Make Ganesh Utsav and Durga Puja toxics-free

Nature's rhythm, seasonal changes and the cycle of life and death have found religious and spiritual re-enforcement through a number of traditional Indian festivals.

Based on the theme of resurgence and rejuvenation, many of them involve immersion of idols into water bodies as a symbol of returning the elements, which give life, back to the earth for a new cycle to begin.

In the recent years, the practice of immersion has become a growing cause for concern on account of its adverse environmental impacts, particularly on the water bodies.

Toxic exposure of the larger community through deadly chemicals and heavy metals used for making the idols is now being placed under the scanner of authorities and civil society groups with greater focus than ever.

At the core of this concern is the overarching issue of toxic materials and chemicals that have been added to the centuries old process of making idols for immersion.

With a general deterioration of the water bodies due to growing population pressure and burgeoning pollution, the practice of immersion in its current form and volume is posing a serious hazard to life and environment.

The festivals of Ganesha Chaturthi and Durga Puja witness a massive community involvement. To match the contemporary ethos, new materials are being used for 'modernising' the representation of these idols without much thought being given to the issue of toxicity and its impact on the environment.

Plaster of Paris

The growing size of idols and the desire for making them more and more colourful has forced idol-makers to shift from clay to Plaster of Paris as the base material. Immersion of hundreds and thousands of idols made of this material is wreaking havoc on these water bodies.

Plaster of Paris is a building material based on calcium sulfate hemihydrate and is created by heating gypsum to about 150 °C. It is the same material that is used for making casts for broken bones.

When an idol made of Plaster of Paris is immersed in the water, it changes form to gypsum, thus adding a large amount of material to the water that breaks down very slowly, while adding to the hardness of water, both of which deteriorate the life carrying capacity and quality of the water.

Impact of Plaster of Paris on idol makers

Exposure Routes: Inhalation, ingestion, skin and eye contact

Symptoms: Irritation eyes, skin, mucous membrane, respiratory system; cough.

Organs Affected: Eyes, skin, respiratory system

Chemical paints and dyes

In terms of health impacts, paints are a greater source of hazard and most of those used for decorating idols are chemical-based. They contain heavy metals like mercury, cadmium and lead, which are neurotoxin and nephrotoxin. These metals are bio-accumulative, implying that once they enter marine life forms like fish; they pass-up the food chain and end up in the food that we eat.

Incidentally, the brighter the colour, the greater is its toxicity. Red, blue, orange and green colours are known to have higher content of mercury, zinc oxide, chromium and lead. Even a single drop of mercury on a person's skin can be fatal. One drop in a 20-acre lake can make the fish poisonous to the birds, animals, and people that eat them.

Impact on water bodies

Though the immediate impact of the large-scale immersions have grabbed news headlines, yet only a limited number of studies have been done for validating the exact nature of this impact. In 2005, Juhu beach area in Mumbai witnessed a virtual flood of dead fish following the festival period. Not many were willing to link this phenomenon with the spurt in pollution following the immersions.

A study by the Central Pollution Control Board (CPCB) on the broad impact of immersion in Yamuna after Dushehra festival at Delhi stretch from upstream

Wazirabad to downstream Okhla barrage is a revealing testimony to the level and nature of pollution that is added to the river water. Over 1,600 idols were immersed at Ramghat, ISBT and Okhla during Dushehra season in 2002. The table below shows the material linked to immersions that were found in the river and its specific impacts.

Another study in 2001, revealed an alarming increase in presence of heavy metals in the Hussainsagar Lake following immersions. The study showed that subsequent to Ganesh-idol immersions, the concentration of these metals increased perceptibly. The level of arsenic, a noxious trace element, had increased nine-fold in the lake water after the idol immersion, compared to its BIS and ICMR standards.

The concentration of mercury was found to be alarmingly high in the lake water. It increased by five to six hundred times in the lake water compared to the specifications of desirable limits set by BIS and ICMR standards.

Go green in your idol immersion practices

A number of organisations, civil society bodies and state authorities have started addressing the issue of pollution and environmental hazard that is caused by the current immersion practice.

