

# Environmental Management in Mass Gatherings: A Case Study of Maha Kumbh Mela 2013 at Prayag, India

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## Abstract

A mass gathering is an essential important aspect of modern society. There are various types of gatherings where thousands of people actively participate. A mass gathering is an effortless way to interact and socialize among the various groups of people. There are various challenges that usually come across while conducting an event which leaves an undesirable impact on the environment. This paper discusses the environmental management in a mass gathering by taking a case study of Maha Kumbh 2013 at Prayag, India. By analyzing the data and information collected regarding the event, a conclusion can be drawn that although such gatherings can entail significant health risks, but there are ways of curbing the ill effects. Also some technological advancement in the field of treatment has made, which can be implemented in other rallies, political events, sporting events, conferences, award ceremonies, other religious gatherings like Haj, Rath Yatra, fairs and fates etc.

**Keywords: Environmental Management, Maha Kumbh, Health Risks, Technological Advancements.**

## I. INTRODUCTION

A public event is an event addressed to a large number of public. Mass gathering is though an assemblage of more than 1000 person at a particular place for a certain period. It is a preplanned event held for a definite period of time at a particular location. It generally includes number of events like political rallies, sporting events like cricket match, basketball match, conferences, religious gatherings like Rath Yatra, Haj, Kumbh Mela, etc, exhibitions, carnivals etc.

There are various roles & responsibilities while conducting any public event. Any public event begins as a concept being proposed by any individual or organization. Firstly a pre-event planning is done in which various issues are discussed like when or where the event will be held, type of event, number of audience interested, duration of the event etc. But the basic and most important aspect of any event conduction is the effects that it can create on the environment. So a detailed study of the largest gathering in the Earth, in terms of identification of beneficial practices, and the failures and success stories of the event is the vital theme of this paper.

Kumbh mela is a mass gathering of Hindus along the banks of the holy river Ganga in India. It is held by turn in four different cities of India i.e. Allahabad, Haridwar, Ujjain and Nashik. The venue depends on the position of the stars and planets. It is held every third year at one of the four venues by rotation: Haridwar, Allahabad, Nashik, Ujjain. The Ardh( i.e. half ) Kumbh fair is celebrated in every six years only at Haridwar and Allahabad. While Maha Kumbh takes place once in twelve years only at Allahabad.

Kumbh is an ancient word that is mentioned in The Vedas according to the Hindu mythology which means pitcher and Mela means fair in Hindi. The pilgrimage is held for about one and a half months at each of the above four places where it is believed in Hinduism that drops of nectar fell from Kumbh carried by Gods after sea was churned. The festival is considered as the “biggest mass gathering on the Earth” and attendees from all over the world can be seen during the fair. There is no precise method of finding out the number of pilgrims even approximately but it is estimated that on auspicious days about two to eight millions pilgrims attend the Kumbh Mela.

Recently Kumbh Mela was held at Allahabad in 2013. To manage this event, the organizing authorities had set up various facilities for the attendees like temporary roads, toilets, hospital and ambulance facilities, fire stations, water and sewerage facilities, etc. There were numerous difficulties, unforeseen conditions along the way. But event was overall success.

For more specification, Maha kumbh 2013 held at Prayag, Allahabad is the main area of study. The main objective of the research is to focus on all the environmental challenges been confronted by the organizing authority of Kumbh 2013 and the measures that could be taken to further enhance the effectual management. The emphasis is basically paid on the introduction of the environmental friendly ways to conduct any large event. We can also relate the conclusions been drawn by the research to the other major mass events held all over the world.

Following are figures showing the rapidly growing number of attendees, according to *The Imperial Gazetteer Of India*:

YEAR	ATTENDANCE
1998	10 million
2001	40 million
2007	70 million
2013	100 million

## II. ORGANIZATION OF MAHA KUMBH MELA 2013 AT PRAYAG, INDIA:

The Maha Kumbh held at Prayag in 2013 was started on 14 January 2013 and ended on 10 March 2013. There were approximately 30 million people who visited the ending ceremony. While the total estimates of people visited is quiet complex to identify but a rough idea of about 100 million can be estimated for 55 days festival.

