

Deterioration in the Water Quality on Account of Mass Ritualistic Bathing during Kumbhmela: A Review

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Abstract—A mass gathering is an essential aspect of modern society. There are various types of gathering where thousands of people actively participate. Kumbhamela is one of the most sacred and important pilgrimage in Indian society. The study carried out by researchers' highlights that mass bathing during Kumbhamela caused the changes in river water quality and indicated that the water is not fit for either drinking or bathing purpose. River water samples were collected from selected sites for study. Various physico-chemical and micro-biological parameters were analysed. Researchers observed that few parameters were within limit and some were exceeding the limit. This paper discusses the environmental management in mass gathering by taking a case study of Kumbhmela, India. Also some technological advancement in the field of treatment has made which can be implemented. The aim of the work is to study the changes in various water parameters such as physico-chemical, biological parameters due to mass bathing from the research work which is already carried out.

Keywords: Environmental Management, Kumbhmela, Technological Advancement, Water Quality, Mass Bathing.

1. INTRODUCTION

Water is the most precise thing in this world, which we can't live without. Water being an important part of environment occurs in solid, liquid and gaseous forms on earth. Water may take different forms on earth like water vapour and clouds in the sky, sea water in the oceans, ice bergs in the polar oceans. Amongst all these forms liquid state of water from the rivers is most important for human beings in different respective manners. Water is used by living beings mainly for drinking as we know water is life. Water is also used by people for different aspects. From agriculture to industries in every work water is essential. In agriculture field water is the main resource to grow crops, where as in industries water is used for different processes like manufacturing of materials, for releasing the waste water, rivers are used. In day-to-day life humans use water for drinking as well as bathing, cooking, washing and many more different activities.

Water pollution is an appalling problem, powerful enough to lead the world on a path of destruction. Water is an easy solvent, enabling most pollutants to dissolve in it easily and contaminate it. The most basic effect of water pollution is directly suffered by the organisms and vegetation that survive in water, including amphibians. On a human level, several people die each day due to consumption of polluted and infected water. The waste water obtained from these all acts of different industries, agricultural activities is released in rivers because of which river gets contaminated. There are many different possible ways because of which water gets contaminated. It not only pollutes the water but also makes it unfit for use in different processes. There are several reasons for contamination of water as follows:-Industrialisation, Urbanisation, Increasing population, Ritualistic activities.

The field of ritual studies has seen a number of conflicting definitions of the term. One given by Kyriakidis is that a ritual is an outsider's or "etic" category for a set activity (or set of actions) that, to the outsider, seems irrational, non-contiguous, or illogical. Ritualistic events that mark a person's transition from one status to another including birth, coming-of-age, marriage, death as well as initiation into groups. Mass bathing is one of these ritualistic events in which people gather together to take holy deep in sacred rivers. This gathering of people and mass bathing is known as Kumbhmela. It is believed in Hinduism that drops of nectar fell from the Kumbha carried by gods after the sea churned (SamudraManthan). Bathing in these rivers is thought to cleanse a person of all sins.

Kumbhamela is held at one of the four places by rotation:- Haridwar , Allahabad(prayag), Nashik and Ujjain. The rivers at the four places are: The Ganges at Haridwar, the confluence (sangam) of the Ganges and the Yamuna and the mythical Saraswati at Allahabad, the Godawari at Nashik, and the Shipra at Ujjain. People take holy bath in these sacred rivers

during the Kumbhamelas which is one of the main reason for the contamination of rivers due to ritualistic activities.

The Godavari River is the second longest river in India after the river Ganges having its source at Tryambakeshwar, Maharashtra. It starts in Maharashtra and flows east for 1,465 kilometres (910 mi) emptying into Bay of Bengal draining the Indian states are given as Maharashtra (48.6%), Telangana(18.8%), Andhra Pradesh (4.5%), Chattisgarha (10.9%), Madhyapradesh (10.0%), Odisha (5.7%) and Karnataka (1.4%) through its extensive network of tributaries. Measuring up to a staggering 3,12,812 km², it forms one of the largest river basins in India, only the Ganges and Indus (within Indian borders) rivers have a drainage basin larger than it. In terms of length, catchment area and discharge, the Godavari river is the largest in peninsular India and had been dubbed as the 'Dakshina Ganga' the South Ganges river. Thousands of people take holy deep at a time due to which river is contaminated. Many studies are carried out on different river's contamination; calculating the changes in Physico-chemical, biological parameters, checking if they are within permissible limits or not, Carrying out surveys to see why values of different parameters are changing and what remedies were given to control the contamination. In the current paper review of different studies which are already carried out by different researchers on different rivers at different locations.

2. MATERIAL AND METHODOLOGY:

While carrying out study various physico-chemical and microbiological parameters during Mahakumbh were studied. Water sample at various site during Kumbhmela were collected. Height from mean sea level, latitude and departure was calculated. Various parameters such as Total Dissolved Solids (TDS), Most Probable Number (MPN), pH, Alkalinity, Hardness, Chemical Oxygen Demand (COD), Biochemical Oxygen Demand (BOD), and Dissolved Oxygen (DO) were studied.

