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Flood Resilience in the Digital Age: Exploring Facebook's Role in Enhancing Disaster Preparedness among Smartphone Users in Gaya, Bihar

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Abstract

In today's digital environment, social media platforms have emerged as powerful tools for disaster communication and community resilience. This study investigates the role of Facebook in enhancing flood preparedness among smartphone users in Gaya district, Bihar, a region vulnerable to recurring floods. Employing a quantitative research design, a structured survey was conducted with 300 respondents equally divided between urban and rural areas. The study examines Facebook usage patterns, levels of engagement with flood-related content, preparedness actions taken, and user perceptions of the platform's effectiveness in flood risk communication. The results show that 68% of respondents use Facebook daily, with 95% accessing the platform via smartphones. A substantial 80% of participants reported receiving flood alerts on Facebook, and 62% indicated taking preparedness measures based on the information received. In terms of perceived effectiveness, 75% found the content useful, 70% considered it trustworthy, 68% affirmed its clarity, and 72% acknowledged its timeliness. Cross-tabulations revealed urban users were more likely than rural users to participate in Facebook groups related to flood management, and male users slightly outpaced female users in receiving flood alerts. The study underscores Facebook's potential as a reliable tool for disaster preparedness in digitally connected communities. However, it also highlights limitations such as a lack of representation from non-smartphone users and limited platform comparison. The findings provide a foundation for future research and policy aimed at integrating social media into disaster risk reduction frameworks, particularly in underserved regions.

Keywords; Community Resilience, Digital Literacy, Disaster Risk Reduction, Facebook, Flood Preparedness, Social Media.

INTRODUCTION

Natural disasters continue to pose significant threats to human life, infrastructure, and the environment, with floods being among the most frequent and destructive forms of disasters worldwide (Albahri et al., 2024: Glago, 2021). In India, floods affect millions of people each year, causing widespread displacement, health emergencies, property loss, and disruption to livelihoods (Singh et al., 2023). The state of Bihar, owing to its geographic location and the flow of major rivers such as the Ganga, Son, and Falgu, is particularly vulnerable to seasonal flooding. Gaya district, located in southern Bihar, is one such region that often experiences the adverse effects of heavy rainfall and flood-related disasters. The socio-economic vulnerability of the population, combined with a lack of real-time information and preparedness strategies, increases the risks faced by communities during flood events (Kansal et al., 2017). In the contemporary era, communication plays a vital role in managing disasters. The proliferation of smartphones and the internet has dramatically altered how people receive, process, and respond to information during emergencies (Baraldo & Di Giuseppantonio Di Franco, 2024). Among the various digital platforms available, Facebook stands out as a widely used social networking site that offers real-time communication, information dissemination, and community interaction.

With features such as live updates, location tagging, emergency alerts, and group networking, Facebook holds potential as a tool for raising awareness and guiding preparedness actions before and during floods.

Facebook's relevance is particularly noteworthy in a country like India, where the smartphone user base is growing rapidly, even in rural areas. As people increasingly rely on mobile phones and digital platforms for everyday communication (Kumar et al., 2023; Sah, 2025), the role of social media in disaster risk reduction is becoming more prominent (Ramrakhiyani, 2023). However, while national and international organizations have recognized social media's importance in crisis communication, academic research examining its actual effectiveness in local and regional contexts remains limited.

This study addresses this gap by focusing on the Gaya district of Bihar, where both urban and rural populations actively use Facebook. The research aims to explore how Facebook contributes to enhancing flood preparedness and community resilience among smartphone users. Specifically, it investigates how individuals engage with Facebook for disaster-related information, how they interpret and act on such information, and whether their usage leads to increased preparedness and safety.

The significance of this study lies in its attempt to evaluate not only the frequency and nature of Facebook use during floods but also its perceived effectiveness as a medium of disaster communication. The research considers various factors such as gender, location (urban or rural), and level of digital literacy to understand differences in engagement and preparedness behaviors. By employing a structured, close-ended survey approach and analyzing data through descriptive statistics, cross-tabulations, and inferential techniques, the study seeks to provide actionable insights for policymakers, disaster management authorities, and digital media practitioners.

In sum, this research contributes to the ongoing discourse on digital literacy and disaster communication by examining Facebook's evolving role in enhancing flood preparedness in vulnerable regions. It aims to bridge the gap between technology use and grassroots-level disaster management in the digital age.

LITERATURE REVIEW

In recent years, the intersection of digital communication and disaster preparedness has emerged as a critical area of academic inquiry. Scholars and practitioners alike recognize the role of information and communication technologies (ICTs), particularly social media platforms, in enhancing public awareness, promoting community participation, and facilitating timely responses during disasters. The existing body of literature provides valuable insights into how digital tools contribute to disaster risk reduction, yet also reveals notable gaps, particularly in the Indian rural context.

Social Media and Disaster Communication

Numerous studies underscore the transformative impact of social media on disaster communication. Platforms such as Facebook, Twitter, and WhatsApp enable rapid dissemination of information, foster two-way communication between authorities and the public, and support peer-to-peer sharing of warnings, resources, and safety tips. Social media is especially valuable during the preparedness and response phases of disasters, offering real-time updates, situation reports, and community-level interaction (Ogie et al., 2022).

