

Mahakumbh Mela 2025 Through the Lens of Vishal Bharat: Interlinking Culture, Climate and Historical Traditions through Sustainable Tourism

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Abstract

This paper evaluates sustainable tourism practices at the Mahakumbh Mela 2025 in Prayagraj, one of the world's largest religious gatherings. It assesses environmental, social and economic strategies, challenges and the integration of responsible tourism into massive religious events.

The methodology involved a mixed methods approach combining qualitative and quantitative data. Secondary sources included government reports, research articles, environmental impact assessments books and literature, etc. Primary data came from interviews, surveys and on-site observations, enabling a holistic analysis of sustainability initiatives.

Sustainable measures featured eco-friendly infrastructure, robust waste management, renewable energy, electric rickshaws and AI-driven crowd monitoring. Community engagement promoted recycling and reduced pollution. However, challenges arose from massive waste volumes, water strain, pollution, infrastructural gaps, cultural resistance and low pilgrim awareness, leading to environmental degradation.

The Mahakumbh Mela pioneered sustainable religious tourism but requires ongoing enhancements for culturalenvironmental balance. Key recommendations include pilgrim education, better waste segregation, deeper community involvement and long term water conservation. This study advances responsible religious tourism discourse, guiding future global events.

Keywords: Mahakumbh Mela, Waste Management, Environmental Impact, Pollution Control, Community Engagement, Sustainable Tourism

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Introduction

Sustainable tourism refers to a form of travel that aims to protect the natural environment, respect the traditions and culture of local communities and contribute positively to local economies while ensuring long-term benefits for everyone involved (UNWTO, 2015). It developed as a response to the negative impacts of mass tourism, including environmental damage, overuse of natural resources and the erosion of cultural identity. The concept is based on three key principles: environmental conservation, social fairness and economic sustainability (Elkington, 1997).

Rather than being a temporary trend, sustainable tourism is a necessary approach for the future of the tourism sector. It seeks to reduce harmful effects while enhancing the positive outcomes of tourism, ensuring that both the environment and local communities gain lasting benefits.

Types of Sustainable Tourism

- a) *Eco-Tourism*: Focuses on responsible travel to natural environments, aiming to protect ecosystems and support the well being of local communities (UNEP, 2018). It promotes low impact activities, environmental awareness and responsible tourist behaviour.
- b) *Cultural Tourism*: Involves visiting places with cultural, historical or artistic importance. It ensures the preservation of local traditions while generating economic benefits for communities through cultural products and services (Richards, 2018).
- c) *Adventure Tourism*: Refers to exploring natural areas through activities like hiking, cycling and kayaking, while minimizing environmental impact and respecting local communities.
- d) *Community-Based Tourism*: Emphasizes active participation and control of local communities in tourism activities, ensuring direct economic benefits, cultural exchange and preservation of traditions and landscapes.

- e) *Agri-Tourism*: Encourages visitors to engage in rural and agricultural activities such as farming or farm visits, supporting local farmers, promoting sustainable practices, and preserving rural environments.

Benefits of Sustainable Tourism

- a) *Environmental Protection*: Sustainable tourism plays an important role in conserving natural resources, limiting pollution and safeguarding biodiversity. It helps ensure that natural landscapes and wildlife remain available for future generations to experience and enjoy.
- b) *Cultural Preservation*: Promoting sustainable tourism helps protect cultural heritage and traditions by respecting local customs and values. This enables communities to retain their cultural identity and pass it on to the next generation.
- c) *Economic Growth*: Sustainable tourism contributes to economic development, particularly in rural and less developed regions. It creates employment opportunities, boosts local businesses and generates income, while ensuring that economic progress does not harm the environment or society.
- d) *Social Empowerment*: By involving local communities in tourism activities, sustainable tourism strengthens their role in decision making and ensures they benefit directly. It supports social equality, uplifts marginalized groups and increases awareness about protecting cultural and natural resources (UNWTO, 2015).

Challenges of Sustainable Tourism

- a) *Over-Tourism*: A major challenge is the excessive number of tourists in certain destinations, which can lead to environmental damage, overcrowding and the loss of local uniqueness. Managing visitor numbers and promoting alternative or off-season destinations can help reduce this pressure.

