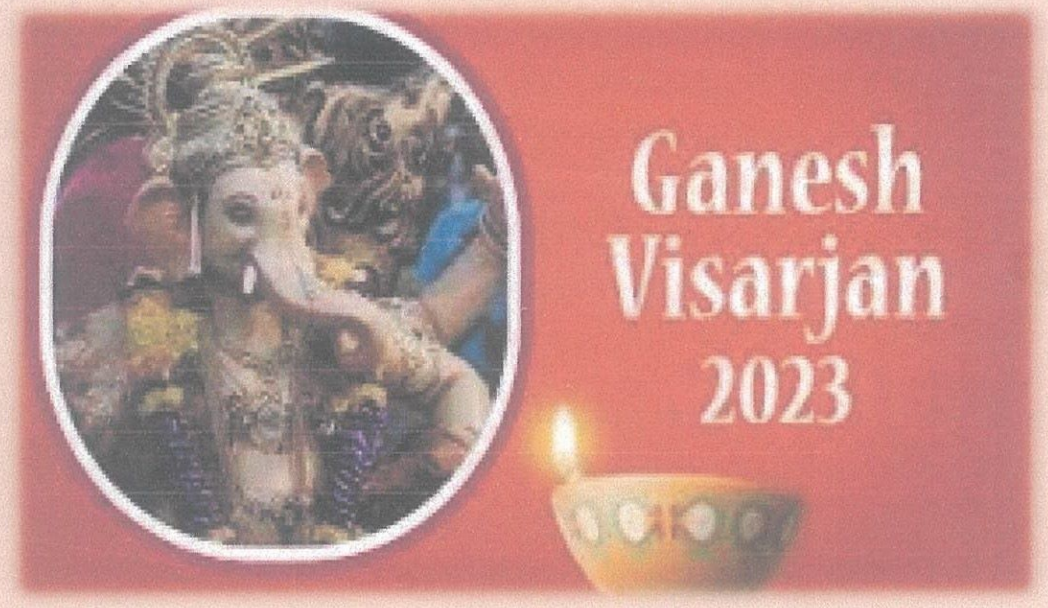
Report on

"Impact of Idol Immersion on River Water Quality During Ganesh Chaturthi-2023"



Uttar Pradesh Pollution Control Board

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1. Introduction:

Idol worship has been in the practice in India since ancient time. To worship God only natural things like milk, curd, ghee, coconut, beetel & river water were usually used. Idols were made with clay & then coloured with natural colors like turmeric. In present scenario, POP made idols, metals, ornaments, oily substances, synthetic colors & chemicals are used to make polish and decorative idols for worship. Ganesh Chaturthi, also called Vinayaka Chaturthi is auspicious Hindu festivals which are celebrated for several days every year. During this festival, idols are worshipped and immersed in nearby water bodies by the devotees. On festive occasion such as Ganesh Chaturthi, it has been tradition in our country to immerse idols in water bodies like river, pond, lake etc. when these idols are immersed our aquatic environment gets severely affected. In addition to silting, toxic chemicals used in making idols tend to leach out and pose serious problems of water pollution; hence there is urgent need to monitor the water quality of River during idol immersion on occasion of Ganesh Chaturthi. In this concern Central Pollution Control Board (CPCB), New Delhi issued the guidelines for idol immersion in artificial ponds during festive season.

Now Immersion of Idols was prohibited in River Gomti and artificial ponds were created by concerned State govt departments. Considering the orders passed by Hon'ble Court, a need was felt to revise guidelines issued in the year 2010 for idol immersion and subsequently, "Revised Guidelines for Idol immersion" was issued during May, 2020 effective from 01.01.2021. In this regard Uttar Pradesh Pollution Control Board (UPPCB) has conducted sampling and analysis during pre and post Puja season on occasions of Ganesh Chaturthi in previous years. On the occasion of Ganesh Chaturthi 2023, UPPCB has conducted the monitoring of water quality of river Gomti at selected locations. Press notice dated 16.09.2023 has published by UPPCB in various newspapers (The Times of India, Dainik Jagran, Hindustan) for mass awareness about the aforementioned matter. In great concern to the matter of Idol Immersion in artificial ponds during Ganesh Chaturthi 2023 a letter dated 05.09.2023 has also sent to the Joint Secretary, MOEFCC, all District Magistrates (DMs) of Uttar Pradesh and all Regional Officers (ROs) of UPPCB. This report is prepared on the basis of study conducted by UPPCB during the Ganesh Chaturthi 2023.

