



ENVIRONMENTAL MANAGEMENT IN THE WORLD'S LARGEST MASS GATHERING KUMBH MELA 2019 AT CONFLUENCE OF RIVER GANGA AND YAMUNA AT PRAYAGRAJ, INDIA

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Abstract: Mass gathering events is very common in India due to which there have been various instances which has made certain negative impact on our environment. Kumbh Mela is one of the largest mass gathering event on the earth. It is one of the most important and sacred festival which is celebrated four times in 12 years on the banks of river Ganga (Haridwar), river Shipra (Ujjain) . River Godavari (Nashik) , and at the confluence of rivers the Ganges, the Yamuna, and the mythical Sarasvati(Prayagraj). This time it has taken place at Prayagraj. This paper studies the water and Sanitation management and impact on the environment before and after Kumbh Mela 2019 at Prayagraj with the help of relevant data of that event collected. Moreover, it discusses what steps have been taken by the government to curb the ill effects of the place of event to be held with the implementation of new technologies like Geo-tubes and Bio-Remediation. The study shows that there were proper arrangements for the Sanitation with use of 1.22 lakhs Eco-toilets along with 20,000 dustbins. Moreover, solid waste was properly managed at most of the locations with the help of Tipper vehicles which carried the solid waste to the treatment plants. Several new STPs were installed to manage the waste generated.

Keywords: Kumbh Mela; Sanitation; Waste Management; Water Supply and its Quality and Water Pollution;

I. INTRODUCTION

A mass-gathering event abbreviated as MG is usually defined as the assemblage of people in large numbers at a particular location for some purpose (WHO, 2015). Kumbh Mela, the holy event of India is one of the largest congregations in the pilgrimage world of faith to bath at Sangam, Prayagraj. Approximately 12 crore visitors from 75 nationalities were present of this mammoth event to be held from January 15th to March 4th, 2019. The observance site rotate between pilgrimage places located on four sacred rivers on the bank of river Ganga at Haridwar , on the bank of river Shipra at Ujjain, on the bank of river Godavari at Nashik as well as on the Sangam of the rivers Ganges, the Yamuna, and the mythological Sarasvati at Prayagraj (Singh & Bisht, 2014). In addition, a Great Kumbh Mela festival is celebrated in every 144 years at Prayagraj.

Kumbh mela 2019 has covered an area of around 45 km .Many people take a holy dip in rivers during special occasions including Makar Sankranti, Purnima , Amavasya , Ganaga Dashara, Deepawali,, etc. as a symbol of faith. Such mass bathing events greatly affect the health of the river with respect to water pollution. The main aim of the study is to manage the mass gathering and to find out the measures taken to treat the solid waste generated during the Kumbh Mela 2019 held at Prayagraj. This paper discusses the water, sanitation, and hygiene components at the Kumbh Mela, In this study, various water quality parameters before, during and after the Mela dates are taken into consideration. The chosen parameters describe the designated best use for river waters. Central Pollution Control Board (CPCB), India, has given the definition of Designated Best Use (DBU) of rivers and the evaluated parameters were compared with their standard values to estimate the quality of the river during the mass gathering.



Fig 1: Kumbh Mela 2019 at Prayagraj Aerial View

II. THE KUMBH MELA 2019 AT PRAYAG

Kumbh Mela, 2019 was held at Triveni Sangam in Prayagraj(previously known as Allahabad), Uttar Pradesh, India , starting from January 15th to March 4th 2019. Pilgrimage from all over the world has visited the Kumbh 2019 to be a part of this religious festival.

2.1 GEOGRAPHICAL LOCATION OF PRAYAGRAJ 2019

Prayagraj lies in the southern Uttar Pradesh and stands at the Sangam of the river Ganges, Yamuna and the mythological river Sarasvati. It covers an area of 70.5 km² (27.22 sq miles). Prayagraj lies in the humid subtropical climate zone. It exhibit hot dry summer season from April to June, cool dry winter season from December to February as well as warm humid monsoon season from July to September. It is well connected to other parts of country by road, rail and by air facilities (Singh & Bisht, 2014).

2.2 MAKING OF KUMBH 2019

The pilgrims from around the globe assemble on the below mentioned dates in table 1 to take a holy dip on the occasion of Kumbh Mela. The approximate visitors were estimated on these dates of Shahi Snan.

