



Research article

SAFETY COMPLIANCE WITH DISASTER-RISK PROTOCOLS AMONG TOURISM OPERATORS IN DESTINATION CROSS RIVER, NIGERIA

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ABSTRACT

This study examined safety compliance with disaster-risk protocols among tourism operators in Destination Cross River, Nigeria. A descriptive survey design was adopted, using questionnaire and interview checklist data obtained from 384 respondents drawn from tourism operators, tourism-sector employees and relevant government agencies. Descriptive statistics and analysis of variance were used to assess disaster-risk measures, compliance confidence, communication channels and variation in compliance levels. Findings showed that the main measures provided by authorities were disaster preparedness, prevention and mitigation (42.7%), disaster-risk assessment (27.1%), disaster recovery (16.7%) and disaster-risk reduction (13.5%). Operators reported uneven confidence in compliance and response, with 38% somewhat confident, 30% very confident, 23% not very confident and 9% not confident at all. Social media (37%) and radio/television (28.6%) were the leading emergency communication channels. The ANOVA result showed no significant difference in compliance levels among operators ($F = 0.005114$, $p = 0.945317$). The study contributes destination-level evidence on tourism safety governance and recommends stronger training, drills, communication and institutional monitoring.

KEYWORDS

Disaster risk management; safety compliance; tourism operators; disaster-risk protocols; destination resilience; emergency communication; Cross River State; Nigeria.

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Introduction

Tourism destinations are increasingly exposed to complex disaster risks arising from climate variability, urban growth, infrastructure pressure, public-health emergencies, insecurity, weak governance and changing visitor behaviour. These risks are particularly important in destinations where tourism facilities are located along rivers, coastal corridors, forest environments, steep slopes, heritage landscapes and densely used urban recreation spaces. Disaster risk in tourism is not only a physical event; it is also a management problem because the scale of loss depends on preparedness, institutional coordination, communication, staff capacity and compliance with safety protocols. The Sendai Framework for Disaster Risk Reduction emphasises understanding risk, strengthening governance, investing in resilience and enhancing preparedness for response and recovery (United Nations Office for Disaster Risk Reduction [UNDRR], 2015). These priorities are directly relevant to destination management because tourism businesses depend on safe mobility, credible information, functioning infrastructure and public trust.

The tourism sector is vulnerable because it brings together mobile visitors, employees, transport providers, accommodation facilities, attractions, event venues, food-service operators, communities and

government agencies in shared spaces. A flood, landslide, fire outbreak, windstorm, road accident, communal conflict or public-health emergency can disrupt the visitor experience, damage facilities, reduce destination reputation and threaten lives. Contemporary tourism-resilience literature therefore treats disaster management as a core component of sustainable destination governance rather than a peripheral security issue (Liu et al., 2024; UN Tourism, 2024). In this sense, safety compliance is both an ethical responsibility and a competitiveness requirement. Destinations that cannot demonstrate preparedness and risk-management capacity may struggle to attract visitors, investors and insurance support.

Destination Cross River is a particularly relevant setting for this study because the state contains a diverse tourism geography. Calabar functions as an administrative, commercial and leisure hub, while sites such as Marina Resort, Cross River National Park, Afi Mountain Wildlife Sanctuary, Ikom Monoliths and Obudu Mountain Resort are linked to riverine, rainforest, mountain, heritage and urban recreation environments. These attractions create strong opportunities for tourism development, but they also expose operators to distinct hazard profiles. Coastal and riverine areas face flooding and windstorm risks, rainforest and protected-area sites face erosion and access constraints, mountain destinations face landslide and road-safety risks, and hotels or event centres face fire, crowd-control and drainage-related hazards. The safety of the destination therefore depends on how operators and public agencies translate disaster-risk protocols into everyday practice.