- b) *Balancing Development with Sustainability*: Developing tourism infrastructure like hotels and resorts while maintaining environmental and social responsibility can be challenging. There is often a conflict between short term economic gains and long term sustainability goals.
- c) *Green-washing*: Some businesses claim to follow sustainable practices without actually implementing them. This misleading approach, known as *green-washing*, makes it necessary to ensure proper monitoring, transparency and accountability in tourism practices.
- d) *Climate Change*: Climate change significantly affects the tourism sector through altered weather patterns and increased emissions from travel. Promoting low carbon technologies and encouraging eco-friendly travel options are essential steps to address this issue (Gössling et al., 2020).

The Mahakumbh Mela 2025

i. Historical Significance

The Mahakumbh Mela is not only a religious gathering but also an important cultural and social event in India. It has developed over thousands of years, growing from small local gatherings into a large and well known festival. In the past, it served as a meeting point where people from different regions came together to share ideas, trade goods and celebrate their common cultural traditions.

Over time, the event has gained international recognition, attracting not only Hindu pilgrims but also tourists, researchers and media from across the world. The 2025 Mahakumbh Mela showcased India's rich spiritual traditions and cultural diversity, helping to connect with a global audience. In addition to its cultural and religious importance, the Mela also plays a major role in boosting economic activity at local, regional and national levels.

ii. The Scale of the Event

The Mahakumbh Mela is one of the largest gatherings in the world in terms of size and participation. By 26 February 2025, the Prayagraj Mela recorded more than 66 crore visitors, exceeding expectations and marking a historic milestone.

To manage such a large number of people, extensive temporary arrangements were made, including tents, temporary hotels and guesthouses. This significantly benefited the hospitality sector, as hotels, home-stays and tour operators saw a rise in demand. Transportation services and short term rentals also experienced increased activity during this period.

With millions of pilgrims traveling by train, road and air, transportation systems such as railways, highways and airports played a crucial role. The long duration of the Mela also encouraged investments in infrastructure like roads, sanitation and healthcare, which continue to support the region even after the event.

The Mela also acts as a marketplace for traditional crafts and food. Artisans from different parts of the country sell handicrafts, textiles, jewellery and religious items. The large number of visitors increases demand for local products and services, boosting small businesses.

Additionally, the event creates thousands of temporary jobs in sectors such as hospitality, retail, transport and services. Local vendors, artisans and food sellers gain significant economic benefits. However, it is important to ensure that these benefits are managed sustainably so that local communities continue to gain in the long term (Press Information Bureau, 2025).

iii. Economic Linkages

a) Local Economy:

The Mahakumbh Mela has a strong and direct impact on the local economy of Prayagraj. It leads to a significant rise in tourism, which creates job opportunities and supports small businesses such as vendors, shopkeepers and service providers. The event also

encourages government spending on infrastructure, public facilities and urban development, which further strengthens the local economy and improves living conditions in the region.

b) Regional Economy:

The benefits of the Mela extend beyond Prayagraj to the wider region of Uttar Pradesh. The large number of visitors helps promote tourism in nearby towns and cities, leading to improved infrastructure and services. This not only supports short term economic activity but also contributes to long term regional development. As a result, surrounding areas gain better visibility and attract more tourists even after the event concludes.

c) National Economy:

At the national level, the Mahakumbh Mela plays an important role in boosting India's tourism sector and overall economic activity. It attracts both domestic and international visitors, encouraging trade and business across various industries. The event also enhances India's global image by showcasing its cultural and spiritual heritage, thereby strengthening its soft power. Additionally, sectors like transportation, hospitality and advertising experience increased demand during this period.

d) Global Tourism:

The Mahakumbh Mela draws a considerable number of international tourists, especially from countries with large Indian diaspora communities. Global media coverage of the event increases India's visibility as a major cultural and spiritual destination. This exposure opens up opportunities for international partnerships, investments and collaborations in the tourism sector, further contributing to economic growth and global engagement (The Guardian, 2025).