Table 1: Important Bathing Dates and Approximate Visitors

S.No	Occasion	Date	Approx. Crowd (in lakhs)
1	Makar Sankranti	15.01.19	140
2	Paush Purnima	21.01.19	35
3	Mauni Amavasya	04.02.19	181
4	Basant Panchami	10.02.19	125
5	Maghi Purnima	19.02.19	120
6	Maha Shivratri	04.03.19	110

Prayagraj is well connected to other parts of the country by road, train and air. The airport is located at Bamrauli, away from city center. The city has four major railway stations namely Prayag Station, Allahabad Junction, City Station at Rambagh and Daraganj Station. During the Allahabad Kumbh Mela, inland waterways have been used for transportation of pilgrims as well as tourists between Varanasi and Allahabad, a distance of 60 km. The government has also set up four floating terminals, one each at Sujawan Ghat, Kila Ghat, Naini Bridge and Saraswati Ghat. Additionally, two vessels - SL Kamla and CL Kasturba as small boats were also deployed for pilgrim movement. Special trains were being run by the Indian Railways to Prayagraj during the Allahabad Kumbh Mela. Similarly, several new flights have been operational from January 13 to March 30. Facilities were provided to ensure that no problems occur during the stay of pilgrims for 55 day Kumbh Mela.

Table 2: Facilities provided in Kumbh Mela 2019

S.No	Services Provided	Numbers
1	Toilets	1,22,000
2	Dustbins	20,000
3	Tent City	4200 Premium beds
4	Electricity	40,700 L.E.D Lights
5	Drinking Water	200 Water ATMs

Source: Kumbh Mela Official Website

2.3. TREATMENT OF DRAINS DISCHARGING INTO RIVER GANGA

National Mission for Clean Ganga (NMCG), State Mission for Clean Ganga (SMCG) and Government of Uttar Pradesh supported the treatment of drains projects in UP from December 2018 in light of Kumbh 2019. A total of 152 drains were being treated through different technologies which were polluting discharging wastewater into river Ganga and polluting it. At Prayag, drains treated were namely Amitabh Bacchan Culvert- Salori Nala, Mawaiya Nala, Old GT Road Nala, Rajapur Nala etc for reducing the pollution of river Ganga at Sangam area.

Table 3: Technology used for treatment of Drains

S.No	Number of Drains treated	Technology Used for Treatment
1	05	Modular Technology(Geo Bag)
2	06	NEERI Technology(Natural Attenuation based treatment Technology)
3	141	Bio- Remediation

Table 4: Performance monitoring parameters for treatment of drains decided by NMCG, New Delhi

S.No	Parameters	Permitted Value
1	BOD(mg/l)	$\leq 30\text{mg/l}$ or 40% reduction in Initial value of BOD
2	COD (mg/l)	$\leq 100\text{mg/l}$ or 40% reduction in Initial value of COD
3	TSS(mg/l)	$\leq 100\text{mg/l}$ or 40% reduction in Initial value of TSS
4	pH	6.5 – 9.0
5	Fecal Coliform	2500 MPN/100 ml

Table 5: Analysis of Parameters between Inlet and Outlet samples collected from the drains treated by CSIR-NEERI

Parameters	Inlet Samples	Outlet Samples	Percent Reduction
pH	7.27	7.29	-0.275
DO(mg/L)	9.27	9.76	-5.258
TSS(mg/L)	233.3	91.0	60.99
BOD(mg/L)	63.5	27.8	56.22
COD(mg/L)	332.7	100.7	69.73
Total Coliforms(MPN/100ml)	69472.7	55154	20.61
Fecal Coliforms(MPN/100ml)	31064.8	21559.5	30.59