Social media's participatory nature allows users not only to receive but also to co-create and verify information, thereby democratizing disaster communication (Alexander, 2013: Lam et al., 2023). Additionally, the growing trend of "digital volunteers" who use platforms like Facebook to support emergency efforts—by sharing alerts, coordinating rescue efforts, or providing on-ground situational updates—has further enhanced social media's utility in times of crisis.

Facebook's Role in Disaster Risk Reduction

Among social networking platforms, Facebook has gained particular attention due to its widespread usage and unique features (Tazeen & Mullick, 2023). The platform's "Safety Check" feature, real-time posting, live video options, and group functionality enable communities to respond to and recover from disasters more effectively (Dallo & Marti, 2021). Facebook is often used to organize relief efforts, locate missing individuals, and share critical survival information during emergencies (Plain, 2022).

In the Indian context, Facebook groups have played a significant role in coordinating flood relief efforts in various states (Jamaludin et al., 2023). Increased engagement with Facebook pages managed by local disaster management authorities suggests the platform's potential in bridging communication gaps, particularly where official infrastructure is weak (Rafliana et al., 2022).

Digital Literacy and Regional Disparities in Access

While digital platforms offer significant potential for disaster preparedness, disparities in access and digital

literacy remain major barriers (Alkureishi et al., 2021). Although rural smartphone penetration is increasing, gaps persist in terms of digital awareness and media literacy. These disparities impact how effectively rural users interpret and act on disaster-related content on social media (Wilding et al., 2018).

Users in rural India often depend on visual cues (e.g., images and videos) rather than text-heavy posts. This underscores the need for localized and simplified content tailored to users' linguistic and literacy needs during disasters (Yustisia et al., 2023).

Research Gaps and Relevance to Gaya, Bihar

Despite the growing body of literature on social media and disaster communication, most existing studies are centered on urban populations or broader national-level trends. There is limited research focusing on district-level dynamics in states like Bihar, where socio-economic vulnerability and frequent disasters intersect with increasing digital access. Gaya, a flood-prone district with expanding mobile internet usage, remains underrepresented in disaster communication studies.

Moreover, few studies investigate the effectiveness of social media platforms—especially Facebook—as perceived by end-users in rural or semi-urban regions. There is a critical need to understand how individuals use and respond to Facebook-based information during floods, what barriers they face, and how usage differs across gender and geographic locations.

Conclusion of the Review

The reviewed literature affirms the significance of social media platforms, especially Facebook, in disaster preparedness and resilience-building. However, it also identifies gaps related to localized studies, user perceptions, and region-specific challenges. This study addresses these gaps by focusing on Gaya, Bihar—exploring how Facebook is used by smartphone users to access, engage with, and act upon flood-related information. The findings are expected to contribute to both academic discourse and practical policymaking in disaster communication and digital literacy.

Research Question

1. How effectively is Facebook used by smartphone users in Gaya, Bihar, to enhance community preparedness and resilience during flood situations?

Research Objectives

1. To assess the extent of Facebook usage among smartphone users in Gaya for accessing flood-related information.
2. To examine gender- and region-based (urban/rural) differences in the use of Facebook as a tool for flood preparedness.
3. To evaluate the perceived effectiveness of Facebook content (alerts, posts, videos, group messages) in enhancing individual and community resilience during floods.

METHODOLOGY

Research Design

This study adopts a quantitative research design using a survey method to explore the role of Facebook in enhancing flood preparedness and community resilience among smartphone users. A structured questionnaire serves as the primary tool for data collection, allowing for systematic measurement and statistical analysis. The research design enables the identification of trends and patterns across different demographic groups, including urban and rural residents as well as male and female users.

Area of Study

The study takes place in Gaya district, Bihar. Gaya provides a diverse setting that includes both urban and rural regions, making it ideal for comparative analysis. By focusing on this location, the study captures variations in digital access and usage patterns that influence disaster preparedness behaviors across different communities.

Population and Sample

The target population consists of smartphone users aged 18 years and above who are active on Facebook and reside in Gaya district. The study uses stratified purposive sampling to ensure the inclusion of both urban and rural residents, as well as male and female respondents. The sample comprises 300 participants, with 150 from urban areas and 150 from rural areas. Each subgroup is selected to achieve gender balance and regional diversity. Participants are selected based on their willingness to participate and their ability to provide informed responses related to Facebook use and flood preparedness.

Data Collection Tool

Data is collected through a structured close-ended questionnaire designed to capture relevant information on the following:

- Demographic profile (age, gender, education, occupation, urban/rural location)
- Facebook usage patterns (frequency, duration, access device, purpose of use)
- Flood-related engagement (receiving or sharing alerts, participation in Facebook groups or pages related to disaster management)
- Preparedness behavior (steps taken in response to Facebook-based information)
- Perceived effectiveness of Facebook content (usefulness, trustworthiness, clarity, timeliness)

The questionnaire uses multiple-choice and Likert-scale items to ensure consistency in responses and statistical analysis.