Objectives

The objectives of the study are as follows:

- i. Assess the environmental sustainability of the Mahakumbh Mela, focusing on resource use, waste management and environmental degradation.
- ii. Analyse the social sustainability, including the impact on local communities, cultural preservation and stakeholder engagement.
- iii. Examine the economic sustainability, considering the economic benefits, employment generation and the long-term impact on the region.

Study Area

Prayagraj, earlier known as Allahabad, is located in Uttar Pradesh and serves as the host city for the Mahakumbh Mela at the Triveni Sangam, the sacred meeting point of the Ganga, Yamuna and the mythical Saraswati rivers. During the 45 days event, which concluded on 26 February 2025, a vast temporary city spread across nearly 4,000 hectares was established to accommodate millions of pilgrims.

The region lies within the fertile Gangetic plains and includes sensitive river ecosystems that are highly vulnerable to pollution and excessive use. To manage the event, large scale temporary infrastructure was developed, including around 200,000 tents, 400 kilometres of roads, 30 pontoon bridges and approximately 150,000 toilets. Eco-friendly materials such as bamboo were used in construction to reduce environmental impact and limit damage to natural habitats.

Economically, Prayagraj depends largely on tourism and agriculture. The Mela attracted over 66 crore visitors, creating employment opportunities in sectors like hospitality, transportation, retail and handicrafts. Local vendors and businesses experienced significant growth, contributing not only to the city's economy but also to regional and national economic development. However,

the massive scale of the event also puts pressure on essential resources such as water supply and sanitation systems.

Prayagraj is chosen as a key site for the Kumbh Mela due to its deep religious significance. At the same time, it presents challenges related to environmental degradation, especially river pollution and increasing cultural pressures. Therefore, it serves as an important case study to examine how large scale religious tourism can be managed sustainably by balancing environmental, social and economic factors.

Data Sources and Methodology

To examine the sustainability of the Mahakumbh Mela 2025, it is important to use both qualitative and quantitative data in order to understand its environmental, social and economic dimensions. Given the complexity of such a large scale religious event, the study has adopted a comprehensive research approach. It combines both primary and secondary data sources, allowing for a more detailed and well rounded analysis of the event's overall sustainability.

Secondary Data Collection

Secondary data for this study has been collected mainly from published reports, official records, academic studies and government documents. These sources provide important background information and a strong base for analysis. The following types of secondary data are considered essential for the study:

Environmental Sustainability -

Issuing authority	Insights
Government and Institutional Reports	
Reports by the Ministry of Tourism, UP Government and the National Environmental Engineering Research Institute (NEERI)	Government initiatives and plans for waste management, pollution control and eco-friendly measures during the Mahakumbh Mela

India Tourism Development Corporation (ITDC)	Reports on the sustainable tourism infrastructure around the Mahakumbh Mela
Environmental Impact Assessments (EIAs)	
Any available EIAs related to the Mahakumbh Mela or similar largescale religious events	Analyse environmental risks such as waste management, water pollution and overuse of resources
Academic Studies and Articles	
Research articles and case studies focused on the Mahakumbh Mela 2025	Environmental impact of previous Kumbh Melas (including those held in Prayagraj) and how they have been managed?
Studies on ecological conservation efforts at religious tourism sites	Ecological arrangements in Mahakumbh Mela for conservation

Social Sustainability -

Issuing authority	Insights
Government Reports on Social Impact	
Documents from the State Government of Uttar Pradesh	On community engagement, social infrastructure and programs for protecting local heritage
Social Impact Assessments (SIAs)	
Social Impact Assessments (SIAs) for the Mela or for similar large-scale events	Focus on community impacts and public health
NGO and Local Community Reports	
Reports by NGOs	On community development, heritage preservation and socio-cultural sustainability during the Mahakumbh Mela
Data on local stakeholder engagement	In the decision making processes related to the Mahakumbh Mela
News Articles, Blogs and Interviews	
Media reports, local blogs and interviews with community leaders	Social benefits and challenges brought by the Mahakumbh Mela