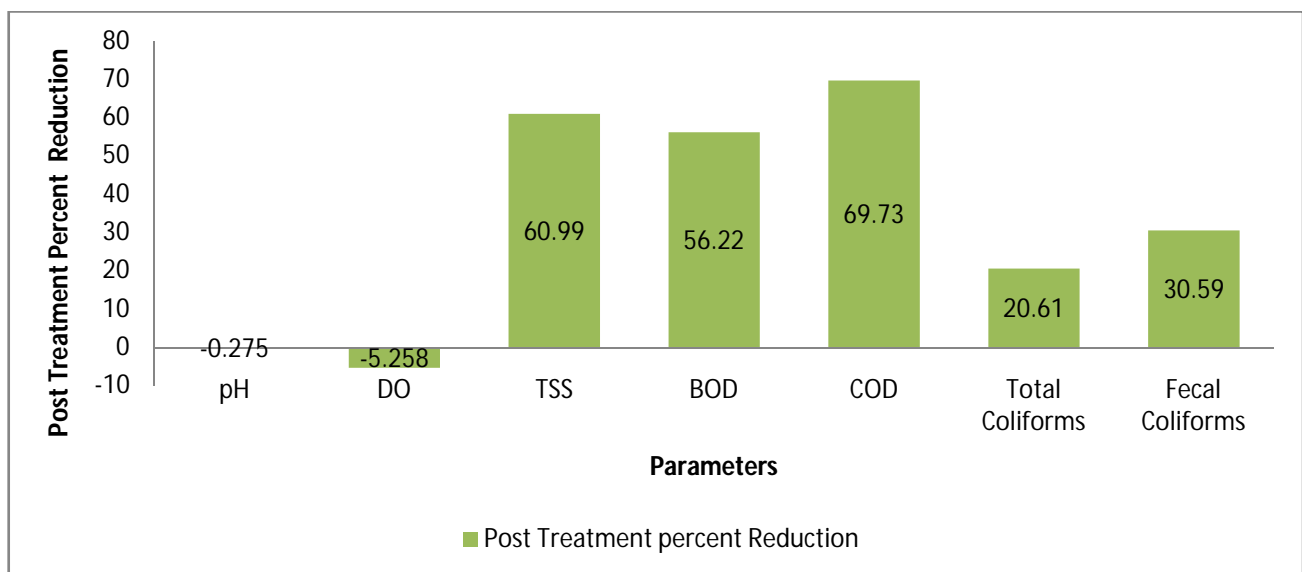


Fig 2: Graphical Representation of post treatment reduction in tested parameters

In Fig 2, pH and D.O have negative values for post treatment percent reduction. Increment in DO values at outlet give a positive sign of treatment given to the drains.

2.4. INTRODUCTION OF NEW TECHNOLOGIES

Modular technologies like bioremediation and geo-bag modular STP is also used for making clean Kumbh. Collaboration has been done with the National Environmental Engineering Research Institute (NEERI) in treating the influents at some drains. It was expected that the effluents that enter in the Ganga from these drains are treated up to the level of less than 30 Biological Oxygen Demand (BOD).

2.4.1. **Bioremediation:** It is a process in which living organisms are used such as micro organisms to rectify contaminants from water. It was used to achieve some of the below mentioned objectives-

- Reduction of B.O.D or C.O.D or T.S.S of the waste water of drains.
- To increase the dissolved oxygen of the flowing waste water of drains.
- Reduction of the Organic Build up or Sludge in the drains’s bottom.
- To maintain the physical appearance of the waste water.

2.4.2. **Geo-bag or Nonwoven Geotextile bag-** This new system has been extensively used in the Kumbh Festival at Prayagraj , wherein approximately 69 MLD of wastewater was subjected to treatment through geosynthetic dewatering tubes with remarkable results. It is made out of porous synthetic fabric stitched from three sides and is open from one side. It is filled with soil and is installed at the river bank or near sea shores. It helps in protecting rivers and other water bodies from erosion by developing an embankment and by filtering sludge from the wastewater. Since this system does not require any elaborate civil construction, the deploying time is very less. In fact, a 30 MLD set up in Mawaiya during the Kumbh Mela was set up in 13 days, without any civil construction.

2.4.3. **Natural Attenuation Based treatment Technology-**Natural attenuation is a treatment technology for the contaminants and it also used for reducing the concentration and mass of petroleum hydrocarbons .It is adopted for the protection of human health as well as the environment from their adverse effects. It is a combination of physical, chemical, or biological processes. It is a natural technique to reduce the concentration of contaminants, mobility, mass, volume, toxicity in groundwater or soil. Most prominent disadvantage of this treatment technology is that it takes a longer duration to obtain the remediation objectives as compared to other remediation techniques.

III. RIVER WATER QUALITY AT PRAYAG DURING KUMBH 2019

In India, water quality is affected by disposal of treated and untreated sewage and industrial runoff into rivers. Upstream from the location of kumbh and its bathing sites which includes large number of factories including leather tanneries, runoff from the agricultural farms, and small towns that continuously discharge waste directly into the Ganga (Vortmann, & Balsari, Satchit & Holman, Susan & Greenough, (2015)). Sangam is among the top four highly polluted stretches in the longest Indian River, Ganga. The Central Pollution Control Board (CPCB) has recognized the water of river Ganga in Prayagraj as “Not Satisfactory”. The main reason of water pollution in this city is lack of sewage system. According to the Namami Ganga Project reports, 70% of the pollution of river is due to sewage, 20% is due to industrial waste and only 10% is due to non-point sources like throwing of garbage, open defecation.