2. Sampling Plan:

UPPCB has conducted the monitoring and sampling of water quality of river Gomti at three stages: **1)** Before idol immersion (Date: 19.09.2023), **2)** During idol immersion (Date: 25.09.2023 & 28.09.2023) and **3)** After idol immersion (Date: 01.10.2023). Aforementioned locations of River Gomti were selected as sampling sites because idol immersion activity was mainly done nearby these sites and major drains outfall at these locations has impact on the water quality of the river in Lucknow. Considering the size of the water body, appropriate numbers of sampling locations were determined in order to get a fairly representative assessment of water quality.

During Ganesh Chaturthi- 2023, to assess the water quality of River Gomti, Four (04) sampling locations were selected: **1)** U/s Kudiya Ghat, **2)** D/s Kudiya Ghat, **3)** U/s University Bridge, **4)** D/s University Bridge. Details of sampling locations are given below:

Table: 1. Details of sampling locations of River Gomti in Lucknow

S. No.	Sampling Locations	Date of Monitoring	Selected Parameters
1.	U/s Kudiya Ghat	**Before idol immersion**: Date 19.09.2023 **During idol immersion:** Date: 25.09.2023 & 28.09.2023 **After idol immersion**: Date: 01.10.2023	**Physico-chemical parameters:** Colour, pH, DO, BOD, COD, TDS, TSS Conductivity, Turbidity, Alkalinity, Chloride, Hardness
2.	D/s Kudiya Ghat		
3.	U/s University Bridge		
4.	D/s University Bridge		**Heavy metals:** T. Cr, Pb, Zn, Cu, Cd

3. Methodology:

For ascertaining water quality, 1) Physico-chemical parameters- Color, pH, Dissolved Oxygen (DO), Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Conductivity, Turbidity, Total Dissolved Solids (TDS), Total Suspended Solids (TSS), Alkalinity, Chloride, Hardness and 2) Heavy metals-Total Chromium (T. Cr), Lead (Pb), Zinc

(Zn), Copper (Cu), Cadmium (Cd) were selected and analysed by following Standard Methods (APHA 24th Edition , 2023, BIS method for BOD):

Table 2: Detail of parameters selected for the analysis of water samples

S. No.	Parameters	Unit	Standard Methods
1.	pH	-	4500H^+ Electrometric Method
2.	Color	Hazen	2120B: Visual Comparison Method
3.	Dissolved Oxygen (DO)	mg/l	4500-OB Iodometric Method
4.	Biochemical Oxygen Demand (BOD)	mg/l	03 day, 27 °C is 3025 (Part 44): 1993
5.	Chemical Oxygen Demand (COD)	mg/l	5220 B, Open Reflux Method
6.	Conductivity	µS/cm	2510 B Laboratory Method
7.	Turbidity	NTU	2130 B Nephelometric Method
8.	Alkalinity	mg/l	2320 B Alkalinity by Titration
9.	Hardness	mg/l	2340 C EDTA Titrimetric Method
10.	Total Dissolved Solids (TDS)	mg/l	2540 C TDS dried at 180 °C
11.	Total Solids (TS)	mg/l	2540 B TS dried at 103-105 °C
12.	Chloride	mg/l	4500B Argentometric Method
13.	Total Chromium (T. Cr)	mg/l	3111 B AAS (Direct-Ac Flame Method)
14.	Lead (Pb)	mg/l	3111 B AAS (Direct-Ac Flame Method)
15.	Zinc (Zn)	mg/l	3111 B AAS (Direct-Ac Flame Method)
16.	Copper (Cu)	mg/l	3111 B AAS (Direct-Ac Flame Method)
17.	Cadmium (Cd)	mg/l	3111 B AAS (Direct-Ac Flame Method)

4. Results:

Results of water quality monitoring for various parameters (General parameters & Heavy metals) are given in Table 3 & 4. The photographs of the sampling locations and artificial ponds at River Gomti are also given in Fig. 1 & 2.

