The result of present study shows the Godavari River water was slightly polluted during Kumbh Mela activities at Nashik.

Keywords: Kumbh Mela, Godavari River, Assessment, Water Quality.

Introduction: The River Godavari is the main source of water supply for Nashik city. Besides this it is used for industrial and domestic waste disposal. Beyond urban area, agricultural activities are carried out at a very large scale on both the banks of river Godavari. The water quality of river is degrading due continuous addition of untreated sewage. This sewage is causing serious damage to the aquatic life present in the water [6]. The pesticides and chemical fertilizers used on these agricultural fields are usually washed away into the river. These activities are responsible for deterioration of water quality of the river. The the quality of the Godavari River is contaminated; the domestic wastewater of the city was a major factor that is responsible for the contamination of the Godavari River [3]. It has got an overall impact on physical and chemical parameters of the water. The survival of aquatic life is in danger due to the chemicals discharged into the river. Toxins within water are harmful to aquatic ecosystem. In most of cases sewage is partly or fully treated or untreated which is directly discharged into the streams and rivers. The use of partially treated wastewater and water supplies, contaminated with sewage for irrigation has been implicated as one of the highest sources of pathogenic micro-organisms, in addition to heavy metals contaminating vegetables and other agricultural settlements may pose serious health hazards [2,5,9,11,12]. The growing problem of degradation and human activities on river ecosystem has made it important to monitor water quality of rivers to evaluate their state of pollution. Being a holy river most of the religious activities are performed on the bank of river Godavari and that too at Ram Kund. People from all the parts of country do come to Ram Kund for various religious purposes and most of them take a holy dip in Ram Kund. Since it is a part of river Godavari and most of the people take bath in Ram Kund the water quality at this location is analyzed.

Study Area: Ram Kund, 35 kms from the origin of river Godavari, is situated in Nashik city of Maharashtra State. It is a place for holy dip. Daily thousands of people take a dip in Ram Kund. During Kumbha Parva Lakhs of people take holy dip in Ram Kund. The belief is that God Rama use to take a bath in Ram Kund and the river takes a turn in ninety degree at this place. The turbulence created due to to abrupt change in direction creates lot of turbulence in water which helps in increasing Dissolved Oxygen level in water. But now days due to various human activities this place got polluted. So to determine the pollution level of this scared place, it is selected as the study area.

Location of Sampling and Sampling: Nashik is a rich historical town of legendary Lord Rama, who spent some time of his exile in Nashik. Nashik has a unique blend of civilization of modernization. This city of temple is one of the holiest places for Hindus inviting thousand of tourist every year. Nashik has scenic beauty of Sahyadri range of mountains merged with vineyards and agricultural yields and a busy hub of industrial activities. Nashik is a paradise for tourist with historical caves, temple, holy rituals, museums, wet lands and lot more.

Kumbh Mela: Thousands of years ago, perhaps in the Vedic period, gods & demons made a temporary agreement to work together in obtaining amrita (the nectar of immortality) from the Milky Ocean, & to share this equally. However, when the Kumbha (pot) containing the amrita appeared, the demons ran away with the pot & where chased by the gods. For twelve human years the gods & demos fought in the sky for the possession of this pot of amrita fell on the four places: Prayag, Haridwar, Ujjain & Nashik. Thus, Kumbhamela is observed at these four locations where the nectar fell. Kumbha Mela is attended by millions of people on a single day. A ritual bath at a predetermined time & place is the major event of this festival. Other activities include religious discussions, devotional singing, maits water irrespective of its water quality suitability. The mass feeding of holy men/women & the poor & religious assemblies where doctrines are debated & standardized. Kumbha Mela (especially the Maha Kumbha Mela) is the most sacred of all the Hindu pilgrimages. Thousands of holy men/women (monks, saints, sadhus) grace the occasion by their presence. The suspiciousness of Kumbha Mela is in part attributed to the gathering of thousands of holy men/women at one place on earth. According to astrologers, the "Kumbha Fair" takes place when the planet Jupiter enters Aquarius & the Sun enters Aries.
Kumbh -Mela scheduled at Nasik, will commence on 14th July 2015 and end by 11th August 2016, almost after a year. Important dates of this grand occasion are mentioned below.

Table 1: Kumbh Mela 2015 Schedule

Date	Event
14th July 2015	Flag hoisting of the main ceremony at Ram Kunda
19th August 2015	Flag hoisting of the Akhara at Sadhugram
26th August 2015	Shravan Shudha – First Snan
29th August 2015	First Shahi Snan
13thSeptember 2015	Second shahi Snan
18th September 2015	Third Shahi Snan
25th September 2015	Bhadrapad Shukla Dwadashi-Vaman Dwadashi Snan

Materials and Methods: The laboratory experiments were conducted at post Graduate Department of Environment Management, Chhatrapati Shahu Institute of Business Education and Research (CSIBER), Kolhapur, while water sample were collected on periodic basis at Kushawart Kund (Trimbakeshwar, Nashik) and Ram Kund (Nashik). The Grab Sampling Method was followed for collection of water sample from River Godavari. The various parameters (pH, TDS, Total Hardness, Oil and Grease, Chloride, Free CO2, Sulphate, Inorganic Phosphate, Sodium, and Potassium) were analyzed in laboratory by using different analytical techniques [1].

