



## Slow poisoning of Indian reservoirs due to idol immersion: A case study of Laharpur reservoir, Bhopal

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### Abstract

Today the developmental activities and the occupancy in the area is exerting pressure on the water body. Surface water contains some degree of contamination and in country like India this increases due to some religious activities. The present study was conducted on Laharpur reservoir, Bhopal to access the pollution load due to such religious activities. During the course of study various parameters like DO, BOD COD, pH, turbidity, alkalinity, Nickel, Manganese, Chromium and Lead were observed during pre-immersion and post immersion of idols. It was found that there is little variation in physico-chemical parameters but the increasing load of heavy metals due to idol immersion is a serious problem for the reservoir.

**Keywords:** *Biodegradable and non-degradable material, Idol immersion, Siltation, Toxicity, Water contamination*

### Introduction

The Laharpur reservoir is at the southwest corner of the Bhopal city (India) and was constructed with an objective to store water for irrigational purposes. At the time of construction it was in the outskirts of Bhopal, but expansion of the township reached beyond the reservoir and now it is well within the settlements. The development activities and the occupancy in the area is exerting pressure on the water body. Surface water almost always contains some degree of contamination and this is also increased by the other religious activities. Added clay results in the siltation of water bodies while addition of biodegradable and non biodegradable materials contaminate the water quality. Besides polluting the water, they reach humans *via* the food chain, when human consumes these fishes and sea food. In India, festivals like

Ganesh Chaturthi, Durga Puja and Diwali are occasions of great joy and celebration and there is tradition of idol immersion on such occasions but unfortunately they also add even greater load to our already overburdened rivers, lakes and seas. Idols are made up of plaster of Paris, lime and cement contain toxic substance, when these are immersed they silt the water bodies. These do not get dissolve or disintegrate fast and on settling on the beds, kills the flora and fauna. Even clay idols are being baked which does not allow it to dissolve in water easily. Moreover, the chemical dyes and colors being used to color them contains poisonous elements like mercury, zinc oxide, chromium and lead which even in low concentration kill aquatic life and have the potential of causing even cancer (Dhote *et al.* 2001). On certain festivals idols were brought at community level and so was less in number. But now each house has one for them. Even at community level, the spirits is more of competitions with one community trying to do another by having bigger and jazzier idols some idols are so big that cranes are required for immersion (Fig. 3). The decoration on the idols has also turned jazzier with our Gods and they are being decorated with non-biodegradable and toxic

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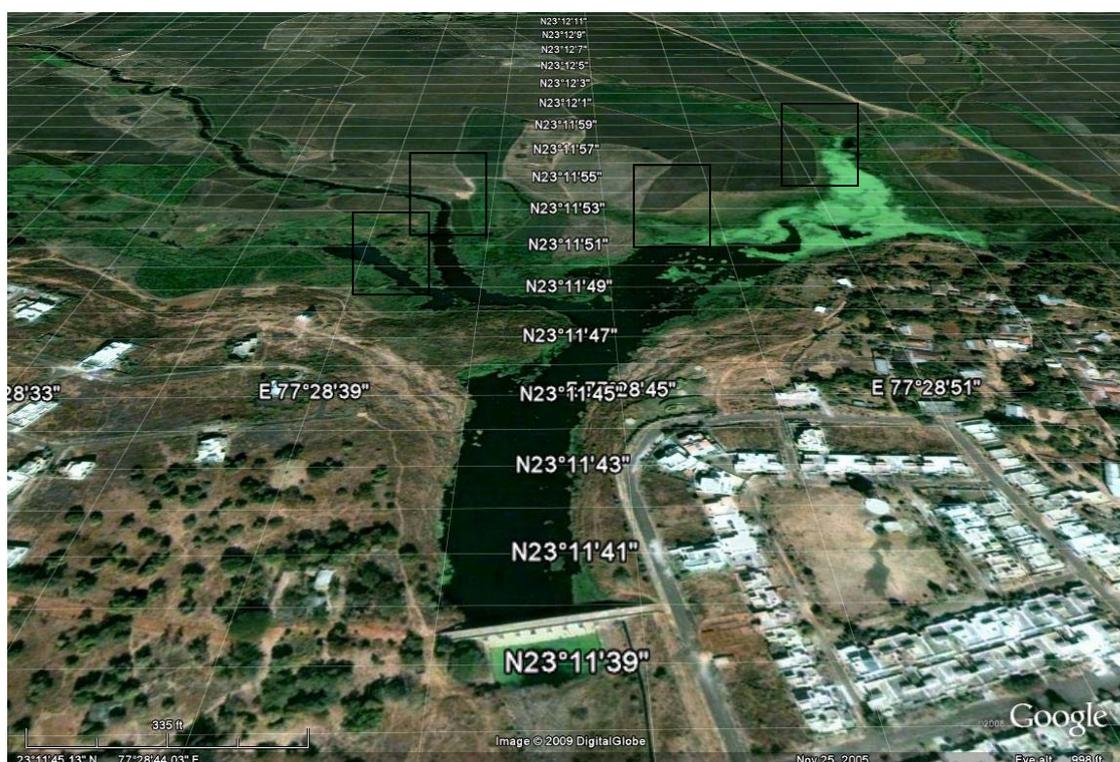
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material like thermocol, zari and plastics. Along with the idols we also immerse tones of polybags, flowers, earthen-vessels, clothes, coconuts and other decorations.