Analysis Results of River Gomti during Murti Visarjan on the occasion of Ganesh Chaturthi
(September 2023)

Table 3: Results of General Parameters:

Before Murtivisarjan (19.09.23)

S. No	Sampling Point	Colour (Hazen)	pH	Conductivity (µs/cm)	Turbidity (NTU)	DO (mg/l)	BOD (mg/l)	COD (mg/l)	TDS (mg/l)	TSS (mg/l)	Alkalinity (mg/l)	Hardness (mg/l)	Chloride (mg/l)
1	U/S Kudiya Ghat	40	7.35	608.7	28.6	3.36	7.6	32.8	378	47	214	190	23
2	D/S Kudiya Ghat	40	7.29	619.2	31.2	3.18	8.0	35.2	386	50	224	198	25
3	U/S University Bridge	40	7.20	638.4	37.6	2.86	9.2	39.6	398	52	236	210	28
4	D/S University Bridge	40	7.16	646.5	39.8	2.69	9.5	42.4	402	54	244	216	29

During Murtivisarjan (25.09.23)

S. No	Sampling Point	Colour (Hazen)	pH	Conductivity (µs/cm)	Turbidity (NTU)	DO (mg/l)	BOD (mg/l)	COD (mg/l)	TDS (mg/l)	TSS (mg/l)	Alkalinity (mg/l)	Hardness (mg/l)	Chloride (mg/l)
1	U/S Kudiya Ghat	40	7.28	614.0	26.8	2.96	7.8	34.0	382	46	222	198	24
2	D/S Kudiya Ghat	40	7.24	621.8	29.2	2.81	8.4	36.8	386	48	232	204	25
3	U/S University Bridge	40	7.18	634.9	35.8	2.48	9.5	41.2	394	51	244	218	28
4	D/S University Bridge	40	7.15	642.1	37.2	2.36	10	43.6	398	53	252	226	30

During Murtivisarjan (28.09.23)

S. No	Sampling Point	Colour (Hazen)	pH	Conductivity (µs/cm)	Turbidity (NTU)	DO (mg/l)	BOD (mg/l)	COD (mg/l)	TDS (mg/l)	TSS (mg/l)	Alkalinity (mg/l)	Hardness (mg/l)	Chloride (mg/l)
1	U/S Kudiya Ghat	40	7.32	602.0	25.4	3.08	8.0	34.8	374	49	218	194	26
2	D/S Kudiya Ghat	40	7.28	615.0	27.2	2.92	8.5	38.0	382	52	224	198	28
3	U/S University Bridge	40	7.20	640.8	33.8	2.60	9.8	42.8	396	56	232	206	31
4	D/S University Bridge	40	7.17	649.6	35.4	2.46	10.4	45.2	404	58	238	212	32

Post Murtivisarjan (01.10.23)

S. No	Sampling Point	Colour (Hazen)	pH	Conductivity (µs/cm)	Turbidity (NTU)	DO (mg/l)	BOD (mg/l)	COD (mg/l)	TDS (mg/l)	TSS (mg/l)	Alkalinity (mg/l)	Hardness (mg/l)	Chloride (mg/l)
1	U/S Kudiya Ghat	40	7.39	638.2	27.6	3.29	7.5	33.6	394	48	234	210	28
2	D/S Kudiya Ghat	40	7.34	654.5	30.2	3.03	7.8	36.0	406	50	242	216	29
3	U/S University Bridge	40	7.26	677.6	36.8	2.64	9.0	41.2	418	54	250	226	33
4	D/S University Bridge	40	7.22	690.4	39.6	2.45	9.4	44.4	428	56	258	232	35

Table 4: Results of Heavy Metals

S.No	Sampling Point	Before Murtivisarjan (19/09/2023)					During Murtivisarjan (25/09/2023)					During Murtivisarjan (28/09/2023)					Post Murtivisarjan (01/10/2023)				
		Chromium (mg/l)	Zinc (mg/l)	Lead (mg/l)	Copper (mg/l)	Cadmium (mg/l)	Chromium (mg/l)	Zinc (mg/l)	Lead (mg/l)	Copper (mg/l)	Cadmium (mg/l)	Chromium (mg/l)	Zinc (mg/l)	Lead (mg/l)	Copper (mg/l)	Cadmium (mg/l)	Chromium (mg/l)	Zinc (mg/l)	Lead (mg/l)	Copper (mg/l)	Cadmium (mg/l)
1	U/S Kudiya Ghat	ND	ND	ND	ND	ND	ND	0.0006	ND	ND	ND	ND	ND	0.0594	ND	ND	ND	0.0972	ND	ND	ND
2	D/S Kudiya Ghat	ND	0.0167	ND	ND	ND	ND	0.0586	ND	ND	ND	ND	ND	0.0594	ND	ND	ND	ND	ND	ND	ND
3	U/S University Bridge	ND	0.0232	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4	D/S University Bridge	ND	0.0264	ND	ND	ND	ND	0.0103	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