Table 6: Primary Water Quality Standards for Bathing (CPCB)

S.No	Parameter	Permissible Range
1	pH range	6.5-8.5
2	Dissolved Oxygen	4.0 mg/l or 50% saturation value whichever is higher.
3	Color And Odor	No noticeable color.
4	Floating Matter	Nothing Obnoxious
5	Fecal Coliform	100/100 ml(MPN)
6	Biochemical Oxygen Demand(3 days at 27°C)	3 mg/l

The quality of river was monitored regularly at monthly interval. The quality of river Ganga in Allahabad before, during and after the Kumbh Mela is tabulated below:

Fig 2: Graphical Representation of post treatment reduction in tested parameters

Parameters	Dec 2018		Jan 2019		Feb 2019		Mar 2019	
	u/s	d/s	u/s	d/s	u/s	d/s	u/s	d/s
D.O(mg/L)	8.8	9.0	11.9	10.9	10.4	9.8	8.7	8.3
B.O.D(mg/L)	3.2	3.4	3.0	2.8	3.1	3.4	3.0	3.3
Total Coliform(MPN/100ml)	22000	21000	17000	20000	14000	17000	16000	20000
Fecal Coliform(MPN/100ml)	13000	11000	9300	11000	7800	9300	9200	11000

It can be seen from the Fig 3 and 4 that before the start of the Kumbh the quality of water was not satisfactory. In December 2018, the Total Coliform and the Fecal Coliform (MPN/100ml) were decreasing towards the downstream of the region indicating that steps were taken to improve the quality of River at Prayag. The river water can be considered suitable for bathing if the DO is more than 5 mg/l and BOD level is less than 3 mg/l, as per CPCB. For January month the BOD level was quite satisfactory for bathing, but for February and March months the B.O.D values were exceeding the permissible values, because of the important bathing events as Mauni Amavaysa, Basant Panchami, Maghi Purnima and Maha Shivratri. But for each month during Kumbh (January-March) the Total coliform and Fecal Coliform (MPN/100ml) were increasing towards downstream of the region. It shows that the quality of river was degrading during the Kumbh.

