

Traditional And Social Media in Promoting River Management Awareness: A Case of Namami Gange During Maha Kumbh 2025 at Prayagraj

^{1*}Mohammad Najeeb Ahsan, ²Prof (Dr.) Dhruv Sabharwal

^{1*}Sharda School of Media Film & Entertainment, Sharda University National, Mission for Clean Ganga, Ministry of Jal Shakti, India.

²Professor, Sharda School of Media Film & Entertainment, Sharda University, Knowledge Park 3 Greater Noida 201310

***Corresponding Author**

DOI: <https://doi.org/10.51244/IJRSI.2026.1306000389>

Received: 20 June 2026; Accepted: 25 June 2026; Published: 13 July 2026

ABSTRACT

River conservation is an urgent environmental and socio-cultural problem in India and for the Ganga River in particular. Although the Namami Gange mission has conducted several campaigns, traditional one-way communication has proved ineffective in encouraging the long-term participation and behaviour change of the public. Social media platforms have the interactive potential to create awareness about ecological issues and encourage participation, particularly in events such as Maha Kumbh Mela 2025 at Prayagraj with high visibility.

The study adopted a convergent parallel mixed method approach to assess the effectiveness of social media campaigns for the conservation of the Ganga. The quantitative data was gathered by stratified random sampling of 385 respondents from representative groups of pilgrims, locals, youth volunteers and officials/NGOs, as well as by using the social media analytics (Facebook, Instagram and X engagement metrics). Twenty five key informant interviews were conducted using a semi-structured approach to collect qualitative information. The integration of the two methods was done by data triangulation and joint display, by analyzing the statistics and using thematic analysis of interviews, and how online engagement can be related to offline behavioral change.

All results suggest that there is a very high positive correlation between social media engagement (likes, shares, comments) and increased public awareness and participation in river cleanliness activities. Content that was culturally and spiritually relevant had the most engagement and behavioural impact. The responses of youth volunteers and frequent users were particularly strong. The results reveal the effectiveness of social media as an awareness and behaviour change catalyst when used in combination with cultural values, compared to the traditional media approaches.

The study offers insights and recommendations based on the findings to utilize digital strategies in the upcoming river management and public engagement program under Namami Gange to ensure long-term sustainability, with a focus on culturally responsive and engaging communication strategies.

Keywords: Social Media Campaigns; River Management; Ganga River; Namami Gange; Maha Kumbh Mela 2025; Mixed-Methods Research; Behavioural Change

INTRODUCTION

Rivers are essential for managing ecological balance, cultural identification, and economic well-being of communities [1]. The Ganga River is one of the essential rivers in India's natural heritage and spiritual traditions. It helps for agriculture, manufacturing, and households, that revered as sacred in Hinduism [3]. Rapid development, manufacturing discharge, and huge water mining have raised the rivers' ecological strength [4].

The condition of the Ganga River is worse nowadays, causing problems for the whole nation. So demands the well-improved approach that integrates the social awareness and the technological measures [5]. The government of India has developed various approaches, notably the Namami Ganga mission, which is employed for pollution control, better infrastructure, and active enrolment of the local community [6, 7]. The public awareness and their enrolment depend on the success of their initiatives. The rise of digital media modifies the path through which such kind of data is collaboratively shared with the public in older years for sharing environmental data through traditional platforms [8, 9]. Nowadays, social media platforms play an essential role in environmental collaboration. Permitting awareness to reach the wider public almost rapidly to generate the interactive spaces for the public, government agencies, and non-governmental schemes to be involved directly [10, 11]. Social media and other online applications help humans to participate in community activity, share their thoughts, and also feel comfortable communicating with others. This makes them connected to social and ecological phases. Namami Ganga and Clean Ganga schemes have raised public interest on social media and care for the environment nowadays [12, 13].

The upcoming Maha Kumbh Mela 2025 in Prayagraj provides a timely and exciting opportunity to study the effectiveness of social-media-driven conservation communication [14, 15]. The Maha Kumbh Mela is expected to attract millions of pilgrims and present both challenges and opportunities for river management. Pilgrims, volunteers, and authorities use digital platforms to share information about the event, recall cleanliness campaigns, and share eco-friendly behavior [16, 17]. To be effective in developing sustainable communication strategies for both non-profit conservation organizations and commercial enterprises, practitioners must understand how campaigns involve behavioral change and contribute to the shared environmental responsibility [18, 19]. Although a number of studies have examined how social media informs environmental consciousness, most remain generalizable in scope to worldwide climate or confined to conservation programs (i.e., #climatechange or #conservation) [20, 21]. Few studies have looked at the relationship between digital engagement and Indian cultural and religious contexts, especially when it comes to the Ganga River [22]. Furthermore, little is known about how various demographic groups' online engagement translates into their participation and behavioral changes offline. Therefore, this study examines how social media campaigns affect the management of the Ganga River, focusing on the behavioral and communication components of public participation during the Maha Kumbh 2025. By using digital files, surveys, and interviews with different groups of humans, this research understands how the social media platform helps individuals to be involved in the cleaning process of the Ganga River in a sustainable way. Figure 1 shows the Ganga River's landmark.

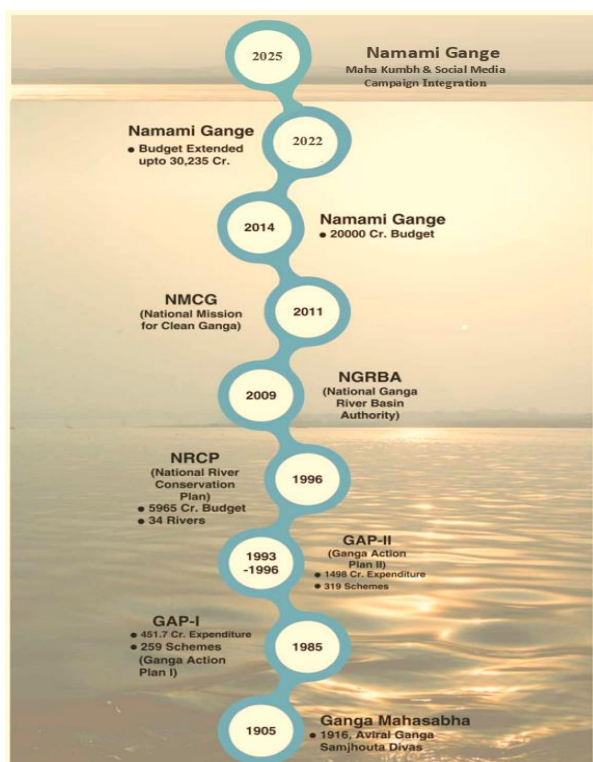


Figure 1: Key Milestones in Ganga River Cleaning Initiatives

This research states how digital platforms help to save the environment. To help ecological conservation, it describes how government policies, technology, and culture work together. The outcomes of this research support policymakers and environmental groups in creating better, more practical, and sensitive plans for future river protection. Figure 2 illustrates the facts of the Maha Kumbh Mela 2025.

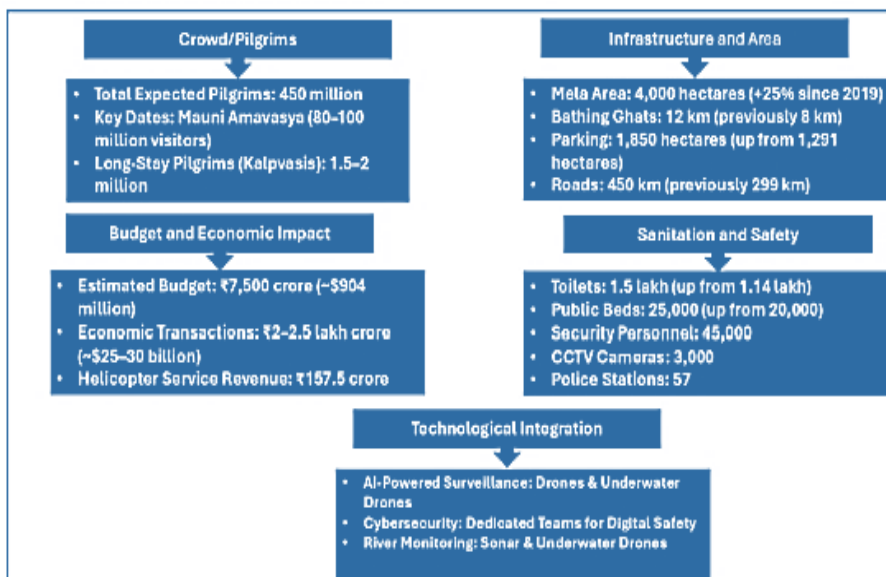


Figure 2: Key Facts of the Maha Kumbh Mela 2025 at Prayagraj

Research Gap

Nowadays, research on ecological communication is increasing, but there are still many gaps that occur when it comes to the Indian context. India's rivers and old ecological traditions are a vital part of its culture, but numerous studies ignore them and focus on Western plans. There are a few online studies that show how big events affect or raise concerns about saving the environment. Research that explores how social media is employed in real actions in river conservation is also very limited. Most of the studies use either data (quantitative analysis) or personal opinions and experiences (qualitative analysis), but do not suggest the triangularization of a mixed approach. Due to this, many volunteers, residents, and pilgrims were often left out. The relation among spirituality, religious rituals, and environmental awareness has not been investigated enough. This makes the knowledge gap about how India's cultural traditions can help to protect nature. This research helps to fill these gaps by integrating social media engagement analysis with public opinion data gathered over Maha Kumbh 2025. It also provides suggestions for creating more effective and culturally sensitive river conservation schemes.

