



# Kumbh at Prayag // 2025

*How a logistical marvel in the form of a transient city comes to life*



**Amit Kapoor**

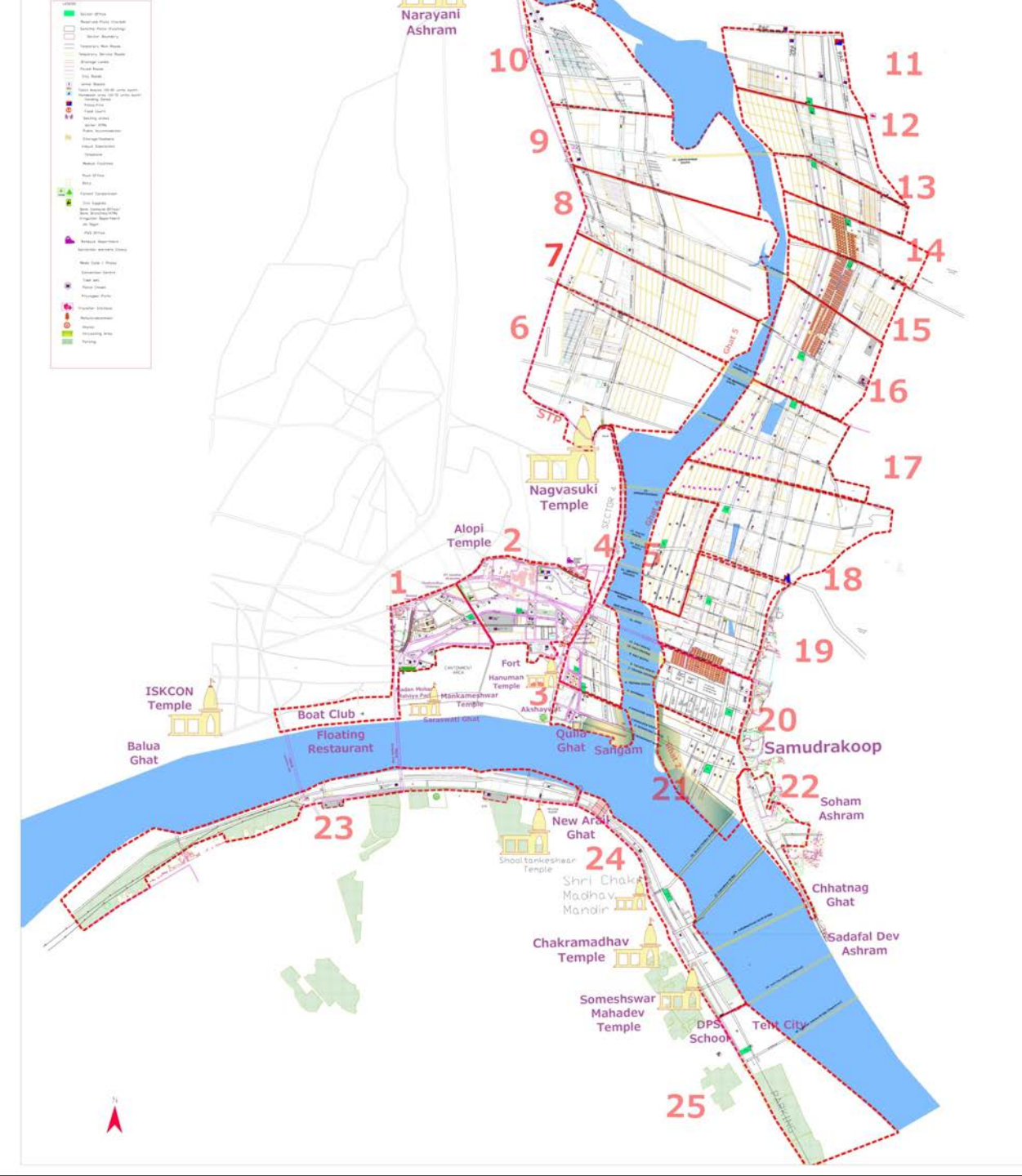


# MAHA KUMBH MELA 2025

Maha Kumbh Mela 2025 in Prayagraj, held from 13 January to 26 February, saw a record-breaking turnout of 66 crore devotees, far surpassing initial estimates of 45 crore.

Spanning over 25 sectors with 4,000 hectares, the event featured extensive infrastructure upgrades, including more than 10,000 tents, 12 km of bathing ghats, and the reclamation of 1,850 hectares to accommodate the massive influx of pilgrims.

Source : IFC Research Team



# Management of Kumbh

- The Uttar Pradesh government designated the Mela grounds as a new administrative district—“Maha Kumbh Mela District”—to streamline crowd management, sanitation, and security operations.
- Additionally, robust medical services with thousands of healthcare personnel, enhanced power supply networks, and AI-driven lost-and-found solutions contributed to a safe and spiritually enriching experience for devotees bathing at the confluence of the Ganges, Yamuna, and mythical Sarasvati rivers.



# Crowd Management



# Crowd Management

**Crowd management** is one of the most pressing concerns when managing an event of this magnitude.

One logistical challenge faced during the development of the mela infrastructure was the timely construction of pontoon bridges, also known as "Peepa Puls."



## Pontoon Bridge Challenge

High Ganges flow (20,000 cusecs) delayed construction, which ideally requires 6,000–10,000 cusecs.



## Rapid Expansion & Completion

Bridges increased from 22 to 30, built within 60 days despite adverse conditions.