### A. Study Area:

The study area is the city of Allahabad in the state of Uttar Pradesh, India. It lies on coordinate 25.4500 °N, 81.8500 °E. Located in southern Uttar Pradesh, the city's metropolitan area covers 63.07km<sup>2</sup>. It is connected by road to prominent cities of country like Jhansi, Kanpur, Lucknow, Jaipur, Bhopal, New Delhi etc. Buses operated by Uttar Pradesh and other State Road transport Corporation as important means of road transport.

Allahabad Junction is one of the main railway junctions in the Northern India and headquarters of the North Central Railway Zone. The four main stations in Allahabad are Prayag Station, City Station at Rambagh, Daraganj station and Allahabad Junction. The city is connected to most of the Uttar Pradesh cities and other major cities like Chennai, Vishakhapatnam, New Delhi etc.

Allahabad is served by Allahabad Airport, which is 12 kilometres from the city centre. Air India and Spice Jet connects Allahabad to Delhi and Mumbai. Inland waterways Authority of India connect Allahabad to Haldia.

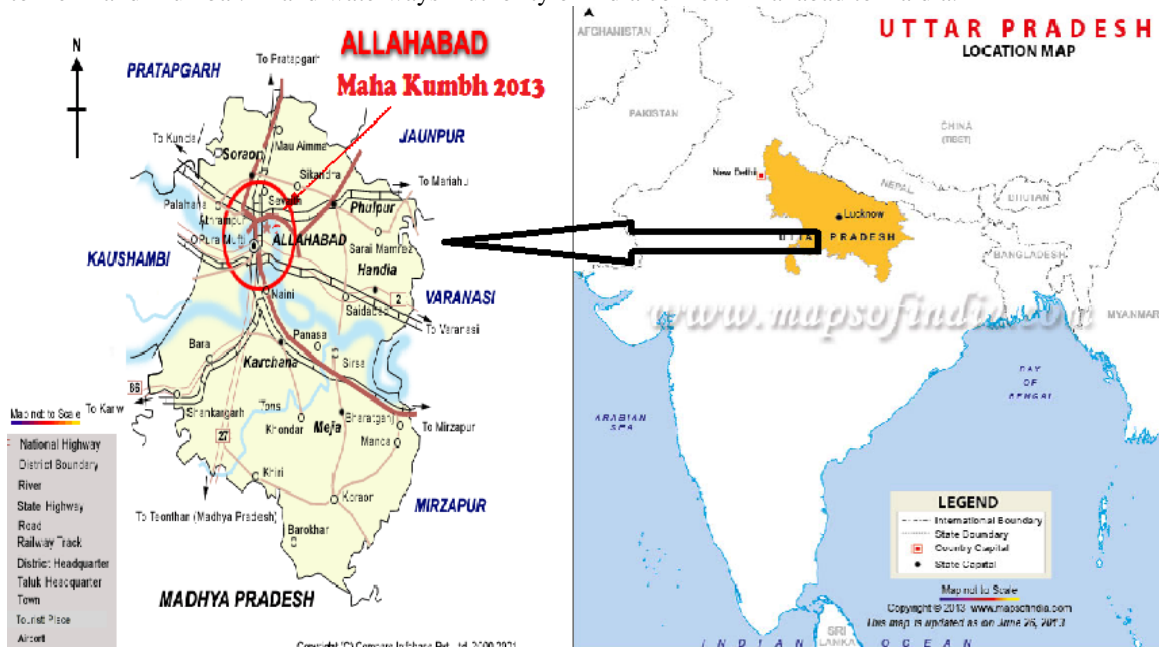


Fig. 1: Geographical Map of Allahabad

### B. Background of problems:

India is world's second largest populated country with country's population near 1.2 billion according to 2011 census. With such a huge population, the religion, faith, thinking and beliefs vary differently for different lot. Every sect of people has their own festivals and their ways of celebration. Generally these celebrations end up becoming an event of mass get-together. These events are observed with large number of turnouts with limited span and space. With this increasing number of events, it becomes imperative for the Government to get involved and make required arrangements to keep the functioning of the event up to date. The authorities need to get prepared for all kinds of causalities, security, disease outbreak, health and sanitation etc. Proper planning is essential for conducting any kind of event.

