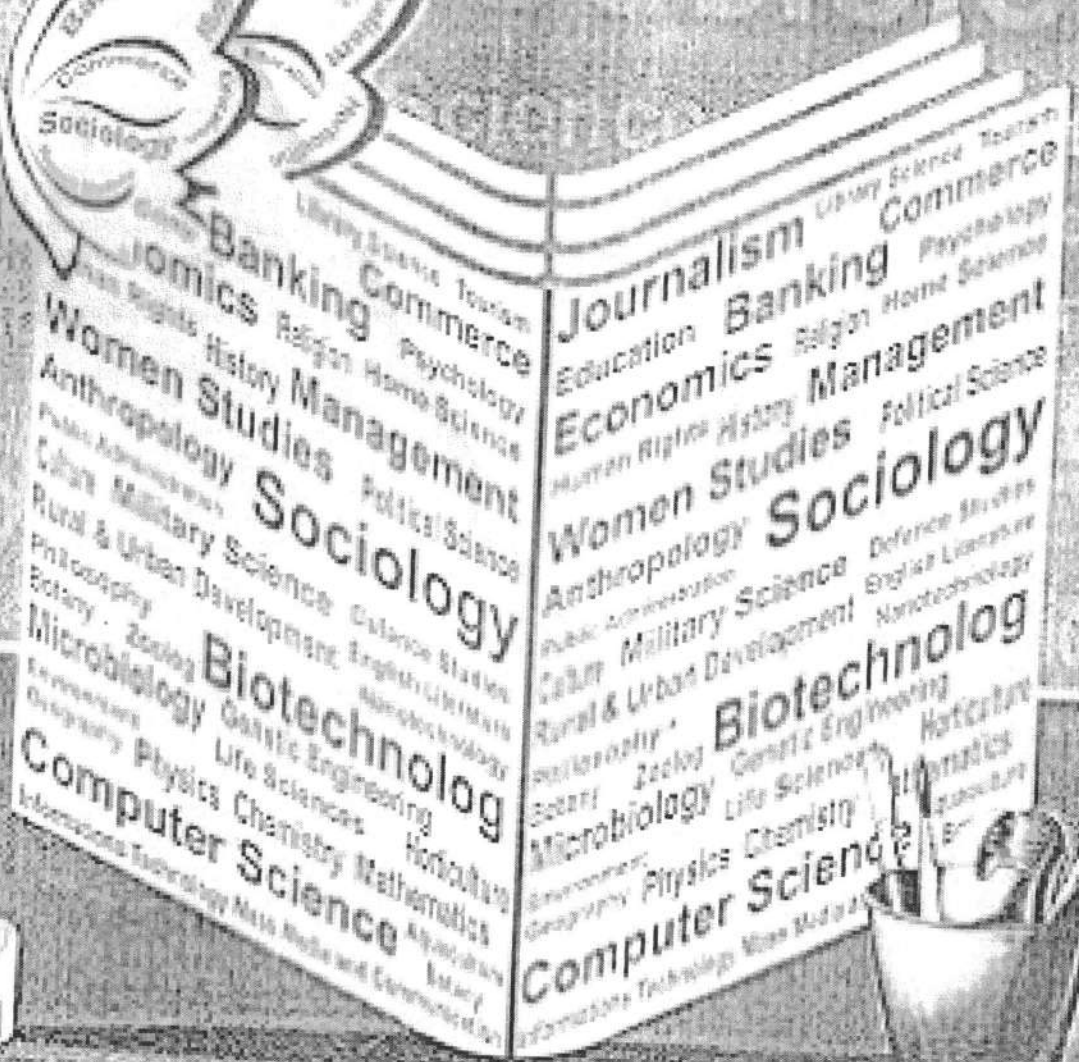
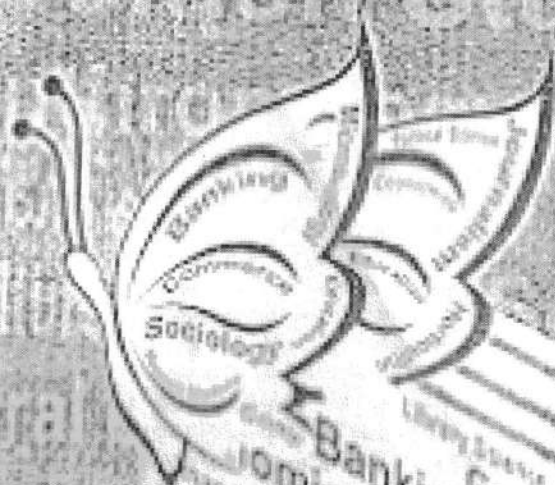