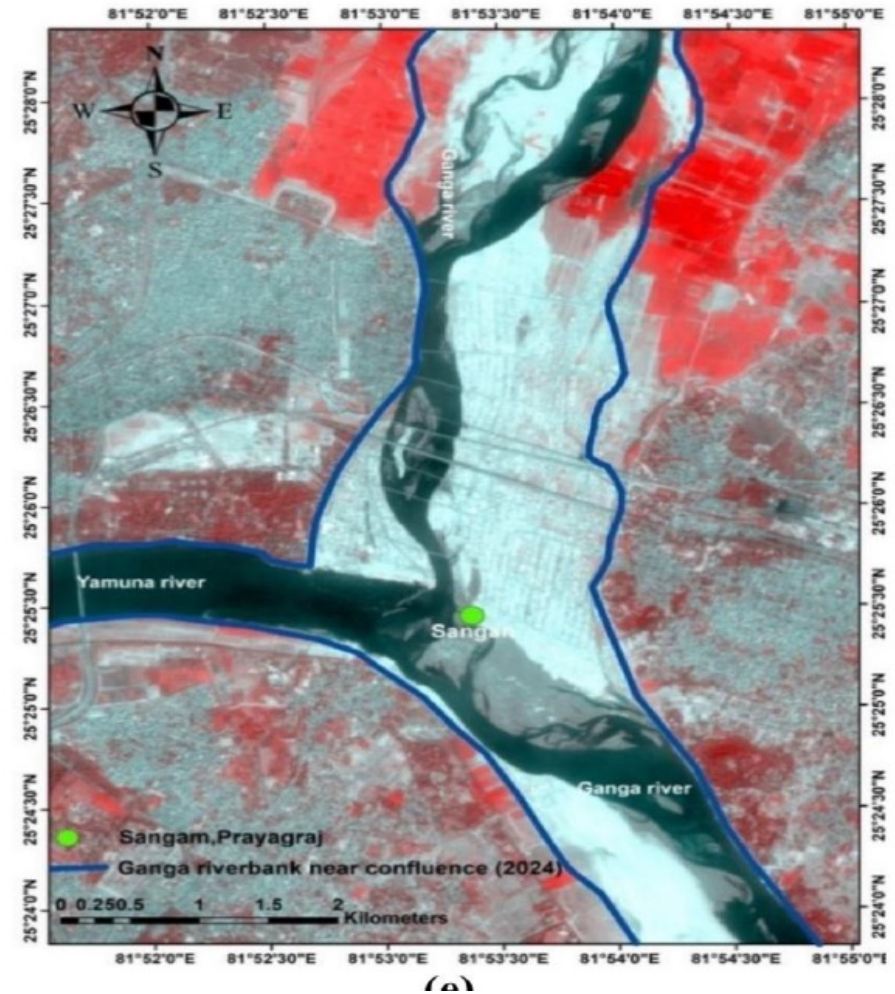
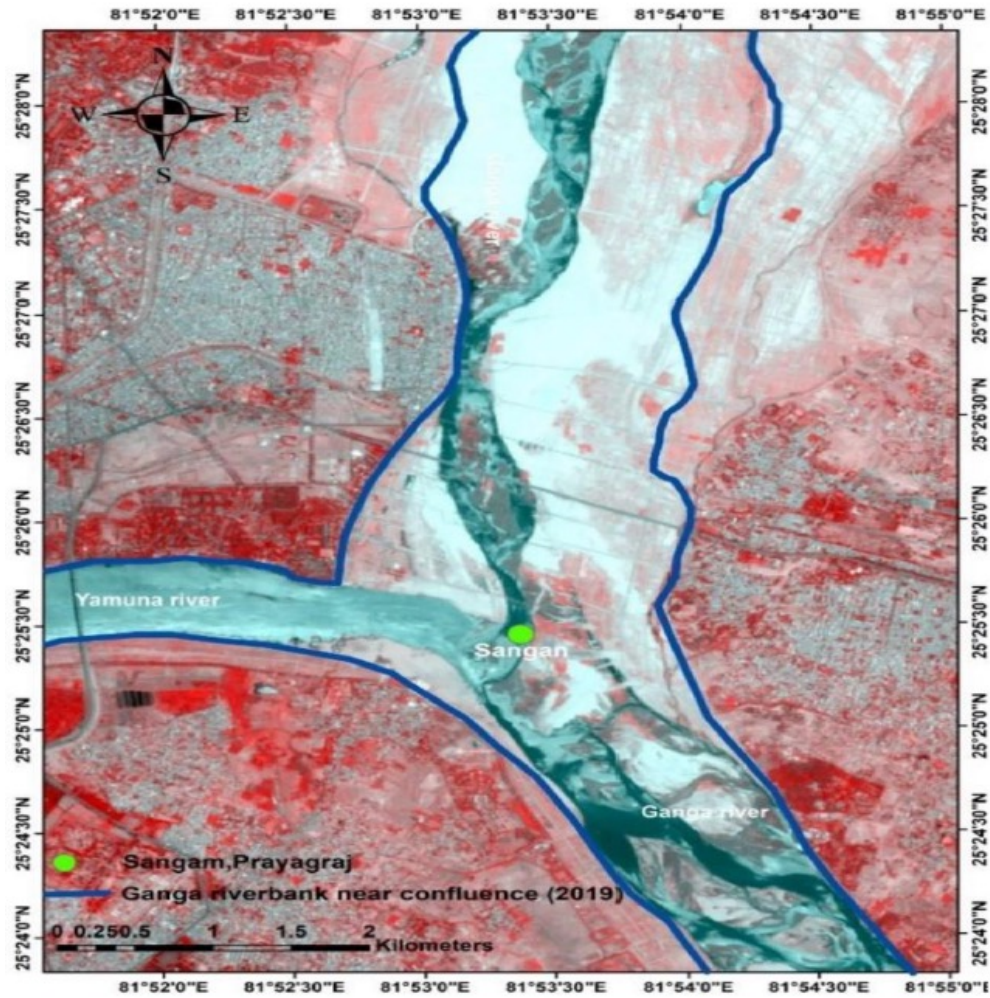


## Daily Maintenance

Dedicated teams on standby to ensure continuous, safe operation during the Mela.



# Flow Status of River 2019 vs 2024





# Expansion of Sangam Bathing Area Feat achieved by Irrigation Department

- **Mass Mobilization & Land Reclamation:**
  - The irrigation department and Mela administration mobilized 250 dredgers and over 16,000 laborers.
  - Reclaimed 2 hectares of land at Triveni Sangam in just 85 days.
- **Enhanced Capacity for Devotees:**
  - Expansion allows at least 200,000 more devotees to bathe simultaneously, greatly increasing accommodation compared to past years.
- **Additional Land Reclamation Efforts:**
  - The deployment of 4 dredging machines resulted in reclaiming an extra 26 hectares of land, a fulfilling experience for millions of pilgrims.
  - This effectively **tripled the bathing capacity** at the Sangam compared to 2019.
- **Coordinated Government Effort:**
  - Careful planning and collaboration among the irrigation department, labourers, and technical teams ensured a safe and spiritually



# Rejuvenation of Ghats

- Several historic ghats, including Old Arail, Baluwa, Kali, and Mauzgiri along the Yamuna River, and Chhatanag, Nageshwar, and Rasulabad along the Ganga River, have undergone rejuvenation with an investment of ₹15 crores.
- This initiative reflects a commitment to both spiritual and infrastructural enhancement. The improvements made to these ghats facilitated better access and enriched the experience for devotees, allowing them to participate in rituals without any obstacles.



# Massive Deployment of Police & Armed Forces

- **Personnel from all 75 districts of Uttar Pradesh** and armed forces from across India were mobilized.
- **Dynamic crowd control** measures include **real-time management of barricades and pontoon bridges** to prevent cross-movement between key areas like Jhunsi and Naini.
- **Real-time crowd density monitoring** guides personnel to execute **30 planned divergence schemes** to maintain safe movement.
- **54 Standard Operating Procedures (SOPs)** established for emergencies, including **fire hazards, bomb threats, and crowd surges**.
- **Variable Messaging Displays (VMDs)** indicate which **pontoon bridges are open or closed** for efficient crowd movement.
- **Specialized security units such as:**
  - **Rapid Action Force (RAF):** Trained in riot control & emergency response.
  - **Indo-Tibetan Border Police (ITBP):** Expertise in managing large crowds & high-risk situations.
- **Empathy & psychological training** provided to personnel for **non-confrontational crowd management**.



# Technology-Enabled Security

- **2700+ CCTV cameras, including 328 AI-enabled cameras**, enable real-time monitoring.
- **Drone surveillance** enhances tracking of crowd movements and prevents bottlenecks
- **Loudspeaker announcements in multiple languages** guide pilgrims and help prevent confusion.





# Health Facilities at Mela

## Extensive Medical Infrastructure:

- Over 2,000 medical personnel deployed; Central Hospital (100 beds) & 23 additional hospitals (360 beds total), including sub-central and sector hospitals.

## Specialized & Emergency Services:

- Comprehensive care from OPD to major surgeries; 133 ambulances (7 river, 1 air) and dedicated first aid posts, plus key hospitals on high alert.