Data Analysis Techniques

The collected data is analyzed using both descriptive and inferential statistical techniques:

- Descriptive statistics (frequencies, percentages, and averages) describe general patterns of Facebook use and flood preparedness behavior.
- Cross-tabulation examines the relationship between key variables such as gender, geographic location, and frequency of engagement with disaster-related content on Facebook.

Statistical analysis is conducted using Microsoft Excel.

Ethical Considerations

This research follows established ethical guidelines. All participants provide informed consent prior to participating. Participation is strictly voluntary, and respondents have the right to withdraw at any stage of the survey without any consequence. The study ensures anonymity and confidentiality, with no personally identifiable information collected or disclosed. The data is used solely for academic and research purposes. Ethical clearance is obtained from the relevant institutional committee, if required.

FINDINGS & DISCUSSION

Table 1 Demographic Profile of Respondents (N=300)

Demographic Variable	Category	Frequency	Percentage (%)
Gender	Male	153	51
	Female	147	49
Age Group	18-30 years	135	45
	31-45 years	105	35
	46 years and above	60	20
Education Level	Basic/No Formal Ed	75	25
	Secondary	120	40
	Undergraduate	105	35
Location	Urban	150	50
	Rural	150	50

Table 1 presents the demographic profile of the 300 respondents who participated in the study, reflecting a well-balanced and diverse sample from the Gaya district. The gender distribution is nearly equal, with males constituting 51% (153) and females 49% (147) of the participants, which suggests that both men and women actively use Facebook in this region, allowing for a comprehensive analysis of gender-bsased differences in flood preparedness behaviors. Age-wise, the respondents are predominantly young adults, with 45% (135) falling within the 18-30 years age group, indicating that younger individuals are more engaged with digital platforms like Facebook. This demographic is often more tech-savvy and likely to access real-time information during emergencies. The 31-45 years age group forms 35% (105), while older adults aged 46 and above make up 20% (60), highlighting a gradual decline in digital engagement with increasing age, which may affect preparedness levels among older populations.

Education levels vary, with 40% (120) having completed secondary education and 35% (105) holding undergraduate degrees, reflecting a moderate to high literacy level among respondents, which can influence their ability to interpret and act upon digital disaster-related content. Conversely, 25% (75) of respondents reported having basic or no formal education, underscoring the digital literacy challenges that may exist within a significant portion of the population, particularly in rural areas. The sample is equally divided between urban and rural locations, with 50% (150) from each, allowing the study to explore differences in digital access and engagement across geographic settings. Urban users may have better internet connectivity and more frequent Facebook usage, potentially leading to higher preparedness levels, while rural users might face challenges like limited access or lower digital literacy, which could hinder the effectiveness of Facebook as a disaster communication tool.

Overall, the demographic composition indicates a diverse user base with varying degrees of access, literacy, and engagement, providing a robust foundation for analyzing how Facebook serves as a medium for flood preparedness across different segments of the population in Gaya. The findings based on this profile can help tailor disaster

communication strategies to meet the specific needs of different demographic groups, enhancing the overall resilience of the community.

Table 2 Facebook Usage Patterns among Respondents

Usage Variable	Category	Frequency	Percentage (%)
Frequency of Facebook Use	Daily	204	68
	3-5 times per week	66	22
	Less frequent (once a week or less)	30	10
Average Daily Usage Time	Less than 1 hour	105	35
	1 to 2 hours	138	46
	More than 2 hours	57	19
Device Used to Access Facebook	Smartphone	285	95
	Laptop/Desktop	15	5

Table 2 outlines the Facebook usage patterns among the 300 respondents, highlighting the extent and nature of their engagement with the platform. A significant majority of participants, 68% (204), reported using Facebook daily, demonstrating that Facebook is a routine part of their digital interaction. An additional 22% (66) access the platform three to five times per week, indicating regular but less frequent usage, while only 10% (30) use Facebook once a week or less, suggesting a smaller group with limited engagement. This high frequency of use reflects Facebook's potential as a reliable channel for disseminating flood-related information and emergency updates.

Regarding the average daily time spent on Facebook, nearly half of the respondents (46%, or 138) spend between one to two hours on the platform each day, which indicates a moderate to high level of engagement sufficient for staying informed about ongoing events. Meanwhile, 35% (105) use Facebook for less than an hour daily, possibly limiting their exposure to real-time disaster alerts or preparedness content. A notable 19% (57) of users spend more than two hours daily on Facebook, potentially positioning them as key information sharers or digital volunteers within their communities.

The device used to access Facebook overwhelmingly favors smartphones, with 95% (285) of respondents relying on mobile devices, while only 5% (15) use laptops or desktops. This highlights the critical importance of mobile-optimized content and real-time notifications in flood preparedness communication strategies. Given the dominance of smartphone access, disaster management agencies should prioritize mobile-friendly, visually engaging, and concise information to maximize reach and impact among users in Gaya.

In summary, the data reveals a highly active Facebook user base with frequent daily access primarily through smartphones, reinforcing the platform's suitability as a tool for timely flood-related communication and community engagement in both urban and rural settings.