Kumbh Mela is generally acknowledged to be an event that is organized in religiously traditional method. With almost 10 million people gathering in a limited area, it becomes difficult for the organizing committee to take care of needs of each and every individual. This is similar to establishing and running a whole new city with all the basic amenities in a short duration.

### C. Planning at Maha Kumbh 2013:

Kumbh Mela is a massive event attracting millions of human population from all over the world. Every time there are new challenges. It was indeed a tough job for the planners to assess the data based on the previous year's Kumbh Mela and extrapolate the current estimated people travelling down by considering the factors such as population growth, infrastructure, road connectivity etc. the following data provides consideration for comparison:

- (1) Maha Kumbh 2001 was for 44 days while Maha Kumbh 2013 was for 55 days
- (2) India's Population was 102.87 crores in 2001 which has mounted to 121.02 crores in Census 2011.
- (3) The state population of Uttar Pradesh was 16.61 crores in 2001 which has raised by 20% in 2011.
- (4) The population of Allahabad district in 2001 was 49 lakhs and in 2011 it was 59 lakhs.

Estimated pilgrims during Kumbh Mela as estimated by Allahabad Nagar Nigam:

Table - 1  
Important Days and Estimated Visitors At Maha Kumbh 2013

S.No.	Bathing Days	Kumbh 2001		Kumbh 2013	
		Dates	Estimated Visitors	Dates	Projected Visitors
1.	Makar Sankranti	14.1.2001	100 lacs	14.1.2013	110 lacs
2.	Paush Purnima	09.1.2001	50 lacs	27.1.2013	55 lacs
3.	Mauni Amawasya	24.1.2001	276 lacs	10.2.2013	305 lacs
4.	Vasant Panchami	29.1.2001	175 lacs	15.2.2013	193 lacs
5.	Maghi Purnima	08.2.2001	150 lacs	25.2.2013	165 lacs
6.	Maha Shivratri	21.2.2001	50 lacs	10.3.2013	55 lacs

Various amenities provided by the Government were: road, water supply, land area, toilets, roadways, railways, fire stations, hospitals etc. as mentioned in Table 2:

Table - 2  
Services Provided By Allahabad Government

S.No.	SERVICES	UNITS	2001	2013
1	Area	Hectares	1495.31	1936.56
2	Toilets	Number		
2.a	Individual	Number	20481	35000+
2.b	Sulabh Complex (10 seaters)	Number	20	340
2.c	Trench Pattern	Number	17100	7500 (PRAI type)
2.d	Non Conventional	Number	0	1000+
3	Buses (Special)	Number	2824	3608
4	Trains	Number	600	750
5	Water supply	Kilolitres	56000	80000+
6	Roads laid	Kilometres	96.40	156.20
7	Hospitals			
7.a	Allopathic	Number	14	14
7.b	Homeopathy	Number	07	12
7.c.	Ayurvedic	Number	10	12

PRAI: Planning Research and Action Institute

### III. VARIOUS ENVIRONMENTAL CONCERN IN KUMBH MELA 2013

There are various factors which are been affected by the gathering of masses which are enlisted as follows:

- (1) Water supply and quality
- (2) Public health
- (3) Sanitation
- (4) Waste water management
- (5) Noise Pollution
- (6) Air pollution

Each of the above issues is quite important regarding the environmental approach of event management. Following are some challenges faced while conducting Kumbh Mela 2013:

**A. Water supply and Quality**

Each day more than 2.9 billion litres of untreated waste water is dumped in Ganga by nearby industrial areas of Allahabad. One of the major challenges at the Kumbh is managing the water flow for the millions of people who come to bathe. The clean water availability could not meet the requirements of the huge mass, predominantly on the special days. At Sangam, Allahabad, BOD of Yamuna and Ganga is generally less than 6mg/l which is generally due to the discharge of effluent of pulp and paper industries into the tributaries of Ganga (Ram Ganga and kali). Defecation in or nearby Ganga had lead to various diseases. Dips and the materials used for carrying the holy rituals like candles, flowers, etc further degrade the water quality of the river.