## Advanced Technology & AI Integration:

- ECG services, central pathology lab (100+ tests/day), and AI-driven translation supporting communication in 41 languages.

## Affordable Medicines & Wide Network:

- Five Jan Aushadhi Kendras in Mahakumbh Nagar (part of 15,000+ national network), contributing significantly to the national medicine sales target.



# AYUSH CENTRES



According to the Chief Ayurveda Officer of Nagar Mahakumbh, the Ayurveda Department treated **7 lakh 32 thousand 02** patients, of which **4 lakh 60 thousand 702** were ayurvedic and **2 lakh 71 thousand** were Homeopathy related patients.



Additionally, with the help of the Morarji Desai Institute, **7,100** patients benefited through yoga. In the Mahakumbh Mela area, **90 doctors** and a team of **150 employees** have been providing services day and night at the Ayurveda hospitals that were set up.



In the Ayurveda clinics located in **Sector-02, Sector-21, and Sector-24**, people were continuously informed about ways to prevent illness and remain healthy through regular yoga. Physiotherapy yoga services were also provided to the pilgrims, benefiting **3,430** of them.

The Ayush team distributed medicines from a mobile van, while the Homeopathy team conducted health check-ups in remote areas without Ayurveda hospitals. They also visited Tunga, Verna, Janana, and local shelter homes to treat colds and coughs.

An aerial night photograph of a city, likely in India, showing a wide river in the foreground and a dense urban area with many lights in the background. Power lines and structures are visible across the scene.

# Uninterrupted Power supply marveled by UP Power Corporation Ltd (UPPCL)

UPPCL addressed a surge in electricity demand with significant infra enhancements

- New Sub-Station Deployments: 170 sub-stations: 11/0.4 kV, 400 kVA capacity.
- 14 sub-stations: 11/0.4 kV, 250 kVA capacity. 128 sub-stations: 11/0.4 kV, 100 kVA capacity.
- Enhanced Power Reliability: These efforts ensure a stable, reliable electricity supply for the anticipated high load.

# Innovations (Based on 2019 Mela Issues):

## Solar Hybrid Lights:

- 2000 installed (compared to 70,000 normal ones)
- Can charge via electricity and solar power
- Light-sensing: Auto switches on/off based on sunlight
- Anticipated fog issues, so they also charge via electricity as backup
- No power cuts affect them (unlike 2019, where light cuts were a major issue)

## RMU (Ring Main Unit) – 15 locations:

- Connects three main regions – Daraganj, Jhunsi, and Arail
- Ensures electricity can be withdrawn/transferred in case of power loss in any area (14 permanent substations (main electricity sources))
- Interconnections done through 11 KV lines over pontoon bridges
- Takes just 20 seconds to switch over

## Portable High-Mast Generators (4 units):

- Used for electricity poles and substations
- Mela setup work is 24/7, but substations couldn't be built at night due to land allocation/road issues
- These generators provided temporary power for night work

## Safety Improvements:

- In 2019, short circuits were a big issue
- This time, all wiring was done through pipes to avoid exposed/naked wires
- MCBs were installed to prevent electrical hazards

## QR Coding & Geo-Tagging:

- All electrical assets were geo-tagged for easy tracking
- Helped in locating faults quickly
- Also used for lost and found – people could send photos of electrical points, scan the location, and navigate back

# Lost and Found Centers : Reunited loved ones



## BHASHINI's Digital Lost & Found Solution :

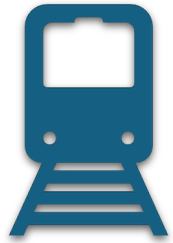
- Enabled voice input and real-time translations for ease of reporting lost/found items.
- **Integrated Support Services:** Provides center visitors food, water, and medical assistance.
- **Centralized Real-Time Database:** Continuously updated for swift cross-referencing of missing individuals and family inquiries.
- **Impact:** Rapid reunification of lost individuals with families, underscoring the system's effectiveness and high relief

# Transport and Connectivity





# Railway Transportation at Kumbh Mela



## Extensive Rail Operations

The Indian Railways played a crucial role in facilitating transportation during the Kumbh Mela. More than 14,000 trains operated during the event handling close to 5 crore devotees.

Among the nine stations serving Prayagraj, the Prayagraj Junction alone handled 5,332 trains, providing significant relief to travellers.

Additionally, ring rail MEMU services were introduced for pilgrims visiting Ayodhya, Kashi, and Chitrakoot.

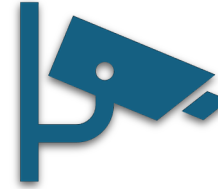


## Effective Crowd Management

To ensure smooth passenger movement, the railways implemented unidirectional entry and exit points at stations. For instance, at Prayagraj Junction, entry was from the city side, while exit was from the Civil Lines side.

Direction-wise, color-coded holding areas were created at all railway stations in Prayagraj, with a total capacity of over one lakh passengers. These enclosures provided essential amenities such as resting spaces and washrooms.

More than 18,000 personnel from the Railway Protection Force



## Infrastructure Development & Security Measures

To enhance surveillance, 1,186 CCTV cameras were installed, out of which 116 cameras were equipped with facial recognition technology for real-time monitoring.

The transportation efforts were managed by three key railway zones: Northern Railway, North-Eastern Railway, and North-Central Railway, covering stations in and around Prayagraj

# Bus Connectivity

On February 12, 2025, the Uttar Pradesh government deployed an additional 1,200 buses, supplementing the 3,050 already allocated for Maha Kumbh 2025.

- ✓ Special shuttle services were also arranged to enhance transportation within the city.- Buses were available every 10 minutes at four temporary bus stations.
- ✓ A total of 750 shuttle buses were operating every 2 minutes to improve intra-city connectivity.- Measures were taken to prevent overcrowding and ensure smooth movement for the pilgrims.





## **Circular Approach & 3Rs in Waste Management at Maha Kumbh Mela**

# Challenges of Solid Waste Management (SWM) in Mass Gatherings as Maha Kumbh Mela

## ◆ High Waste Generation:

- ❖ 60 crores of pilgrims generate tons of waste daily (plastic, food, paper, organic waste).

## ◆ Limited Infrastructure:

- ❖ The temporary nature of the event makes long-term waste solutions difficult.
- ❖ Inadequate collection bins & disposal sites.

## ◆ Segregation & Recycling Issues:

- ❖ Lack of proper waste segregation at source.
- ❖ Low public awareness about eco-friendly disposal methods.

## ◆ Logistical & Manpower Constraints:

- ❖ Need for continuous waste collection & transport to treatment sites.
- ❖ Managing the workforce in a high-footfall, chaotic environment.

## ◆ Environmental Impact:

- ❖ Risk of water contamination from untreated waste.
- ❖ Air & land pollution due to unregulated open dumping & burning.

***Need for a Circular & Sustainable Approach!***

# Solid and Waste Management Preparedness for Maha Kumbh Mela

- Under the Swachh Kumbh initiative, the Prayagraj Mela Authority has set up around **1.5 lakh toilets and urinals** in the Maha Kumbh area.
- More than **15,000 sanitation workers** and **2,000 'Ganga Seva Doots'** worked day and night to ensure that the holy rivers and the fairgrounds remained spotless, reinforcing the commitment to a '**Swachh Kumbh**'.