All this is adding a greater load to our already overburdened water bodies. Our water is poisoned, killing the innocent aquatic life and affecting our health too. Environmentalist said that materials like plaster of paris do not dissolve easily and reduce the content in the water which in turn results in the death of fishes and other aquatic species Mukherjee (2000) and Mukherjee (2001).

Immersion of thousands of idols had added over 5000 liters of paints and hundreds of kilograms of toxic synthetic material into waterbodies. The paint used in idols also contains heavy metals such as Hg, Cr and Pb which contaminate the water further. Information to this effect will go long way in educating people who think that using poisonous and colorful material by such activities they are devoting their emotions to God. Keeping these points in mind the present study is an attempt to know the effect of idol immersion on Laharpur reservoir of Bhopal.



Source: Google Earth

### Materials and Method

For the present study the samples were collected from four different places of Laharpur reservoir *i.e.* Anna nagar fed drain, Shahpura fed drain, Barkhera Pathani Nalla and Barkhera Nalla. The samples were collected by automatic sampler and were analyzed for various physico-chemical and heavy metal contents including DO (dissolved oxygen), pH, BOD, COD, turbidity and alkalinity. All the parameters were analyzed following the standard methods of APHA (1998), Khanna and Bhutiani (2004) and Trivedy and Goel (1986).

### Results and Discussion

The annual average obtained for various physico-chemical parameters of Laharpur Reservoir are given in Table 1 and 2 and Fig. 5 while the annual average for various heavy metals are given in Table 3 and 4 and Fig. 6. Immersion of idols contains toxic substance and silts the water bodies. Added clay results in siltation of water bodies while addition of biodegradable and non-biodegradable material contaminates the water quality (Brown and Ganesh 1991) (Fig. 1 and Fig. 2). On immersion of these idols in the reservoir, the water gets contaminated with various heavy



metals present in the paints of idols and a change in chemical load in the water in the water body is expected Dhamji and Jain (1995) and Hosetti *et al.* (1994). Khanna and Bhutiani (2003) observed variations in ecological status of sitapur pond at Haridwar. All this is adding a greater load to our already overburdened water bodies our water is poisoned, killing the innocent aquatic life affecting our health too Khanna and Bhutiani (2005) observed the benthic fauna and its ecology on river Ganga and observed that changes in physico-chemical parameters may result in depletion of benthic fauna.

The immersion practice leads to degradation of water quality and siltation. Parameters like turbidity, BOD and COD became higher on immersion. During course of study the increase in heavy metal concentration is low or we can say that can say that it is tolerable at present, but it is apprehended that continuation of immersion might change this. While the biodegradable materials are the cause of short term deterioration of water quality, the heavy metals are the cause of health hazards in the long run (Agemian and Chau, 1975; Saika *et al.*, 1988; Forstern and Whitman, 1983; APHA, 1998).