Fig. 2: Saints Performing Rituals During Kumbh 2013  
Source: National Geographic Website

**B. Public health & sanitation**

Public health refers to all organized measures (whether private or public) to prevent communicable as well as non communicable diseases, promote health and prolong life among the population as whole. Its activities aim to provide conditions in which mass can stay healthy. The focus of public health intervention is to improve health and quality of life through prevention and treatment of diseases. A modern health practice requires multi disciplinary tea, of professionals and public health workers. In selecting a site for conducting an event, an analysis should be made of any potential health hazards in the area. Hazards vary as powerlines which could be brought down by storms, extremes of temperature, pollens, particulate matter, dust storms, pests, vectors etc, The basic problems associated with public health are:

- (1) People do not use toilets and just go off in the open in a mass event basically in developing Country like India.
- (2) Manual Scavenging still prevails. There are about 9000 sweepers whose job is to sweep the feces into the pits.
- (3) The absence of an effective public health network in densely populated areas has resulted in an extraordinary high disease burden.
- (4) Breeding of mosquitoes and growth of pathogens followed by odor nuisance are basic characteristics of human feces.
- (5) Various waterborne disease was spread in recent Maha Kumbh 2013 having following numbers and time relationship:

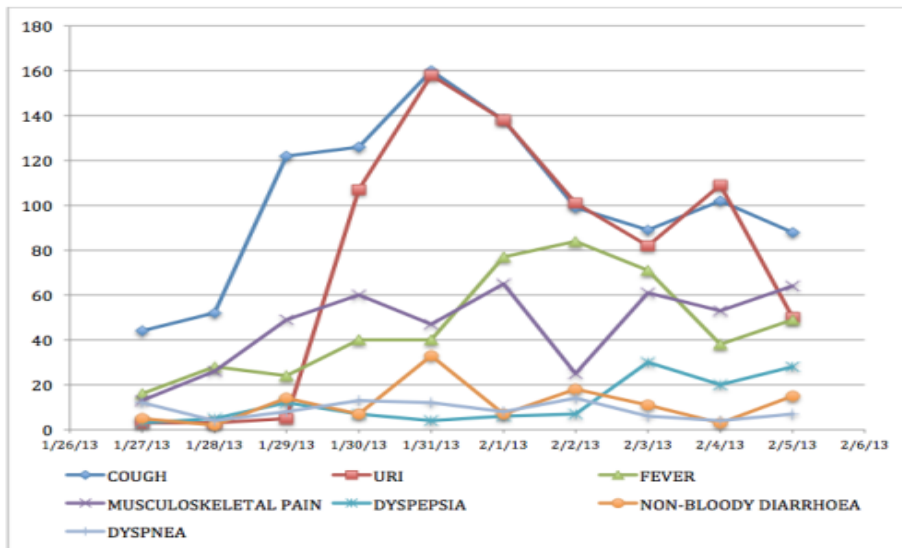


Fig. 3: Analysis of Diseases In Maha Kumbh 2013

### **C. Solid waste management**

The basic important issues related to solid waste are: Damage to environment and innumerable health issues. The following were the common sites at Kumbh Mela:

- (1) Trash decomposes in open which attracted flies and rats.
- (2) Trash is dumped in non biodegradable materials like polyether bags thus exist forever contaminating soil and the groundwater.
- (3) Animals often die from ingesting harmful materials like plastic, polythene bags etc.
- (4) The solid waste is swept into Ganga and her tributaries where large amount of biodegradable waste takes a lot of oxygen from water to decompose leading to death, illness and BOD level at certain stretch stoop down to unfavorable limits.
- (5) Non biodegradable materials just float & block off the free flow of water and slowly leech their harmful chemicals into water itself.
- (6) Lack of education and awareness among the ordinary people.

### **D. Air Pollution**

Air pollution has reached such a critical stage where it adversely affects every creature in the planet. The major sources are just stem out of the human activities like burning of fossil fuels, oil and natural gas, factories emitting smoke, automobiles, power houses, engines etc. These leads to the emissions of various gases like sulphur dioxide, nitrogen dioxide, carbon monoxide etc.