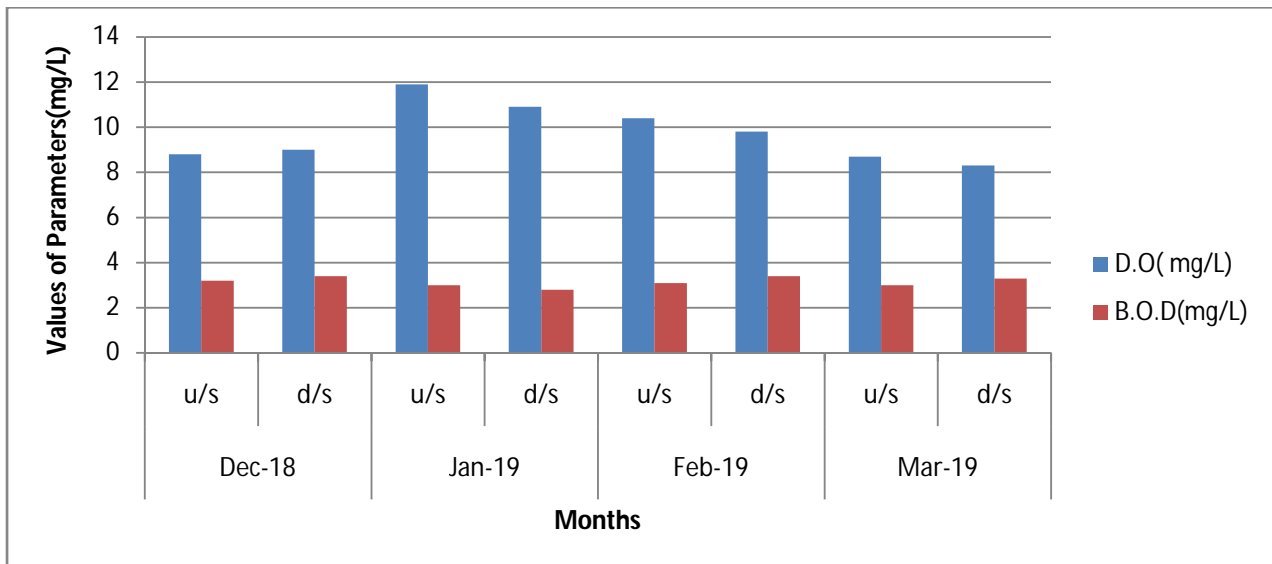


Fig 3: Variation of D.O and B.O.D from December 2018 to March 2019 at Prayagraj

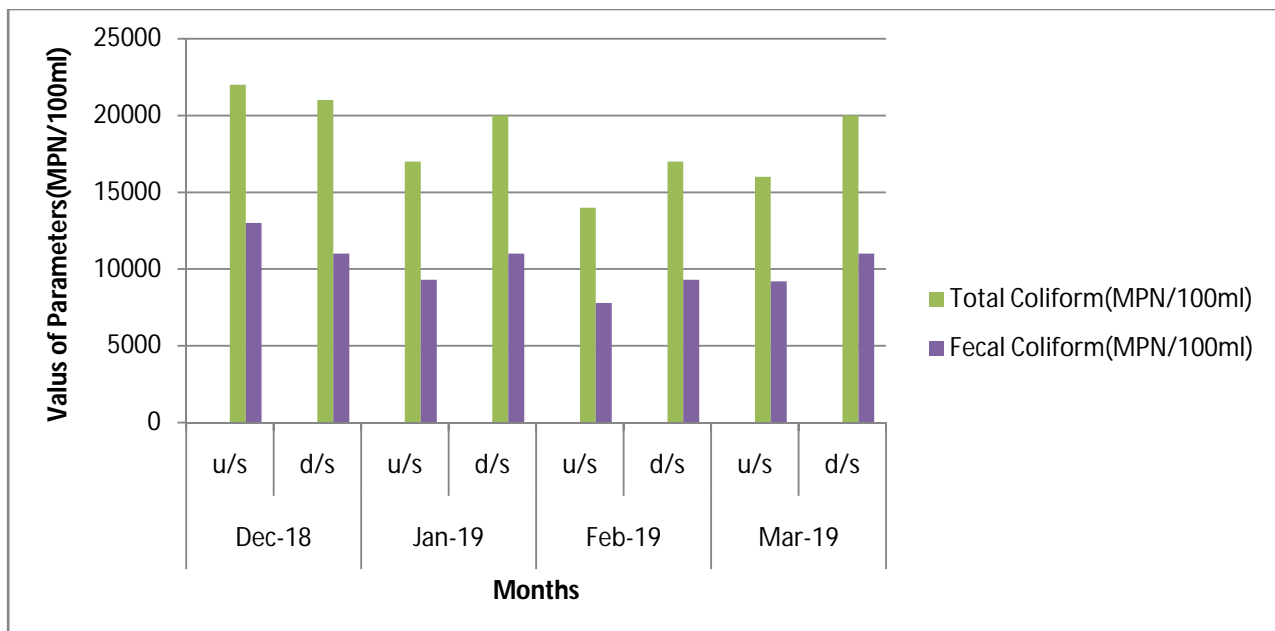


Fig 4: Variation of Total Coliform and Fecal Coliform from December 2018 to March 2019 at Prayagraj

The Government of Uttar Pradesh had ordered to shutdown leather factories in the cities lying upstream to the Prayagraj like Unnao and Kanpur from December 15th to March 15th so that clean water can be provided to devotees participated in the Kumbh 2019 at Prayag (The Financial Express,2019,Jan 2).

The river water was monitored by Uttar Pradesh Pollution Control Board (UPPCB) before and just after the first day of Shahi Snan during Kumbh and the result is tabulated as below.

Table 8: Quality of River at Different Monitoring Stations, Prayag (UPPCB)

Name of the station	Distance from Sangam	Date of monitoring	BOD (mg/l)	DO (mg/l)
Sangam	0	8-1-2019	3.2	12.4
Sangam	0	15-1-2019	3.0	10.6
Rasulabadghat	10 km upstream	8-1-2019	3.8	12.5
Rasulabadghat	10 km upstream	15-1-2019	3.1	12.4
Shastri bridge	2 km upstream	8-1-2019	3.4	12.3
Saraswati ghat	2 km downstream	8-1-2019	2.7	9.8
Saraswati ghat	2 km downstream	15-1-2019	2.5	9.6
Chhatnag ghat	5 km downstream	8-1-2019	3.7	10.5
Chhatnag ghat	5 km downstream	15-1-2019	2.9	10.5

IV. CHALLENGES IN ORGANISATION OF KUMBH MELA 2019

Each of the below issues is quite important regarding the environmental approach of event management. These issues are studied in detail. Following were the challenges faced in the organization of Kumbh Mela 2019 at Prayag:

- i. Drinking water supply
- ii. Sanitation
- iii. Solid Waste Management
- iv. Sewerage
- v. Public Health Hazards
- vi. Failure of Modern Technologies used

4.1. DRINKING WATER SUPPLY

All water supplies for human consumption should follow the Guidelines of World Health Organization (WHO) on Drinking Water Quality (WHO, 2015) as mentioned in Table 9.