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A Study of Estimated Socio-environmental Impact on River Godavari during Sinhasta Kumbh Mela 2015 in Nashik city, Maharashtra

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Abstract

Kumbh Mela 2015 will be one of the giant affairs among all other fairs and festivals celebrated whole heartedly in Nashik and Trimbakshwar. Being one of the most important religious places, Nashik (Sinhasta) Kumbh Mela is generally acknowledged to be more sacred of all the festivals that occur once in every twelve years along the banks of River Godavari. No doubt this holy festival causes brings diverse and spiritually to every soul that take part in it, but emergence of public health risks and shortfalls during Kumbh mela are totally neglected. On the contrary, Kumbh mela has become a source of economic surch and treasure, which has ultimately benefited to the growth of Nashik city. Thus, the study focuses on estimating the changes in physico-chemical qualities of the water during mass bathing and social beneficiaries complemented to Kumbh Mela 2015. The study also evolve some remedial measures to prevent dispersing of the loopholes in managing the event.

Keywords: Kumbh Mela, mass bathing, social beneficiaries.

Introduction

Kumbh Mela (Kumbh means pot) is a sacred Hindu Pilgrimage that takes place at Nashik & Trimbakshwar in Maharashtra on the banks of Godavari River. Thousands of years ago, perhaps in the Vedic period, gods & demans made temporary agreement to work together in obtaining amrita (the nectar of immortality) from the Milky Ocean, & to share this equally. However, when the Kumbha (pot) containing the amrita appeared, the demans ran away with the pot & were chased by the gods. For twelve human years the gods & demans fought in the sky for the possession of this pot. It rains fall on the four places Prayag, Haridwar, Ujjain and Nashik. Thus, Kumbh mela is observed at these four locations where the nectar fall. (National Information Centre, Colaba, Nashik, 2001)

Kumbh Mela is attended by millions of people on a single day. Thousands of holy men/women (monks, saints, sadhus) attend the event with lot of devotion and spirit. A ritual bath at a preferred time & place is the major event of this festival. Now in the year 2015 from 15 August to 15 September at Kumbh Mela is being held at Trimbakshwar & Nashik in Maharashtra there will be a floating population more than 20 million during the mela (Shahi Seva). The floating population include temporary migrants, Sadhus, Mahants and pilgrims within and outside the country. During bathing, people not only take dip in the water body but also drink its water irrespective of its water quality suitability.

On the occasion of Kumbh Mela, Nashik Municipality Corporation (NMC) has given approval to spend Rs. 2,505 crore for carrying out infrastructure projects ahead. Out of the total

total, Rs. 1,150 crore would be spent on PWD projects, Rs 664 crore for land acquisition purposes and Rs 152 crore for water supply projects. The figures are obviously satisfactory and may fulfill the demand for the overall socio-economic development of the city and its suburbs. Thus, the following study emphasizes on increased rise in floating population during the event, need of personnel, improvement in infrastructure, environmental degradation and mitigation, etc. Further, an attempt has been made to suggest some remedial measures of environmental impacts and rational use of treasure and its outcome.

II. Objectives

The present study is undertaken with the following objectives:

1. To study the social impact of Kumbh mela on the development of Nashik city and project the increasing requirements according to mass gathering during the event.
2. To assess the increased environmental impact and changes in the water quality of Godavari river during the event.
3. To evolve remedial measures to prevent environmental hazards due to mass bathing & alternatives for maintaining bathing water quality of River Godavari.