Table 3 Flood-Related Engagement on Facebook

Engagement Activity	Frequency	Percentage (%)
Received Flood Alerts on Facebook	240	80
Shared Flood-Related Information	165	55
Participated in Flood Management Facebook Groups or Pages	144	48

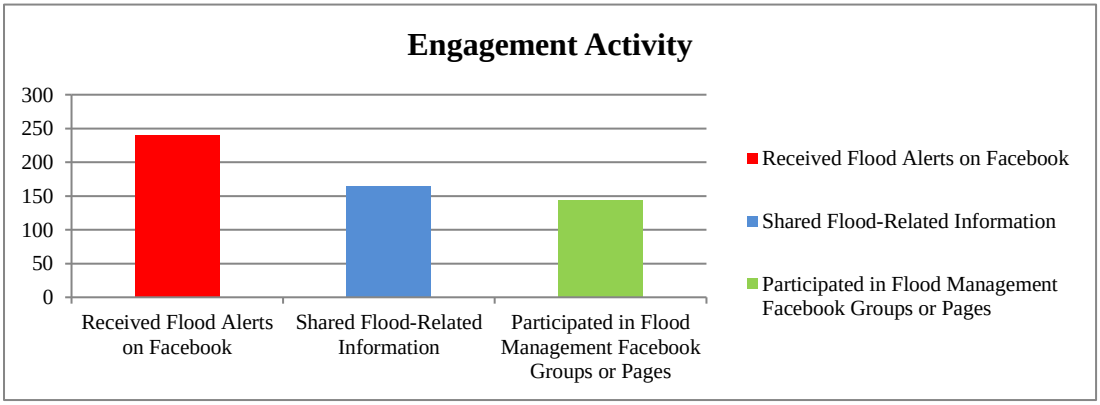

Figure 1 Engagement Activity

Table 3 & **Figure 1** presents the extent to which respondents engaged with flood-related content on Facebook. A substantial 80% (240) of the respondents reported receiving flood alerts via the platform, indicating that Facebook plays a significant role in the dissemination of emergency warnings and real-time updates during flood situations. This high level of alert reception suggests a strong reliance on the platform for disaster communication, especially in the context of limited or delayed official sources in certain regions.

Also, 55% (165) of the participants actively shared flood-related information on Facebook, illustrating that more than half of the users were not only passive recipients but also contributors to the flow of critical information. This behavior points toward a participatory culture where individuals recognize their role in community awareness and safety, particularly during emergencies. Such sharing may include forwarding alerts, posting precautionary tips, or even uploading photos/videos from flood-affected areas to inform others. In addition, 48% (144) of respondents stated they participated in flood management groups or pages on Facebook. These groups often serve as virtual hubs for community mobilization, mutual aid, and discussion of preventive actions. Participation in such online communities reflects a growing trend of using digital spaces for civic engagement and preparedness planning, which is especially valuable in geographically dispersed or resource-constrained settings.

Collectively, the data from **Table 3** underscores Facebook's function not just as a communication medium but also as a community-building and resilience-enhancing platform. It reveals that users in Gaya are not only consuming flood-related content but are also actively involved in sharing and engaging within relevant digital communities—making Facebook a powerful tool for grassroots-level disaster preparedness and response efforts.

Table 4 Preparedness Behavior Based on Facebook Information

Preparedness Action	Frequency	Percentage (%)
Took Some Preparedness Steps	186	62
Stored Emergency Supplies	120	40
Planned Evacuation Routes	105	35
Informed Family/Friends About Flood Risks	150	50

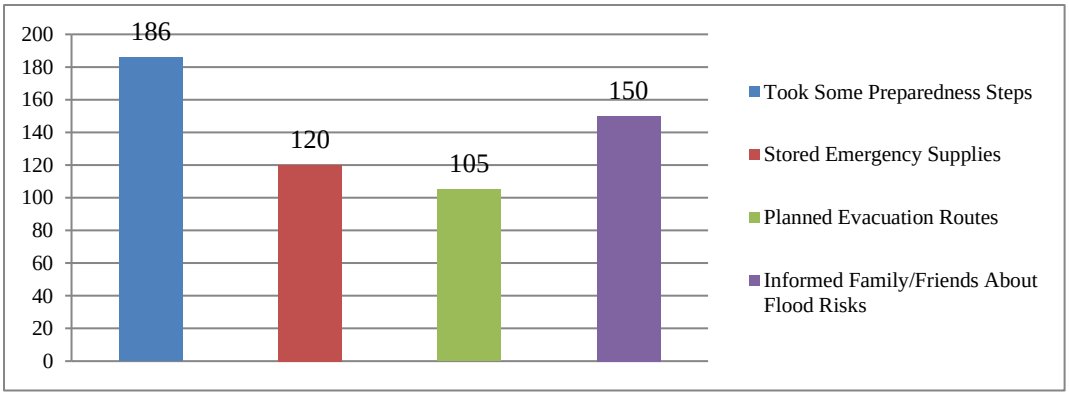

Figure 2 Preparedness Action

Table 4 and **Figure 2** illustrate how Facebook usage translated into real-life preparedness behaviors among respondents in the Gaya district. Notably, 62% (186 out of 300) of respondents reported taking at least some preparedness actions based on information received through Facebook. This reflects the platform's practical impact, suggesting that digital communication via social media can effectively motivate behavioral change in the context of disaster readiness.