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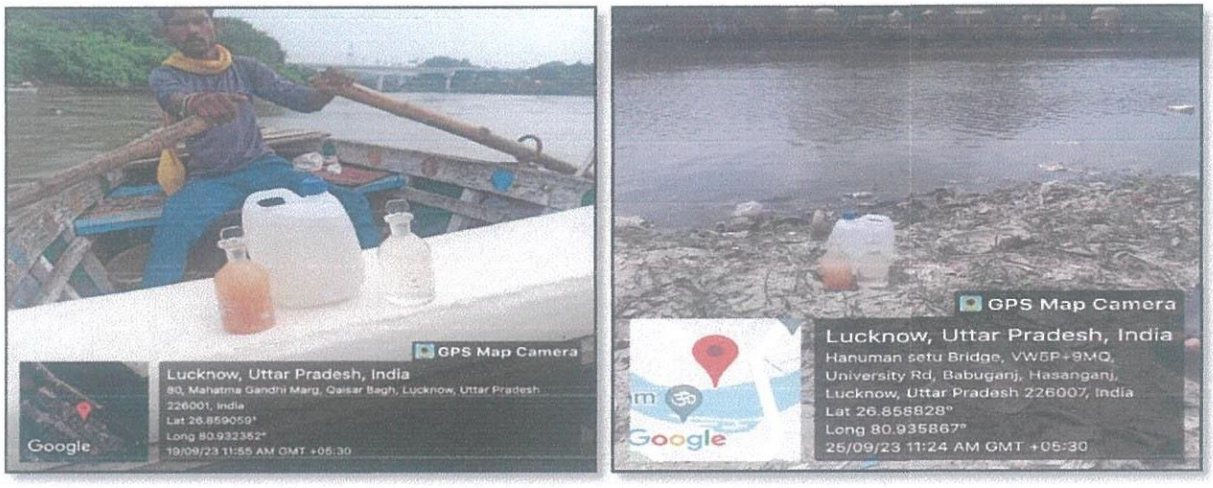
Fig. 1: Sampling Locations & Artificial Pond at University Bridge, River Gomti

Idol immersion in Artificial Ponds



River Gomti: a) U/s University Bridge **b) D/s University Bridge**

Fig. 2: Sampling Locations & Artificial Ponds at Kudiya Ghat, River Gomti

Idol Immersion in Artificial Ponds

River Gomti: a) U/s Kudiya Ghat **b) D/s Kudiya Ghat**

5. Observations:

Ganesh Chaturthi- 2023 was celebrated on Date: 19.09.2023 and idol immersion (visarjan) was done on Date: 25.09.2023 & 28.09.2023. Monitoring of water quality of river Gomti has been done before, during and after idol immersion. On this occasion idol immersion was done in artificial ponds made near the river. Water quality monitoring was done at 04 locations (U/s & D/s Kudiya Ghat, U/s & D/s University Bridge) of river Gomti before, during and after idol immersion by the analysis of general parameters and heavy metals. It is observed that value of analysed parameters before, during and after idol immersion of river Gomti at all selected locations are not significantly changed due to the idol immersion in artificial ponds made near the river.

6. Conclusion:

In concern to the "Guidelines of CPCB for Idol immersion" during Ganesh Chaturthi-2023 water quality monitoring of river Gomti has been done by UPPCB. Water quality monitoring was done at 04 locations (U/s & D/s Kudiya Ghat, U/s & D/s University Bridge) of river Gomti before, during and after idol immersion by the analysis of general parameters and heavy metals. On the basis of results of water quality parameters analysed (general parameters and heavy metals) before, during and after idol immersion, it is concluded that among all the parameters observed no any significant change were observed for general water quality parameters such as pH, DO, BOD, COD etc. and heavy metals also.