Fig.1: Contamination of Laharpur reservoir



Fig.3: Cranes for idol immersion



Fig.2: Small island formed by the wastes



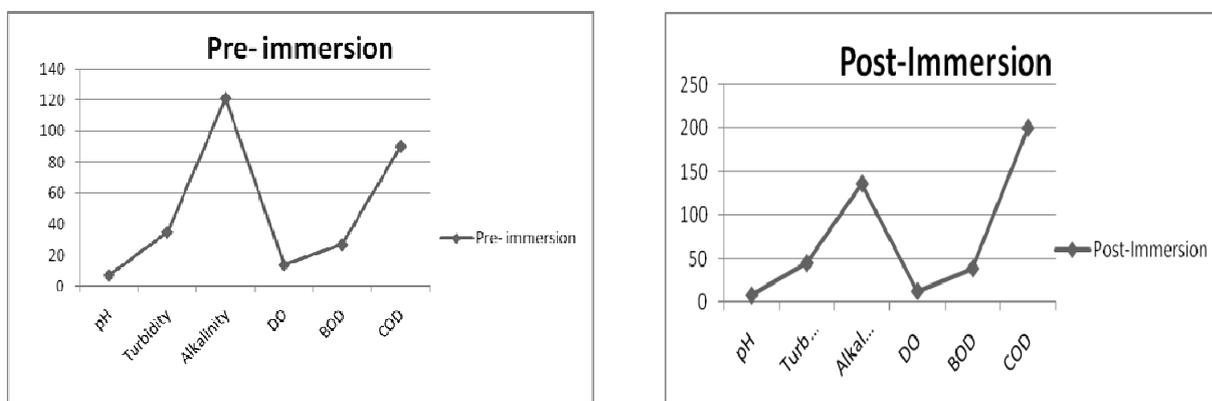
Fig. 4: Idol of 21 feet

**Table 1: Impact of Ganesh idol Immersion on water quality of Laharpur Reservoir, Bhopal (India)**

Parameters	Pre- immersion (average values obtained from surface water and bottom water)	Post-Immersion(average values obtained from surface water and bottom water)
pH	7.1-7.3	7.8-8.1
Turbidity (J.T.U.)	30-35	40-45
Alkalinity (mg/l)	89-121	105-136
DO (mg/l)	9-13.9	3.1-12.8
BOD (mg/l)	13.8-26.9	14.1-38.9
COD (mg/l)	25-90	140-200

**Table 2: Impact of Durga idol Immersion on water quality Laharpur Reservoir Bhopal (India)**

Parameters	Pre- immersion	Post-Immersion
pH	7.8-8.9	8.1-9.2
Turbidity (J.T.U.)	35-40	28-32
Alkalinity (mg/l)	105-135	98-120
DO (mg/l)	4.6-14.7	3.9-7.6
BOD (mg/l)	13.5-25	13.9-31.9
COD (mg/l)	125-259	196-395



**Fig. 5: Graphs showing differences between pre immersion and post immersion in various parameters**

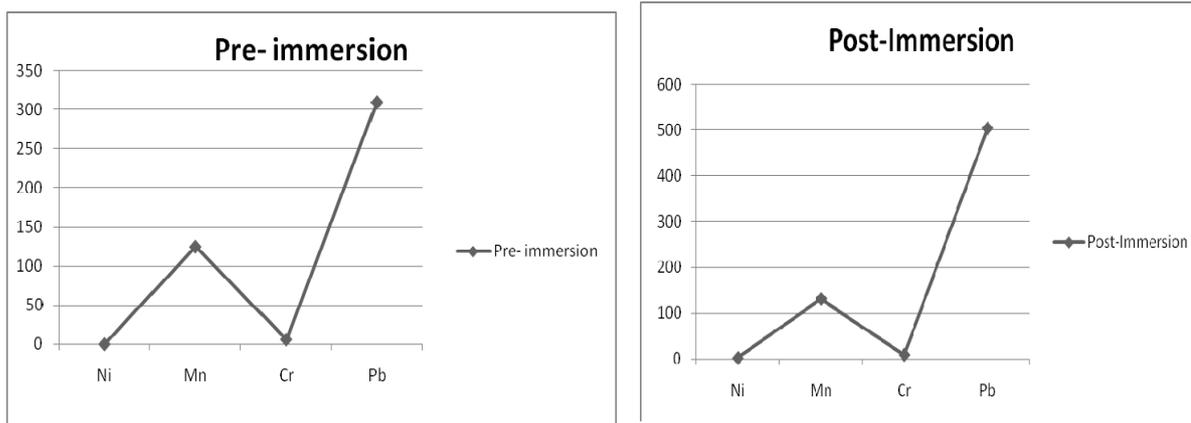
**Table 3: Heavy metals concentration (µg/l) during Ganesh idol Immersion in Laharpur Reservoir**

Heavy metals	Pre- immersion (average values obtained from surface water and bottom water)	Post-Immersion(average values obtained from surface water and bottom water)
Ni (µg/l)	BDL	3
Mn (µg/l)	115	132
Cr (µg/l)	5	10
Pb (µg/l)	360	504



**Table4: Heavy metal concentration (µg/l) during Durga idol Immersion in Laharpur Reservoir**

Heavy metals	Pre- immersion	Post-Immersion
Ni (µg/l)	BDL	5
Mn (µg/l)	125	142
Cr (µg/l)	6	9
Pb (µg/l)	310	377



**Fig. 6: Graphs showing differences between pre-immersion and post immersion in various heavy metals**

**Conclusion**

Comparison of the results obtained in this study indicates that the average chemical and metallic contamination due to idol immersion activities in the sample collected from the Laharpur reservoir is a major environmental problem. Any alternation in water discharge of pollution would not remain at one location for long time and the contamination what so ever is subsequently is carried away in the flow of water. The immersion practices lead to degradation of water quality and siltation. For other parameters like turbidity, DO, BOD, COD and heavy metals become higher on immersion. Idols have grown in number and size over the year and the urban water bodies are facing on increasing nutrient load. From the above study it may be concluded that there is small variation in physico-chemical parameters of Laharpur reservoir, but the increasing concentration of heavy metals like Cr, Ni, Mn and Pb is an alarming position of slow poisoning of Laharpur reservoir besides this there is also danger to flora and fauna because the idols do not dissolve in water properly. They go to river bed

and affect the aquatic life.