Cross River State has experienced disaster events and risk conditions that justify closer examination of tourism safety compliance. Flooding, landslides, communal clashes, protests, road accidents and political instability have affected different parts of the state at various times. Flooding remains important because heavy rainfall, inadequate drainage, river overflow and settlement expansion can intensify exposure, while landslide risks are associated with steep terrain, vegetation loss and soil saturation in some upland environments. Existing emergency institutions, including national and state disaster-management agencies, provide a formal policy platform for preparedness and response. However, formal existence of emergency structures does not automatically guarantee compliance among tourism operators. Compliance depends on awareness, training, resource availability, supervision, communication channels, organisational culture and perceived seriousness of risk (Ajake et al., 2022; Akeh et al., 2024; Eneyo, 2024a; Eneyo, 2024b)

The central problem addressed in this study is that disaster-risk protocols may exist, but the level of safety compliance among tourism operators in Destination Cross River remains uncertain. Tourism facilities may know that preparedness, prevention, mitigation, response and recovery are important, yet they may lack regular drills, clear reporting lines, trained safety officers, emergency equipment, visitor information systems and documented standard operating procedures. Where operators are only partially confident in their capacity to comply, destination resilience becomes fragile. This gap is significant because visitors often assume that operators and public agencies have already taken reasonable safety precautions. When the assumption is wrong, disasters can escalate into reputational crises for the wider destination.

This study therefore examines safety compliance with disaster-risk protocols among tourism operators in Destination Cross River, Nigeria. Specifically, it identifies tourism facilities and associated disaster vulnerabilities, examines measures provided by authorities to help operators cope with disaster risk, assesses operators' confidence in compliance and response, evaluates communication channels used to inform tourists during disaster-risk situations, and tests whether statistically significant differences exist in compliance levels among operators. The study contributes to international scholarship by providing empirical evidence from a subnational African tourism destination where ecotourism, urban leisure and hospitality facilities intersect with multi-hazard exposure. It also offers policy evidence for tourism authorities, emergency-management agencies and operators seeking to strengthen destination safety and sustainable tourism development.

Literature review

Disaster risk management in tourism refers to the organised processes through which destinations, operators and institutions identify hazards, assess vulnerabilities, reduce exposure, prepare for emergencies, respond during incidents and support recovery after disruptive events. Disaster risk is commonly understood as the interaction between hazard, exposure, vulnerability and capacity. In tourism, this interaction is shaped by visitor flows, facility location, quality of infrastructure, emergency planning, communication reliability and the readiness of operators to protect tourists and workers. UNDRR (2022) argues that contemporary risk is increasingly systemic because disruptions cascade across sectors, supply chains and communities. A tourism disaster therefore affects more than a single facility; it can disrupt transport, accommodation, local livelihoods, public confidence and the image of the destination.

Safety compliance is the extent to which individuals and organisations adhere to rules, procedures, standards and instructions designed to prevent or reduce harm. Compliance theory emphasises that adherence is influenced by knowledge, perceived legitimacy of rules, trust in authorities, monitoring, organisational norms and the capacity to act (Eneyo & Essien, 2024; Etienne, 2010; Eneyo et al., 2023; Eneyo et al., 2025; Eneyo, 2018). In tourism organisations, compliance is not simply a matter of issuing instructions. Operators must understand protocols, believe that the protocols are necessary, possess the resources to implement them and experience management commitment to safety. Han et al. (2015) show that compliance with emergency alerts is shaped by message credibility, perceived risk and user response capacity. This insight is relevant to tourism because operators and visitors are unlikely to comply with warnings that are vague, inconsistent or poorly communicated.

The hospitality literature also demonstrates that deep compliance requires more than surface obedience. Hu et al. (2021) found that employees' adherence to safety measures during crisis conditions was supported by management safety practices, organisational crisis strategies and psychological acceptance of safety procedures. This means that tourism operators must embed safety into their organisational routines rather than treating it as an occasional response after disaster warnings. For hotels, resorts, parks, event centres and recreation facilities, deep compliance includes risk assessment, fire-prevention systems, evacuation plans, first-aid readiness, visitor briefing, staff drills, record keeping, reporting channels and collaboration with emergency agencies.

Disaster-risk protocols are formal or semi-formal policies, procedures and operational guidelines established to prevent, mitigate, prepare for, respond to and recover from disaster events. In the tourism sector, these protocols may include hazard mapping, emergency contact systems, evacuation routes, staff responsibilities, guest registers, warning procedures, signage, crowd-control rules, communication templates, fire-safety checks and post-incident review. The Sendai Framework provides a global policy foundation for such protocols by emphasising risk understanding, governance, investment and preparedness (UNDRR, 2015). At destination level, these priorities must be translated into practical tools that operators can understand and apply. A protocol that is not communicated, funded or monitored remains a document rather than a functioning safety system.

