

Building Toilets for Millions at the World's Largest Gathering: Kumbh 2025

- A Review From Sanitation Point Of View

The significance of Kumbh

The 'Kumbh', is synonymous with a cultural & spiritual legacy of Hinduism, a global appeal, and the world's largest religious gathering. The event occurs in every 12 years as *Purn* (Complete) Kumbh, in every 6 years as *Ardh* (Part) Kumbh and in every 144 years as *Maha* (Grand) Kumbh. Recognized by UNESCO as part of the Intangible Cultural Heritage of Humanity, this 45-day event attracts visitors from every corner of the world.

The Maha Kumbh 2025, a confluence (*Sangam*) of three rivers holy Ganges, Yamuna and mythical Saraswati at Prayagraj, Uttar Pradesh, India - recorded the presence of 660 million people, ¹ who took a dip in the holy waters. This is the highest ever recorded number in the history of Kumbh and way more than what was anticipated by the government (i.e. 450 million). The foreign visitors were expected to be between 1.5 – 3 million from more than 100 countries. ²

Such a massive event, demand for higher standard of public health services, especially in the post-pandemic scenario. And to justify to its international standards and collate the government's decade-long national sanitation initiative, named '*Swachh Bharat Mission*' (Clean India Mission), the state government had put in immense efforts to make it a '*Swachh Kumbh*' or 'Clean Kumbh'. For this, the toilet infrastructure was strategically planned across the 4000 hectares of land divided into 25 sectors by adopting an advanced maintenance system, expanding the sewage management system and conducting massive public awareness initiatives during an entire event, as an opportunity to set a global example of clean and green Kumbh.

However, providing an efficient and proper sanitation for such a huge congregation is a challenge for any administration.



Image showing the millions of people taking dip at Triveni Sangam (the primary ghat where the confluence of rivers takes place) on one of the auspicious bathing days during Maha Kumbh 2025. (Image Source: Pib.gov.in)

Sanitation initiatives of Kumbh 2025

The state had put in an extensive toilet infrastructure thoughtfully planned and covering its all the important aspects– *Access, Utility, Maintenance, Environmental consideration and Behaviour change.*



Access – Total 1,50,000 toilet units (five times more than what were built in Kumbh 2013) were strategically installed covering 10,000 acres of land from parking to ghats. The toilets were bifurcated as - 49,000 tentage toilets with soak pits, 12,000 Fiber Reinforced Plastic (FRP) toilets with septic tanks, 17,000 FRP toilets with soak pits, 9000 prefabricated steel-based community toilets with septic tanks & 23,000 with soak pits, 350 mobile toilets with 10 seats each, 15,000 cemented toilets, 500 VIP toilets and 20,000 FRP-based public urinal units. ³

Utility – Almost 1250 km pipeline was laid across the entire site supplying water to approx. 50,000 water access points, including the supply of water for toilets. ⁴ Although, for public the toilets had no individual tap connections – one water point served 10 toilet cubicles, from where the user had to fill a bucket and carry it to the toilet.

Maintenance – 350 suction vehicles were deployed to collect liquid waste from the septic tanks. To ensure proper cleaning of toilets a jet spray cleaning system was put in place and eco-friendly chemical solutions were used to help maintain the hygiene and odour-free sanitation facilities. ⁵ 10,000 sanitation workers were deployed for the regular cleaning of the site, while 5,000

workers were working just to clean the toilets. Additionally, 1,500 *Ganga Sevadoots* were monitoring the cleanliness of toilets by inspecting them twice a day by using Information, Communication & Technology (ICT) apps and filling out the questionnaire by scanning the QR code installed at every toilet.¹

Environmental considerations – The sanitation facilities were planned for the ‘Zero Discharge’ into the holy Ganges, in order to meet the environmental standards of the river and ensure the public health of millions of devotees who took a dip during the event. Three temporary Sewage Treatment Plants (STP) of 500 KLD capacity were installed at three sectors of the site for on-site waste treatment. ⁷ and three permanent Sewage treatment plants of 183 MLD capacity were added to the existing (340 MLD) city sewerage infrastructure. Additionally, it was ensured that all 81 city drains discharging sewage into the rivers were either connected to the treatment plant or managed by local authorities to achieve zero discharge into the holy Ganges during the event. ⁶