III. Materials and Methods

Various government reports published by Central Pollution Control Board assess the study of significant impact of mass bathing on water quality during the Kumbh Melas, with recommendations for an environmental management plan. One of these reports, entitled "Environmental quality assessment (EQQA) during Sinhasta Kumbh mela 2003 at Trimbakshwar & Nashik (Maharashtra)" carried out by Maharashtra Pollution Control Board, Nashik assesses health risks and public health responses related to diseases, accidents and shortfalls in infrastructure.

The review of five bathing ghats (Platform) and one sewage treatment plant namely Kachaswara and Abhyas-Godavari Sangam at Trimbakshwar, Victoria Bridge and Barkhad at Nashik, and Sewage Treatment Plant (STP) and Kapila - Godavari Sangam at Fargusea, were assessed as sampling sites in the study. The Water Quality Assessment is estimated for upcoming Kumbh Mela 2015. Some of the physico-chemical parameters like pH, Biological Oxygen Demand (BOD), Dissolved Oxygen (DO), Suspended Solids (SS) and content of detergent for all the days of Shahi Seva viz., 11/8/05, 12/8/05 & 13/8/05 and 26/8/05, 27/8/05 & 28/8/05 and 6/9/05, 7/9/05 & 8/9/05, are assessed and estimated change in these properties during the Mela is estimated with the help of Exponential regression

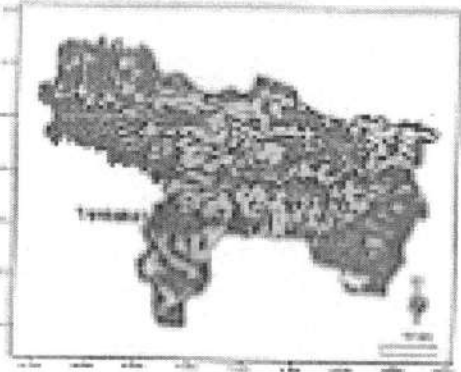
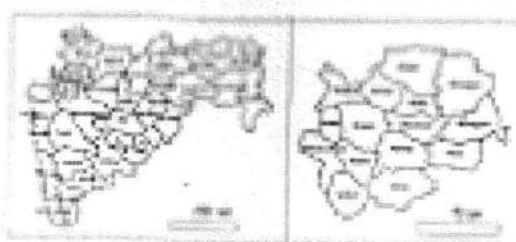
study. The threshold rate of population increased to 20 million in 2017 by NMC than the previous. Karbh Mela (12 million in 2005 and 15 million in 2007) is a census of mayor. With the massive increase in the floating population during the mela, health issues, has created an deterioration of water quality in most of the water bodies of sampling sites.

Quaternary Progress Report 2001 and 2010-12 highlight accelerated expenditures on Karbh Mela. As per the action plan, the bank of the river Godavari would be developed on the sites of Gajnar's Sahasran river foot. A study also project on the re-organization personnel for every place and infrastructure schemes. Considering a stampede during the last Karbh Mela in Nashik, disaster management projects would also be put in place under the plan.

IV. Study area

Nashik or Nashik is a city in Maharashtra, India. It is the third largest city of Maharashtra and also third most industrialized city in Maharashtra popularly called as 'Wine city of India'. Nashik city is located at 19.91° to 20.50° latitude and 73.78° to 75.89° longitude. It lies on a North-west part of the Maharashtra state, at 365 meters above mean sea level. According to the Census of India, 2011, Nashik had a population of 1,48,971 with only 259 sq. km. area. The population of Nashik urban agglomeration as on 11 November 2012 is 1,562,769. The city has great mythological background. Lord Rama lived in Panchal during his curfew. Agast Rishi also stayed in Nashik for Tapasya. Karbh Mela in Nashik, a merrymaking affair is attended by nearly three and a half million pilgrims. Thousands of pilgrims and holy men and millions of pilgrims take dip in the holy Nashik and Keshavnagar reservoirs. Residential arrangements for Sadhus is reside in Tapovan called Tapovan on left bank of Godavari River. Nashik being one of the main cities of Maharashtra, the city is well connected by train, road and air with different parts of India.