Tourism destinations require multi-stakeholder disaster governance because no single actor controls all dimensions of risk. Public agencies may provide hazard information, policy guidelines and emergency response, but operators control daily facility management, staff training and visitor interaction. Communities observe local risk signals and may assist during response, while visitors need reliable information on safe behaviour. Dredge (2007) notes that destinations are complex relational spaces shaped by government, business, community and visitor dynamics. For Destination Cross River, this means that safety compliance must be viewed as a destination-wide governance issue involving the Cross River Tourism Bureau, emergency-management agencies, local governments, facility managers, tour operators, transport providers, community leaders and tourists.

Recent literature on tourism resilience emphasises dynamic capabilities. Jiang et al. (2023) argue that tourism organisations need knowledge-based, human, relational and financial resources to build disaster-management capabilities. Knowledge resources include hazard information and lessons from past incidents. Human resources include trained personnel and safety leadership. Relational resources include networks with government agencies, communities and other operators. Financial resources enable investment in equipment, insurance, maintenance and recovery. Where these resources are weak, tourism organisations may appear operational during normal periods but become fragile when hazards occur. This perspective helps explain why compliance cannot be separated from organisational capacity.

Emergency communication is another major component of safety compliance. During a disaster-risk situation, tourists and workers need timely, clear, credible and actionable information. Abukhalaf and von Meding (2021) show that excessive, conflicting or inaccessible information can reduce compliance and increase vulnerability, especially among groups with language or cultural barriers. In tourism, communication must account for visitors who may not understand local geography, hazard signs or emergency agencies. Social media, radio, television, email alerts, SMS and on-site announcements can all be useful, but they have different strengths. Social media is fast and widely used, while radio and television may reach broader audiences during severe weather. On-site announcements are essential for immediate facility-level response.

Public-health emergencies have further expanded the meaning of tourism safety compliance. The COVID-19 pandemic showed that hospitality and tourism operators may be required to implement protective measures quickly, communicate new rules, manage visitor expectations and maintain service quality under crisis conditions. Aliu (2022) observed that public non-compliance during lockdown enforcement in Nigeria was linked to economic hardship, mistrust and implementation challenges. Akeh and Anake (2025) similarly reported that accommodation providers in Calabar experienced service-delivery changes and compliance difficulties during COVID-19. These studies suggest that compliance improves when protocols are realistic, supported by communication and connected to the economic realities of operators.

The present study is anchored on Emergency Management Theory and the tourism resilience perspective. Emergency Management Theory organises disaster action around preparedness, mitigation, response and recovery. Preparedness involves planning, training, drills and resource positioning before a disaster. Mitigation reduces the likelihood or impact of hazards through preventive measures. Response refers to immediate actions taken during an emergency, while recovery involves restoration, learning and rebuilding after disruption. The tourism resilience perspective complements this theory by emphasising the ability of operators and destinations to withstand, adapt and recover from shocks. Together, these frameworks allow the study to assess whether safety protocols in Destination Cross River are recognised as part of a continuous resilience system rather than as isolated emergency instructions.

Safety compliance in the context of this study therefore means the extent to which tourism operators adhere to established disaster-preparedness and emergency-management guidelines, including preventive measures, response procedures and safety regulations designed to protect tourists, employees and facilities. Disaster-risk protocol refers to the set of formal policies, procedures and operational guidelines established by disaster-management and tourism authorities to prevent, mitigate, prepare for, respond to and recover from disaster events that may affect tourism destinations. These definitions guide the analysis of operator confidence, authority measures, communication methods and observed variations in compliance levels.

Methodology

The study adopted a descriptive survey research design. This design was appropriate because the research sought to obtain systematic information from tourism operators, tourism-sector employees and relevant government agencies about safety compliance with disaster-risk protocols in Destination Cross River, Nigeria. A descriptive survey is suitable for assessing perceptions, practices, confidence levels and institutional support at a defined

point in time. It also allows the use of both quantitative and qualitative information, enabling the researcher to describe patterns and interpret the practical meaning of the findings. In this study, the design supported the examination of disaster-risk measures, compliance confidence, communication channels and differences in compliance levels among operators.