Economic Sustainability -

Issuing authority	Insights
Tourism and Economic Reports	
Reports from India Tourism and local tourism boards	Economic impacts, including revenue from ticket sales, accommodation, transportation and retail
Data from previous years' Kumbh Melas on the number of visitors and economic indicators	Local employment rates, tourism-related GDP contributions, etc.
Local Economic Surveys	
Government or private sector surveys measuring the economic impact on the local economy	Income generation, local employment and small business activities during the Mela
Cost-Benefit Analysis Reports	
Studies comparing the short-term economic benefits of the event to the longterm costs	Infrastructure degradation, overcrowding and social tensions
Academic Research	
Peer-reviewed articles focusing on the economic effects of mass religious tourism	Related to the Kumbh Mela or other religious festivals with similar scale

Primary Data Collection*a) Primary Data Collection Approach*

In order to complement the secondary data, qualitative primary data was collected through methods such as interviews, focus group discussions and participant observation. This approach facilitated a comprehensive understanding of the environmental, social, and economic dimensions of sustainability associated with the Mahakumbh Mela.

b) Interviews with Stakeholders

Structured interviews were conducted with key stakeholders, including government officials, environmental experts, community leaders, tourism operators, religious authorities and representatives of non-governmental organizations. To ensure objectivity and reliability, simple random sampling was employed, along with stratified and systematic sampling techniques. Approximately 20 respondents were selected from each stakeholder group to ensure balanced representation.

c) Interview Questions

The interview schedule included questions designed to assess sustainability concerns, such as the environmental impact of the Mela, its long term social and cultural implications for local communities and the effectiveness of its management in terms of sustainability. Respondents were also asked to provide their perspectives on the influence of the event on local culture and the surrounding environment.

d) Pilgrims and Tourists' Perspectives

Interviews were also conducted with pilgrims and tourists attending the Mela to evaluate their perceptions of sustainability and responsible tourism practices. This provided valuable insights into visitor awareness, attitudes and behaviour.

e) Focus Group Discussions

Focus group discussions were organized with local community members to examine the social impacts of the event. These discussions focused on issues such as changes in lifestyle, economic opportunities and potential cultural disruptions arising from the large scale gathering.

f) Participant Observation

Participant observation was undertaken by the researcher during the Mahakumbh Mela to obtain first hand insights into the management and functioning of the event. Observations were focused on key aspects such as waste management practices, crowd control mechanisms, interactions between visitors and local residents and the commercialization of sacred

spaces. This method contributed to a more grounded and practical understanding of the event.

Surveys and Questionnaires

Surveys were administered to a randomly selected sample of pilgrims and local residents to collect quantitative data on perceptions regarding the sustainability of the Mahakumbh Mela. The questionnaire covered key areas such as environmental awareness, employment opportunities and the impact of tourism on the local economy. Sample questions included the frequency of visits to the Mela, opinions on the effectiveness of waste management systems, and whether individuals experienced any economic benefits from the event.

In addition, secondary quantitative data related to visitor numbers and economic indicators were collected from government reports and tourism authorities. These data were used to assess the overall economic contribution of the Mela, including tourism revenue, performance of local businesses and employment trends during the event period.

Environmental data were also gathered from official sources, including information on water quality, air pollution levels and waste generation. Furthermore, data on environmentally friendly initiatives, such as waste management systems and energy efficient infrastructure, were examined to evaluate the environmental impact of the event.

Discussion

Being one of the largest human gathering in the world, the Mahakumbh Mela presents both significant challenges and opportunities in terms of sustainable tourism. Its massive scale, deep cultural importance and environmental implications make it an important example for understanding how sustainability can be applied to large scale religious events. This case study evaluates both the effective sustainable practices adopted during the Mahakumbh Mela 2025 and the key challenges encountered in the process.

Planning and Preparation

Successful Practices:

a) Comprehensive Infrastructure Planning

The event was carefully planned to accommodate millions of visitors while minimizing long term environmental impacts. Temporary infrastructure such as roads, bridges, toilets and camps was designed to be dismantled after the event, reducing ecological damage. Eco-friendly materials like bamboo were widely used in construction to limit the use of non-renewable resources.