Location Map of Nashik city and Trimbakeshwar



Trimbakeshwar is located at about 35 km away from Nashik on the geographical location is 19.24° to 19.54° latitude and 74.17° to 75.31° longitude. The River Godavari originates from Trimbakeshwar. Keshavnagar, Trimbakeshwar temple along with the 12 Ayodhya, Braundgi peak, Godavari-Keshavnagar are the most spiritual places located at Trimbakeshwar. There are every Akhada (scholar) and gharas (Holy areas) of sadhus and bhaktas in this area.

Climate of the Nashik is generally compares with that of Bangalore and Pune because of its pleasant nature. The maximum temperature of Nashik city and Trimbakeshwar is near similar. In summer the average annual temperature is above 42°C and Winters are mostly pleasant with a maximum and minimum temperature of 32°C and 10°C. Relative humidity ranges from 43% to 62% (IMD-weather report, 2011). Though average rainfall of the District is between 2000 and 3000 mm, there is wide variation in the rainfall received.

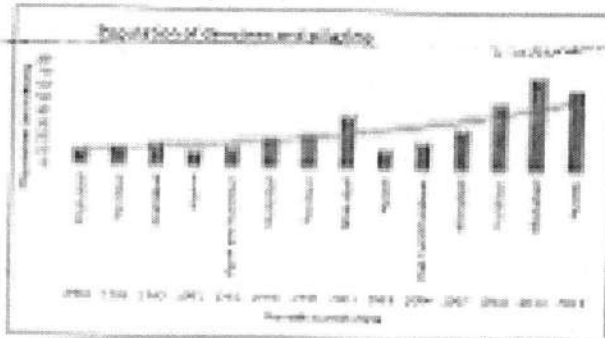
V. Discussion

A study can be distinguished into two categories aspects viz. Social aspects related to civic infrastructure during Mela 2013 and environmental impact with residential population rise.

A. Social Impacts

1. Estimated floating population of Sadhus, mahantas and pilgrims:

Unlike Allahabad, Nashik City expects comparatively less floating population (temporary migrants) of 20 million at every Shakti Sagar. With five location of this Holy bath and three holy baths, about 40 million population grows with the dip in the holy water of river Godavari. In order to fulfil the hospitality of such a great event, large amount of resources and infrastructure is required in the city.



Graph 1 - Estimated Floating Population during Karbh Mela 2013 at Nashik, Trimbakeshwar.

A. Civil Infrastructure:

Nashik Municipal Corporation (NMC) is responsible for the delivery of variety of services like water supply, sewerage, sanitation, drainage, and solid waste management, road trafficking & transportation during Karbh Mela. About 50% of financial support is given by Central government of India, 20% by State Government of Maharashtra and 30% by NMC. This pretty amount amount is used to improve and upgrade the infrastructure of the city. NMC is also bound to provide services regarding medical facilities, sanitation & conservancy, emergency, control of food adulteration & some other function under the public health regulation. Table 1 highlights the services and facilities provided in previous Karbh Mela, 2003

Table 13: Estimated requirement for water Kumbh Mela, 2015

S. No.	Parameter/ Factor/ Parameter	Year 2011	Year 2015
1.	Water supply	500 ML/D*	1000 ML/D
2.	Water supply	1000 ML/D**	2000 ML/D
3.	Water supply	1000 ML/D**	2000 ML/D
4.	Water supply	1000 ML/D**	2000 ML/D
5.	Water supply	1000 ML/D**	2000 ML/D
6.	Water supply	1000 ML/D**	2000 ML/D
7.	Water supply	1000 ML/D**	2000 ML/D
8.	Water supply	1000 ML/D**	2000 ML/D
9.	Water supply	1000 ML/D**	2000 ML/D
10.	Water supply	1000 ML/D**	2000 ML/D
11.	Water supply	1000 ML/D**	2000 ML/D
12.	Water supply	1000 ML/D**	2000 ML/D
13.	Water supply	1000 ML/D**	2000 ML/D
14.	Water supply	1000 ML/D**	2000 ML/D
15.	Water supply	1000 ML/D**	2000 ML/D
16.	Water supply	1000 ML/D**	2000 ML/D
17.	Water supply	1000 ML/D**	2000 ML/D
18.	Water supply	1000 ML/D**	2000 ML/D
19.	Water supply	1000 ML/D**	2000 ML/D
20.	Water supply	1000 ML/D**	2000 ML/D