The study was conducted in Cross River State, located in the South-South geopolitical zone of Nigeria. The state lies between latitudes 4 degrees 33 minutes N and 6 degrees 35 minutes N of the Equator and longitudes 8 degrees 50 minutes E and 9 degrees 60 minutes E of the Greenwich Meridian. It is bordered by Benue State to the north, Ebonyi State to the west, Akwa Ibom State to the south and the Republic of Cameroon to the east. Cross River State occupies approximately 20,156 square kilometres and has a tourism landscape that includes urban waterfront facilities, resorts, national parks, wildlife sanctuaries, mountain destinations, monolith sites, hotels, recreation centres and event venues.

The state's tourism geography made it appropriate for examining safety compliance because the selected tourism facilities and sites are exposed to different hazard conditions. Marina Resort is located close to the Calabar River and is therefore associated with coastal and riverine flooding, windstorms and road-access risks. Cross River National Park is linked to rainforest conditions, flooding and erosion. Afi Mountain Wildlife Sanctuary and Obudu Mountain Resort are associated with upland terrain where landslides, erosion and road accidents require attention. Hotels, recreation centres and event centres across the destination face hazards such as flooding, fire outbreak, windstorm, erosion and crowd-management risks. Figure 1 presents the selected tourism facilities and sites within the study area.

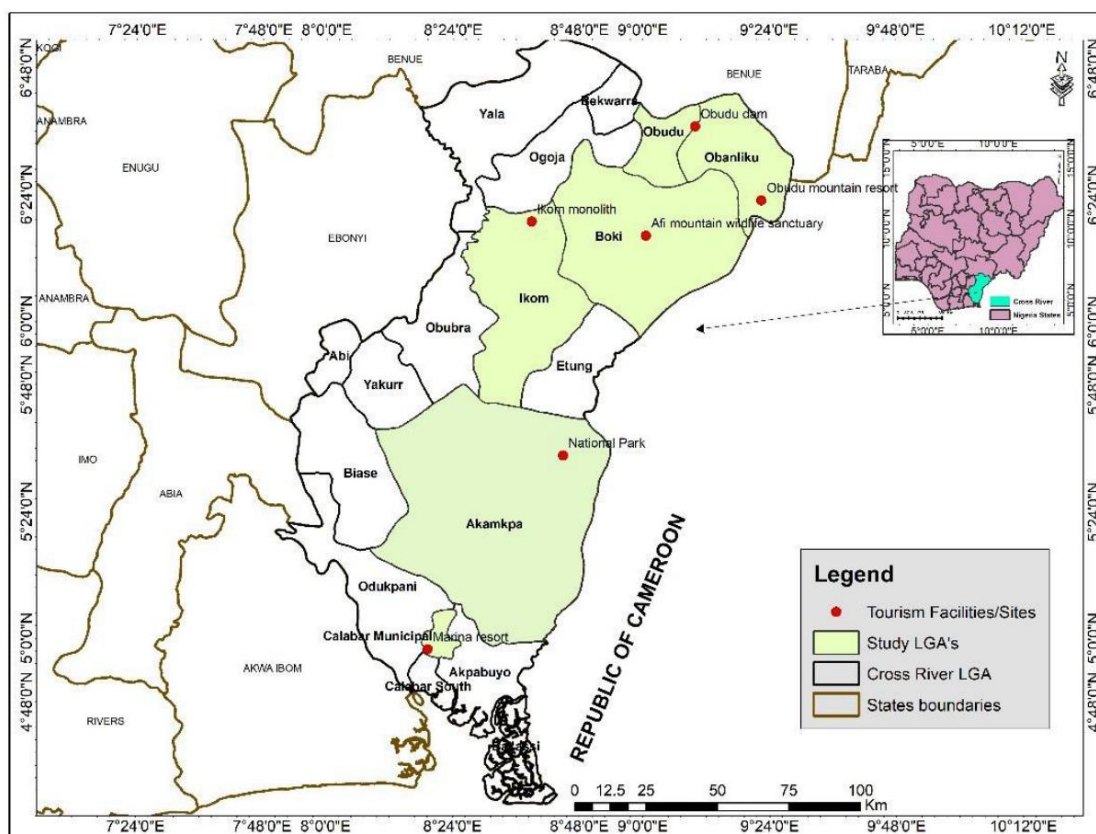


Figure 1. Selected tourism facilities/sites within the study area.