Table 9: WHO guidelines on Drinking Water Standards

Parameters	Highest Desirable	Maximum Desirable
pH	7.0-8.5	6.5-9.2
Turbidity	5.0 JTU	25.0 JTU
Taste and Odour	Nothing	Disagreeable
Total Solids	500 mg/L	1500 mg/L
Coliform count in the water entering the distribution system	Zero in any sample of 100 mL	Zero in any sample of 100 mL

The National Green Tribunal (NGT) had directed the Uttar Pradesh and Uttarakhand Pollution Control Boards to display the quality of water of the river Ganga at all important locations on monthly basis, to indicate whether the river water is fit for drinking (Sandrp 2019). The UP government have taken responsibilities for supplying drinking water to the attendees at Kumbh Mela, 2019 by providing 5,000 stand posts, about 800 km pipeline. Moreover, 200 water ATM's based on reverse osmosis (RO) technique as well as 150 water tankers had been made in use for Kumbh Mela. Also, about 100 hand pumps had been installed so that there is no scarcity of water in the mass gathering at Prayagraj. 8,000 cusecs of clean water was released before every Shahi Snan to ensure clean water during the entire Kumbh Mela. Building materials company HIL Ltd., a CK Birla Group, with its roofing solutions brand Charminar had installed numerous water kiosks to serve clean drinking water to the devotees at Kumbh Mela, Prayagraj (The Hindu Business Line, 2019, Jan 31)

4.2. SANITATION

The Kumbh Mela organized in 2013 had faced a lot of waste generation, people were forced to defecate in open areas putting their lives in danger. That's why Cleanliness and proper Sanitation was given the top priority in Kumbh Mela 2019. The campaign used during the Kumbh Mela 2019 was "Swachh Kumbh". The campaign combines the messages of cleanliness and Clean Ganga and commitment of Swachhta. The Sanitation activities involves installation of about 1.2 Lakh eco-toilets with proper management and disposal of waste, placement of about 15000 Manpower so to keep the streets and Mela area clean. It also includes the installation of about 20,000 dustbins for solid waste collection (Kumbh Mela official website). The Global Interfaith WASH Alliance (GIWA) and UN's Water Supply and Sanitation Collaborative Council (WSSCC) were also present in the Kumbh Mela. They were involved in spreading awareness about the role of clean water, hygiene and sanitation in supporting human health and enhancing prospects for a better healthy life (WSSCC, 2019).

Table 10: Sanitation facilities provided at the Kumbh Mela 2019

S.No	Facilities provided	Numbers
1	Community toilets	62,500
	Urinals	20,000
	Institutional	40,000
	Total	1,25,000
2	Dustbins	20,000
3	Swachhagrahis	15,00
4	Night Sweepers	9000
5	Tipper Vehicles	120
6	Compactors	40



Fig 5: Ecofriendly toilets at Kumbh Mela 2019, Prayagraj

4.3. SOLID WASTE MANAGEMENT

Efforts were made to reduce the generation of waste during the mass gathering in Kumbh Mela 2019 held at Prayag by setting up of more than 1.22 Lakhs of eco-toilets. Manpower was also enforced to take care of waste lying on the roads. According to a report by Centre for Science and Environment (CSE), New Delhi, the amount of waste generated during the 55 day long Kumbh was about 18 times more than what the district produces daily. The existing sewage treatment capacity of the district was about 254 Million Litres per Day was not able to treat half of the generated waste. This result in lying of the waste at the banks of river Ganga, thus making it more polluted (Down To Earth's, 2019, May 16-31).

More effects are:

- i. The trash was left unattended on the roads which would attract flies.
- ii. Animals can swallow plastics putting their life in Danger.
- iii. Waste Discharged in the river would lower its DO level thus making the existence of aquatic life difficult (Singh & Bisht ,2014)



Fig 6: Garbage left at Sangam after the Kumbh Mela at Prayag

The Jal Board deputed 46 engineers, one to monitor each of the 46 drains in order to curb the muck entering the river. The engineers appointed were given the task to report the condition of the drains, ensure sample collection and update the findings to the Ganga Pollution Control Unit in real time. They are also required to report the volume of sludge added by the drain into the Ganga and the technology used to clean the drain water. Real-time pictures of the drain are also supposed to be shared regularly. The unsegregated solid waste was dumped into Baswar treatment plant which was not operational since September (2018). On the other hand, the waste which was untreated was directly falling into the nearby streams, which ultimately flows into the Ganga. The plant was receiving around 600 tons of waste per day when it had been assigned to treat only 400 tons per day, and was, therefore, unable to treat all the waste (IANS, 2019).