Result and Discussion: **Table 2: a) Result**

Sample No.	Date	Sample Collection Place	pH	Total Dissolve Solid (mg/l)	Oil & Grease (mg/l)	Total Hardness (mg/l)	Sulphate (mg/l)
1	10/08/2015	Trimbakeshwar (Brahmagiri)	6.8	2100	0.4	106	250
2	10/08/2015	Trimbakeshwar (Kushawart Kund)	8.1	2230	0.36	102	125
3	10/08/2015	Ram Kund (Nashik)	8.7	1235	0.37	182	210
4	17/08/2015	Ram Kund	6.7	1315	0.09	208	270
5	24/08/2015	Ram Kund	7.7	1408	0.01	228	200
6	31/08/2015	Ram Kund	8.8	1490	0.04	100	100
7	07/09/2015	Ram Kund	8.2	1100	0.1	130	158
8	13/09/2015	Ram Kund	7.1	995	0.05	170	60
9	21/09/2015	Ram Kund	6.2	1305	0.37	160	181
10	28/09/2015	Ram Kund	7.6	1594	0.09	230	225
11	05/10/2015	Ram Kund	7.8	1710	0.1	250	160

Table 2: b) Result

Sample No.	Date	Sample Collection Place	Inorganic Phosphate (mg/l)	Na (mg/l)	K (mg/l)	Free CO_2 (mg/l)	Chloride (mg/l)
1	10/08/2015	Trimbakeshwar (Brahmagiri)	0.15	6.5	1	8.8	19.88
2	10/08/2015	Trimbakeshwar (Kushawart Kund)	0.28	13	3.25	8.8	28
3	10/08/2015	Ram Kund (Nashik)	0.42	19	2.5	00	36.92
4	17/08/2015	Ram Kund	0.29	21.25	6	8.8	39.76
5	24/08/2015	Ram Kund	0.17	7	3	00	44.02
6	31/08/2015	Ram Kund	0.4	22	6	4.4	49.7
7	07/09/2015	Ram Kund	0.28	14.5	6.75	00	55.38
8	13/09/2015	Ram Kund	0.23	8.25	2.5	4.4	58.22
9	21/09/2015	Ram Kund	0.5	20.5	5.75	17.6	35.5
10	28/09/2015	Ram Kund	0.55	5.75	2	00	42.6
11	05/10/2015	Ram Kund	0.57	6.8	4.2	8.8	43.2

The pH value of river water ranged from 6.20 to 8.84. pH is an important factor in determining the productivity of an ecosystem. The chief sources of Godavari river water pollution identified as sewage constitute 84-92% and industrial waste 8-16% [4]. The Low pH reduces the amount of dissolved inorganic phosphorus and carbon dioxide available for plankton. The free CO_2 available in a water system is the outcome of catabolic activities taking place especially with respiration of the organisms present in aquatic ecosystem. The river Godavari is polluted at Ram Kunda Nashik; it is believed that continuous pollution of the water sources by various human activities may lead to some health problems to human. The analysis of the water quality parameters of River Godavari water from three (03) different stations in Nasik city shows that the pH, Chloride ion, Total Hardness, Calcium values are not well within the permissible limits [7]. The range of free CO_2 was 0 to 17.6 mg/lt. T.D.S. were determined by using Gravimetric method, the Maximum T.D.S. (2230 mg/lit) and minimum T.D.S (995 mg/lit) was recorded on (10/08/2015 and 13/09/2015) respectively. The low DO values were observed in the Godavari River [8]. The Maximum Chloride concentration was recorded on 13/09/2015 that was (58.22 mg/lit) while minimum was recorded on 10/08/2015 that was (19.88 mg/lit). Minimum and maximum concentration of sulfate was calculated on 13/09/2015 (60 mg/lit) and 17/08/2015 (270 mg/lit) respectively. The range of inorganic phosphate was from 0.15 mg/lit to 0.57 mg/lit. The concentration of Na and K were estimated by using flame photometer. There was fluctuation in Na and K values was observed during analysis .The minimum concentration of Na and K were (5 mg/lit and 1mg/lit), while maximum concentration were (22 mg/lit and 6.75 mg/lit) respectively. Total hardness was determined by using Titrimetric method. The maximum concentration of total hardness were 250 mg/lit on 05/10/2015 while minimum total hardness determined on 31/10/2015 (100 mg/lit). Industrial effluents and domestic sewage have caused inimical effect on river water. Thus, the water in Pune is polluted to the greatest extent followed by Nasik and Kolhapur [10].

Conclusion: The water sample of Godavari River during Kumbh Mela activities Nasik 2015 were analyzed at Laboratory. Total 10 parameters of water sample had been tested. By analyzing the samples we found variations in water quality parameters and we come to conclusion that the Godavari River water was slightly polluted during Kumbh Mela activities Nasik 2015. But water did not found high polluted by reason of various measures like discharging extra water in river Godavari, continuous removal of solid wastes from river (Green dustbins were there for collection of waste generated at the bank of river and separate bins were for the collection of food waste materials), mobile toilets, mobile clinics, cover river bank with net etc. were taken during Kumbh Mela by Nashik Municipal Corporation, Government of Maharashtra along with various NGOs. Also regular rainfall during Kumbh Mela at Trimbakeshwar & Nashik might be responsible for dispersion of pollutants.

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