Objectives

The key goals of this research are defined as follows:

1. Examine how effectively social media is spreading awareness about the Ganga conservation over Maha Kumbh 2025.
2. Research explores how the social media platforms (likes, shares, comments) are supporting the Namami Ganga campaign.
3. Detect how social media platforms connect with humans in their real-life environmental actions.
4. Developed to understand what the stakeholders (government officials, NGOs, and youth volunteers) think about how social media helps in the management of rivers.
5. Suggest how digital communication is employed in future projects to restore and protect the rivers.

Hypotheses

According to prior research and their observations, this research proposes the following hypotheses:

H₁: Social media platforms raise public awareness about the problems in river conservation over the Maha Kumbh 2025.

H₂: Humans who are more in online platforms (through likes, shares, and comments) have strong environmental attitudes.

H₃: Social media helps to encourage real-world actions for individuals, like participating in cleaning rivers and managing waste responsibly.

H₄: Youth volunteers and the local participants respond more actively to the social media conservation messages than to other platforms.

H₅: The social media platforms may be affected depending on the content type, whether it is informative, emotional, or tied to cultural and religious values.

This research seeks to show how social media inspires people to take action for the environment. Examine online data and the perspectives of real people about how digital platforms influence awareness and behaviour. Focusing on India's unique cultural and religious context, the research also helps to understand how environmental issues are discussed in society. The outcomes guide human collaboration, shape environmental policies, and support the planning of events that engage communities.

LITERATURE SURVEY

Explore the link between cultural heritage, sustainability, and visitor engagement. Mishra et al [23] suggested the actions of humans attending the Maha Kumbh Mela for spiritual tourism. This work detects the features, including people's spiritual motivation, interest in learning about culture, and the nature of the event, which strongly influence the individuals in cultural and religious experiences. These outcomes offer practical plans for policymakers and tourism agents who want to encourage practices and protect culture during large religious gatherings. This research is limited due to the reliance on survey responses from participants and may not fully apply outside the context of the Maha Kumbh Mela.

To study how the 2019 Kumbh Mela affected city plans and infrastructure, Yadav et al. [24] looked at changes in land use and land cover (LULC). The study aimed to see how huge pilgrimages change urban areas and affect roads, buildings, and farmland. The result provides useful data for policymakers and city planners to support infrastructure for temporary settlement. However, the study focused on only one city and used satellite images with limited details.

Bobade et al. [25] employ the experience economy approach to develop the Maha Kumbh as a unique spiritual experience. The work understands how religious events generate experiences for both local and international visitors. It guides the event planners, marketers, and policymakers on how to increase the participants and reach audiences worldwide. One key point is showing how technology works together with others to make pilgrimages more engaging. However, the study is limited due to the lack of real data on participants' behaviour, making it hard to generate the exact result.

Shukla et al. [26] offered the social effects of the kumbh mela in aspects like faith, tradition, and community bonding. The research examined how large events preserve cultural heritage and also create a sense of belonging among diverse participants. The outcomes strengthen the social connections, protect culture, and boost local economies. The result of this study is string but it still limits that this study is not fully apply to other kumbh mela locations.

Kumar et al. [27] highlighted how industrial waste and religious offerings contribute to the pollution of the Ganga River in Haridwar and Rishikesh, causing serious damage to its water quality and ecosystem. It

investigated successfully integrating the importance of the river as a religious entity with the effectiveness of state-of-the-art treatment methods, regulation, and community-based stewardship. Policymakers, environmental organizations, and local communities can benefit from this research's capacity to provide practical suggestions for sustainable river management while also referencing global restoration community instances. Main contributions involve a focus on compliance with the law, involvement of community engagement, and the relationships between cultural principles and environmental protection. Disclaimed contributions include the interaction of the conditions in the study area and a lack of empirical evaluation of the studied interventions, which limit the generalizing of the outcomes. Through in-depth qualitative interviews, Roychowdhury et al.'s study [28] explores the religiosity, spiritual experiences, and environmental consciousness of young adults who attend the Maha Kumbh Mela in Prayagraj in 2025. The main goal is to comprehend how young people's use of social media, digital technology, and religious pilgrimage practices relates to environmental issues and religious pilgrimage behaviors. The study's conclusions give policymakers and event coordinators insight into how youth and a third-string platform fulfill their roles in spiritual experiences and ethical behaviors. The importance of digital interaction (such as social media and virtual darshan), the variety of participation motivations, and the interaction between contemporary and older forms of religion are some of the main conclusions. Limitations include the use of qualitative techniques, which may restrict generalizability, and a small, age-specific sample (20–30 years).

Krishnan et al. [29] explore how the integration of digital tools, including live streaming, mobile device applications, and social media, is completely shifting traditional religious events, altering rituals, and promoting community engagement. The work states how technology helps large religious gatherings by making them more accessible and encouraging participation. The results guide the government officials and event organizers. However, the work might not fully represent all types of religious events.

Mishra et al. [30] suggested electromagnetic field exposure in various parts during the Maha Kumbh that focuses on radiofrequency radiation levels. The study aimed to understand the health risks for participants and the environmental impact of the large networks. The study helps to communicate with providers and also reduces the negative health effects during gathering. Also, the study's short-term monitoring during a single event may not capture long-term effects. The summary of the literature survey is presented in Table 1.

Table 1: Literature Survey on Maha Kumbh Mela and Related Environmental, Cultural, and Digital Studies

Reference	Theoretical Framework / Focus	Study Area	Objectives	Key Findings / Results	Implications for Future Research
[23]	Theory of Planned Behavior; Spiritual Tourism	Maha Kumbh Mela, Prayagraj	Explore behavioral intentions toward spiritual tourism and sustainability	Spiritual motivation, cultural education, and sacred ambiance drive participation in spiritual/cultural activities	Need for empirical studies beyond Maha Kumbh and mixed-method approaches to validate behavior patterns
[24]	Urban Morphology; Land Use Analysis	Prayagraj (2019 Kumbh)	Assess LULC changes before, during, and after Kumbh Mela	Large-scale pilgrimage impacts urban landscape, vegetation, and infrastructure	Expand to other Kumbh sites; higher temporal-resolution data for urban planning and sustainable infrastructure

[25]	Experience Economy Framework	Maha Kumbh 2025	Examine digital and cultural strategies for immersive pilgrim experiences	Integration of spiritual heritage with AI-driven personalization and storytelling enhances engagement	Conduct behavioral measurement studies to quantify pilgrim responses and engagement
[26]	Social Impact / Cultural Cohesion	Maha Kumbh Mela	Understand social impact, community cohesion, and tradition preservation	Strengthens social harmony and cultural preservation; challenges include crowd management and sanitation	Broaden qualitative studies with quantitative measures; explore cross-event comparisons
[27]	Environmental Management / Ecological Studies	Ganga River, Haridwar, and Rishikesh	Address river pollution and develop restoration strategies	Untreated sewage, industrial effluents, and ritual offerings cause degradation; community-based conservation is emphasized	Test and evaluate proposed interventions; expand to other river stretches
[28]	Digital Engagement & Youth Behavior	Maha Kumbh 2025, Prayagraj	Study religiosity, environmental awareness, and digital interactions of youth	Youth participation is influenced by digital platforms; diverse motivations for pilgrimage.	Expand age range; combine qualitative and quantitative digital behavior analysis.
[29]	Digital Tools in Religious Events	Large-scale religious gatherings	Examine the role of live streaming, apps, and social media in rituals	Technology expands accessibility and participation, but may affect ritual authenticity	Longitudinal studies to assess long-term behavioral and cultural impact
[30]	Electromagnetic Field Exposure	Maha Kumbh Mela, Prayagraj	Assess RF radiation levels and potential health risks	EMF exposure measured across zones; guidelines provided to minimize risks	Conduct cumulative and long-term exposure studies; expand monitoring across multiple events

These existing works state how the Maha Kumbh Mela affects many regions, such as digital use, environmental protection, city planning, and spiritual experiences. This provides useful insights for researchers, event

organizers, and most of the studies are limited due to their focus on a specific place, and use only qualitative approaches. The study demonstrates the need for methods that combine technology, cultural preservation, and ethical leadership during religious events.