4.4. SEWERAGE SYSTEM

With a view of organizing a huge mass gathering in Kumbh Mela, three new Sewage Treatment Plants were setup at:

Table 11: Establishment of 3 New STPs

S.No	Locations of New STPs	Capacity(in MLD)
1	Naini	42
2	Phaphamau	14
3	Jhunsi	16

These projects were established to prevent 7.8 crore litres per day of sewage from flowing untreated waste directly into River Ganga. Out of the total waste generated during the Kumbh Mela, 2000 Metric Tons of waste was transported to a STP located at Baswar village and dumped it in the premises of a non-functional Sewage Management Plant. The Baswar STP has been non-operational since September 2018. All the five machines installed to treat solid waste were non-functional (IANS, 2019). According to the reports of NGT, despite of installment of new Sewage Treatment Plants (STPs), large number of existing plants (STPs) were overflowing in Prayagraj and as a result, they were sending untreated waste directly into the Ganga, making it unfit even for bathing. The Sewage Treatment Plant (STP) located at Rajapur was receiving excess sewage than the installed capacity. But it was capable of treating only half of the waste with the help of geotube technology and the remaining half was being allowed to enter the Ganga without treatment. In the Mawaiya Nala, the untreated water from the drain was directly entering the Ganga because it had a bypass.

4.5. PUBLIC HEALTH HAZARDS

Mass gathering poses a risk to public health. Therefore, it is important to prevent or minimize the risk of poor health for the devotees. The type of planning for mass gathering is mainly dependent on the event conducted along with the risk assessments as well as with the help of resources available. Unfortunately, efficient methods to control and mitigate health risks are proven to be inadequate on execution to such mass gathering events, especially on such a large scale (Sharma et.al, 2019). A analysis of 10 years of public health safety in India shows that around 540 injured casualties along with 936 dead occurred in 27 traditional mass gathering events (Sanyal et.al ,2011).

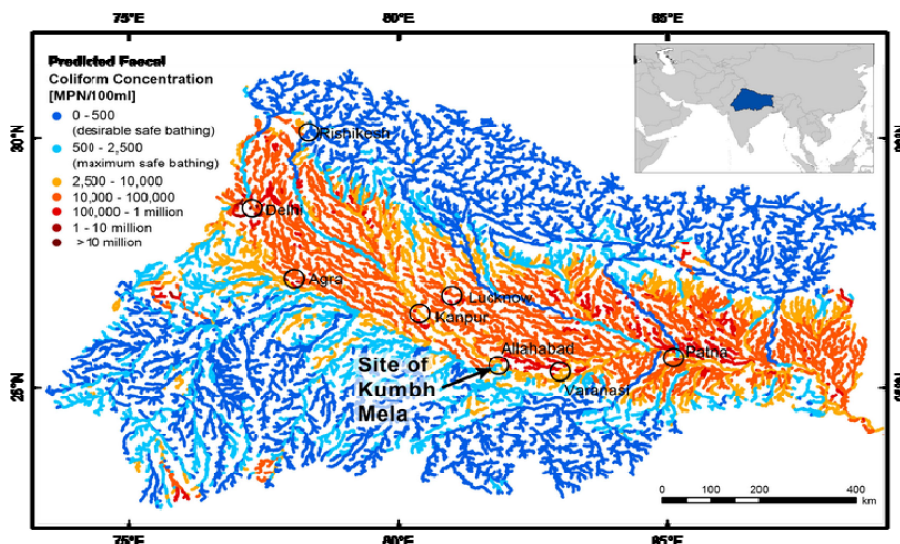


Fig 7: Predicted sewage pollution across the Ganges catchment including Allahabad – (Milledge et al., 2018)

In Kumbh mela 2019, the main risk to attendees and the residents of the area was through presence of Faecal coliform in the river Ganga. These bacteria enter rivers through disposal of untreated sewerage and through open defecation activities. Total coliforms abbreviated as TC is a biological parameter which measures quality of water, given by the Central Pollution Control Board (CPCB) for organized outdoor bathing. Its maximum permissible limit is 500 MPN/100 ml (MPN = most probable number).



The Total coliform count in January in the river Ganga at Prayagraj was found out to be around 20,000 MPN/100 ml and 17,000 MPN/100 ml downstream and upstream respectively, which was around 40 times more than the maximum permissible limit. The high numbers of faecal coliform indicate that the pathogens are present in water, usually contributed through excreta of human and animals. Their presence can cause water borne diseases such as diarrhea ("Hindustan Times, 2018, March 28).