Global Example: Similar to the 2010 Vancouver Winter Olympics, which focused on reducing environmental impact through sustainable construction and post event dismantling, the Mahakumbh Mela adopted temporary infrastructure strategies to lower environmental pressure.

b) Environmental and Resource Management

Considering the high demand for water for drinking, bathing and sanitation, detailed planning was carried out for efficient water use. Mobile water filtration systems were installed and conservation campaigns were promoted to reduce wastage. A dedicated pipeline network ensured proper distribution of water across the Mela area.

Global Example: Like the Glastonbury Festival, which has successfully reduced water usage through refill stations and eco-friendly sanitation, the Mahakumbh Mela implemented similar sustainable water management practices.

c) Stakeholder and Community Engagement

Active involvement of local communities and stakeholders, including welfare committees, NGOs and environmental groups, played an important role in promoting sustainability. Awareness campaigns encouraged responsible behaviour and environmental conservation among participants.

Global Example: Similar to the Edinburgh Festival in Scotland, where local communities are involved in planning processes, the Mahakumbh Mela

ensured participation at the grassroots level, strengthening support for sustainable initiatives.

d) Waste Management Strategies

A structured waste management system was introduced, focusing on the segregation of organic waste, plastics and recyclable materials. Food vendors were encouraged to use compostable materials and eco-friendly waste bins were placed throughout the Mela area to manage waste effectively.

Global Example: The Tokyo 2020 Olympics implemented an advanced waste management system with extensive recycling practices. This approach influenced similar sustainability measures at the Mahakumbh Mela.

Challenges in Planning and Preparation

a) Logistical Challenges

Despite detailed planning, managing logistics on such a large scale remained a major challenge. Coordinating transportation, water supply, sanitation and waste management required extensive workforce and collaboration between government bodies, private organizations and NGOs, making execution highly complex.

b) Infrastructure Limitations

Due to the vast scale of the event, some infrastructure projects could not be completed within the required time frame. In certain areas, especially more remote locations, inadequate facilities led to temporary issues in sanitation and waste management, affecting the overall efficiency of services provided to pilgrims.

Implementation of Sustainable Practices

Successful Practices:

a) Promotion of Sustainable Transport

Sustainable mobility was strongly encouraged during the Mahakumbh Mela, with a focus on public transport systems. Electric buses and e-rickshaws were

introduced to facilitate the movement of pilgrims across the Mela area. In addition, walking routes and bicycle use were promoted to reduce traffic congestion and lower carbon emissions. Shared transport options were also encouraged to further minimize environmental impact.

Global Best Practice Example: Similar to the Copenhagen Climate Festival, which promotes green mobility and public transportation, the Mahakumbh Mela 2025 emphasized the use of electric vehicles and bicycles as environmentally friendly alternatives.

b) Plastic Waste Reduction and Alternatives

A major initiative was undertaken to reduce plastic usage by promoting eco-friendly alternatives. Reusable metal water bottles were distributed and pilgrims were encouraged to use cloth bags and bamboo based products. A strict ban on single use plastics was implemented and vendors were directed to adopt biodegradable packaging materials.

Global Best Practice Example: The Glastonbury Festival in the United Kingdom has successfully addressed single use plastic issues through reusable products and structured waste systems, similar to the measures adopted at the Mahakumbh Mela.

c) Sustainable Energy and Lighting Solutions

Renewable energy, particularly solar power, was widely utilized across the Mela site. Solar-powered streetlights and energy efficient lighting systems helped reduce dependence on conventional energy sources. Careful infrastructure planning also contributed to minimizing energy wastage.

Global Best Practice Example: The Dubai Expo 2020 demonstrated the large scale use of solar energy, which influenced similar sustainable energy practices at the Mahakumbh Mela.

d) Eco-Friendly Food Vendors

Food vendors were encouraged to follow sustainable practices by using biodegradable packaging materials. Organic food options were promoted and

steps were taken to reduce food waste through composting and redistribution initiatives.

Global Best Practice Example: The Paris 2024 Olympics has prioritized sustainable food systems by promoting local and organic food while minimizing waste, aligning with similar efforts at the Mahakumbh Mela.