Source: Department of Geography and Environmental Science, University of Calabar, 2025.

The study population comprised tourism operators, employees in tourism-sector establishments and relevant government agencies involved in tourism and disaster management. These included stakeholders such as the Cross River State Tourism Bureau, the National Emergency Management Agency and employees working

in tourism facilities within the study area. The estimated population of the relevant tourism and agency workforce was 16,000. This population was appropriate because the study focused on those who either implement safety protocols, supervise tourism operations, support emergency management or participate directly in destination service delivery. The sample size was determined using the Taro Yamane formula for a finite population at a 95% confidence level and a 5% margin of error. A sample of 384 respondents was obtained. A multistage sampling technique was employed because tourism operators and stakeholders were spread across different parts of the destination. In the first stage, the state was stratified into three senatorial zones: North, Central and South. In the second stage, key tourism facilities and government agencies with direct relevance to tourism and disaster management were purposively selected. In the final stage, simple random sampling was used to select respondents within the identified strata. This approach helped ensure geographical representation while minimising selection bias among eligible respondents.

Data were collected using a semi-structured questionnaire and an interview checklist. The questionnaire obtained data on respondent characteristics, tourism-site vulnerabilities, authority-provided disaster-risk measures, confidence in compliance and response, and communication methods used to inform tourists during disaster-risk situations. The interview checklist provided additional contextual information on institutional support, practical constraints and operator readiness. Data collection took place over four weeks during weekdays and working hours to reach operators and officials when facilities and offices were active. Primary data were complemented with secondary information from literature on disaster risk management, tourism resilience, compliance and destination governance.

The research instrument was subjected to face and content validity procedures. Experts in Tourism Studies, Disaster Management and Research Methodology from the University of Calabar reviewed the instrument for clarity, relevance and adequacy. Their observations were incorporated before final administration. A pilot survey was conducted among tourism operators outside the selected study locations to test clarity and consistency. Reliability was assessed using Cronbach's alpha, which yielded a coefficient above the acceptable threshold of 0.70. This indicated satisfactory internal consistency and supported the use of the questionnaire for the main study. Data were analysed using descriptive and inferential statistical techniques. Frequencies and percentages were used to describe respondents' age profile, measures provided by authorities, compliance confidence and communication channels. Tables, charts and a map were used to present the results clearly. Analysis of variance was used to test whether significant differences existed in compliance with disaster-risk protocols among tourism operators. The ANOVA test was interpreted at the 0.05 level of significance. Data processing was carried out using the Statistical Package for Social Sciences and Microsoft Excel, while the map used in the study was designed with ArcMap.

Ethical considerations were observed throughout the study. Participation was voluntary and informed consent was obtained from respondents before data collection. Participants were informed about the purpose of the research, the academic use of the data, confidentiality of responses and their right to withdraw without penalty. No personal identifiers were reported. The study also received approval from the appropriate departmental research committee and permission was sought where necessary from relevant offices and facilities. The study acknowledges the possibility of response bias because some respondents may overstate their level of compliance due to social desirability or fear of institutional scrutiny; this was reduced by assuring anonymity and presenting results in aggregate form.

Results and discussion

The results are presented in line with the objectives of the study and the data collected from 384 respondents. The section begins with the demographic profile, then examines disaster vulnerabilities at selected tourism sites, measures provided by authorities, confidence in compliance and response, communication methods and the ANOVA result. The discussion integrates the numerical findings with disaster-risk management, compliance

and tourism-resilience literature so that the results are not treated as isolated statistics but as evidence for strengthening destination governance. Figure 2 presents the sex distribution of respondents. Male respondents represented 56% of the sample, while female respondents represented 44%. This distribution indicates that both male and female stakeholders were included, although males were slightly more represented. The gender pattern is important because tourism safety is implemented through a wide range of roles, including facility management, security, guiding, accommodation services, event management, food service, transport and administrative coordination. In many tourism destinations, men may be more visible in security, transport and site operations, while women may be heavily involved in hospitality, customer service, food provision and administrative roles. Effective disaster-risk protocols must therefore be gender-inclusive and communicated across all operational units.