Behaviour Change – *Swachhata Rath Yatra* (Cleanliness processions) and several cleanliness drives were organized by the Municipal Corporation of Prayagraj, to encourage cleanliness. Street plays and musical performances were conducted to educate pilgrims on proper waste segregation and disposal. Additionally, Public address systems at ghats continuously broadcast messages urging devotees to maintain cleanliness. ¹



Image showing the preparation of the Maha Kumbh 2025, the toilet cubicles getting ready to be installed at the site. (Image Source: Associated Press (AP))

Evolving definition of 'Sanitation' through previous Kumbh

Kumbh has always shown a pattern of increase in terms of its attendees and hence the infrastructure, land coverage and required sanitation services. Maha Kumbh 2025 had two times more pilgrims than the previous Kumbh held in 2019 and five times more than the Kumbh held in 2013. (120 million in 2013, 220 million in 2019 and 660 million in 2025).⁹

In 2025, the number of toilets increased by 20% from the 2019 Kumbh (1,20,000 in 2019 to 1,50,000 in 2025). The Kumbh 2019 was the first ever Kumbh that introduced bio-toilets, ICT monitoring system, odour management, volunteer participation and behaviour change apart from building toilets. Even an effective sewage collection, treatment and safe disposal system was put in place.⁸ However, in Kumbh 2025 these initiatives were not just carried forward but also enhanced with more equipment and manpower.

Comptroller and Auditor General of India. (2014). *Performance Audit of Maha Kumbh Mela-2013, Allahabad. Government of India*, flagged a key issue on disposal of untreated sewage in the river and higher levels of BOD and coliform in *Sangam* (confluence) area in 2007 and 2013 Kumbh. Hence, this year special precautions were undertaken to address the problem.

Sanitation Challenges that still prevail

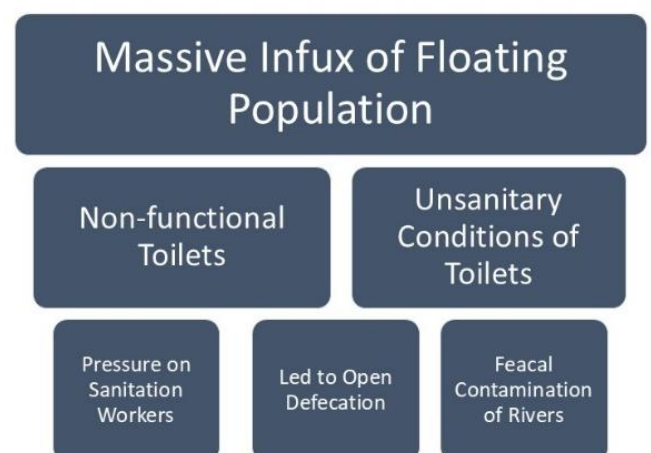
This year, the event witnessed a massive influx of population more than what was planned and anticipated.

The facilities at Kumbh were planned for a peak of 2-3 million population at any given point of time including 0.5-0.6 million people were estimated to be presiding at the site for an entire event duration. However, an unexpected massive influx of floating population this year recorded - 5 million people who took a dip at holy Ganges on the second auspicious bathing day alone (maximum recorded till now).¹ This had put immense pressure on the planned sanitation

facilities, as most of the toilets were found to be in unsanitary and non-functional condition during the event. Also, the toilets lacked individual water connections, which made it even more difficult for people to access water and hence led to the clogging and blocking of the toilets with waste. It also poses serious challenge especially for women, children and old age people.

The toilet cleaners had to clean toilets manually, as the jet spray did not have enough pressure and moreover, they had to clean continuously getting themselves dirty. The lack of individual tap connections in toilets made the situation worse, the supply of buckets to carry water to the toilets was short, hence people used plastic bottles and dumped them inside the toilets leading to clogging and making it unfit for further use.¹⁰

It has also been recorded that the open defecation and high pressure on planned sewerage management services had led to faecal discharge into the holy Ganges. Therefore, handling the excess sewage and monitoring the environment became an issue during the peak flow of pilgrims. This had put an extra pressure on the planned system leading to high faecal coliform level in the river.¹¹



Sanitation solutions for future Kumbh

While looking at the solutions, it is imperative to look into the minor details of toilet infrastructure - like the design of the toilets, the need for water per usage and monitoring and cleaning mechanisms.