**Suggestions for proper idol immersion  
Going back to traditional festivals**

With the help of the following points, we can do lot for our water bodies and can prevent them from being polluted and silted.

**1. By making an idol from china clay or mud:** Plaster of paris does not dissolve easily in water hence the idol float in water and after some time it settles at the bottom causing siltation of the reservoir. Mixing of plaster of paris in water pollutes the reservoir and can have an adverse effect on the health of living beings. Hence it is appropriate to use an idol made up of mud.

**2. Idol should not be huge:** Now a days the idols of 11, 21, 51 feet are made which requires iron rods, bamboos etc. to insert them for support which again contributes in polluting the water body. Such a heavy amount of the clay immersion with above supporting substances (iron rod, bamboo etc) also increases the base level of the water body ultimately leads in decreasing the capacity of the reservoir in containing water.



**3. Color of the idol:** An idol should be made with natural color which looks more appealing than one made with artificial colors.

**4. Return to Eco-Visarjan:** Certain human friendly suggestions are there as following with which we can celebrate our festivals.

- I. If idols have to be immersed, make sure that they are made of unbaked mud or clay.
- II. Do not buy idols painted with chemical color or those having non-biodegradable material (thermocolor, plastic *etc.*) as decoration.
- III. Smaller idols can be immersed in clean water in vessel at home. Leave it for some time and when they mixes with water give it to your plants especially, Tulsi.
- IV. Make dough of idol using turmeric powder. Such idols can be colored by using natural colors like haldi, chandan, kesar, kumkum *etc.*
- V. Flowers and other biodegradable materials used in worship may be used for mulching by spreading them on the top of soil around the plant or trees. They can also be composted.

## References

- Agemian, H. and Chau, A.S.Y., 1975. An automatic absorption method for the determination elements in lake sediments after acid digestion. *Analytica Chimica Acta*, 80, 61-66.
- APHA, 1998. *Standard methods for examination of water and waste water*, American Public Health Association, Washington D.C., 20<sup>th</sup> Edition.
- Brown Robert L. and Ganesh 1991. *Studies of an Asian God*, State University of New York. 57-1: 9-12.
- Dhamji S.K. and Jain Y., 1995. Studies on the water quality index of a lentic water at Jabalpur, M.P., *Pollution Research*, 14(3), 341-346.
- Dhote S., Varughese B., and Mishra, S.M., 2001. Impact of Idol immersion on water quality of twin lakes of Bhopal. *Indian Journal of Environment Protection*, 2(11), 998-1005
- Forstern U. and Whitman G.T.W., 1983. *Metal Pollution in the aquatic environment* 2<sup>nd</sup> Edition, Springer.
- Hossetti B.B., Kulkarni A.R. and Patil H.S., 1994. Water quality in Jayanthi Nallah at Panchganga at Kolhapur, *Indian Journal of Environmental Health*, 36(2), 124-127.
- Khanna, D.R. and Bhutiani, R., 2004. *Water analysis at a glance*, ASEA Publication, Rishikesh.
- Khanna, D.R. and Bhutiani, R., 2003. Ecological status of Sitapur pond at Haridwar (Uttarakhand), India, *Indian Journal Environ. And Ecoplan.*, 7(1): 1758-178.
- Khanna, D. R. and Bhutiani, R., 2005. Benthic fauna and its ecology of River Ganga from Rishikesh to Haridwar (Uttaranchal), India, *Env. Cons. J.*, 6(1) : 33-40.
- Mukherjee A., 2000. *Religious activities and water pollution: Case study of idol immersion in Upper Lower Lakes of Bhopal*. Proceedings of the 2<sup>nd</sup> World Water Forum and Ministerial Conference, Hague, Netherland.
- Mukherjee A., 2001. *Religious activities and water pollution: Proceedings of the Asian Wetland Symposium*. Penang, Malaysia.
- Saika D.K., Mathur R.P. and Shrivastava S.K., 1988. Heavy metals in water and sediments of Upper Gabga. *Indian Journal of Environmental Health*, 31(1), 11-17.
- Trivedy, R.K. and Goel, P.K., 1986. *Chemical and biological methods for water pollution studies*. Environ. Pub, Karad (India).