A closer look at specific preparedness measures reveals nuanced patterns. Forty percent (120) of the participants stored emergency supplies such as food, water, flashlights, or medicines after encountering related advice or alerts on Facebook. This indicates that digital messaging plays a tangible role in prompting proactive behavior and basic household-level disaster readiness.

Also, 35% (105) of respondents stated they had planned evacuation routes in anticipation of potential flood events, again highlighting Facebook's potential as a medium for fostering informed decision-making. While this percentage may appear moderate, planning evacuation routes often requires a higher level of awareness and community coordination, which may explain the relatively lower response rate compared to other actions.

Moreover, 50% (150) of participants took the initiative to inform family members or friends about flood risks, demonstrating the ripple effect of Facebook-based communication. This interpersonal sharing of information strengthens social networks during crises and further supports community-level preparedness.

In summary, the data in **Table 4** and **Figure 2** collectively affirm that Facebook is not only a channel for receiving information but also a catalyst for concrete disaster preparedness behaviors. While not all respondents undertook every recommended action, a significant portion of the sample was influenced enough by Facebook content to improve their readiness for flooding events—a critical outcome in a flood-prone region like Gaya.

Table 5 Perceived Effectiveness of Facebook Content in Flood Preparedness

Effectiveness Indicator	Frequency (Agree/Strongly Agree)	Percentage (%)
Usefulness of Flood Information	225	75
Trustworthiness of Information	210	70
Clarity of Posts and Alerts	204	68
Timeliness of Updates	216	72

Table 5 presents insights into how respondents perceived the effectiveness of Facebook content in relation to flood preparedness. The results indicate a generally positive perception among users, with the majority agreeing or strongly agreeing that Facebook played a valuable role in disseminating flood-related information.

A significant 75% (225 out of 300) of respondents found the flood-related content on Facebook to be useful. This suggests that the platform is not merely a social outlet but serves a practical function during emergencies by delivering relevant, actionable information. Closely related, 70% (210 respondents) considered the information trustworthy, indicating a strong degree of confidence in the authenticity and accuracy of the content shared on the platform.

In terms of communication quality, 68% (204 respondents) agreed that the clarity of posts and alerts was satisfactory. This implies that the language, format, or presentation style used in Facebook content was generally accessible and easy to understand, which is crucial for effective communication during emergencies, especially among diverse user groups in both urban and rural areas.

Furthermore, 72% (216 respondents) acknowledged the timeliness of Facebook updates. This highlights the platform's capacity to provide real-time or near-real-time information—an attribute that greatly enhances disaster responsiveness. Timely alerts allow individuals and communities to act quickly, whether it involves seeking shelter, storing supplies, or contacting emergency services.

In summary, the responses in **Table 5** affirm Facebook's credibility and practical utility as a disaster communication tool. High scores in usefulness, trustworthiness, clarity, and timeliness reflect the platform's multifaceted value in enhancing flood preparedness among smartphone users in Gaya. These findings also support the argument for integrating social media into official disaster communication strategies, particularly in regions with high mobile and internet penetration.

Table 6 Cross-Tabulation - Gender vs. Frequency of Flood Alert Reception on Facebook

Gender	Received Flood Alerts (Yes)	Received Flood Alerts (No)	Total
Male	126	27	153
Female	114	33	147
Total	240	60	300

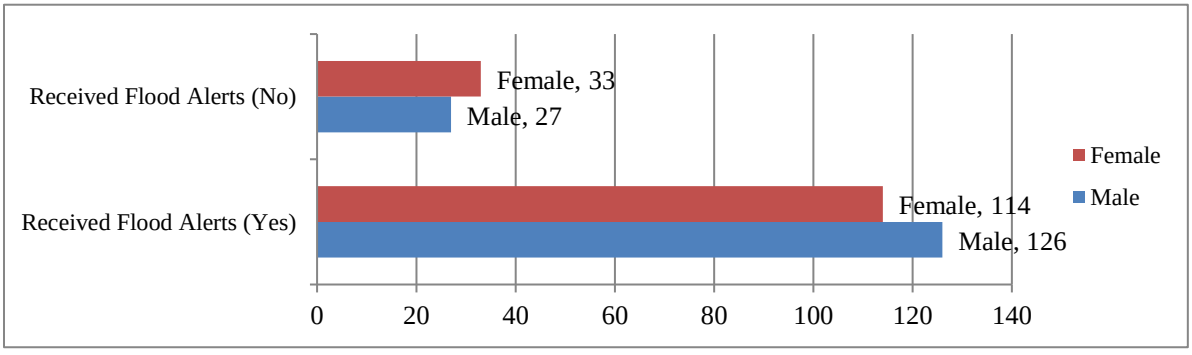

Figure 3 Gender vs. Frequency of Flood Alert Reception on Facebook

Table 6 & **Figure 3** presents a cross-tabulation of gender and the frequency of receiving flood alerts on Facebook among the 300 respondents. The data reveals that both male and female users actively engage with flood-related content, though with slight variations. Among male respondents (N=153), 126 individuals (82.35%) reported receiving flood alerts through Facebook, compared to 114 females (77.55%) out of 147. While both groups show high levels of engagement, males exhibited a marginally higher rate of receiving flood alerts.