- *Access to water connections at individual toilet units*, running water is essential to keep the toilets clean and maintain hygiene standards per usage. Lack of running water leads to clogging and blockage in toilets, as witnessed in 2025 Kumbh. This may include a flushing system, (part flushing – 4 litres/usage) for each use.
- *Behaviour change*, as it was recorded in 2013 Kumbh that 80% of the population at Kumbh comes from rural areas who are used to open defecation practices and not acquainted with hygienic toilet practices.¹² Hence it is essential to have behaviour change practices especially in and around toilet complexes. More emphasis needs to be given at this issue.
- *Increase of on-site treatment*, by increasing the containment capacity of the septic tanks/soak pits. However, it is also essential to innovate and adapt advanced designs for soak pits and septic tanks. (for example: introducing filter media to prevent seepage of untreated water into the ground, twin pit septic tanks to separate water and sludge) The overflow of the septic tanks is one the major reasons for overflowing faeces and blocking of toilets.
- *Zero discharge* –For an effective collection system, the frequency of collection has to be increased. Use of more prefab technologies (for example: prefabricated Sewage Treatment Plants (STP)s, Bio-digesters) for on-site collection and treatment.
- *Constant adaptation of advanced toilet designs*, the use of innovative toilets that use less water, or which are more women and disabled-friendly require to be experimented and adopted with every Kumbh.



Image showing the sanitation workers being ready to go on their job during Maha Kumbh 2025 (Image Source: Associated Press (AP))

Conclusion

Sanitation, especially toilet building has been a concern of the nation since the launch of the nationwide sanitation initiative 'Swachh Bharat Mission (SBM)' (Clean India Mission) in 2014. Since then, it has been 11 years of rigorous education, research, innovation, implementation and learning on toilet building in the entire nation. Collating the learnings from SBM, many initiatives were adopted during Kumbh 2025. However, we still face challenges to put upfront a robust and resilient toilet infrastructure in place.

It has been observed that, while many new initiatives were undertaken in Kumbh 2025 to make it a clean Kumbh, but Kumbh surprises every year and hence calls for new innovations and initiatives to be adopted and upgraded with every event.

With global visitors, it calls for sanitation and hygiene for international standards to avoid any public health challenge, especially in a post-pandemic scenario. Additionally, safe sanitation and hygiene practices are even more critical to prevent the contamination of the sacred rivers and the groundwater.

Therefore, to handle such a huge mission with an efficient sanitation system, it becomes the responsibility of not just government but also at individual, community and organization level to take the civic responsibility. As it is more likely that one single agency would fail to handle such a mammoth task.

Lastly, *Maa Ganga* (Holy Ganges) is the faith and carries high religious significance. While using the toilet at one of the tents at the Kumbh 2025, one of the pilgrimages said to the user '*Please ganda nahi kariyega, yeh bhi maa ganga hi hai*' (Please use the toilet properly, as this is also the holy Ganges) pointing towards the riverbed. This brings to the thought that once the event ends the Pilgrims, Sadhus (Saints), Officials everyone will go back to their homes, this pop-up city will vanish, the holy Ganges waters will reclaim its banks and engulf all that was left behind on her lands. Hence it is our duty to leave only our prayers and respect - not our waste.

Author:

Mr Mahender Kumar Gupta
Managing Director

Ms Suhani Gupta
Sr. Architect



M/s MKG Engineering Services Pvt Ltd
1st Floor, A-8, Paryavaran Complex,
IGNOU Road, New Delhi - 110030