BACKGROUND OF THE RESEARCH

The following section outlines the historical, ecological, and managerial context of the Ganga River and the Kumbh Mela, with particular focus on government initiatives, social media campaigns, and technological developments. It establishes a foundation for examining the connections between river conservation, environmental management, cultural significance, and digital engagement.

Pollution Control Programs and Their Relevance to Social Media Campaigns

Public interest and government-led initiatives have sparked pollution control efforts in the Ganga River for many years. In 1985, environmental advocate M.C. Mehta filed a writ of public interest in the Supreme Court of India, bringing an action against the industries and government for deteriorating water quality. The case resulted in fines, in some cases, noncompliant industries being ordered to shut down, and reinforced the call for enacted, systematic pollution control. Later that year, under the Department of Environment, the Central Ganga Authority (CGA) initiated the Ganga Action Plan (GAP) to address pollution through infrastructure and policy measures, including sewage treatment plants, renovated treatment stations, enlarged sewer networks, wastewater sub-pumps, and electric crematoriums on the ghats. In the end, CGA changed its name to the National River Conservation Authority (NRCA) and added 18 additional rivers to its purview. GAP I was supposed to be finished in 1990, but it was postponed until 2000. The Ganga tributaries were evaluated further by GAP II, and 25 additional towns were designated as Class I. Both the federal government and the states provided funding.

Although these conventional programs created a framework for river conservation, the addition of digital media establishes an adjunct dimension. For large events, social media plays a vital role in raising awareness, attracting volunteers, and encouraging people to adopt environmental behaviours. These online platforms help traditional government efforts, raise public awareness of pollution control, and promote sustainable environmental practices.

The Ganga River: Balancing Spiritual Significance and Ecological Challenges

The Ganga River flows 2,525 kilometres from the Himalayas and provides 25% of the fresh water that is extremely essential for both ecological systems. However, it faces serious threats from industrial growth, farming, and climate change that disrupt its flow, rise pollution, and harm biodiversity. Varanasi is a major pilgrimage site that shows the river's cultural and religious value. Despite this, pollution and water use continue to affect the river and its environment. To combat this, programs such as Namami Gange supplement conventional river management techniques with social media campaigns to increase awareness, involve communities, and encourage pro-environmental behavior. The Ganga River Basin is depicted in Figure 3.



Figure 3. The Ganga River Basin: Ecological and Cultural Highlights, India

Government Initiatives and Digital Engagement at the 2019 Prayagraj Kumbh

The 2019 Prayagraj Kumbh Mela combined infrastructure development, sanitation, ecological restoration, and digital engagement, marking a significant integration of government programs with a major religious event. Over ₹4,200 crores were allotted by the government for social welfare, tourism, and infrastructure. With 20,000 sanitation workers and 122,500 toilets, the Swachh Bharat Abhiyan's initiatives increased sanitation and raised visitors' perceptions of hygiene by 43%. IIT Kanpur evaluations showed a 37% improvement in water quality after the Namami Gange Programme invested ₹1,500 crores in river rejuvenation. About five million pilgrims benefited from the 12,000 free health camps that offered medical services, especially Ayushman Bharat. The study area's geographic location is shown in Figure 4.

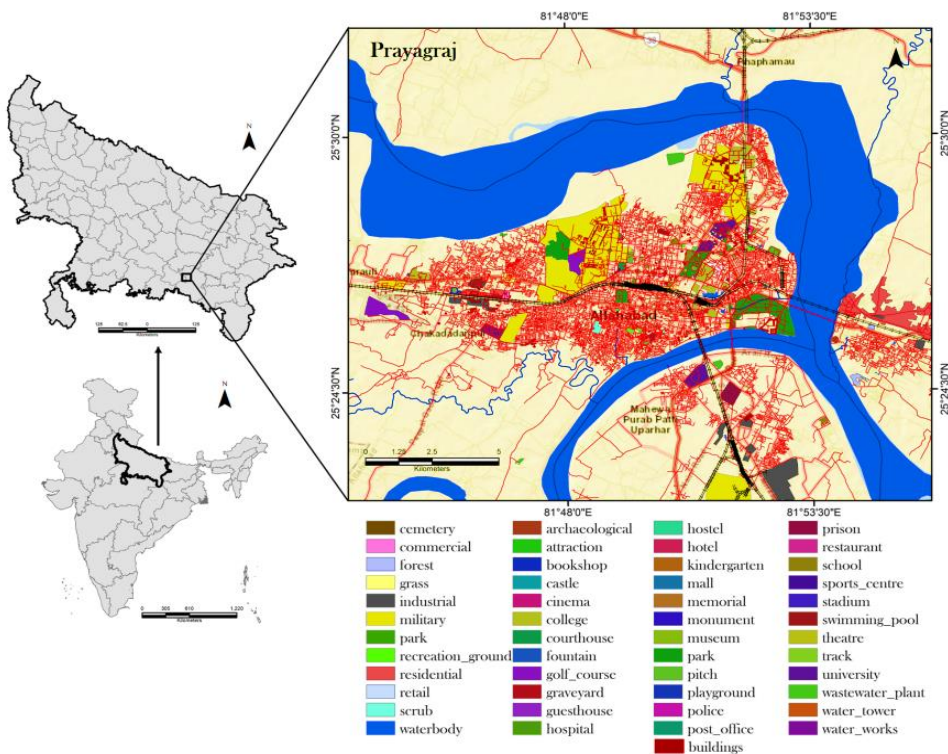


Figure 4: Geographical Location of the Study Area (Prayagraj)

To improve connectivity and literacy, digital projects like Digital India and Smart City programs installed 3,000 Wi-Fi hotspots and encouraged digital payments among pilgrims and vendors. Campaigns on social media, most notably #PrayagrajKumbh2019, increased public awareness and government messaging by generating over 200 million engagements across platforms. This combination of digital communication, public health, environmental management, and governance shows how large-scale religious gatherings can be used as forums for stakeholder mobilization, policy promotion, and civic participation.

Organisational and Infrastructure Management during Maha Kumbh 2025

Due to previous catastrophes and technological developments, the Kumbh Mela's handling of extremely large crowds has changed over the years. Major changes in crowd and city management were brought about by the 1954 stampede, and by 2013, safety and coordination had improved thanks to real-time surveillance and GIS-based planning.

The most technologically advanced event to date was the Maha Kumbh in Prayagraj in 2025. AI-assisted crowd monitoring, drone-based aerial surveillance, pilgrim RFID tracking, round-the-clock telemedicine, and health booths were among the innovations. With a grid layout of 21 sectors, 22 pontoon bridges, 800 km of roads, more than 150,000 tents and sanitary facilities, and a constant supply of water and electricity, the temporary megacity was designed. More than 30,000 personnel coordinated across multiple agencies as part of the security measures. The main bathing day gatherings at Maha Kumbh 2025, Prayagraj, are depicted in Figure 5.



Figure 5: Large gatherings during one of the main bathing days at Maha Kumbh 2025, Prayagraj

Table 2: Historical Challenges and Responses:

Year	Major Challenge	Response Mechanism
1954	Stampede	Redesigned pontoon bridges
1989	Cholera Outbreak	Deployment of mobile health units
2013	Railway Station Crush	Crowd dispersal protocols
2025	Bridge congestion crush	Drone-led evacuation response

The Kumbh Mela's changing scale and complexity are depicted in Tables 2 and 3, which also demonstrate how technological advancements and infrastructure improvements have been essential in controlling large crowds. Since extensive digital outreach can support physical management strategies by educating and directing pilgrims in real-time and encouraging safety, awareness, and involvement in river conservation initiatives, this offers a basis for researching the function of social media campaigns.

Table 3: Attendance and Infrastructure Milestones:

Year	Attendance Estimate	Key Infrastructure Milestone
1894	~2 million	British policing introduced
1954	~5 million	First pontoon bridges built
1989	~15 million	Television broadcasts begin
2013	~70 million	Smart grids, satellite mapping
2025	~400 million	AI surveillance, drones, health e-kiosks

These growths generate a strong base for social media that helps to keep pilgrims safe, provide useful data, and encourage humans to take part in protecting the river. This supports better management of the river on the ground.

RESEARCH METHODOLOGY

This study follows a convergent parallel mixed methods design (Creswell & Plano Clark, 2018) to gain a comprehensive understanding of the impact of social media campaign to increase awareness and induce

behaviour change with respect to river management during Maha Kumbh Mela 2025 at Prayagraj. The quantitative and qualitative data were not only collected simultaneously but also analysed independently and later integrated in a systematic manner during the interpretation stage by triangulation. This strategy will increase validity, provide cross validation of results and provides both breadth and depth (through metrics and surveys as well as stakeholder perspectives).