The overall data aligns with earlier findings that 80% of the total sample received flood alerts via Facebook, suggesting that the platform serves as an important information channel for both genders. However, the difference in alert reception may be attributed to usage patterns—possibly reflecting that male users are slightly more active or consistent in their Facebook engagement, or perhaps more likely to follow or join flood-related pages and groups.

Importantly, the relatively small gender gap (approximately 5 percentage points) in alert reception suggests a relatively equitable digital information environment, where both men and women in Gaya have access to and are utilizing social media platforms for disaster-related updates. This insight can guide local disaster communication strategies to further bridge any minor gaps and ensure inclusive outreach through digital platforms like Facebook.

In conclusion, this cross-tabulation reinforces Facebook's broad reach across genders in Gaya's digital landscape and highlights the potential of gender-inclusive digital campaigns to enhance flood preparedness.

Table 7 Cross-Tabulation - Urban vs Rural Facebook Group Participation in Flood Management

Location	Participated in Groups (Yes)	Participated in Groups (No)	Total
Urban	90	60	150
Rural	54	96	150
Total	144	156	300

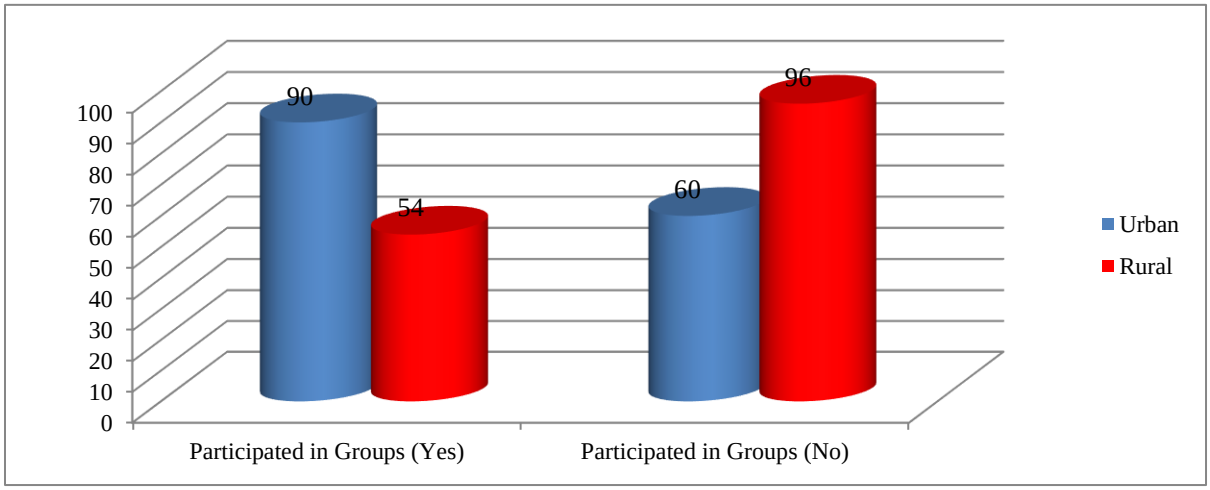

Figure 4 Urban vs Rural Facebook Group Participation in Flood Management

Table 7 highlights the differences in participation in Facebook groups related to flood management between urban and rural respondents. Out of the total 150 urban participants, 90 individuals (60%) reported participating in such groups, whereas among the 150 rural participants, only 54 individuals (36%) engaged in flood-related Facebook groups. This stark contrast indicates a significant urban-rural divide in the digital engagement with disaster management communities on social media platforms.

The data suggests that urban respondents are considerably more active in leveraging Facebook for organized, community-based flood preparedness. This could be due to higher digital literacy, better internet access, and greater exposure to online disaster risk communication tools in urban areas. On the other hand, rural respondents appear less connected to these virtual communities, which may be influenced by limited awareness, technological constraints, or a lack of trust in digital sources of disaster information.

With only 36% of rural users participating in such Facebook groups, there is a clear need for targeted digital inclusion initiatives. These could include awareness campaigns, localized content in regional languages, and community

workshops to build digital capacity in rural areas. Increasing rural participation in flood management discussions online can enhance community resilience, enable faster information sharing, and foster a more inclusive disaster response strategy.

In essence, the table underscores the critical role of location-based digital disparities in shaping how communities prepare for and respond to flood events. Bridging this gap is essential for equitable disaster preparedness in both urban and rural Gaya.

Summary of Findings

This study extends previous research on digital communication and disaster preparedness by exploring the role of Facebook in enhancing flood resilience among smartphone users in Gaya district, Bihar. Building upon earlier works that established the potential of social media in crisis communication, this study offers empirical insights into how demographic characteristics, usage patterns, and perceived effectiveness shape Facebook's utility in flood preparedness.

The findings reveal several key patterns. First, Facebook is widely used by the respondents, with 68% accessing the platform daily and 95% using smartphones as the primary device. A significant portion of users (80%) reported receiving flood alerts through Facebook, and more than half (55%) actively shared flood-related information. Preparedness behaviors were positively influenced by this engagement—62% of users took some preparedness steps based on the information they received, with actions ranging from storing emergency supplies to planning evacuation routes and informing others.