In Maha Khumbh the major cases of respiratory illness in approximately 15,000 patients were the smoke from choolahs used for cooking and shredding away the coldness of winter seasons. Also the priests and the rural people lit up their cigars, hookas and even cigarettes smoking was th common site in the gathering. Smoking is the huge issues in a public gathering in India. People just litter away the cigarettes, cigars, bidis etc. it raises the level of dangerous particulate matter linked to heart diseases, lung cancer, mouth and throat disorder etc.

Dust caused by large crowds or vehicle movements created annoyance and had caused problems for performers, patrons, and even the audience especially affecting the sensitive group of people.

### **E. Sewerage and wastewater**

Event site without a sewerage system can never be approved for conducting any kind of event. A relevant health authority or agency takes control of the waste water treatment and disposal system from food stalls, ablution blocks, etc. The Ganga and Yamuna are already beyond the acceptable levels of pollution. The clean water is taken ruthlessly from the rivers and sewage, offerings, wastewater are directly dumped in these rivers prior any kind of treatment. It is clear that for the occasion of Maha Kumbh, the government has made huge efforts to clean the two rivers but with a little success. There were certain steps implemented:

- (1) More water is allowed to flow in the river. This is critical because without dilution there will no assimilative capacity in the river.
- (2) Allahabad has built sewerage treatment plants. But it do not have proper system to intercept the sewage and transport it to the treatment units. In this way plants are not used effectively. The system remains underutilized for its capacity.
- (3) The city tried the experiments with affordable ways of treating sewage by using bioremediation system
- (4) The government had put a strict regulation on the polluting industries like distilleries, tanneries etc for discharging their waste in Ganga. This step provided temporary relief against pollution.

## **IV. SUSTAINABLE EFFORTS**

Mass events always require special management measures including non routine investments public resources in order to mangle and fulfill short term benefits keeping in mind the sustainable utilization of resources. But the condition of rapid fulfillment of the demands like building up of whole new arena for Maha Kumbh causes imbalance. The challenges were to conduct the Maha Kumbh by overcoming the imbalance and properly managing the resources in best possible way.

This makes the role of technology to come into play. Few technological methods and techniques could make the event more successful:

### **A. Hazard identification and risk Assessment**

The initial step of any mass event is to recognize any kind of hazard in the vicinity of the event area. The nature of hazard may vary according to location, but general natural hazards like floods, droughts, fire breakdown, wind storms, cyclones etc. can always occur without prior alarm. Many socio-political, economical and environmental prerequisites are considered for adequate risk assessment:

- (1) Adequate ventilation, illumination
- (2) No slip and leveled flooring
- (3) Safe access to equipments
- (4) Illuminated area layout to put in display at regular noticeable places
- (5) Fire extinguishers, fire blankets and fire alarms provision

- (6) A emergency team formation to counter the emergencies
- (7) Skilled personals to check and operate the equipments.

### **B. Public Awareness**

Public awareness should be emphasized if the proper planning has to be implemented. Many efforts should be made by the organizing committees to aware the general public concerning the necessary information through media, newspapers, electronic display boards, hoardings etc. For the very grass root announcements, pamphlets can be distributed among the public. Billboards and hoardings can also be used for mentioning help lines and other information. DO's & DON'T's information could also be mentioned in the public hoardings other information containing document. The entry and exit gate's information is also must in case of stampede.

Apart from above facilities, a Help Desk can also be setup for addressing all type of queries, complaints, requests etc. having staffs of both the sexes.

### **C. Water Supply**

Water is required for survival. It's the most important duty of an organizing committee to provide safe and portable drinking water. The water supplied should be uniform and the constant supply is enhanced by laying proper pipelines carrying drinking water from Water Board Supplies. The pressure should be sufficient enough to meet the required demands at all outlet points. Water should be readily accessible at all food premises, ablutions, toilets, laundry, designated standpipes, fire fighting, first aid posts and all the other required area. But it is strongly be available by the recognized water authority supply.

If event is arranged in a smaller scale, tanker facilities could be provided. But for the large scale events lasting from few days to months, spigots could be installed along with the water purification facility.