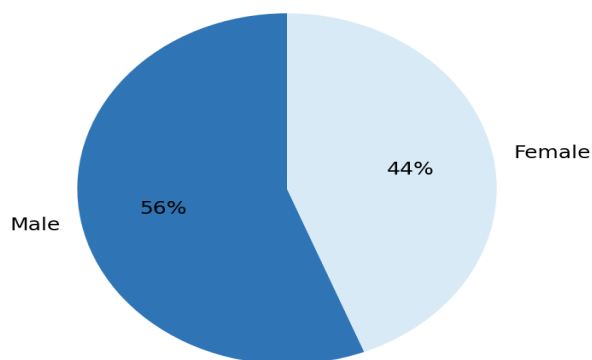


Figure 2. Sex distribution of respondents.

Source: Researchers' fieldwork, 2025.

Table 1 presents the age distribution of respondents. The largest age group was 31 to 40 years, representing 121 respondents (31.5%). This was followed by respondents aged 41 to 50 years, with 112 respondents (29.2%), and those aged 21 to 30 years, with 98 respondents (25.5%). Respondents aged 51 years and above accounted for 45 respondents (11.7%), while those below 20 years accounted for only eight respondents (2.1%). The result shows that most respondents were within economically active and operationally relevant age groups. This strengthens the reliability of the responses because many respondents were likely to have direct knowledge of facility operations, staff practices and safety communication.

Table 1. Age of respondents.

Age	Frequency	Percentage (%)
Below 20 years	8	2.1
21-30 years	98	25.5
31-40 years	121	31.5
41-50 years	112	29.2
51 years and above	45	11.7
Total	384	100

Source: Researchers' fieldwork, 2025.

The dominance of respondents between 31 and 50 years also suggests that the study captured individuals who may occupy supervisory, managerial or experienced operational positions. Disaster-risk compliance often depends on such actors because they translate policies into facility-level decisions. Younger workers may receive instructions, but supervisors and managers often decide whether to conduct drills, purchase equipment, keep emergency records and coordinate with agencies. The age distribution therefore supports the relevance of the evidence for destination-level policy because the responses reflect the perceptions of people likely to influence safety practices within tourism establishments. Table 2 presents selected tourism destinations and their associated disaster vulnerabilities. Marina Resort in Calabar Municipality is exposed to coastal flooding, windstorm and road-accident risks due to its riverine setting and visitor movement. Cross River National Park

in Akamkpa is vulnerable to flooding and erosion because of its rainforest ecosystem and proximity to river systems. Afi Mountain Wildlife Sanctuary in Boki is associated with flooding, landslides, wildfire and road accidents, while Ikom Monoliths are exposed to flooding and landslides in a tropical rainforest environment. Obudu Mountain Resort is associated with landslide and erosion risks due to steep terrain, while hotels, recreation centres and event centres across the state face flooding, erosion, windstorms and fire outbreaks.

Table 2. Tourism destinations with associated disaster vulnerabilities.

Tourism site/facility	Local government area	Primary disaster risk	Remarks
Marina Resort	Calabar Municipality LGA (Cross River South)	Coastal flooding, windstorm and road accident	Located along the Calabar River, making it susceptible to coastal and riverine flooding.
Cross River National Park	Akamkpa LGA (Cross River South)	Flooding and erosion	Proximity to rivers and rainforest ecosystem increases vulnerability to flooding and erosion.
Afi Mountain Wildlife Sanctuary	Boki LGA (Cross River Central)	Flooding, landslide, wildfire and road accident	Heavy rainfall, steep topography, vegetation loss, dry debris and access conditions increase hazard exposure.
Ikom Monoliths	Ikom LGA (Cross River Central)	Flooding and landslide	High rainfall, topography, soil conditions, vegetation loss, poor drainage and river overflow intensify risk.
Obudu Mountain Resort	Obanliku LGA (Cross River North)	Landslide and erosion	The resort is located on the Obudu Plateau where steep terrain increases landslide risk during heavy rainfall.
Hotels, recreation centres and event centres	Across Destination Cross River	Flooding, erosion, windstorm and fire outbreak	Urbanisation, inadequate drainage and facility density increase exposure to flooding, erosion, windstorms and fire incidents.