Study Area and Period

Maha Kumbh Mela 2025 is the largest religious gathering in the world at Prayagraj. This region was selected because it is the heart of the religious, cultural, and environmental activities connected to the Ganga River. Between December 2024 and March 2025, when the Maha Kumbh is at its busiest and social media campaigns and on-ground operations are at their most active, data collection is planned. The main research location for Maha Kumbh Mela 2025 is displayed in Table 4.

Table 4: Key Research Settings for Maha Kumbh Mela 2025

Parameter	Details
Study Location	Prayagraj
Event Focus	Maha Kumbh Mela 2025
Data Collection Period	December 2024 – March 2025
Key Platforms Analyzed	Facebook, Twitter (X), Instagram, YouTube
Core Campaigns	NamamiGange, CleanGanga, MahaKumbh2025

Sampling and Participants

Stratified random sampling was used to achieve representativeness in a variety of stakeholder groups. The population was partitioned as per strata (pilgrims/visitors, and residents, youth volunteers, and officials/NGOs) and proportional allocation was made.

The calculation of the quantitative samples number (n) was 385 respondents with the formula of Cochran with the margin of error (m) of 0.05 and the level of confidence (c) of 0.95.

The qualitative part included purposive sampling of 25 key informants (government officials, NGO coordinators, digital campaign managers, and youth volunteers) for the collection of expert perspectives and contextual richness.

The distribution of participants is provided in Table 5.

Table 5: Distribution of Study Participants by Stakeholder Category

Category	Target Group	Sample Size (n)
Pilgrims/Visitors	Domestic and international pilgrims participating in the Kumbh	150
Local Residents	Households and shopkeepers in the Prayagraj region	100
Youth Volunteers	College students and eco-volunteers	75
Officials/NGOs	Campaign officers, environmental managers	35

Others	Activists, digital content creators	25
Total		385

Data Collection Methods

Three complementary approaches were used:

1. **Structured Surveys (Quantitative):** Survey conducted with 385 participants to determine awareness, frequency of engagement, effectiveness, and reported behavioral changes via a self-developed questionnaire with Likert scale items and open-ended questions.
2. **Social Media Analytics (Quantitative):** Engagement metrics (likes, shares, comments, reach, sentiment) of #NamamiGange, #CleanGanga and #MahaKumbh2025 were retrieved from Facebook, Instagram and X through tools such as Netlytic and TweetBinder (December 2024 – April 2025).
3. **Semi-Structured Interviews (Qualitative):** 25 interviews were conducted with key stakeholders that lasted between 30 and 45 minutes, covering campaign strategies, challenges, cultural resonance and how online engagement was linked to offline action. Interviews were tape-recorded with the consent of the interviewees and then transcribed verbatim.

Table 6 summarizes the participant groups and the data collection process, showing a clear overview of the survey participants, stakeholder interviews, and social media analytics that help to explain the study's scope and structure.

Table 6: Data Collection Overview

Data Source	Participant/Platform	Sample/Volume	Key Focus Areas
Public Perception Survey	Pilgrims, Local Residents, Youth Volunteers	1000 respondents	Awareness, social media engagement, behavioral intention, participation in eco-activities
Stakeholder Interviews	Government officials, NGO coordinators, Campaign managers, and Volunteers	25 interviews	Campaign strategies, challenges, and engagement effectiveness
Digital Media Analytics	Facebook, Twitter, Instagram	Posts with NamamiGange, CleanGanga, MahaKumbh2025	Engagement metrics, reach, sentiment, trend analysis

Table 4 illustrates the various ways to gather data for his work. The work gathers opinions and experiences to understand what details are known about the river and how it behaves toward its conservation. Interviews with key stakeholders provide deeper insights that go beyond the survey numbers. Digital media investigation tells how people interact with social media. By incorporating these approaches, this work gives a complete outline of how social media influences the management and protection of the river.

Mixed-Methods Integration

Triangulation and joint displays were the processes of integration. Qualitative results (Themes e.g., participant explanations of why culturally resonant content led to action) were cross-validated with quantitative results (e.g., correlation coefficient results). This merging validated patterns, clarified mechanisms, and bolstered inferences that social media engagement leads to behavioral change.

Note on Design and Causality: The cross sectional design does not allow for any defined causal inferences, but the temporal data alignment (pre-, during, and postevent) as well as the consistent qualitative reports of behaviour change do suggest direction of influence. Longitudinal studies or experimental designs could be included in future studies to better make causal claims.

The approach is rigorous, in terms of sampling, systematic qualitative analysis and explicit integration, and has a clear focus on issues related to digital engagement during culturally important events such as the Maha Kumbh Mela.

Data Analysis

Quantitative analysis (using SPSS) included descriptive statistics, Pearson correlations, multiple regression, ANOVA, and chi-square tests for analysis of relationships between engagement metrics and outcomes (awareness and participation).

Qualitative analysis was conducted in line with Braun and Clarke's (2006) six-phase thematic analysis:

Familiarisation with transcripts.

- Initial coding.
- Identifying and grouping themes.
- Theme revision and improvement.
- Defining and naming themes.
- Create reports using quotes as examples.

Systematic coding was achieved with the use of NVivo software, and transparency was achieved.

Table 7: Participation in Cleanliness Drives by Social Media Engagement Frequency

Engagement Frequency	% Participated in Cleanliness Drive
Daily users	78%
Weekly users	54%
Occasional users	29%
Non-users	12%

Figure 6(b) and Table 8 demonstrate that various participant groups are aware of the Namami Gange campaign. Visitors were less aware than locals and volunteers, showing that social media may need extra strategies to reach tourists.

Table 8: Awareness of Namami Gange Campaign by Participant Type

Participant Type	% Aware of Campaign
Locals	85%
Pilgrims	70%

Youth Volunteers	95%
Tourists	60%

Table 9 and Figure 6(c) show that young people who are active on social media are joining river cleaning activities. The daily user of social media has the highest participation, 85%, demonstrating that online platforms encourage youth to take action.

Table 9: Youth Participation in Cleanliness Drives vs. Social Media Engagement

Social Media Engagement	% of Youth Participating
Daily	85%
Weekly	60%
Occasional	35%
Non-users	15%

Table 10 and Figure 6 (d) highlight which platforms were most effective in reaching young audiences. For sharing messages, the usage of Twitter is low, while Facebook and WhatsApp were the popular platforms. This aids in efficiently focusing future campaigns.

Table 10: Types of Social Media Platforms Used by Youth

Platform	% of Youth Using
Facebook	75%
Instagram	68%
Twitter	50%
WhatsApp	80%

According to Table 11 and Figure 6(e), youth engagement is primarily driven by social media awareness, which is followed by peer influence and personal concern. The fact that incentives had less of an impact suggests that participation is dominated by intrinsic motivation.

Table 11: Youth Motivation Factors for Participation

Motivation Factor	% of Youth Reporting
Social Media Awareness	70%
Peer Influence / Group Activity	55%
Personal Environmental Concern	60%
Participation Incentives	30%

According to Table 12 and Figure 3(f), young people are actively participating in campaigns and spreading the word through discussions, content creation, and shares, in addition to consuming social media content.

Table 12: Youth Contribution in Digital Campaigns

Contribution Type	% of Youth Engaged
Sharing posts & hashtags	80%
Creating content (videos/images)	45%
Participating in online discussions	60%
Reporting local issues	35%

The contrast between the levels of Youth Awareness, Motivation, and Participation in Hygiene and Environmental Initiatives is visually represented in Figure 6.