4.6. FAILURE OF MODERN TECHNOLOGIES USED

Modern technologies like Bioremediation, Non-woven geobags or geotubes are used to reduce the discharge of waste into the river. But to some extent only they were effective. National Green Tribunal (NGT) stated that the use of Geotubes were completely waste of money. The technology involves treatment of waste water with the help of activated carbon and polymers. It is introduced inside 50 meter or 25 meter bags commonly known as Geotubes, where waste is filtered with the help of membranes. Then the solid waste gets collected inside these bags. But the Activated carbon and polymer reduces odor only, they didn't reduce the dissolved BOD of the waste. Moreover, the installation of Geotube technology is done at only five out of the 85 drains flowing into the Ganga and even at installed stations they treat only some portion of the waste and the rest is discharged into the river untreated ("Item No. 06 Court No. 1 PRINCIPAL BENCH, NEW DELHI NCR ...").

V. MEASURES AND INNOVATIVE TECHNOLOGIES WHICH CAN BE USED TO PREVENT POLLUTION DURING KUMBH MELA

There are so many innovative technologies which are introduced to treat the commercial, residential as well as industrial wastewater and solid waste so as to make the environment pollution free. In such mass gatherings, pollution such as air pollution, water pollution, soil pollution as well as noise pollution are very common. To rectify such issues, various emerging and innovative technologies can be opted for the event of Kumbh at Haridwar which would be effective and inexpensive at the same time. Various measures and technologies include:

5.1. VERMIFILTRATION

Vermifilter is a biofilter which removes contaminants in the waste water using Earthworms. It is very similar to a trickling filter. The earthworms secrete certain kind of enzymes from their gut and digest the microbial biomass as a result of which the organic matter is converted into humus and can be used to improve soil fertility. The wastewater gets purified and is discharged as effluent passing through the Vermi bed containing worms. This technology is cheap, requires less space and has low maintenance. It can be used at nearby treatment plants to decontaminate waste water.

5.2. PHYTOREMEDIATION

Phytoremediation is a technique of removing contaminants from the wastewater using living green plants. It is a low cost, natural technique which uses solar energy. Removal of contaminants from surface water, groundwater as well as from soil can be done. It is a technology which is environmentally sound for prevention and control of pollution. Plants like *Jatropha Curcas*, *Ficus Microcarpa*, *Alyssum Lesbiacum*, *Arabidopsis Halleri* etc can be used to remove contaminants specially metals from the wastewater. This technology can be installed at the banks of the River at suitable distance.

5.3. SEGREGATION OF WASTE AT SOURCE

Solid waste generation in such mass gatherings are so much that it sometimes become very difficult to manage the waste and thus pollution occurs along with several diseases. People do a lot of littering on such mass events like polyethylene bags, rags, garlands, leftover food etc, and to curb such issues, dustbins should be provided at various locations. Each spot should have two dustbins (one green for biodegradable waste and one blue for non-biodegradable waste) so that the waste gets separated at source only. To make the people aware of following the rule of throwing the waste in bins, certain public awareness posters can be made and announcements can be made at regular basis.

5.4. MEASURES TO CONTROL AIR POLLUTION

Several people visit the Kumbh by their own transportation, which leads to air pollution. Therefore, to prevent air pollution, battery cars can be used to avoid fuel burning. Use of Carpool by the attendees is another option to control air pollution. Also, more and more trees can be planted to maintain the beauty of Kumbh Mela.

VI. CONCLUSION

India is well known for its rich culture and traditions. So many festivals are celebrated in our country and Kumbh Mela is no less than a festival here. Kumbh Mela had been a bench mark to other countries and is always a success at all 4 sacred places Haridwar, Ujjain, Nasik and Prayag. Kumbh mela is the assemblage of millions of people on the banks of rivers Ganga, Godavari, Shipra and Confluence of Ganga, Yamuna and Mythological Sawsasati. People gather from all round the globe to participate and witness the stream of knowledge, religion and spirituality. The Kumbh Mela organized at Prayagraj, 2019 was based on the theme "Swachh Kumbh for a Swachh Bharat".



Arrangements such as Eco-toilets, Drinking water ATMs, tents, installation of dustbins, establishment of new sewage treatment plant (STPs), renovation of already installed STPs, various swachhagiris were deployed in order to regulate the waste generated during the Kumbh Mela. UP Govt. along with CPCB has monitored the Ganga basin before, during and after the Kumbh to analyze the water quality and to conclude whether the efforts made were up to the point or not. New techniques like Bio-remediation, Geotubes and Natural Attenuation based treatment technologies are also used to prevent the solid waste being discharged into the river, but they were partially effective. Three Sewage Treatment Plants were also installed and several existing Sewage Treatment Plants were upgraded in order to ensure a clean Kumbh. Sanitation was given a top priority and to ensure that approximate 1.22 lakhs eco-toilets were installed, to avoid open-defecation.

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