3. LITERATURE REVIEW:

Md. Iqbal Sultan (2015), studied Tourism, Economy & Environmental problems of a religious town Haridwar. Objectives were to focus on potential tourist resources, to assess the impact of religious tourism on local economy, to focus on environmental problems related to the tourism development. The main methodology of this paper is divided into two parts. Descriptive and the second are Statistical and Cartographic both primary and secondary. Researcher carried out a case study on Ganga river in which the information obtained was nearly 89 million litres of sewage is daily disposed in river by 12 municipal towns that comes along its route to Haridwar. Nearly 15 lakh pilgrims visit the state in months May to August. Kumbhamela began from January 14, 2010 to April 28, 2010 including 11 bathing dates in between. Nearly 80 million people bathed along 15 kilometres stretch which was the main reason of river pollution.

Pankaj Malvia and Anjani Dwivedi(2015), studied Physico-chemical parameters of Narmada water. The natural resource was being polluted by indiscriminate disposal of sewage industrial waste and human activities which affect quality of river. Researchers studied about impact of water quality on health and found that water pollution not only results in significant economy loss but also lead to life threatening causes. They also commented on methods used for treatment of water.

Kumawat D.M. and Manish Sharma(2015), studied on Quality status of river Kshipra situated in Ujjain, The study was carried to assess the quality status of Kshipra before its proper linkage with river Narmada. Water quality was assessed in terms of physical, chemical and biological parameters. Four sampling sites were selected covering almost whole city along the river travers. Physical parameters included pH, temperature, conductivity and opacity, while chemical parameters assessed were TDS, TSS, hardness. Total coliforms, faecal coliforms, TVC were taken as microbial parameters. After studying all these parameters it was found that all the parameters were above the permissible limits laid by WHO/CPCB.

Nayak et.al.,(2014), studied physico-chemical parameters and biological parameters were collecting samples and after analysis of this samples they have compared with pre Sagarmela (non-bathing time).The physico-chemical parameter of water like dissolved oxygen(DO),bio-chemical oxygen demand(BOD), pH. In comparison to pre Sagarmela, higher bacterial load was recorded during Sagarmela.

Bhutiani and Tyagi (2012) studied water quality of Ganga River during Maha Kumbh-2010. Water samples were collected from five different sites and analysed various Physico-Chemical and Microbiological parameters. It has been seen that all parameters tested were within the permissible limit according to WHO (2009) and BIS (2004). But it was seen that MPN was positive for all this samples. It was seen that two sites were more affected than remaining three i.e. Har-ki-pauri and Mayapurgat at Haridwar.

Sharma et.al., (2012) carried out study to evaluate the impact of mass bathing on water quality of Ganga River during Maha Kumbh-2010. The water samples were collected from three different bathing Ghats of river Ganga and they analysed for different Physico-Chemical parameters. It was observed that all parameters were slightly affected at the Ghat of Sapt Rishi Ashram, which was least used for bathing purpose and so it remains least disturbed zone among all three, whereas almost all parameters were highly affected at Har- ki- Pauri, the site used most by the pilgrims for ritualistic bathing purpose.

Tewari et.al.,(2011), analysed water quality parameters of river Ganga during Maha-Kumbha, Haridwar. They have studied the water quality of Ganga river during mass bathing during Mahakumbh in terms of microbiological and molecular analysis during Makarsankranti to Shakh Poornima. The results

clearly indicate that organic matter and untreated sewage were mixing in the river during the period of MahaKumbha. They have calculated total bacterial load on water and analysed effect of water quality.

Bhatnagar and Sangwan, (2008), Studied impact of mass bathing on water quality on new moon day i.e. amavashya (no moon day) in terms of physico-chemical and biological characteristics. The result revealed by increase in organic pollution. They have to develop base line data on physical and biological aspects of this sacred ecological unit that may need attention for its upkeep in near future and provided some health remedial measures.

Anshuman Tripathi et al., (2007), studied the role of water use patterns and sewage pollution in incidence of water borne diseases along the Ganga River in Varanasi. They carried out survey which was used to estimate water borne and enteric diseases incidence. They observed overall rate of water borne and enteric diseases incidence, was estimated about 66% during one year period. They have observed and identified possible risk factor for residence leave by and use of water.

H.kulshetra and Sharma (2004), Researchers studied about the mass bathing during Ardhakumbha. They found that due to mass bathing water quality of river was changed drastically and it was not fit for any usage like drinking or bathing. It was celebrated in Haridwar, from 26th January to 15th May 2004. Researcher's study showed that presence of Faecal Coliforms(FC) which states that there was presence of pathogenic micro-organisms. And might cause water borne diseases. But still the water was safe with respect to DO content, the values of BOD and COD values exceeded the maximum permissible limits.

Sinha et al. (1990), analysed impact of mass bathing on the water quality of the Ganga River at Hauteshwarnath (Pratapgarh). They have analysed the water quality or the impact observed on river on Maha-Shivaratri festival. Water samples were collected from three different ghats on the bank of Pratapgarh and studied different physico-chemical and biological parameters. From results they have concluded that the mass bathing causes a major change in water quality of the river which may cause different health issue on the river water users.

4. CONCLUSION

The study clearly depicted that the mass bathing during Mahakumbh tends to change the overall ecology of the tank by significantly affecting water quality. The water quality was found unfit for both drinking and bathing purposes during 55% occasions of mass ritualistic bathing because of changes in physico-chemical, biological parameters present in water. It can be observed that in some cases of water borne infections including, severe diarrhoea, high-grade fever, skin infections, vomiting with abdominal pain were diagnosed among the pilgrims.

Proper legislative efforts can be taken which includes chlorination of river water and to educate the pilgrims can improve the bathing conditions, reduce the pollution load on river water by constructing toilets in the vicinity of river and minimize the health risks.

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