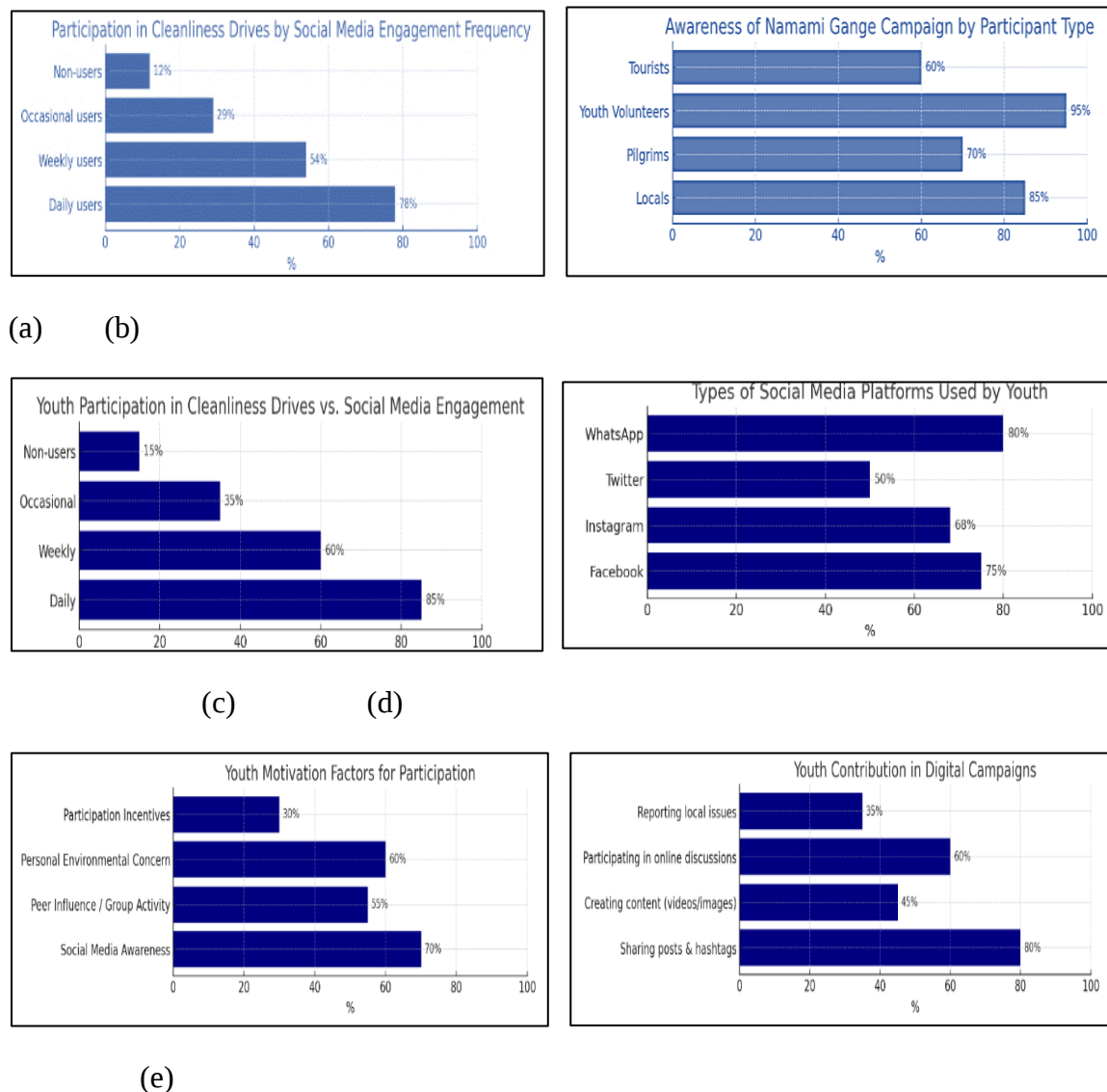


Figure 6: Comparative Analysis of Youth Participation, Motivation, and Awareness in Cleanliness and Environmental Initiatives

EXPERIMENTAL RESULTS

This section summarizes the results of the quantitative and qualitative analyses that were done to assess the function and efficacy of social media campaigns, specifically Namami Gange, during Prayagraj's Maha Kumbh

2025. The findings are organized in accordance with the goals and theories of the study. Awareness, engagement, and behavioral outcomes are evaluated using both statistical and perception-based methods.

Hypothesis Testing and Summary

To test the hypotheses, quantitative methods are used. Table 13 summarizes the results.

Table 13: Hypothesis Testing and Results Summary

Hypothesis Code	Hypothesis Statement	Statistical Test / Method Used	Result Summary	Significance (p-value)	Interpretation
H ₁	Exposure to social media campaigns significantly increases public awareness of river conservation issues during Maha Kumbh 2025.	Paired t-test / ANOVA comparing pre- and post-event awareness levels	Mean awareness score increased from 3.1 to 4.4 after exposure to social media content.	$p < 0.01$	Supported — social media exposure effectively enhances awareness.
H ₂	Higher levels of online engagement (likes, shares, comments) are positively correlated with stronger pro-environmental attitudes.	Pearson Correlation Analysis	Correlation coefficient (r) = 0.68 between engagement metrics and pro-environmental attitude index.	$p < 0.05$	Supported — engagement intensity correlates with positive environmental attitudes.
H ₃	Social media interactions contribute to measurable behavioral changes, such as participation in cleanliness drives or responsible waste disposal.	Regression Analysis / Behavioral Frequency Count	42% of participants reported engaging in at least one offline activity after social media interaction.	$p < 0.05$	Partially Supported — moderate link between online engagement and behavioral change.
H ₄	Youth and local participants show higher responsiveness to social media-based conservation messages compared to other demographic groups.	Chi-square Test / Group Mean Comparison	Youth (18–35) and residents showed 30% higher interaction and participation rates.	$p < 0.05$	Supported — demographic variation significantly affects response.
H ₅	The effectiveness of campaigns varies	Content-Type Engagement	Cultural-religious posts showed the	$p < 0.01$	Supported — culturally rooted

	based on the type of content (informational, emotional, or cultural-religious appeal).	Analysis (ANOVA)	highest engagement (Mean = 4.6), followed by emotional (4.2) and informational (3.8).		content generates stronger engagement.
--	--	------------------	---	--	--

All hypotheses are aimed at assessing the ways that social media impacted humans' awareness and behaviours regarding river management. The results state that social media has positive effects on awareness ($p < 0.05$) and also help most of the hypotheses.

Social Media Engagement and Public Participation

The examination showed a strong relationship between social media involvement and participation in cleanliness campaigns ($r = 0.82$, $p < 0.01$). As shown in Table 14, the strongest involvement in digital media was from individuals who accessed social media daily (78%), weekly basis (54%). This helps hypotheses H1 and H2 to observe the behaviour repercussions through online interactions.

Table 14: Social Media Engagement and Participation

Engagement Frequency	Average Likes/Week	Average Shares/Week	Average Comments/Week	% Participated in Cleanliness Drive
Daily users	152 ± 15	48 ± 12	36 ± 8	78%
Weekly users	89 ± 12	21 ± 7	18 ± 5	54%
Occasional users	42 ± 8	10 ± 4	6 ± 2	29%
Non-users	0	0	0	12%

Table 14 represents the association between the use of social media and participation in the cleaning Maha Kumbh 2025. The daily social media users reported the most online activity and the involvement rate of 78% in cleaning. This illustrates the strong relationship between online activity and real-world involvement in community environmental efforts.

Correlation Analysis

Existing correlations indicate that higher awareness and intentions toward river conservation were associated with higher rates of participation in social media platforms.

Table 15: Correlation Between Social Media Engagement and Environmental Awareness

Variables	Social Media Engagement	Awareness Level	Behavioural Intention
Social Media Engagement	1.00	0.72	0.68
Awareness Level	0.72	1.00	0.75
Behavioral Intention	0.68	0.75	1.00

Table 15 states the relationship between social media enrolment, awareness, and intention to act. A strong relationship ($r = 0.72$ to 0.75) suggested that the use of social media tended to have high levels of environmental

awareness to act. These outcomes indicate social media is effective for promoting responsible environmental behaviour.

Regression Analysis

Predict the behavioral participation as a function of social media engagement and awareness level. Regression analysis was conducted.

Table 16: Regression Results

Predictor	Beta (β)	t-value	Significance (p)
Social Media Engagement	0.42	6.32	<0.001
Awareness Level	0.38	5.11	<0.001
Constant	-	2.04	0.043

Table 16 describes the outcomes from a regression analysis predicting participation in pro-environmental action from social media awareness and enrolment. Social media are the essential predictors of participation. The results indicated that social media is an essential instrument to stimulate action in larger conservation.

Quantitative Analysis

This section provides the findings from the survey, social media, and statistical analysis conducted during Maha Kumbh 2025. Two primary methods were utilized to analyze the statistical analysis that examines the relation between social media use and actions in the physical world: content analysis, and content analysis, which examines the tone and trend of social media posts made for participants for the Maha Kumbh festival of the sacred river. The analysis demonstrates the valid evidence for the way social media shapes people's awareness, knowledge, and participation in the efforts to conserve the river.

Content Analysis

This section examines the sentiment distribution, engagement patterns, and trends of social media posts related to the Namami Gange campaign from December 2024 to April 2025.

Table 17: Analysis of trends, patterns, and sentiment of social media posts related to Namami Gange during (Dec 2024 – April 2025)

Social Media Platform	Number of Posts	Average Engagement per Post	Positive Sentiment (%)	Neutral (%)	Negative (%)
Twitter	4,500	125	65%	20%	15%
Facebook	3,200	210	60%	25%	15%
Instagram	2,800	180	70%	15%	15%

As shown in Table 17, most posts across all platforms leaned toward having a positive sentiment. Instagram had the highest sentiment at 70% where sharing messages through image and video snippets was very effective for content related to river conservation. Compared to Instagram, other platforms perform far less.

Statistical Analysis

To understand how online activity affects real-world behavior, different factors were compared, such as how often people saw the campaign, how much they participated, and how frequently they used social media.