Furthermore, the perceived effectiveness of Facebook content was notably high: 75% of respondents agreed it was useful, 70% found it trustworthy, 68% considered it clear, and 72% reported that updates were timely. Notably, cross-tabulation analysis revealed a gender gap in alert reception and an urban–rural divide in participation in flood management groups, suggesting that digital disparities affect engagement levels and disaster readiness.

Scientifically, these findings demonstrate that Facebook is not merely a tool for social interaction but a significant medium for enhancing community resilience. It confirms the platform's potential to act as a real-time communication channel for localized disaster alerts and preparedness information. The results also point to the socio-technological factors—like education, location, and access—that influence digital disaster communication outcomes.

These findings lay the groundwork for future research that can explore similar dynamics in different geographical contexts or with other digital platforms such as WhatsApp or Twitter (now X). They also open avenues for mixed-methods studies that incorporate qualitative insights from users, local governments, and disaster response agencies.

In summary, this study provides robust evidence that Facebook plays a growing role in informing, engaging, and mobilizing communities in the face of flood risks. It facilitates scientific research by offering quantifiable indicators of engagement, trust, and preparedness that can be replicated or expanded in future studies.

However, the study has some limitations. It relies on self-reported data, which may include biases or inaccuracies. The sample is limited to one district and may not capture variations in other regions. Also, while Facebook was the focus, the influence of other platforms was not examined, which may affect the comprehensiveness of digital preparedness understanding. Despite these limitations, the research significantly contributes to the evolving field of disaster communication and digital resilience in semi-urban and rural India.

CONCLUSION

This study set out to investigate the role of Facebook in enhancing flood preparedness and community resilience among smartphone users in the Gaya district of Bihar. The problem at the core of this research was the lack of empirical understanding of how digital platforms, particularly Facebook, are being utilized for disaster communication and preparedness, especially in regions vulnerable to recurrent flooding.

The key findings of the study reveal that Facebook is widely accessed across demographic segments in Gaya, with 68% of respondents using it daily and 95% accessing it through smartphones. Importantly, 80% of participants reported receiving flood alerts on Facebook, and over half engaged in activities such as sharing information and joining disaster-related groups. This digital engagement translated into tangible preparedness behaviors, including storing supplies, planning evacuations, and informing family members. Respondents also perceived Facebook content to be useful, timely, trustworthy, and clear, supporting the platform's potential as a disaster communication tool. Gender and location-based variations, such as higher participation from

urban users and a slight gender disparity in alert reception, highlight the nuanced dynamics of digital communication in disaster settings.

The implications of these findings are substantial. They underscore the importance of integrating social media platforms like Facebook into formal disaster risk reduction (DRR) strategies. Policymakers, emergency response agencies, and community organizations can leverage such platforms to disseminate timely and reliable information during flood events. The results also call attention to the digital divide and the need for targeted outreach to ensure equitable access to life-saving information.

Despite its contributions, the study has certain limitations. The reliance on self-reported data introduces potential biases, and the research is geographically limited to a single district, which may constrain the generalizability of the findings. Furthermore, the study focuses solely on Facebook, without exploring the role of other popular platforms like WhatsApp or Telegram that may also influence disaster preparedness.

Future research should consider a comparative analysis across multiple districts or states prone to natural disasters. It would also be valuable to incorporate qualitative interviews to gain deeper insights into users' experiences and trust in digital content.

In conclusion, this study highlights Facebook's growing relevance as a tool for enhancing flood resilience in semi-urban and rural India. By bridging the gap between digital communication and disaster preparedness, this research contributes to the evolving discourse on community-based resilience in the digital age. Strengthening digital literacy, improving access, and promoting inclusive engagement through platforms like Facebook can pave the way for more resilient, informed, and prepared communities in the face of future climate challenges.

REFERENCES

[1] Albahri, A., Khaleel, Y. L., Habeeb, M. A., Ismael, R. D., Hameed, Q. A., Deveci, M., Homod, R. Z., Albahri, O., Alamoodi, A., & Alzubaidi, L. (2024). A systematic review of trustworthy artificial intelligence applications in natural disasters. *Computers & Electrical Engineering*, 118, 109409. https://doi.org/10.1016/j.compeleceng.2024.109409

[2] Alexander, D. E. (2013). Social media in disaster risk reduction and crisis management. *Science and Engineering Ethics*, 20(3), 717–733. https://doi.org/10.1007/s11948-013-9502-z

[3] Alkureishi, M. A., Choo, Z., Rahman, A., Ho, K., Benning-Shorb, J., Lenti, G., Sánchez, I. V., Zhu, M., Shah, S. D., & Lee, W. W. (2021). Digitally Disconnected: Qualitative study of patient perspectives on the digital divide and potential solutions. *JMIR Human Factors*, 8(4), e33364. https://doi.org/10.2196/33364

[4] Baraldo, M., & Di Giuseppantonio Di Franco, P. (2024). Place-centred emerging Technologies for Disaster Management: a Scoping Review. *International Journal of Disaster Risk Reduction*, 112, 104782. https://doi.org/10.1016/j.ijdrr.2024.104782