## LARGE-SCALE SANITATION INFRASTRUCTURE

TO ACCOMMODATE THE VAST INFLUX OF DEVOTEES

12,000

FRP Toilets  
with Septic Tanks



16,100

Prefabricated  
Steel Toilets  
with Soak Pits



20,000

Community  
Urinals  
Strategically Placed



## EFFICIENT WASTE MANAGEMENT SYSTEM

20,000

Trash Bins  
For Waste Segregation  
at Source



37.75 Lakh

Liner Bags  
For Systematic  
Waste Collection



Special

Sanitation Teams  
For Rapid  
Waste Clearance



# Spread of 1.5 lakh toilets across sectors

**Sector 13**



**Sector 12**



**Sector 24**



**Sector 21**



**Sector 3**



**Sector 17**





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# SANITATION WORKERS AT MAHAKUMBH MELA

Source : IFC Research Team

# Street Cleaners: Lifeline of Kumbh Mela

15,000 street cleaners

Organized into 800 gangs (12 cleaners per gang)

A mix of 5,000 private cleaners and 10,000 government workers

## Disposal:

- Garbage was collected in bags
- 120 tipper trucks pick up waste 3–4 times daily (with extra trips during peak "bhandara" times)
- Transfer stations: 1 per sector, supported by 2 compactors each
- Waste is segregated for decomposition



## Collection & Transport:

- Baswar Dumping Ground (designed by Nagar Nigam Prayagraj) serves as the final disposal site



# Living Conditions of Sanitation Workers in Mela

Every sector had two circle incharges, 11 supervisors and mates. The mates were managing multiple gangs of 12 workers each.

Every Sanitation worker was promised to be paid 412 rupees per day whereas every mate was paid 453 rupees per day.

Sanitation workers received wages ranging between Rs10,500 and Rs12,000.

Those employed directly under the Government of UP were paid a fixed wage of Rs12,000.

Additionally, Mela Pradhikaran provided each worker with separate rations of 5kg each for wheat, rice, and sugar.

To support the workers further, Mela Pradhikaran supplied essential tentage materials—including tarpaulin, bamboo, and ropes.

However, dedicated sanitation colonies were not available in every sector. In sectors 14, 19, and 5, private contractors had not released the first installment of wages nor met their commitment to provide dedicated facilities till during our visit in the mela .

# Living Conditions of Sanitation Workers

## Sector 23

Sanitation workers employed by Lalo Ji and Sons expressed high satisfaction with their working conditions.

They received their wages promptly—with the initial installment disbursed on schedule.

They were provided with winter clothes, emergency medical assistance, gloves, other cleaning materials, and regular food rations by LJS.



# Living Conditions of Sanitation Workers not in Authorized Colonies



# Challenges in Drainage during Peak Days

## - Sector 19

9<sup>th</sup> Feb – Post 3<sup>rd</sup> Shahi Snan



On Mauni Amavasya , deep cleaning had not happened due to vehicular restrictions . Suction vehicle had arrived just when we were there.

22<sup>nd</sup> Feb – Post 3<sup>rd</sup> Shahi Snan



Daily Cleaning was happening since 12<sup>th</sup> February

# Trash Skimmers: River Cleaners

- Align with PM Modi's Swachh Bharat to keep Triveni Sangam pure
- Remove 10–15 tons of waste daily from the Ganga and Yamuna
- **Operational Overview:**  
Machine capacity: 13 cubic meters, covering a 4 km stretch from the Sangam to the boat club
- **Waste Collection:**
  - Gathers floating debris such as flowers, garlands, paper plates, incense wrappers, plastic, coconuts, clothes, and more
  - Also removes water weeds (water hyacinth)
- **Waste Disposal Process:**
  - Collected waste is dumped at a designated site near Naini
  - Trucks transport waste daily to Baswar plant for separation into recyclables and compostable materials

**Purpose:** Used for cleaning the water at the Sangam during the Maha Kumbh to ensure a hygienic environment for devotees taking a holy dip.



Source : IFC Research Team



# FAECAL WASTE AND WASTE WATER MANAGEMENT AT MAHAKUMBH MELA

Source : IFC Research Team

# How was Waste Management done at Mahakumbh Mela ?

At **Kumbh Mela**, the treatment of **greywater and faecal sludge** follows a structured approach, utilizing both **Sewage Treatment Plants (STPs)** and **Faecal Sludge Treatment Plants (FSTPs)** to ensure proper sanitation and environmental safety.

## 1 Greywater Treatment – STP Process

Greywater is directed to **Sewage Treatment Plants (STPs)**, where it undergoes **screening, grit removal, Bioremediation, and disinfection** before being safely discharged into the **Ganga River**.

## 2 Faecal Waste Treatment – FSTP Process

• **Primary Source:** Temporary toilets and sanitation facilities generate **faecal sludge**, which requires specialized treatment.

• **Collection & Transport:** **Cesspool vehicles** are deployed to collect faecal sludge from various locations and transport it to the **Faecal Sludge Treatment Plant (FSTP)**.

• **Treatment Process:**

- **Screening:** Removal of solid waste and non-biodegradable materials.
- **Anaerobic Reactor (ABR):** Breakdown of organic matter and pathogen reduction.
- **Sludge Drying Beds:** Separation of treated water and solid sludge.
- **Further Treatment:** Processed sludge is converted into **organic manure**, while treated water is directed to the **STP for secondary treatment**.