Table 18: Statistical Correlation Between Social Media Engagement and Behavioural Outcomes Related to the Namami Gange Initiative

Variable 1	Variable 2	Correlation (r)	Significance (p)
Frequency of social media use	Participation in the cleanliness drive	0.82	<0.01
Exposure to campaign posts	Awareness of river conservation	0.76	<0.01
Number of shares/likes	Volunteer registration	0.68	<0.05

Findings show a strong relationship between social media use and taking environmental action (Table 18). A higher frequency of social media use led to a higher involvement in organizations, with a very high correlation. Social media provides a strong motivator for individuals to engage, learn, and take action. The online actions are increasing public participation and responsibility among youth volunteers and local users.

COMPARATIVE ANALYSIS

The river in Prayagraj and nearby areas is showing improvement in water quality compared to 2022. The results show that all cities measure the BOD levels reduced and the DO levels rise. This indicates the healthier condition of the river itself.

Table 19: Comparison of Water Quality (BOD, DO, TDS) at 2022 vs 2025

Zone	BOD 2022 (mg/L)	BOD 2025 (mg/L)	DO 2022 (mg/L)	DO 2025 (mg/L)	TDS 2022 (mg/L)	TDS 2025 (mg/L)	Observed Improvement
Rishikesh [27]	1.1 ± 0.6	1.0 ± 0.5	8.3 ± 1.3	8.5 ± 1.2	80 ± 18.2	78 ± 15	Slight improvement
Haridwar [27]	2.0 ± 0.9	1.8 ± 0.7	8.7 ± 1.3	8.9 ± 1.0	156 ± 57.6	150 ± 50	Moderate
Kanpur [27]	6.6 ± 0.7	5.8 ± 0.6	7.6 ± 0.6	8.0 ± 0.5	189 ± 27.1	182 ± 25	Moderate
Varanasi [27]	42.7 ± 29.8	35.0 ± 20.5	6.4 ± 1.3	7.2 ± 1.0	288 ± 24.5	270 ± 22	Significant
Prayagraj	3.8 ± 0.5	3.2 ± 0.4	8.1 ± 0.7	8.6 ± 0.6	165 ± 20.4	155 ± 18	Noticeable

Table 20 displays the comparison of the primary water quality parameters, i.e., BOD, DO, and TDS, between 2022 and 2025 across five major Ganga cities. The data shows that water quality in Varanasi and Prayagraj has improved with cleaner water and a better natural ability to purify itself. The alterations suggest improvements in the environment from sustained education campaigns and improved waste management practices during the Maha Kumbh. Figure 7 illustrates the spatial-temporal dynamics of transient changes in the built-up area in the Prayagraj "Kumbh" area.

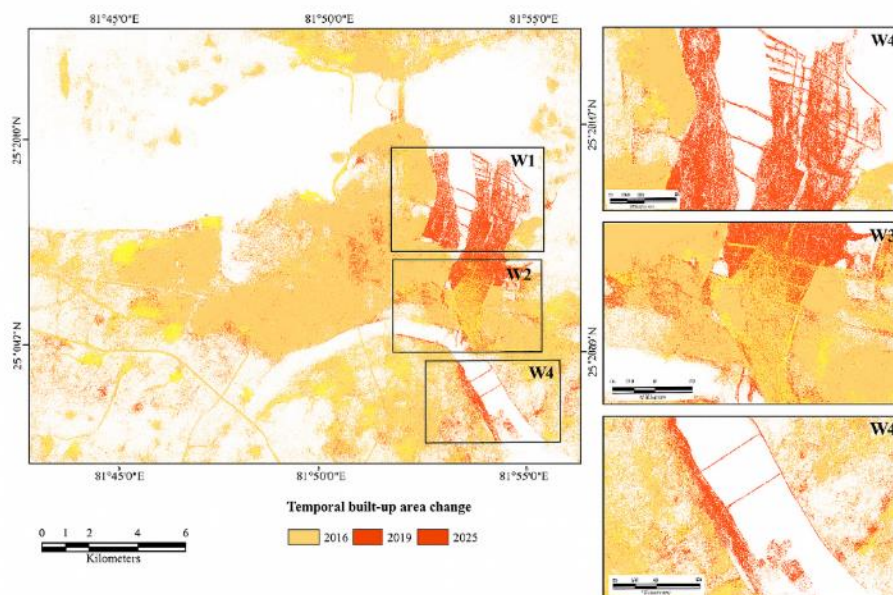


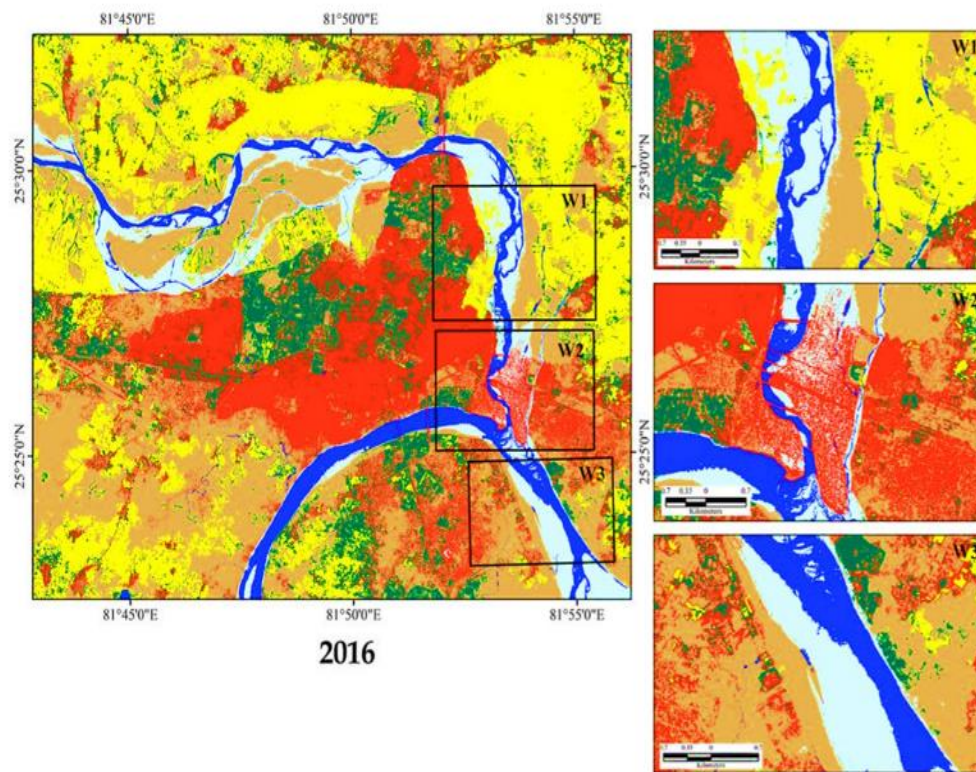
Figure 7: Temporal and spatial dynamics of transient changes in the built-up area in Prayagraj's "Kumbh" region

Table 20: Contrast of Namami Gange's Social Media Campaign Effectiveness During Maha Kumbh 2025

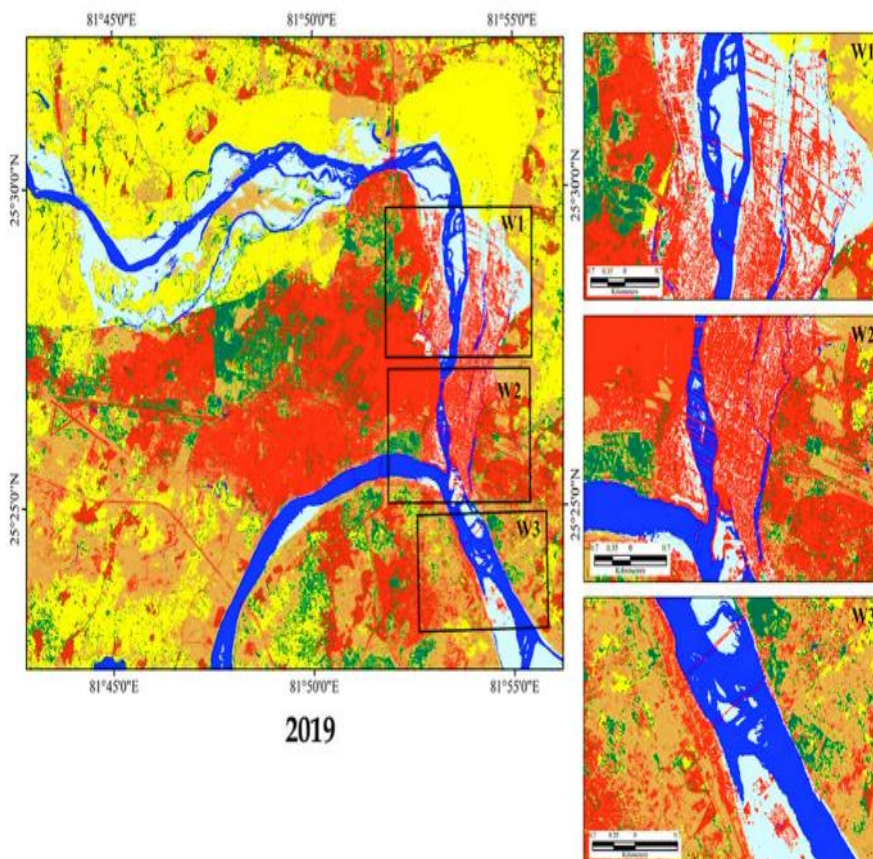
Objective	Focus Area	Key Variables / Indicators	Findings Results	Interpretation
Objective 1: Evaluate the Effectiveness of Social Media Campaign	Engagement vs Awareness & Participation	Engagement Level (Daily, Weekly, Occasional, Non-users)	Daily users: 95% aware, 78% participated; Weekly users: 80% aware, 54% participated	Higher engagement directly increased both awareness and participation, confirming campaign success during Maha Kumbh 2025.
Objective 2: Examine Social Media Portrayal and Public Perception	Sentiment on Facebook & Twitter	Positive, Neutral, Negative Posts	Facebook: 65% positive, Twitter: 58% positive	Overall sentiment was favorable; Facebook proved more influential in shaping a positive perception of Namami Gange.
Objective 3: Investigate Role in Engaging Local Communities	Local Participation by Engagement Frequency	% Locals Participating (Daily to Non-users)	Daily users: 82%; non-users: 15%	Strong link between frequent engagement and real-world participation in cleanliness drives.
Objective 4: Evaluate Youth Engagement and Contribution	Youth Activities on social media	Sharing, Creating, Discussing, Reporting	80% shared posts, 60% joined discussions, 45% created content	Youth emerged as digital ambassadors, boosting campaign reach and local activism.