References

1. Press Information Bureau, Government of India. (2015, February 26). *Mahakumbh 2025: A spectacle of Faith, Unity and Tradition*. <https://archive.pib.gov.in/archive2/AdvSearch.aspx>
2. India Today. (2025, February 26). *Memories of Maha Kumbh Mela 2025: How foreigners will remember Prayagraj, Shahi Snan, Shivratri*. <https://www.indiatoday.in/india/story/memories-of-maha-kumbh-mela-2025-how-foreigners-will-remember-prayagraj-shahi-snan-shivratri-2686021-2025-02-26>
3. The Statesman. (2024, November 20). *1.5 lakh toilets for Mahakumbh Mela area by Dec 15*. Retrieved from <https://www.thestatesman.com/india/1-5-lakh-toilets-for-mahakumbh-mela-area-by-dec-15-1503362121.html>
4. Times of India. (2025, March 31). *Massive 1,249 km water pipeline project for Maha Kumbh 2024 in Prayagraj*. <https://timesofindia.indiatimes.com/city/allahabad/massive-1249-km-water-pipeline-project-for-maha-kumbh-2024-in-prayagraj/articleshow/115498188.cms>
5. Business Standard. (2025, February 17). *Zero river discharge at Maha Kumbh: Daily wastewater treatment ensured*. Retrieved from https://www.business-standard.com/india-news/zero-river-discharge-at-maha-kumbh-daily-wastewater-treatment-ensured-125021701179_1.html
6. Times of India. (2024, March 31). *Thirty-nine untapped drains a big challenge ahead of 2025 Maha Kumbh in Prayagraj: NMCG steps in to fix the gap*. Retrieved from <https://timesofindia.indiatimes.com/india/thirty-nine-untapped-drains-a-big-challenge-ahead-of-2025-maha-kumbh-in-prayagraj-nmcg-steps-in-to-fix-the-gap/articleshow/112792825.cms>
7. Times of India. (2025, March 30). *Revolutionary BARC technology powers temporary STPs for a clean Maha Kumbh*. Retrieved from <https://timesofindia.indiatimes.com/city/allahabad/revolutionary-barc-technology-powers-temporary-stps-for-a-clean-maha-kumbh/articleshow/115342367.cms>
8. Kanaujiya, A. K., & Tiwari, V. (2021). *The Changing Concept of Sanitation Management in Kumbh Mela and Further Challenges*. IJSR, Volume 10, Issue 10.
9. Alison, L., Bhatia, G., & Mehrotra, R. (2014). *Kumbh Mela: Mapping the Ephemeral Mega-City*. Harvard University Press.
10. The Wire. (2025, March 1). *Outcast toilet cleaners keeping Kumbh Mela running*. Retrieved from <https://thewire.in/health/outcast-toilet-cleaners-keeping-kumbh-mela-running>.
11. India Water Portal. (Year, Month Day). *Can we celebrate Kumbh while ignoring the health of its rivers?* <https://www.indiawaterportal.org/people-and-culture/culture/can-we-celebrate-kumbh-while-ignoring-the-health-of-its-rivers>
12. Harvard Global Health Education and Learning Incubator (GHELI). (2014). *Toilets and sanitation at the Kumbh Mela*.
13. Down to Earth. (2025, January). *With 45 million devotees seeking holy bath at Maha Kumbh, here's how administration seeks to ensure that Ganga is dip-safe*. <https://www.downtoearth.org.in/governance/with-45-million-devotees-seeking-holy-bath-at-maha-kumbh-heres-how-administration-seeks-to-ensure-that-ganga-is-dip-safe>
14. India Today. (2025, February 22). *National Green Tribunal warns Uttar Pradesh government on open defecation ahead of Maha Kumbh Mela 2025*. <https://www.indiatoday.in/india/story/national-green-tribunal-maha-kumbh-mela-2025-open-defecation-uttar-pradesh-government-2683954-2025-02-22>
15. Deccan Herald. (2025, Date). *160,000 tents, 150,000 toilets, 1,250 km pipeline: UP administration readies for grand Maha Kumbh*. <https://www.deccanherald.com/india/uttar-pradesh/160000-tents-150000-toilets-1250-km-pipeline-up-administration-readies-for-grand-maha-kumbh-3336054>
16. Pandey, M. K. (2025, February). *Maha Kumbh 2025 and its global appeal: Attracting international pilgrims and tourists to Prayagraj*. *International Journal of Innovative Research in Technology (IJIRT)*, 11(9), 1524. ISSN: 2349-6002
17. Prayagraj Mela Authority. (2020). *Swachh Kumbh, Delivering a Clean Kumbh*. Retrieved from <https://prayagrajdivision.nic.in/division/prayagraj-mela-authority/>