# Faecal sludge being extracted for safe processing at FSTP



Source : IFC Research Team

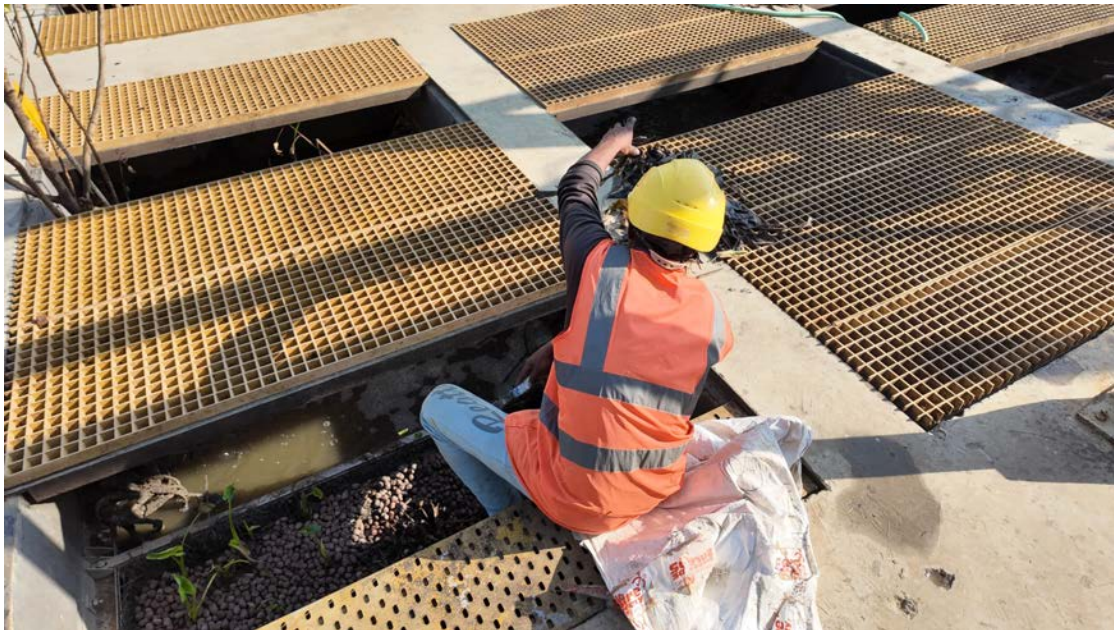




# Sanitation and Waste Disposal at Mela



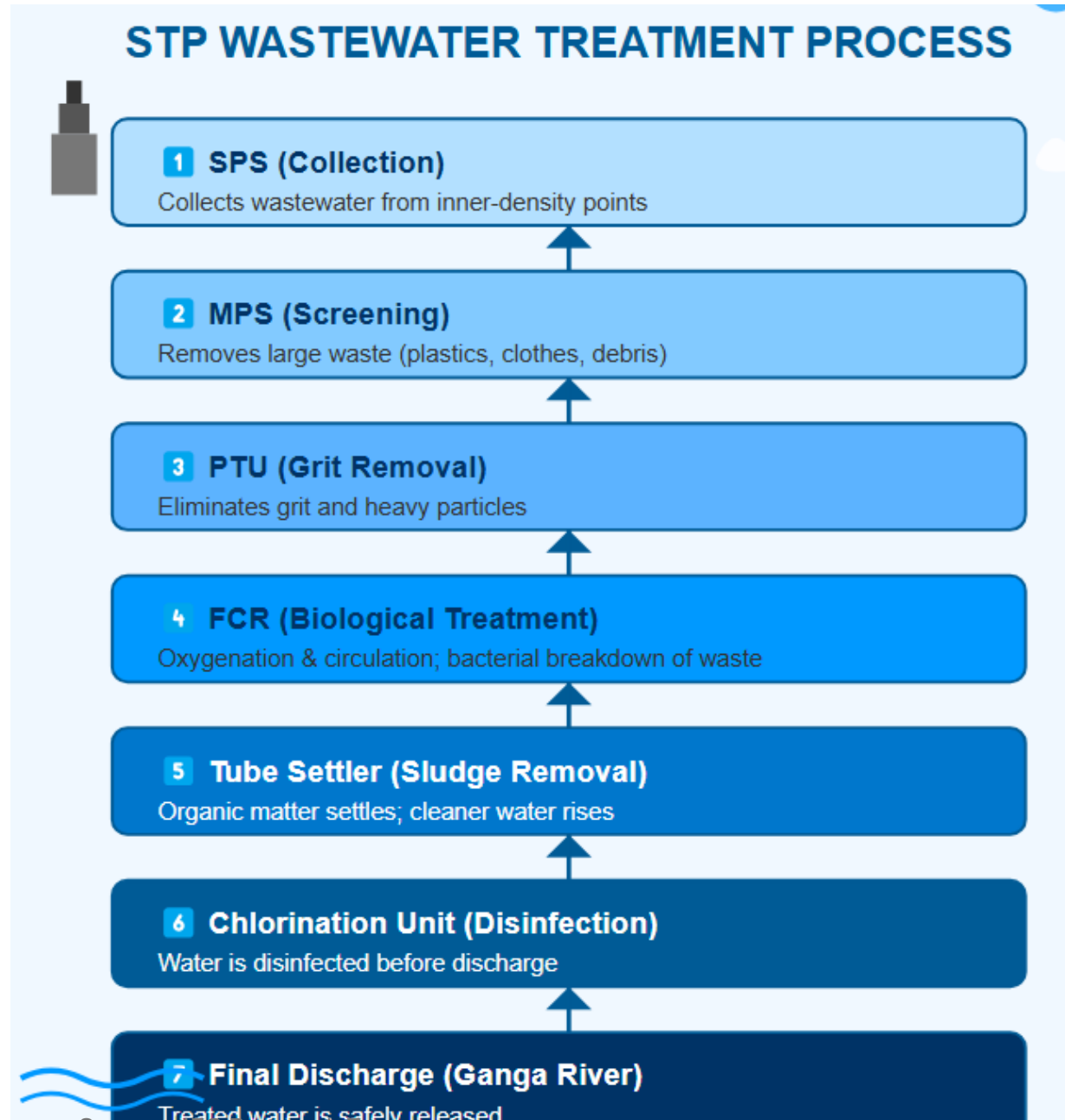
# Permanent STP in Maha Kumbh Mela – Jhunsi



# Permanent STPs Process

The **Permanent Sewage Treatment Plants (STPs)** at Kumbh Mela play a crucial role in **wastewater management**. They ensured that sewage was treated before being discharged into the **Ganga River**.

The treatment follows a structured process to remove **solid waste, organic matter, and harmful contaminants**, maintaining environmental and health standards.



# Understanding the Circular Economy in Waste Management at Kumbh Mela



**Circular Economy** = Minimize Waste + Maximize Resource Efficiency



**Traditional Linear Approach:** Take → Use → Dispose → Leads to waste accumulation.



**Circular Economy Approach:** Reduce → Reuse → Recycle' → Sustainable & efficient.



**Applied to Temporary STP/FSTPs:**



Minimal Waste Generation (On-site sludge retention & reuse as fertilizer).



Water Reclamation (Treated wastewater reintroduced into the system).



Energy Efficiency (Innovative technologies reducing carbon footprint).

# Temporary FSTPs at Maha Kumbh Mela – Concept & Implementation




**3 FSTPs of 500 KLD each** (decided by Jal Nigam based on past mela data)


- Technology: hgSBR (Bhabha Atomic Centre) & ISRO’s oxygen concentration tech.
- Licensed by **Bhabha Atomic Research Centre (BARC)**, India's premier nuclear research facility under the Department of Atomic Energy (DAE), directly overseen by the Prime Minister.

## 17 **Deployment & Timeline:**

- Factory & company based in Ghaziabad.
- Pre-fabricated aluminum structures (assembled on-site).
- Rapid execution: Started: 15 Nov | Operational: 13 Jan.

## **Key Advantage:**

 Temporary but durable – Can be disassembled & reused in rural areas (25-year lifespan).


 Execution time: 2 months (vs. usual 6 months).

# Temporary STPs in Maha Kumbh Mela



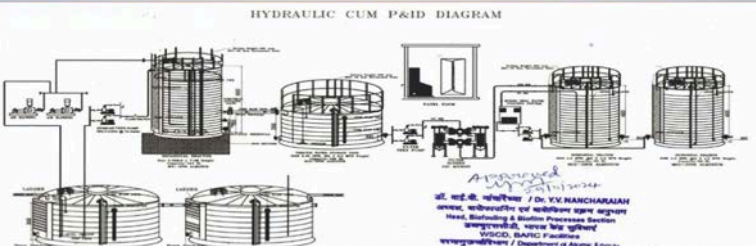
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Work Name:- survey, design, supply, installation, operation & maintenance of 3 No. prefabricated sewage treatment plant of 0.5 MLD each for treatment of sewage during Mahakumbh 2025.  
 Contract No. 11/SECCPYJ-MAHAKUMBH-2025/2024-25  
 Utter Pradesh Jal Nigam (Nagariya), Prayagraj Utter Pradesh  
 Technology:- hgSBR Faecal sludge/wastewater treatment technology  
 Technology Developed and provided by: Bhabha Atomic Research Centre, Department Of Atomic Energy, Govt. Of India

HYDRAULIC CUM P&ID DIAGRAM



Dr. Y.V. HANCHARAJAN  
 Head, Biofiling & Biolin Process Section  
 Energy Research Centre, BARC, Mumbai  
 WSCD, BARC P. address  
 www.barc.gov.in / Department of Atomic Energy



Source : IFC Research Team

# Treatment Process & Environmental Benefits



Faecal Sludge Collection – Screening for garbage.