Challenges in Implementing Sustainable Practices

i. Waste Segregation Compliance

Despite the implementation of waste segregation systems, compliance among pilgrims remained inconsistent. Improper disposal practices led to contamination of recyclable waste, reducing the effectiveness of the system. The enormous volume of waste generated, further complicated management efforts.

ii. Pilgrim Resistance

Many pilgrims were either unaware of or hesitant to adopt sustainable practices, particularly in areas such as waste management and the use of eco-friendly materials. Cultural habits and lack of awareness contributed to resistance, limiting the full effectiveness of sustainability initiatives.

Impact Assessment

Environmental Impact:

i. Positive Impacts

The use of solar lighting, reduction in plastic waste and improved waste management practices helped lower the environmental impact of the event. Temporary infrastructure minimized long term ecological damage, while sustainability initiatives contributed to some reduction in air and water pollution.

ii. Negative Impacts

Despite these measures, the massive scale of the gathering resulted in environmental stress, particularly on river ecosystems. Activities such as mass

bathing and ritual offerings contributed to water pollution in the Ganga and Yamuna. Although mitigation efforts like water treatment and cleaning campaigns were implemented, ecological pressure remained a significant concern.

Social and Economic Impact:

i. Positive Impacts

The Mahakumbh Mela generated substantial economic benefits for local communities by creating employment opportunities in sectors such as hospitality, transportation, waste management and retail. It also supported local vendors and encouraged the adoption of sustainable business practices.

ii. Negative Impacts

The large number of visitors placed considerable pressure on local resources, particularly water supply and sanitation systems, leading to health and hygiene concerns in certain areas. Overcrowding and safety management issues also affected the overall experience of participants.

Long-Term Sustainability Prospects

Experiences from global events such as the Rio 2016 Olympics highlight the importance of long term sustainability planning. Similarly, the Mahakumbh Mela 2025 can benefit from strategies focused on post-event infrastructure reuse and continuous awareness programs for local communities to promote sustainable tourism practices (Travel and Leisure Asia, 2025).

The study highlights several achievements, including the use of eco-friendly infrastructure such as approximately 150,000 portable toilets and around 69,000 solar or LED lights, along with waste segregation systems, electric transport and AI-based crowd monitoring. These measures contributed to reducing carbon emissions and improving safety. Quantitative findings indicate improvements such as reduced energy consumption and partial success in limiting plastic use, while qualitative insights reveal that the participation of over 66 crore people placed significant pressure on available resources.

However, major challenges remained, including excessive waste generation, river pollution caused by ritual practices, water shortages and gaps in sanitation. Cultural resistance among pilgrims also affected compliance, particularly in waste segregation despite awareness campaigns.

When compared with earlier Kumbh Mela studies, similar concerns regarding waste management and river pollution persist. However, the 2025 event introduced new elements such as solar energy expansion and AI-based management systems, which were not prominent in earlier analyses. Compared to global examples like the Glastonbury Festival or Tokyo 2020 Olympics, the Mahakumbh Mela shows progress in technology adoption but faces challenges in public participation. Its massive scale, spread across approximately 4,000 hectares, exceeds the capacity frameworks applied to smaller events, intensifying sustainability challenges similar to those observed in large global events like the Rio Olympics.

Overall, the findings emphasize the importance of developing scalable and culturally appropriate sustainability strategies for mega events. They contribute to frameworks such as the Triple Bottom Line and Sustainable Development Goals, particularly Goals 11 and 12. The study also highlights the need for improved policy measures, including multilingual awareness programs and better river monitoring systems. Economically, it demonstrates the balance between employment generation and resource pressure, while environmentally, it stresses the importance of effective pre-event planning. These insights provide valuable guidance for future large scale events such as the Kumbh Mela, Hajj and international sporting events (Moneycontrol, 2025).