*Average flow per Day = $10^6 \times 5 \times 10^6$ (Gross Approach + Public Health reserves + Marine reserve)

Table 14: Estimated requirement of facilities at Nashik and Kumbh Mela in 2015.

R. Environmental Impact

The results of limited physical-chemical parameters were estimated during Kumbh Mela 2011 viz., two locations of Shakti Sana at Trimbakeshwar, one at Nashik and one at Tapovan respectively are described below and also summarized in Table 5.

Location of sampling	Parameter	2011	2015	Standard	Remarks
Nashik (Trimbakeshwar)	pH	7.8	7.8	6.5-8.5	
	DO (mg/L)	7.2	7.2	5	
Nashik (Trimbakeshwar)	pH	7.8	7.8	6.5-8.5	
	DO (mg/L)	7.2	7.2	5	
Tapovan (Nashik)	pH	7.8	7.8	6.5-8.5	
	DO (mg/L)	7.2	7.2	5	
Nashik (Nashik)	pH	7.8	7.8	6.5-8.5	
	DO (mg/L)	7.2	7.2	5	
Nashik (Nashik)	pH	7.8	7.8	6.5-8.5	
	DO (mg/L)	7.2	7.2	5	
Nashik (Nashik)	pH	7.8	7.8	6.5-8.5	
	DO (mg/L)	7.2	7.2	5	
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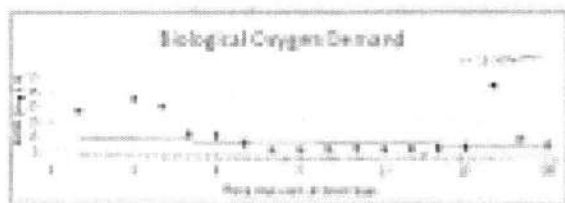
1. pH: The pH values ranging from 7 to 8.5 shows increase in alkalinity of the water. The maximum value estimated was 8.45. During 2015, these estimations will be slightly higher with an average ranging from 7.6 to 8.



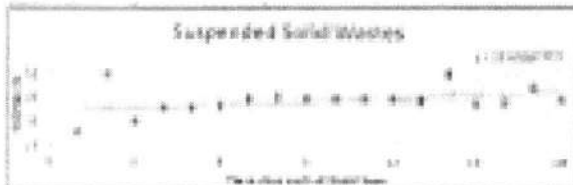
1. Dissolved Oxygen (DO): It ranged from 3 to 7 mg/l in 2011. The experimental data shows that the DO is ranging from 3.0 to 7.0 mg/l. During the event running water of lower hardness added DO, while stagnant water at Kumbh Sana in Trimbakeshwar will have low DO. Thus, the water quality at Trimbakeshwar will be diluted during the 2015.



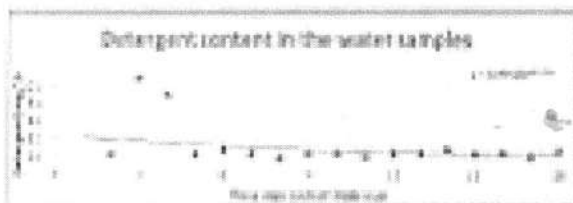
2. Biological Oxygen Demand (BOD): During earlier two Shakti Sana at Trimbakeshwar, BOD was equal to the standard parameter. The water of concern at the BOD at Nashik and Tapovan where is low (< 3 mg/l) is the estimated value above further decrease in BOD percentages 3 mg/l.