Receiving Tank – 2 Lakh litre capacity.



**Pumping to Reactor (hgSBR Technology):** Single-tank treatment for NPK removal (Nitrogen, Phosphorus, Potassium, Ammonia). BOD, COD, TSS reduction within 4 hours.



Tertiary Treatment (Water Polishing – ISRO Tech): Ozonation & Oxidation – Removes color, odor, & bacteria (No chemicals used).

## Sludge Disposal (Post-Mela):

- Retained until the end of the mela (unlike regular FSTPs).
- Ozonation for disinfection → converted into organic manure for farmers.

✓ **Circular Approach:** Waste converted into fertilizer, minimizing pollution.

✓ **Government & Institutional Support:** MNIT Professors involved in bacteria testing & consultation.

# hgSBR Tech: Key Technology used in FSTPs/STPs in Maha Kumbh Mela

- Smaller land footprint (up to 75%)
- Lower costs (up to 40%)
- Effective biological N and P removal
- Lower sludge generation
- No chemical addition (except disinfection)
- Suitable for sewage and Faecal Sludge effluents

## Wastewater Treatment

### Benefits

- ✗ nitrite/nitrate accumulation
- ✓ Efficient N removal
- ✓ P- removal (EBPR)
- ✓ Granular stability
- ✓ Faster start-up



Licensee and technology partner  
R & R Infra

Used water → Treated water →

- Reuse
- Recycle
- Recharge
- Rejuvenation



# The 3Rs Approach :

## 1 Reduce

- **Less Land Use:** 70% less than permanent FSTPs.
- **On-Site Treatment:** Avoids transportation and external processing.
- **No Chemical Usage:** Advanced treatment eliminates the need for chemicals.
- **Less Sludge Disposal:** Sludge retained for full treatment → No frequent disposal required.

## 2 Reuse

- **Water Reuse:** Treated wastewater directed to secondary treatment plants.
- **Reusable Infrastructure:** Modular FSTPs disassembled & is planned to be relocated to villages post-Mela.
- **Sludge Reuse:** Processed sludge converted into organic manure (for agriculture).
- **Equipment Reuse:** Pipes, tanks, and pumps are reusable for future setups.

## 3 Recycle

- **Organic Sludge → Fertilizer:** Nutrient-rich, free from chemicals.
- **Treated Water Recycling:** Redirected into STPs for further use.
- **Oxygen Concentration Technology:** Increases oxygen levels in treated water naturally.
- **Plastic-Free Approach:** Encourages eco-friendly materials at the event.



# PLASTIC-FREE DRINKING WATER SYSTEM FOR ENVIRONMENTAL PROTECTION AND CLEAN WATER SUPPLY

# Access to Clean WATER through 233 ATMs

## Water Management at the Mela

### •Free Access to Clean Water:

Water ATMs now provide water completely free of charge, ensuring that pilgrims have unrestricted access to clean drinking water.

### •Automated, Real-Time Monitoring:

Equipped with sensor-based systems, the ATMs immediately detect any technical issues, allowing for prompt maintenance and ensuring uninterrupted service.

### •High Daily Output:

Each ATM is capable of dispensing between 12,000 to 15,000 liters of reverse osmosis water per day, effectively serving the large number of pilgrims.

### •Continuous Connectivity:

SIM-based technology keeps the ATMs connected to the central network for real-time monitoring of water consumption, levels, quality, and distribution volume.

### •Environmental Protection Initiative:

The system encourages the use of refillable bottles to reduce plastic waste, addressing environmental concerns observed in previous events.



# Access to Clean WATER through 233 ATMs



Water ATMs are not directly part of Solid Waste Management (SWM) but were a crucial element of Water Resource Management (WRM) and Public Health Infrastructure at Maha Kumbh Mela.

- ✓ **Minimized Plastic Waste** – Reduce reliance on single-use plastic bottles.
- ✓ **Encourage Reusables** – Pilgrims refill bottles, cutting down litter.
- ✓ **Better Hygiene** – Safe drinking water prevents diseases

As per CPHEEO norms, an acceptable TDS limit is between 75 to 115 was followed in Mela



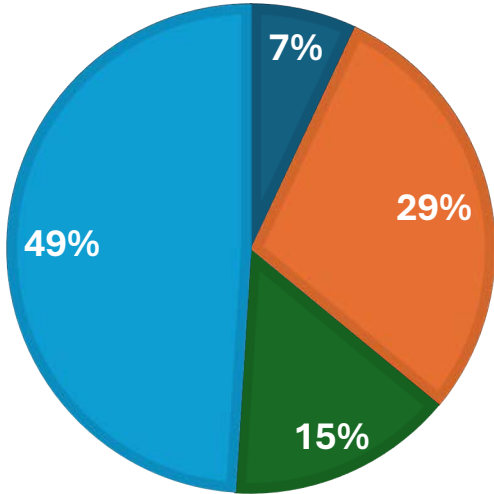
As per **UP Jal Nigam guidelines\***, CPHEEO norms were adhered to, establishing an acceptable TDS range of 75-115 for Water ATMs to ensure safe and potable drinking water at mela.

This analysis categorizes Water ATMs based on their **Total Dissolved Solids (TDS) level tested between February 1st and 24th. Proper water quality ensures public health**, and deviations from the recommended range impact drinkability.

- Non-Functional – 7 ATMs**  
*(Water ATMs that were not operational at the time of visit.)*
- Overpurified (< 75 TDS) – 29 ATMs**  
*(These ATMs dispense overly purified water, removing essential minerals necessary for human health consumption .)*
- Potable Water (75-115 TDS) – 15 ATMs**
- Water Not Meeting CPHEEO Norms (>115 TDS) – 49 ATMs**

### 100 WATER ATMS

- Non Functional
- Overpurified
- Potable water meeting CPHEEO norms
- Water not meeting CPHEEO norms



\* Finalized Guidelines are subject to be received officially by UP JJM

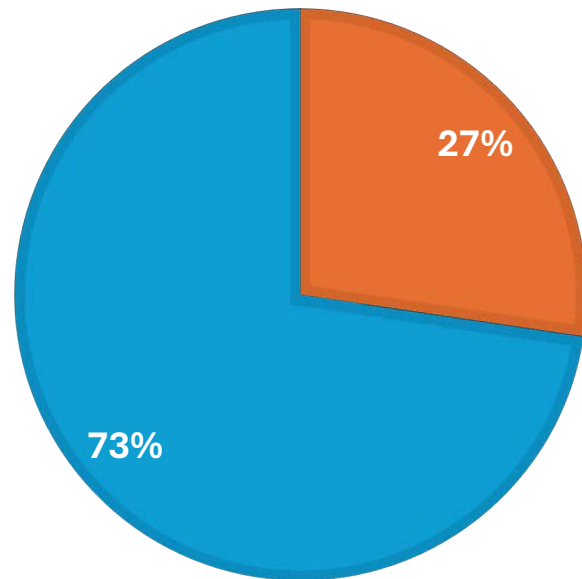
Source : IFC Research Team

As per **UP Jal Nigam guidelines\***, CPHEEO norms were adhered to, establishing an acceptable TDS range of up to 500 for Water Taps to ensure safe and potable drinking water at Mela.