Major Findings

The Mahakumbh Mela 2025 reflects both the challenges and opportunities associated with managing sustainable tourism at a mega scale religious event. The successful execution of the event required detailed planning, innovation and continuous coordination to meet sustainability goals. Based on the evaluation of practices, challenges and overall impacts, the following key findings can be identified:

A. Scale of Sustainability Efforts

The Mahakumbh Mela 2025 showed that even extremely large gatherings can incorporate important sustainability measures. Efforts such as the use of eco-friendly infrastructure, structured waste management systems and the promotion of sustainable transportation contributed to reducing environmental impact. However, the vast number of participants made it difficult to fully manage issues like waste generation, water consumption and sanitation.

B. Environmental and Ecological Impact

Despite focused efforts to limit environmental damage, several ecological challenges remained. The Ganga and Yamuna rivers were under significant pressure due to large scale ritual activities, including bathing and religious offerings. Although preventive measures were implemented, pollution continued to be a concern. Temporary infrastructure helped minimize long term environmental harm, but short term issues such as water pollution and waste accumulation were still evident. Balancing environmental protection with religious practices remains a complex challenge.

C. Social and Economic Impacts

The Mela contributed positively to the local economy by generating employment in areas such as transport, hospitality and waste management. Small businesses and local vendors benefited from increased income and exposure to sustainable practices. However, the large influx of visitors placed pressure on infrastructure, particularly water supply and sanitation systems, sometimes resulting in health concerns. Overcrowding and safety issues also affected the overall experience for some pilgrims. While local communities gained benefits, there is a need to strengthen long term outcomes.

D. Challenges in Pilgrim Engagement

A major finding is the need to improve awareness and participation among pilgrims. While some followed sustainability practices, many were either unaware or hesitant to adopt measures such as waste segregation and eco-friendly alternatives. Increasing awareness and encouraging behavioural

change among pilgrims is essential for the effective implementation of sustainability initiatives.

E. Infrastructure and Resource Management

Although the scale of temporary infrastructure developed for the event was extensive, it did not always meet demand during peak periods. Issues related to water supply, sanitation and electricity highlighted the challenges of managing resources efficiently at such a large scale. The experience emphasized the importance of long term planning and the potential for reusing infrastructure. While solar energy initiatives were effective, there is scope for further improvement in overall energy efficiency.

Recommendations for Future Sustainable Practices:

The Mahakumbh Mela 2025 marks an important step in integrating sustainability into large scale religious tourism. Based on the findings, the following recommendations are suggested to improve future events:

I. Enhanced Pilgrim Education and Awareness Campaigns

The success of sustainability initiatives depends largely on public participation. Stronger and more targeted awareness campaigns should be implemented before and during the event to educate pilgrims about waste management, water conservation and eco-friendly practices. These campaigns should be multilingual and involve community leaders and religious authorities to improve effectiveness and outreach.

II. Strengthening Waste Management and Recycling Systems

Improving waste management is essential to reduce environmental impact. This can be achieved by providing clearly labelled waste bins, deploying volunteers to guide proper disposal and introducing incentives for responsible behaviour. Expanding composting systems and strengthening recycling infrastructure will further support effective waste management.

III. Long-Term Water Management and River Conservation

The protection of river ecosystems should extend beyond the duration of the event. Long term strategies should include regular monitoring of water quality, improved sewage treatment systems and the use of advanced filtration technologies. These measures will help reduce pollution and preserve the ecological and religious importance of the rivers.

IV. Post-Event Infrastructure Utilization

Developing plans to reuse or repurpose temporary infrastructure can provide long term benefits and reduce resource wastage. Infrastructure such as solar lighting, roads and waste systems can be adapted for continued use, supporting sustainable development and minimizing unnecessary expenditure.

V. Community and Stakeholder Participation

Active involvement of local communities and stakeholders is crucial for the success of sustainability efforts. Engaging them in planning, implementation and post event activities can enhance effectiveness and ensure long term benefits. Training programs in sustainable tourism can also help build local capacity and resilience.

VI. Improved Crowd Management and Safety Measures

Efficient crowd management is essential for ensuring safety and enhancing visitor experience. The use of advanced technologies such as drones, smart monitoring systems and real-time data analysis can help manage large crowds more effectively. Strengthening health and safety measures will also reduce risks related to overcrowding and emergencies.

These recommendations aims to promote more sustainable, efficient and inclusive management of future large scale religious and cultural events.

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