3. Suspended Solids (SS): The SS will be much higher at Trimbakeshwar while, suspended solids will be carried away by running water. The projected SS for Kumbh Mela 2015 will range from 50 to 75 mg/l every day.



4. Detergents: The detergent content is very high at Trimbakeshwar where water has to be drained out at periodic intervals. The content is low at Nashik (< 0.1 mg/l). There is possibility of decrease in average detergent content during 2015.



VI. Recommendations

The following are the recommendations based on investigation studies:

- 1. Use of various methods of disinfection such as ozone disinfection etc. in bathing water bodies. The application of chemical disinfectant therefore should

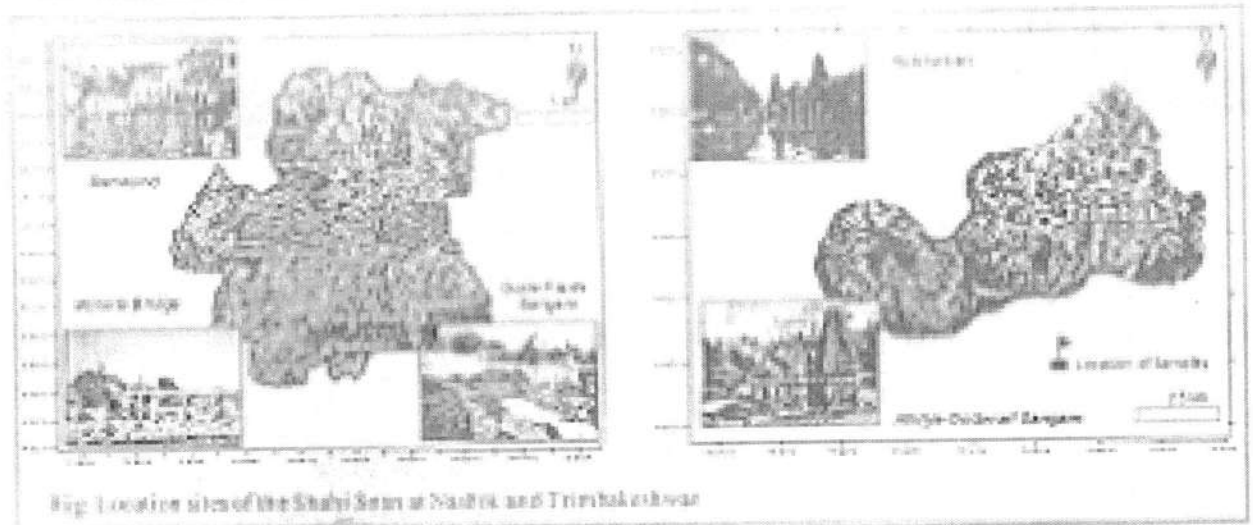


Fig. Location sites of the Shakti Sams at Nashik and Trimbakeswar

1. be totally prohibited in & around the overhead water bodies such as Kashiwarta.
2. Ozonation is being used in most of European countries for the disinfection of drinking water for Community/municipal Corporation etc. Although it is an expensive technology but ozonation is much more advantageous over disinfections by chlorine, bleaching powder & any other disinfectant.
3. Seepage of water in the tanks should be prevented & continuous flow through systems shall be maintained to avoid stagnation build up & to make water quality uniform in the Kashiwarta.
4. Regular filtration of Kashiwarta water may be undertaken by installation of filtration plant exclusively for the purpose.
5. Widening of the 'drainage' in order to avoid the accidents like 2003 Kashiwarta bridge collapse.
6. Alert facilities for quick actions during any kind of mis-behave, accidents, riots, etc. Increase such brigades and police force for law and discipline.
7. Availability of doctors, safe guards, swimmers, volunteers, security booth at large proportion of population centres over must be rushed by the crowd.
8. Last but not least, the responsibility of the event is not in the hands of government, but also devotees. Sadhas, pilgrims and folk. Hence, everyone should work together without any bias and self-interests.

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