[5] Dallo, I., & Marti, M. (2021). Why should I use a multi-hazard app? Assessing the public's information needs and app feature preferences in a participatory process. *International Journal of Disaster Risk Reduction*, 57, 102197. https://doi.org/10.1016/j.ijdrr.2021.102197

[6] Glago, F. J. (2021). Flood Disaster Hazards; Causes, Impacts and Management: A State-of-the-Art Review. *IntechOpen* eBooks. https://doi.org/10.5772/intechopen.95048

[7] Jamaludin, I., Zahidi, I., Talei, A., & Lim, M. K. (2023). Semantic analysis of social network site data for flood mapping and assessment. *Journal of Hydrology*, 628, 130519. https://doi.org/10.1016/j.jhydrol.2023.130519

[8] Kansal, M., Kishore, K., & Kumar, P. (2017). IMPACTS OF FLOOD AND ITS MANAGEMENT – A CASE STUDY OF BIHAR. *International Journal of Advanced Research*, 5(3), 1695–1706. https://doi.org/10.21474/ijar01/3681

[9] Kumar, A., Sah, S. K., & Deb, A. (2023). SOCIAL MEDIA AS a TOOL FOR POLITICAL COMMUNICATION: ANALYZING THE USAGE AND MOTIVATIONS OF POLITICAL LEADERS IN BIHAR. *ShodhKosh Journal of Visual and Performing Arts*, 4(2). https://doi.org/10.29121/shodhkosh.v4.i2.2023.1938

[10] Lam, N. S. N., Meyer, M., Reams, M., Yang, S., Lee, K., Zou, L., Mihunov, V., Wang, K., Kirby, R., & Cai, H. (2023). Improving social media use for disaster resilience: challenges and strategies. *International Journal of Digital Earth*, 16(1), 3023–3044. https://doi.org/10.1080/17538947.2023.2239768

[11] Ogie, R., James, S., Moore, A., Dilworth, T., Amirghasemi, M., & Whittaker, J. (2022). Social media use in disaster recovery: A systematic literature review. *International Journal of Disaster Risk Reduction*, 70, 102783. https://doi.org/10.1016/j.ijdrr.2022.102783

[12] Plain, C. (2022, February 23). *People use Facebook as an emergency communication system during pandemic - School of Public Health - University of Minnesota*. School of Public Health. https://www.sph.umn.edu/news/people-use-facebook-as-an-emergency-communication-system-during-pandemic/

[13] Rafliana, I., Jalayer, F., Cerase, A., Cugliari, L., Baiguera, M., Salmanidou, D., Necmioğlu, Ö., Ayerbe, I. A., Lorito, S., Fraser, S., Løvholt, F., Babeyko, A., Salgado-Gálvez, M. A., Selva, J., De Risi, R., Sørensen, M. B., Behrens, J., Aniel-Quiroga, I., Del Zoppo, M., . . . Hancilar, U. (2022). Tsunami risk communication and management: Contemporary gaps and challenges. *International Journal of Disaster Risk Reduction*, 70, 102771. https://doi.org/10.1016/j.ijdrr.2021.102771

[14] Ramrakhiyani, J. (2023). Media and communication in disaster risk reduction. In *International Handbook of Disaster Research* (pp. 1389–1398). https://doi.org/10.1007/978-981-19-8388-7_89

[15] Sah, S. K. (2025, June 6). *Digital Disaster Communication in Gaya: Twitter's role in navigating heat wave emergencies*. Cosmos: A Journal of Geography. https://www.cosmosjournal.org/papers/volume-2/issue-2/cosmos25429/

[16] Singh, H., Nielsen, M., & Greatrex, H. (2023). Causes, impacts, and mitigation strategies of urban pluvial floods in India: A systematic review. *International Journal of Disaster Risk Reduction*, 93, 103751. https://doi.org/10.1016/j.ijdrr.2023.103751

[17] Tazeen, F., & Mullick, N. (2023). The impact of social media platforms 'Facebook and Instagram' in influencing purchasing behaviour of green products. *Vision the Journal of Business Perspective*. https://doi.org/10.1177/09722629221133960

[18] Wilding, D., Fray, P., Molitorisz, S., McKewon, E., & Centre for Media Transition. (2018). *The impact of digital platforms on news and journalistic content*. University of Technology Sydney. https://www.accc.gov.au/system/files/ACCC+commissioned+report+-+The+impact+of+digital+platforms+on+news+and+journalistic+content,+Centre+for+Media+Transition+(2).pdf

[19] Yustisia, I. R., Priyanti, D. D., Mulachelah, N. A., Kasim, A., Bidin, A., Illahi, A. K., Priyanti, D. D., Tamitiadini, D., Rakhmawati, F. Y., Oktaviani, F. H., Avicenna, F., Yustisia, I. R., Adila, I., Adhrianti, L., Wulandari, M. P., Ahmad, M., Destrity, N. A., Wardasari, N., Zaki, N. M., . . . Laturrakhmi, Y. F. (2023). *The transformation of digital Technology: Its impact on human communication*. https://doi.org/10.11594/futscipress39m

[20] Mukesh Kumar 2024. A Comprehensive Study on the Opportunities and Challenges of E-commerce in Bihar. *International Journal of Innovations in Science, Engineering And Management*. 2, (May 2024), 57–62.