



IDOL IMMERSION IN PONDS: AN EMERGING CHALLENGE FOR WATER QUALITY IN LOCAL WATERSHED MANAGEMENT

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Idol immersion has remained an important aspect of the Indian tradition since ages and continues even today. Worship of gods and goddesses in idol form on various religious occasions, is followed by immersion of the deity in water bodies including rivers, ponds and lakes, which has been identified as a serious challenge for the water quality as well as life of flora and fauna of the aquatic ecosystem. In past decade the number of immersions has significantly increased and the type of material used for making idols has greatly changed from more natural materials to use of toxic paints, chemicals and synthetic materials. According to the UNESCO 'World Water Development Report' India stands the largest extractor of groundwater. These reservoir aquifers depend significantly on local seasonal recharge through lentic water bodies. Smaller water bodies like ponds, which are important part of regional watershed management and transform rural livelihoods, have suffered a major setback in terms of water quality due to idol immersion. The problem intensifies because unlike the larger and lotic water bodies the pollutants cannot be diluted or dispersed and accumulates over time in the system. This increases the possibility of groundwater contamination besides transforming the water to unusable form.

In 2012, after landmark verdict of Allahabad high court to ban idol immersion in river Ganga, the pollution burden on these smaller local water bodies increased significantly in the country. Today National Green Tribunal (NGT) bans the immersion in all river and their tributaries and has ordered state pollution control boards (SPCB) to issue guidelines to minimize the water pollution. The guidelines of various SPCBs clearly demarcate ponds and kunds as possible immersion site besides the makeshift artificial ponds. This problem can be better understood by our case study of Varanasi district in 2017.

Case study of Varanasi

Varanasi, located on alluvial plains of river Ganga is rich in underground fresh water. In recent past serious decline in underground water at a variable rate of 0.19 m to 1.03 m/year has been reported for different parts of the city. The city in past had well planned water shed management system in form of 'kunds' (traditional name for ponds) with wide catchment areas but today it lacks a proper system for groundwater recharge due to rapid spread of urbanization. In 1980s the no of 'kunds' in Varanasi was reported to be 110 but by 2014 it was reduced to just 56 due to encroachment and non-maintenance. Even the remaining ponds are under severe threat in terms of quality of water and their recharge capability.

In Varanasi total eight ponds were demarcated as site of idol immersion in Jan 2017. Our case study focuses on the changes in physico-chemical properties of water of three ponds demarcated as site of idol immersion by the district administration. The procedure involved sampling of three ponds namely Shankuldhara (SD), Ishwargani (IG) and Pahariya (PH) ponds using standard procedures in triplicates, before and after immersion of idols on the occasion of Vasant panchami in 2017. The sampling of water was also done after idol immersion ensuring that effect of aeration during agitation is avoided for measuring dissolved oxygen. The analysis of water quality parameters were conducted in Environmental section of Department of Botany, Banaras Hindu University.

Backgrounds information about sampling ponds

The two immersion sites SD and IG are ancient ponds with well-constructed stone steps on all four sides and can be referred as kunds. These sites have religious cultural importance for Hindu and are often part of mythical tales and ancient scriptures. The third site, PH pond is relatively younger but well lined from all sides and stone stairs on two sides for easy access. All three have urban setting in today's time and thus natural catchment area is restricted but the anthropogenic activities have significant impact on them. The local people of the immediate surrounding keep cattle and thus in rainy season organic loading is higher. The IG and PH pond receive continuous inflow of groundwater in form of open taps of local water supply system. Occasional bathing of people can also be seen on the banks. All three ponds showed signs of eutrophication, green algal growth was observed in SD and PH pond before the study were conducted. The discharge from local surrounding are in form of detergents and soaps can be major cause of the problem.

mg/L for SD, 1.59 to 0.11 mg/L in IG and 1.70 to 0.10 mg/L in PH pond. Such low level of oxygen is fatal for many fishes in ponds and increase anaerobic bacteria activities that leads to the production of methane and hydrogen sulfide gases. These gasses are toxic in nature hence very few aquatic life forms were surviving in the studied ponds.

Findings of the study

The results of sample indicate an overall decline in water quality of all three ponds after the immersion. The dissolved oxygen dropped from 1.03 to 0.51 mg/L for SD, 1.59 to 0.11 mg/L in IG and 1.70 to 0.10 mg/L in PH pond. Such low level of oxygen is fatal for many fishes in ponds and increase anaerobic bacteria activities that leads to the production of methane and hydrogen sulfide gases. These gasses are toxic in nature hence very few aquatic life forms were surviving in the studied ponds.



An increase in total dissolved solids (TDS) and conductivity was observed. The TDS increased by 88ppm, 270ppm and 192 ppm, while conductivity increased by 0.13 mS/m, 0.42 mS/m and 0.29mS/m for SD, IG and PH ponds respectively. This can be directly correlated to the increase in organic load by idol wood, mats cloths, plaster, limestones, clay, etc. This inference is supported by the restriction of other polluting sources as local administration banned other activities like bathing and washing around the pond on the occasion of idol immersion. The high TDS values, leads to organism's cells shrinkage which can affect an organism's ability to swim in a water column.

The results also showed an increase in the pH of the water. The increase was maximum for SD (1.42), followed by PH (0.69) and IG (0.21) which indicated entrance of strongly alkaline material in then waters all ponds. The source of these alkaline ions may be the paints used in coloring the idols and decorative besides the clay used. Such alkaline pH affects the solubility and biological availability of chemical constituents such as nutrients (phosphorus, nitrogen, and carbon), heavy metals (lead, copper, cadmium, etc.), ultimately reducing growth of fishes and facilitating eutrophication in the water bodies.



The toxicity of water in this urban case is mainly due to presence of heavy metals and not due to the industrial effluents or agricultural runoff. An analysis of heavy metal concentrations of the ponds indicates severe accumulation in ponds since year 2011. Average increase in concentrations of Cu, Cr, Ni, Zn, Mn and Cd was 152 ppm, 108ppm, 100 ppm, 67 ppm, 38ppm, and 14 ppm respectively. Source of these heavy metals may be sindur, gulal, paint and ingredients like pigments, binders, fillers, solvents, additives etc., which are used for decorating the idol. High metals concentrations may also adversely affect pond's aesthetics by precipitating as an orange coating on the pond bottom, docks, and vegetation. Due to its persistent nature, these metals enter food chain in long term leading to bio magnification and bioaccumulation that affects the human life. The data represents the severity of the decline in water quality of these ponds in recent past which are used for idol immersion in Varanasi.

Conclusion

In the present world of rapid urbanization and climate change severely impacting monsoon patterns, depletion and quality of ground water table have become a serious matter of concern for all. Local ponds act as natural reservoirs and have their own self-sustaining cycle of hydration that performed a crucial role in rain water harvesting and ground water recharge. Ponds are also important contributors to regional habitat and biodiversity conservation by supporting aquatic flora and fauna including reptiles, amphibians, birds and fishes. They support water needs of regional population for domestic purpose, agriculture and animal husbandry. All this clearly links ponds with good environmental health at regional level. The religious practices that have emerged as challenge for these water bodies have proven the vulnerability of this traditional way of rain water harvesting system to evolving society. The matter needs a serious address and finding ways to conserve environment without adversely affecting the socio-economic dependence associated with these religious practices. These celebrations and practices have proven to generate large scale employment for potters, craftsmen and, artists thereby creating the idol making, domestic and international market, leading to large yearly turnover of revenue. Conservation of ponds can be used to create environmental awareness at regional to global level. It can help the local community to understand the responsibility towards caring for our nature and economic gains thereof, and trying to create a better future for our planet.