The quality of water for drinking and washing should be different as to retain the good quality water resources so that it cannot be wasted for washing and cleaning purposes. But the non potable supplies are to be clearly identified as non drinking purposes. The recycled water should be used for cleaning, gardening, washing, flushing etc. The recycled water can also be used for fire fighting, dust suppression and even sometimes for luxuries activities like spraying fans, coolers etc.

### **D. Health & Sanitation**

Public health is the most significant area of concern. There are numerous ways to create a clean environment for the mass event like regular fogging for pest control, cleaning of stagnant water pits to control the breeding of mosquitoes and flies, hospitals and health centres should be setup with qualifies doctors and nurses to take proper care of the patients, the medicines and other important equipments for the treatments should be present, an ambulance facility should be provided in case of emergency.

There are various methods by which the sanitation of the mass gathering event can be progressed. By technological advancements, different kind of toilets have been developed which can temporarily provides effective and clean sanitation facility:

#### **1) Ecological Sanitation**

These are also known as eco-san, it is a form of sanitation that usually involves urine diversion and the recycling of water and nutrients contained within human wastes back into local environment. Ecosan is based on an overall economical, environmental, sustainable wastewater management system which has been developed to fulfill the need of users as well the local conditions. It provides a flexible framework where the centralized elements can be combined with the decentralized ones, waterborne with dry sanitation high-tech and low-tech etc. by considering a much larger range of options, optimal and economic solutions can be developed for particular situation.

The basic advantages of ecosan are:

- (1) Improvement of health by minimizing the introduction of pathogens from human excreta into the water cycle.
- (2) Promotion of safe, hygienic recovery and use of nutrients, organics, trace elements, water and energy.
- (3) Preservation of soil fertility
- (4) Contribution to conservation of resources through lower water consumption, substitution of mineral fertilizers and minimization of water pollution
- (5) Improvement of agricultural productivity and food security
- (6) Preference for modular, decentralized partial flow-systems for more appropriate cost-efficient solutions adapted to the local situations
- (7) Promotion of holistic, interdisciplinary approach
- (8) Material flow cycle instead of disposal of valuable resources

#### **2) Portable toilets**

These are simple portable enclosures containing a chemical disinfectant instead of water. It is a temporary toilet used for large gatherings with minimal uses of water. Most portable toilets have black open front U-shaped toilet seats with a cover. They are often constructed out of light weight molded plastics.

– Advantages:

Portable toilets have several significant benefits mostly related to their portability; it can be drained, cleaned, disinfected and deodorized on a regular basis. It's cheaper as they are not plumbed, they don't clog. An average portable toilet is able to hold enough sewage for 10 people during the course of a 40 hour work week before the hold reaches unsanitary conditions.

– Disadvantages:

Since they are not plumbed, they keep waste inside the bathroom; this leads to smelly conditions, if not cleaned properly and periodically. This is also considered as an eyesore in most communities, some of which prohibit its use without permission of municipalities.

### 3) *Bio-digester Toilets*

These are based on anaerobic biodegradation of organic wastes by unique microbial consortium was conceived and developed by DRDO for defense forces deployed at higher altitudes areas. In this system, fecal matter is decomposed in bits and converted into water and little carbon dioxide & methane gas. It is totally maintenance free system and doesn't require any sewerage system.

#### a) *Working:*

A consortium of anaerobic bacteria has been formulated and adopted to work at temperature as low as 5 degree C. this is the component t which acts as inoculums to the bio digesters and converts organic matter to methane and carbon dioxide. The anaerobic processes in-activates the pathogens responsible for water borne diseases. Bio digester serves as reaction vessel for bio methanation and provides the anaerobic conditions & required temperature. The optimum temperature is maintained by microbial heat, insulation of reactor and solar heating.

#### b) *Biological Process in Digesters:*

Fecal matter is composed of carbohydrates, fats and proteins. A four step mechanism of decomposition is:

- (1) Hydrolysis: simple sugars, amino acids and fatty acids are break down into simpler compounds
- (2) Acidogenesis: formation of carbonic acid, alcohols, hydrogen and water
- (3) Acetogenesis: acetic acid, hydrogen and carbon dioxide is formed
- (4) Methanogenesis: conversion of all compounds to methane and carbon dioxide and neutral water (pH: 6-9)

The final product is left with no solids, only gases and water.