This analysis categorizes Water Taps based on their **Total Dissolved Solids (TDS) level**.

### WATER TAPS

- Non-Potable
- Potable water meeting BIS standards

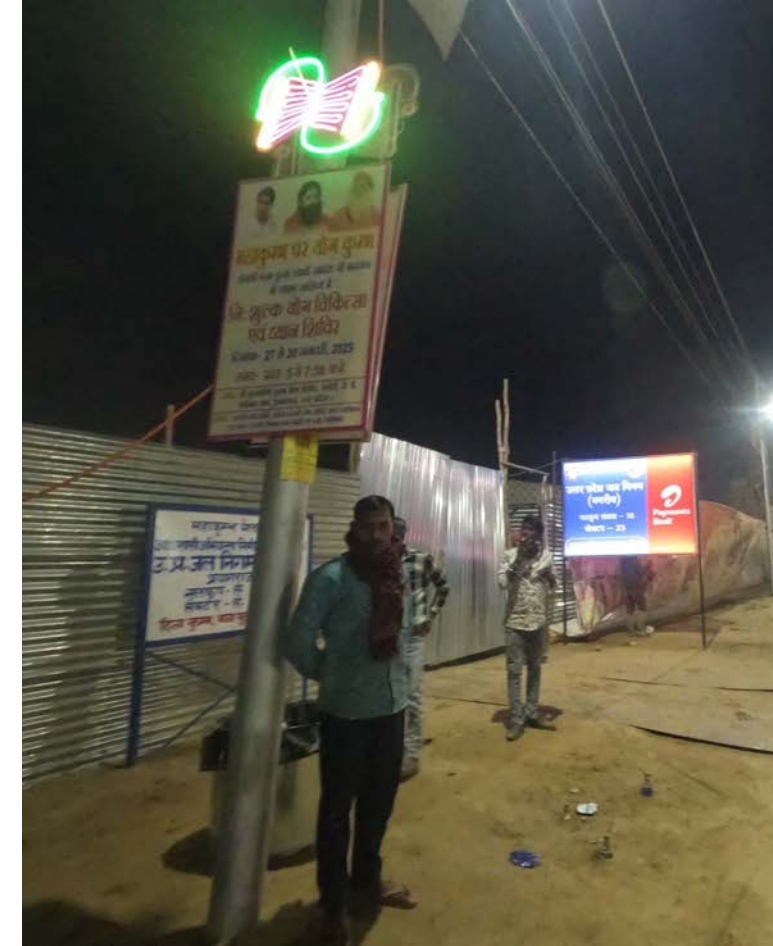


• Out of **150 water tap samples tested between 1<sup>st</sup> February and 24<sup>th</sup> February, 109 water taps (73%) met BIS potable water standards ( based on [BIS - Jal Jiwan Mission](#)) (TDS ≤ 500).\***

• This indicates that **most water taps provided safe and drinkable water** to the public at mela.

\* Finalized Guidelines are subject to be received officially by UP JJM

# Ideal Water ATMs – Sector 23



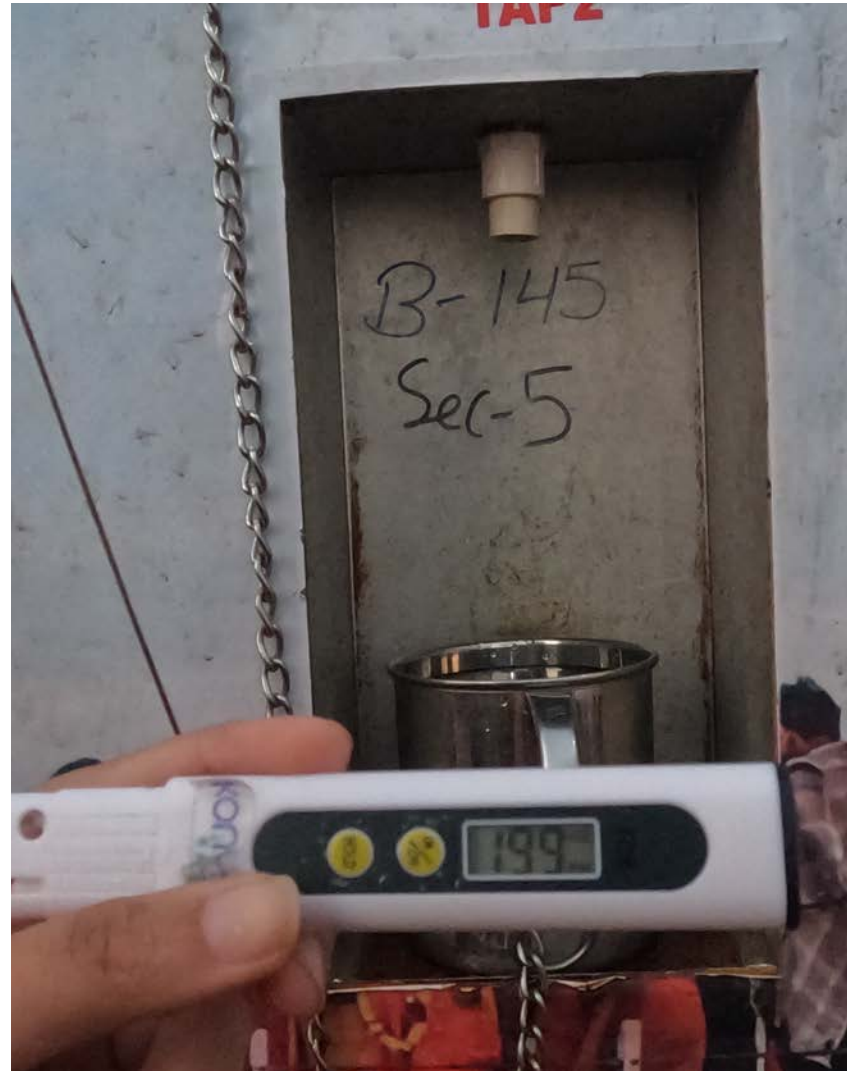
- ✓ 1. Smooth Passage & Proper Leveling
- 💧 2. Potable Drinking Water (Meeting TDS Norms)
- 📱 3. Functional QR Scanner for Reporting & Monitoring by workers