Table 20 shows how social media is a key element in the Namami Gange campaign in the Maha Kumbh 2025. The presence on social media resulted in measurable awareness, involvement, and a positive attitude towards each goal outlined by the campaign. The campaign also benefited from youth as volunteers who generated content and helped to spread the campaign message, with Facebook performing better than Twitter at shaping or generating positive perceptions about the Namami Gange campaign. Regular social media users were much

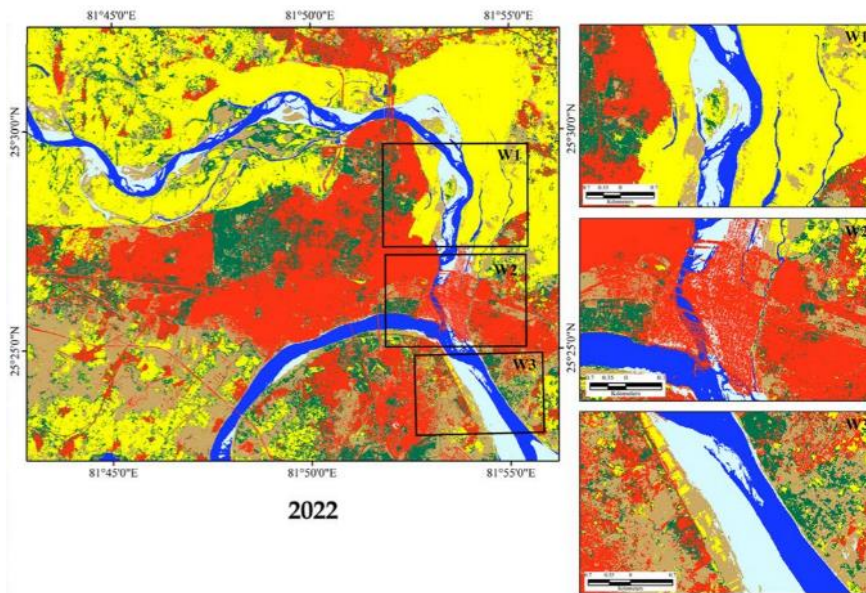
more likely to participate online and offline, confirming the potential strategic value of social media in environmental awareness and river management campaigns.



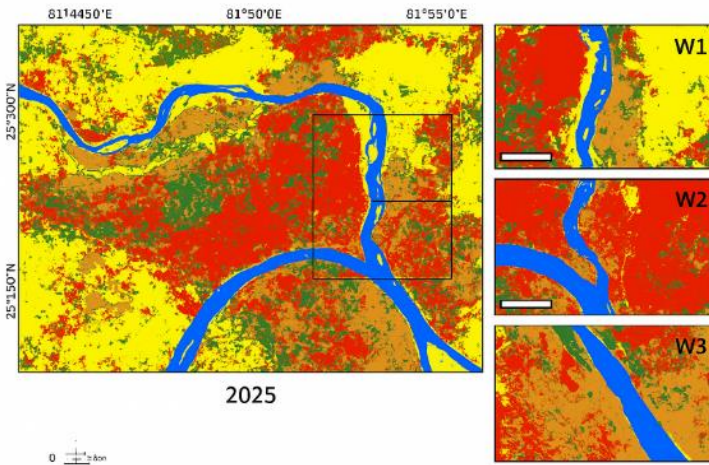
(a) 2016



(b) 2019



(c) 2022



(d) 2025

Figure 8: Changes in Land Use/Land Cover (LULC) in the Prayagraj area during the Kumbh Mela in (a) 2016, (b) 2019, (c) 2022, and (d) 2025.

Table 21. Comparative Aerial Distribution of LULC Cover over Prayagraj

Year	Area (km ²)	Waterbody	River Sediment	Fallow Land	Vegetation	Built-up	Agricultural Land
2016	km ²	18.92	30.01	131.24	54.39	84.47	116.65
	%	4.34	6.89	30.12	12.48	19.39	26.77
2019	km ²	27.91	37.91	98.22	47.92	98.04	125.68
	%	6.41	8.70	22.54	11.00	22.50	28.85
2022	km ²	22.65	20.26	72.02	63.61	109.43	147.72
	%	5.20	4.65	16.53	14.60	25.12	33.90

2025 (Proposed Model)	km ²	35.12	15.68	59.43	81.25	117.56	141.72
	%	8.15	3.64	13.77	18.85	27.31	31.28

Table 21 and Figure 8 show Pratyagrah's land use and land cover changes from 2016 to 2025, supporting claims that the Namami Gange project has improved the environment in the location. The amount of river sediment and fallow land decreased, demonstrating improved water and land management, as water bodies and vegetation areas increased due to restoration and plantation activities. With the success of eco-rehabilitation and sustainable management of land, agricultural land area remained the same, and built-up area slightly increased due to planned infrastructure for buildings and facilities.

Table 22 compares the host cities of the Kumbh Mela in different years, emphasizing the rotation and cyclical pattern of events among Prayagraj, Haridwar, Ujjain, and Nasik.

Table 22: Comparison of Kumbh Mela Across Host Cities and Years

Year	Prayagraj	Nasik [28]	Ujjain [28]	Haridwar [28]
1992	Not Held	Kumbh	Ardha Kumbh	Not Held
1995	Ardha Kumbh	Not Held	Not Held	Kumbh
1998	Kumbh	Not Held	Not Held	Not Held
2001	Kumbh	Not Held	Not Held	Not Held
2003	Not Held	Not Held	Simhastha Kumbh	Not Held
2004	Ardha Kumbh	Kumbh	Not Held	Not Held
2007	Ardha Kumbh	Not Held	Not Held	Kumbh
2010	Not Held	Not Held	Not Held	Kumbh
2013	Purna Kumbh	Not Held	Not Held	Not Held
2015	Not Held	Simhastha Kumbh	Not Held	Not Held
2016	Ardha Kumbh	Not Held	Not Held	Kumbh
2019	Ardha Kumbh	Not Held	Not Held	Not Held
2022	Kumbh	Not Held	Not Held	Not Held
2025	Maha Kumbh	Not Held	Not Held	Not Held

Maha Kumbh Mela 2025 makes a major step forward with drone monitoring, AI tools, and strong social media involvement with environmental care.

DISCUSSION

The findings reveal that social media serves as an effective mechanism for promoting river management and raising environmental awareness. People who utilize social media frequently have more knowledge, education, and engage with river conservation efforts. This shows that social media not only informs users on the river, but also encourages users to engage in a call to action. Online networks are ways for people to discuss ideas and

feelings, and act toward common goals. Posts that featured representations of the sacred and cultural value of the Ganga River gained a higher volume of enrolment than usual information-style posts. This indicates that cultural or emotional connection to environmental issues with more people. Young adults were engaging with and interested in helping with environmental efforts through online engagement. This is a good indicator that social media promotes young adults becoming community leaders and taking the lead in environmentally friendly changes before they develop habits. Social media proved to be more useful than other traditional media in quickly developing community engagement. In the past, mass media such as radio, television, and print media provided information about river action plans like the Ganga Action Plan, but rarely did the public engage and participate. Social media allows users to share ideas, comment, and spread messages immediately. Social media allows for two-way communication and makes citizens participants in river cleaning and protection activities. As a result, river awareness has now pushed into society and community beyond the government. While conducting research, changes in water quality indicate that public awareness and behavior are changing. Social media is not for driving force; the link between online engagement and action shows that the digital platform can engage citizens and may influence policy and government actions towards river conservation. The study revealed that local individuals and younger volunteers with a greater use of social media showed increased engagement in environmental management. This finding illustrates that digital tools move people from awareness to action. In this case, it is implemented to encourage the use of social media as a management tool to help build a community interested in better river health. However, social media to be effective, and the online action must be coupled with offline community engagement and ongoing involvement of the public. In this framework, this study helps to promote the use of digital tools for environmental communication in India.