Mumbai absorbs immersion of about 1.5 lakh idols annually.

Orissa witnesses 5,000 idols being made for Durga Puja.

Over 3,000 idols are immersed in Yamuna during Dushehra.

S.No	Material contributed by immersion	Impact on the aquatic body
1.	Plaster of Paris	Increases dissolved solids, contribute metals and sludge
2.	Decoration material viz. clothes, polish, paint, ornaments cosmetic items etc.	Contributes suspended matters, trace metals (Zinc, lead, iron, chromium, arsenic, mercury etc.) metalloids and various organic and inorganic matter, oil & grease etc.
3.	Flowers, Garlands, oily substance	Increase floating suspended matter organic contamination, oil & grease and various organic and inorganic matter.
4.	Bamboo sticks, Beauty articles	Big pieces got collected and recycled while small pieces remain floating in water or settled at the river bottom inhabiting river flow.
5.	Polythene bags/plastic items	Contribute suspended, settle able matter and hazardous material to water and chokes the aquatic life
6.	Eatables, food items etc.	Contributes oil and grease, organics to water bodies.

Table: Impact of various items on aquatic environment during immersion of idols

The CPCB, for instance, has made some general recommendations and these have been further elucidated on by various state pollution control boards. Specific areas should marked for immersion and related activities to prevent indiscriminate disposal and facilitate retrieval of re-usable materials.

Temporary confined pond near river locations should be identified for immersion of idols and other materials to prevent pollution of main river stream. The closed pond water may be disposed appropriately. The offerings like flowers and leaves may be collected in separate containers or in pits for composting.

After immersion, the recyclable articles like Jari, Clothes, plastics, aluminium foil, wood and bamboo may be taken out from the water bodies. The civic authorities may engage agencies/persons for doing the job. Environment friendly practices such as use of biodegradable dyes and paints should be encouraged.

Changes in concentration (mg/l) of some chemical pollutants in Hussainsagar Lake water before and after the immersion of Ganesh idols

Chemical pollutant	X (mean) conc. in the water	Before immersion of idols	After immersion of idols	BIS and ICMR standards for highest desirable limits
Calcium	25.14	43.77	68.4*	75
Magnesium	7.785	6.590	10.02*	30
Molybdenum	0.090	0.149	0.354*	Not available
Silicon	3.537	2.954	3.826**	Not available
Arsenic	0.124	0.121	0.497	0.05
Iron	0.212	0.125	0.22**	0.3
Lead	0.289	0.351	0.45**	0.1
Mercury	0.689	0.5525	0.778**	0.001

Level of significance: $^{*}P < 0.01$ and $^{**}P < 0.05$.

[‡]Source: Goel, P. K. and Sharma, K. P., *Environmental Guidelines and Standards in India*, Technoscience Publ., Jaipur, 318 pp.

Table: Chemical levels in the Hussainsagar Lake following immersion

Safer alternative

- Use permanent idols made of brass or stone
- Do a symbolic immersion
- Reuse the same idol again the next year
- Use a small unpainted idol made of unbaked clay if you immerse the idol
- Immerse the idol in a tub or a water tank
- Collect the flowers and nirmalya and compost them
- Avoid the use of thermocol and plastic in decorations

Source: www.kalpavriksh.org

Further readings:

Central Pollution Control Board study on Yamuna: http://cpcb.nic.in/oldwebsite/ar2003/ar2-3ch7.htm

Effects of Ganesh-idol immersion on some water quality parameters of Hussainsagar Lake: http://www.ias.ac.in/currsci/dec102001/1412.pdf

Suggested Code of Conduct for Environment Friendly Immersion of Idols: http://mpcb.mah.nic.in/images/guidelinesforimmersion.pdf

Environmental Impact of Ganesh Chaturthi: http://www.e-coexist.com/products/ganesh-chaturthi/the-environmental-impact-of-ganesh-chaturthi

An eco-friendly Ganesh Utsav: http://www.indiatogether.org/2004/sep/env-ganesh.htm

For more on environmentally safe festivals visit: http://www.kalpavriksh.org/f1/f1.4/esaganesh2007

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