# Non-Ideal Water ATM – Sector 5

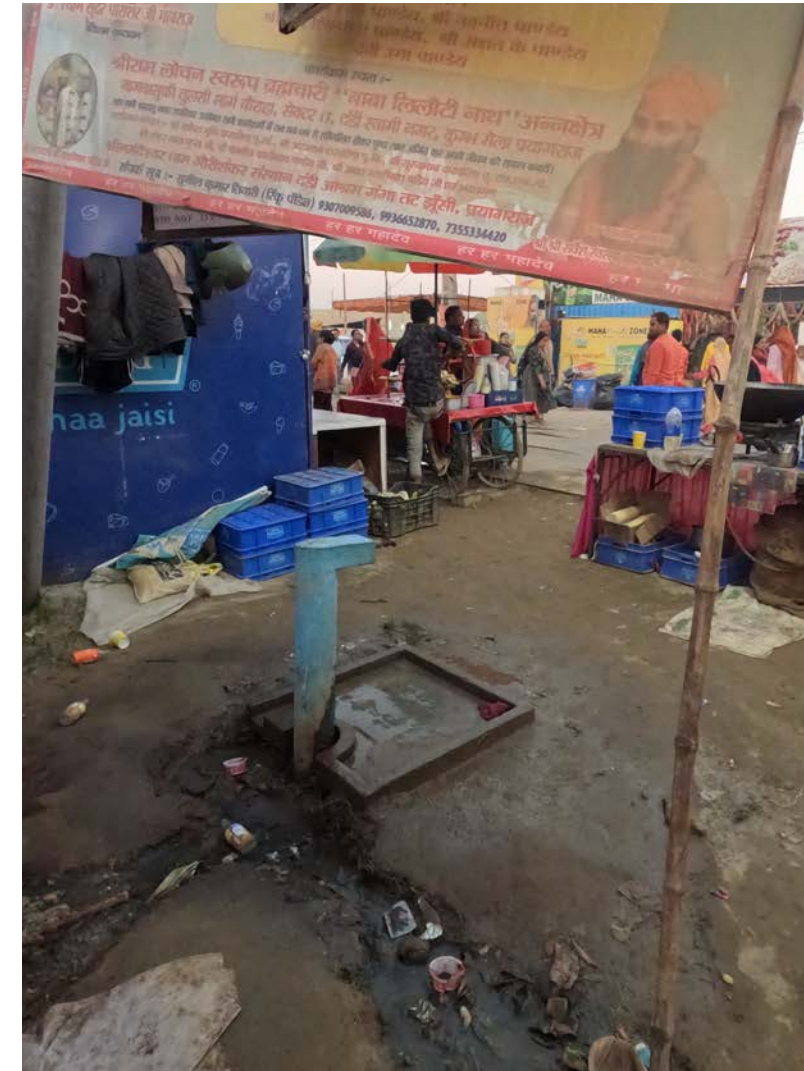
✘ Uneven Leveling and Accumulated waste on pathways



💧 2. Non-Potable Water Supply (TDS Out of Range)



📱 QR Scanner Not Functional / Poor Reporting Mechanism





## Unique RO Structure in Kalash Form – Sector 3

This innovative **Water ATM structure in Sector 3 (Sangam Area)** is designed in a **Kalash form**, symbolizing purity and sustainability. It serves as an **example of technological innovation in public water supply systems**.

### Key Features of the Unique RO Structure

#### 💧 High-Capacity Filtration

- Equipped with a **1,000-litre RO system**, ensuring purified water availability.
- Water depletes within **1 hour**, indicating high public demand and usage.

#### 🔧 TDS Reading: 33

- Classified under **Water ATMs** due to its automated filtration and dispensing system.
- TDS level indicates **over-purified water**, requiring monitoring to maintain essential minerals.

#### 🌍 Cultural & Functional Significance

- The **Kalash-shaped design** enhances aesthetics and represents **clean water as a life-sustaining resource**.



# Value Chain analysis of Sanitation at Maha Kumbh

SUPPORTING ACTIVITIES

## Infrastructure (Physical & IT Systems)

- Sanitation infrastructure, including sewage networks and water treatment facilities, was developed in collaboration with Jal Nigam at the initial stage. Data analytics played a crucial role in demand forecasting and resource allocation, with control rooms monitoring sanitation efficiency.

## Human Resource Management (Sanitation Workforce & Welfare)

- Sanitation workers were recruited and trained, with incentives provided for frontline workers, though delays in salary payments remained a persistent challenge.
- Food provisions for workers were arranged through a partnership with ISKCON and other religious organizations, which distributed meal vouchers. The government supplemented this with a monthly ration of five kilograms.
- A total of 100 suction vehicles were operated to dislodge and collect faecal waste from toilets.
- Housing distribution for sanitation workers was managed by the lekhpals and SDM of each sector

## Technology Development (Sanitation Innovation & Monitoring)

- Innovative sanitation solutions were deployed which included mobile applications enabled sanitation tracking and visitor feedback.
- A three-layered ICT-based monitoring system was implemented, integrating vendors, supervisors, and QR codes affixed to toilets. Reported issues had to be resolved within three hours to ensure prompt sanitation maintenance.

## Procurement (Vendor & Supply Chain Management)

- Waste management services were outsourced to third-party firms and traditional jamadars who provided labour for street and toilet cleaning. A strict penalty structure was enforced for vendors to ensure cleanliness, with daily inspections conducted to monitor compliance and address sanitation gaps.

PRIMARY ACTIVITIES

## Resource Procurement & Workforce Management (Inbound logistics)

- The Sanitation Department provided key cleaning equipment, chemicals, and agents.
- Gang storekeepers managed supplies like phenyl, brushes, buckets, and bleaching powder.
- Continuous water supply and on-demand waste vehicles and sewage systems ensured hygiene.
- Temporary soft pit toilets were maintained by suction machines to remove fecal sludge.

## Sanitation Service Delivery & Waste Management (Production/ Operations)

- Toilets were placed in high-traffic areas: roads, intersections, and near ghats/bathing zones.
- Waste collection followed a structured cycle with real-time geo-tagged photo monitoring.
- Sanitation workers operated 24/7, with one worker per 10 toilets on 10–12-hour shifts.
- For street cleaning, 15,000 workers used 120 tippers and 40 refuse compactors.

## Waste Disposal & Treatment (Outbound logistics)

- Waste collected from different sectors was first transported to transfer stations before being sent to sewage treatment plants (STPs).
- The primary treatment facility at Baswar's capacity was expanded from 600 MT to 1,200 MT to accommodate the increased waste generated during the Kumbh Mela.

## Public Awareness & Engagement (Marketing and sales)

- Public awareness was a critical component of sanitation efforts, with hygiene campaigns under the Swachh Kumbh initiative promoting cleanliness.
- Sanitary pads were made available in sector and sub-sector hospitals to ensure menstrual hygiene
- Mobile applications and helplines enabled visitors to report issues related to sanitation services.

## Maintenance & Emergency Response (Service)

- Sanitation inspectors, deployed in each sector, regularly submitted reports to the central control room, which coordinated with vendors and officials through official letters, WhatsApp groups, and geo-tagged complaints.
- Each sector was managed under a hierarchical structure comprising 1-2 or more circles, overseen by sector medical officers, circle inspectors, and supervisors. Gangs were regulated by a designated mate and storekeeper to maintain smooth operations.

MARGINS

# Environmental & Social Benefits of Temporary STPs in Kumbh Mela

## Environmental Benefits:

- Helped Reduce pollution in the Ganga through effective wastewater treatment.
- Cuts down carbon footprint by minimizing sludge transport.
- Lower land consumption (compact design).

## Social Benefits:

- Provides sustainable employment (chemists, operators, managers, plumbers).
- Creates opportunities for local farmers (free organic manure).
- Sets an example for other large-scale events on sustainable sanitation.

# Learnings for Expanding the Circular FSTP Model

- **Nationwide Deployment:** Adaptable for other mass gatherings (Kumbh Mela, festivals, fairs).
- **Integration with Smart City Projects:** Can be linked to urban wastewater management.
- **Involvement of Private Sector:** Opportunity for PPP models in supporting sustainable WASH practices
- **Policy-Level Support:** Encouraging government adoption for rural sanitation improvement.

**Thank You**

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