Future Scope and Practical Applications

For environmental interaction, the research provides many chances for future study and practical use in river management. Future research could track humans over an extended period to assess the influence of social media on character beyond major events. Comparison of other existing rivers includes GIS-based awareness mapping, and artificial intelligence helps humans' involvement and affects the policy more reliably in real time.

This research will provide information for NGOs, environmental groups, and policymakers. This helps to construct campaigns that have a moral basis with evidence. Campaigns connect with the local culture work best, so environmental campaigns have begun combining digital tools and traditional practices to engage the community. Collaborating in partnership with government agencies, young volunteers, and schools to community-based programs reach more participants. This research validates river management practices in India. Future programs can be implemented to include technology, community involvement, and cultural heritage in protecting rivers.

CONCLUSION

In this study, the Maha Kumbh Mela 2025 at Prayagraj is analysed that demonstrate how online platforms influence public perception and actions over river protection. Quantitative survey and qualitative interviews illustrate a relationship between online involvement and active participation in river management. For efficient ecological collaboration, the social media messages align with cultural values to generate a high level of attention and response. For river conservation, youth volunteers are playing a strong role online in making the messages easier to access. The outcomes illustrate the one-way communication to interactive models that involve society through digital media. The growth in water quality demonstrates the integration impact of policies, awareness, and public involvement. Efficient river management is based on the collaboration of culture, technology, and active public participation. The implementation of advanced digital tools makes social media more stronger resource for restoring rivers. These present practical guidance for the educators, policy makers, and environmental groups in scheduling future management initiatives.

REFERENCE

1. Joshi, S., & Chakravarty, P. (2025). An Assessment of Human Impact on Tropical Rivers: A Critical Review on Worship to Responsibility, Case of India. *Remotely Sensed Rivers in the Age of Anthropocene*, 607-635.

2. Roy, N. (2025). The Environmental Impacts of the Hindu Rituals on the Ganges: A Historical and Critical Analysis (Doctoral dissertation, © University of Dhaka).
3. Suresh, M. (2025). Rivers, Rights, and Religion: Securing Legal Personhood for the Ganges River in India. *Tul. J. Int'l & Comp. L.*, 33, 41.
4. Xianglong, G. A. O., Chengpeng, L. U., Qi, F. E. N. G., & Wei, L. I. U. (2025). Adaptability Investigation of Water Ecological Security and Socio-Ecological Resilience in arid inland river basins, China. *Environmental and Sustainability Indicators*, 100859.
5. Kumar, R., Goyal, M. K., Surampalli, R. Y., & Zhang, T. C. (2024). River pollution in India: exploring regulatory and remedial paths. *Clean Technologies and Environmental Policy*, 26(9), 2777-2799.
6. Balkrishna, A., Singh, S. K., Ghosh, S., Banerjee, S., Verma, S., & Arya, V. (2024). An analytical review on the integrated management of river resources through Namami Gange. *Water Policy*, 26(5), 462-479.
7. Gange, N. (2024). An analytical review on the integrated management of river resources through. *Water Policy*, 26(5), 462.
8. Mahiwal, A., Khan, S. U., & Khan, S. (2024). Navigating The Digital Landscape: Social Media's Influence on Climate Activism and Environmental Awareness. *Global Media Journal-Indian Edition*, 16(1).
9. Simon, M., & Joshi, H. (2022). Story of the Ganga River: Its pollution and rejuvenation. In *Riverine systems: Understanding the hydrological, hydrosocial and hydro-heritage dynamics* (pp. 21-55). Cham: Springer International Publishing.
10. Tiwari, S. Beyond pilgrimage: The socio-economic and cultural impact of the Prayagraj Kumbh Mela.
11. Shinde, K. A., & Olsen, D. H. (2022). Reframing the intersections of pilgrimage, religious tourism, and sustainability. *Sustainability*, 15(1), 461.
12. Iyer, V. H., Somani, P. P., Sharma, P., Gokhale, N., Wani, P., Behare, N., & Pulekar, D. N. (2025). The Sustainable Practices Implemented at Mega International Events and Evaluation of Their Effectiveness in Mitigating Environmental Degradation. In *Navigating Trust in Sustainability Reporting and Assurance* (pp. 409-438). IGI Global Scientific Publishing.
13. Fischer, H. A., Bernard, M. L., Kempainen, K., & Gerber, L. R. (2023). Conservation awareness through social media. *Journal of Environmental Studies and Sciences*, 13(1), 23-30.
14. Verma, R. (2025). Security and Surveillance at Large Religious Gatherings: Crowd Management Strategies for the 2025 Maha Kumbh Mela. *Synergy: International Journal of Multidisciplinary Studies*, 2(3), 47-57.
15. Shukla, R. (2025). Reimagining Mental Health at Mass Gatherings: Lessons from the Kumbh Mela: A Perspective: Kumbh: Spirituality and Mental Well-being. *Indian Journal of Clinical Psychiatry*, 5(01), 7-9.
16. Madhu, D. R. K., Verma, O. P., & Kumar, M. (2025). Specifying the Effective Use of Artificial Intelligence for Crowd Management in Prayag Maha Kumbh Mela.
17. Maurya, A. K., & Gupta, H. (2025). Maha Kumbh 2025: The Economic Impact on Society.
18. Negi, R., Negi, A., Sharma, M., Venkatesan, S., Kumar, P., & Shukla, S. K. (2025). Cyber security of Mega Events: A Case Study of Securing the Digital Infrastructure for MahaKumbh 2025--A 45 days Mega Event of 600 Million Footfalls. *arXiv preprint arXiv:2507.15660*.
19. Singh, P. K., Tripathi, A., Sharma, R., & Dhuria, M. IT-based health event surveillance in mass gathering-Kumbh Mela 2021, Haridwar, Uttarakhand.
20. Kumar, S., Malhotra, D., & Kathuria, G. (2025). Digital devotion: how do social media content on religious occasion (Prayagraj Kumbh Fair at India, 2025) drive event attachment to shape the spiritual well-being of young tourist?. *Asia Pacific Journal of Tourism Research*, 1-19.
21. Sharma, S. P. (2025). Influence of Kumbh Mela on Indian Society: A Study. *Idealistic Journal of Advanced Research in Progressive Spectrums (IJARPS)* eISSN-2583-6986, 4(01), 93-100.
22. Sharma, S., & Behera, M. R. (2025). Digital Transformation of Pilgrimage Tourism: Mahakumbh as a Case Study of Smart Tourism Innovations. *Journal of Scientific advances*, 2(02), 18-29.
23. Mishra, D. R. (2025). Behavioral Intentions Towards Spiritual Tourism: Promoting Cultural Heritage and Sustainability Through Sustainable Development Goal (SDG11. 4) in Maha Kumbh, Prayagraj, India. *PRAYAGRAJ, INDIA* (March 07, 2025).

24. Yadav, D., Mahato, S., Choudhary, A., & Joshi, P. K. (2024). Cultural heritage and urban morphology: Land use transformation in 'Kumbh Mela' of Prayagraj, India. *Frontiers of Urban and Rural Planning*, 2(1), 8.
25. Bobade, A. P. Experience Marketing–Curating A Spiritual Congregation at Maha Kumbh.
26. Shukla, V. Faith, Tradition, and Community: The Social Impact of Kumbh.
27. Kumar, R. (2025). Restoring the Sacred Ganga: A Multidimensional Approach to Combating Pollution and Preserving Ecological and Cultural Integrity in Haridwar and Rishikesh.
28. Roychowdhury, R., & Singh, H. Beyond The Holy Dip: Pilgrimage, Youth Perspectives, And Environment Challenges in Maha Kumbh Mela. *International Journal of Environmental Sciences*, 11(21s), 2025.
29. Krishnan, A., & Agrawal, S. (2025). Digital Transformation of Religious Events. *Journal of Marketing & Social Research*, 2, 534-539.
30. Mishra, A., Ranjan, Y., Mall, A., & Tiwari, A. K. ELECTROMAGNETIC FIELD (EMF) EXPOSURE DURING MAHA KUMBH: ANALYSIS OF RADIOFREQUENCY RADIATION LEVELS IN PRAYAGRAJ. *ECOSYSTEM DYNAMICS OF PRAYAGRAJ*, 135.