– Disadvantages:

Expert and skilled persons are required for design, construction, operation & maintenance depending upon the scale. Reuse of produced energy needs to be established. Sulphurous compounds leads to odour.

### 4) *Pit Toilets*

It is a dry system which collects human excrement in a large container or a pit or a simple slit trench with ventilation facility. They are basically used in rural areas or wilderness which lacks all the basic requirements. The waste pits in some cases may be large enough that the reduction in mass of the contained waste products by ongoing process of decomposition allows the pit to be more or less permanent. In other cases, when pit becomes too full, it may be emptied or hole may be covered by soil and rebuilt over a new pit.

The anaerobic decomposition takes place along with emissions of the gases and volume of sludge is reduced. There will also be die off bacteria and viruses during storage and as the water percolate through the soil so the pollution of groundwater occurs. Control of odour and insects can be achieved by a vented pit.

The period of emptying depends on the size of pit and its usage. it is desirable to store at least one year of sludge production.

### 5) *Dehydrating Toilets*

It is traditional indoor toilet in which urine is diverted to a collection tank or a soak pit under the toilet vault or outside the toilet and feces drop into one of the two vaults, below the toilet seat. When one vault is full, it is then sealed and another one is used. Materials like ash or soil or a mixture of sawdust/lime or soil/lime are added for defecation. The dry material assists the desiccation process and raises pH which aids in pathogen reduction.

### 6) *Composting Toilet*

It is a dry toilet that uses predominantly aerobic processing system that treats excreta with no water or low flush water via composting or managed aerobic decomposition. It can be used as an alternative to flush toilets in water scarce locations or where there is no provision of waste water treatment facility available or to capture the nutrients in human excreta. The decomposition of human sludge takes place in presence of air i.e. aerobic decomposition in an elevated latrine. They are used in many of the roadside facilities and public toilets.

Air can be introduced through an operating to pass through sludge and exit through the vent. Excess liquid is allowed to drain for collection or evaporation. The human excrement is normally mixed with sawdust, coconut coir or peat moss to support aerobic processing, absorb liquids and to reduce odor. The decomposition process is generally faster than anaerobic decomposition used in wet sewage treatment supply like septic tank.

### **E. Solid Waste Management**

There are various measures by which solid waste can be collected or recycled or reused:

- (1) Collection of waste generated at source will not only reduce the burden on the Municipal Corporation but also it saves time and the cost employed on segregation. The authorities should install adequate collection bins at major routes and location and these bins should be emptied at frequent intervals to maintain a clean and hygienic environment.
- (2) Availability of adequate number of sweepers and waste disposal units should cover the entire event area. Containers or garbage bins should be placed in large open areas as approximately 4 per acres.
- (3) Reduce, reuse and recycle should be the main motto of any event to take place by preventing harmful biodegradable materials such as plastics, polythene from entering nearby water body and providing alternative options for processing.
- (4) Exploring creative and innovative ways in which solid waste can be used as a source of fuel in form of by products like biogas. Also an alternative option of eco packaging could be employed.
- (5) Waste disposal or landfill sites should be identified well in advance if required in case of urgency. The efficient facility to transport the waste from event site to dhalao and from dhalao to landfill or waste processing site should be ensured.
- (6) A maintenance schedule should be set up to monitoring the work efficiency of the sweepers and required workers.
- (7) The placement of containers and all the treatment units depends upon the size of event and the crowd gathered. In high traffic areas such as spectator stands, seating toilets, handwashing area, activity areas along walkways from food booth etc. the frequent and easy removal facility should be present for proper management.

### **F. Fire Services**

Fire extinguishers should be installed at all places where there are maximum chances of frequent gatherings. Fire brigade should reach on time merely by fire alarms. In case of emergencies, a team should be dedicated to take control of the situation. The recycled water should be used for fire breakdown. The pantry, kitchens with LPG etc should be taken into special consideration. The combustible materials should be limited from the event area. The security personnel can ensure such strictness. The fire crackers, bits of cigarettes, smoking choolahs, hookas etc should be limited as far as possible.

### **G. Air Pollution Control**

Air borne pollution is the important issue to be taken into consideration. The transfer or movement of crowd, vehicles etc leads to generation of dust. Even in high wind areas, there is dust all around. Fugitive dust particles adversely affect the workforce health and can interfere with the food and water quality.

Concern regarding smoking is also increasing day by day. It kills not only the smokers but it enhances the passive smoking effects. Smoking affects major body parts like heart, lungs, skin, bones, stomach, mouth, throat, reproduction and fertility as well. Public health can be accounted by implementing smoke free policies in major gathering areas. Benefits would include decreased cleaning costs, better public image, the reduction of second hand smoke drifting onto major public areas and reduce nuisance impact for general public as well.

Dust suppression could be possible as:

- (1) Applying gravel to a dirt road surface.
- (2) Sealing unpaved roads with pavement or impermeable materials.
- (3) Reducing exposed ground by maintaining vegetation.

### **H. Waste Water Control**

All the liquid been generated from washing, cleaning or cooking activities should be disposed off efficiently in an approved manner. For a small scale function, a provision of pit can be used but for a large scale even proper treatment units should be employed. The organizers should have sewage pump out truck available on site at all time or on standby status for servicing the portable or other toilets.

In order to control insanitary conditions, sewage and waste water collection, treatment and disposal systems must be constructed and operated to prevent contamination of food or water supply. For insufficient sewerage system, the relevant health authorities should be contacted to determine the requirements for all type of sewage and waste disposal.

### **I. Noise Pollution Control**

For public events especially outdoors there is a need to apply guidelines for the maximum noise level typically allowed at the boundary from the nearest private dwelling in the vicinity of the source of noise pollution. Allow 4-6 weeks time for an application to be processed so that there is time left for comments and objections by affected public and the relevant stockholders in the area. Information regarding time, location, duration of the event along with the sound equipment functionality should be provided by the organizing committee to the relevant authorities.

It may need to consult an acoustic consultant on the impact of loud noise from the event adjoining property and stock in rural area.



### **J. Mass Casualty Management**

Mass casualties are characterized by the severity, diversity of injuries, availability of aid, time, etc. An effective mass management plan requires an establishment of baseline that is an assessment of current system's capacity against which planned changes can eventually be managed. A second key initiative should be taken to provide detailed understanding of hazards and risks. Emphasis should be paid on gathering retrospective data of previous similar events. This should not be limited to large scale disasters but also to the smaller ones like major traffic congestions, industrial incidents, chaos, building collapses and so on. It should not include a forward looking component assessing risk in future from the elements such as unsafe urban development or change in weather patterns.

This also necessitates the development of training modules and guidelines, monitoring and surveillance and early warning, stockpiling, collaboration with NGO's and corporate sectors as partners and thus finally developing a culture of community preparedness. It requires the paradigm change from the application of unlimited resources for the greatest good of each individual patient to the allocation of limited resources for the greatest good of the greatest number of casualties.

## **V. CONCLUSION**

Kumbh Mela, the name itself projects the belief and vibrant traditions in India. With the religious sentiments, and adamant faith of thousands of people encasing the event, the Mela itself is a binder of different sects of people. The effects of Kumbh Mela had grown significantly over the past decades, its ability to draw the mass all around the world has grown significantly.

In the presence of proper planning, a successful event can be guaranteed. The Kumbh had implemented many modern techniques like CCTV, GPS, advanced water treatment units etc., their total efforts is no doubt incredible but there were few loop holes in the planning section. There was lack of awareness among the masses regarding the use of advanced technologies been implemented, inadequacy of skilled personals for operation & maintenance on time.

This paper has covers the overall effects on environment due to conductance of Maha Kumbh by data analysis and few technological advancements which may prove useful to other events over the world like Hajj, Rath Yatra, Durga Puja etc, other fairs and festivals, sporting events, conferences etc. The means of sustainable development can be achieved by fulfilling the basic needs of the masses.

A mass gathering like Kumbh Mela often brings together organization that has never worked together. It is very essential to establish excellent coordination and communication system between different organizing groups. A proper understanding, planning, timely risk assessment and proper resource utilization can make any event a successful one.

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