Source: Researchers' fieldwork, 2025.

The vulnerability profile in Table 2 demonstrates that disaster risk in Destination Cross River is multi-hazard rather than single-hazard. This is important because tourism operators cannot rely on one generic safety plan. Riverine facilities require flood warnings, drainage awareness and evacuation procedures. Mountain destinations require slope-risk monitoring, road-safety guidance and weather-sensitive visitor management. Hotels and event centres require fire-safety systems, crowd-control protocols and emergency exits. Wildlife and rainforest destinations require trail safety, communication support and environmental monitoring. The map in Figure 1 shows that selected facilities are spatially dispersed, which further reinforces the need for decentralised but coordinated emergency planning.

Table 3. Measures provided by authorities for tourism operators to cope with disaster risk.

Measure	Frequency	Percentage (%)
Disaster-risk assessment	104	27.1
Disaster-risk reduction	52	13.5
Disaster preparedness, prevention and mitigation	164	42.7
Disaster recovery	64	16.7
Total	384	100

Source: Researchers' fieldwork, 2025.

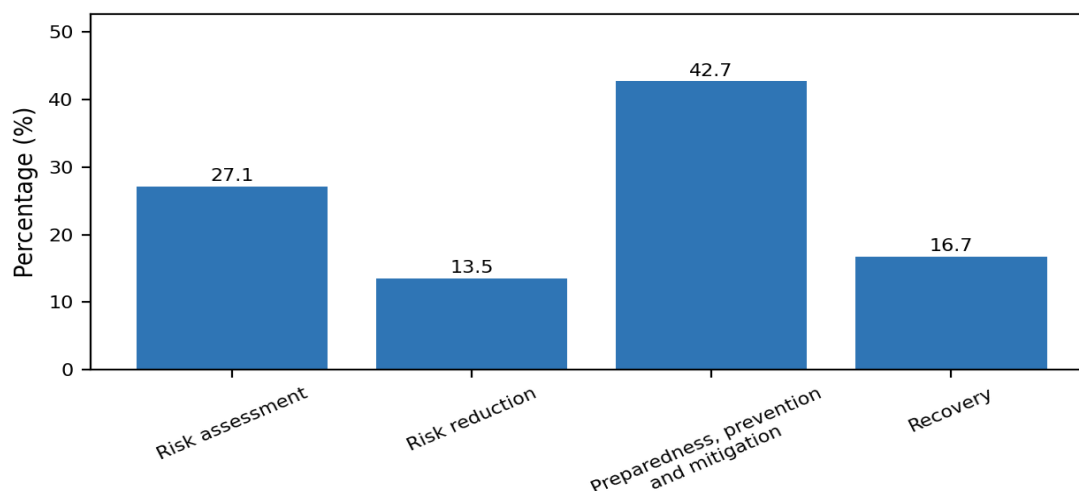


Figure 3. Measures provided by authorities for disaster-risk management.

Source: Researchers' fieldwork, 2025.

Table 3 shows the measures provided by authorities for tourism operators to cope with disaster risk. Disaster preparedness, prevention and mitigation was the most frequently reported measure, with 164 respondents (42.7%). Disaster-risk assessment followed with 104 respondents (27.1%). Disaster recovery was reported by 64 respondents (16.7%), while disaster-risk reduction was reported by 52 respondents (13.5%). This pattern indicates that authorities appear to place more emphasis on preparedness and prevention than on recovery or broader risk-reduction measures. From an emergency-management perspective, this is positive because preparedness and prevention can reduce disaster impacts before they escalate. However, the relatively low percentage for disaster-risk reduction deserves attention. Disaster-risk reduction should not be treated as a narrow activity. It includes hazard mapping, infrastructure improvement, drainage maintenance, building standards, staff training, visitor education, insurance planning, early-warning systems and coordination between public and private actors. The Sendai Framework emphasises that risk reduction requires understanding risk, strengthening governance and investing in resilience (UNDRR, 2015). If only 13.5% of respondents identified disaster-risk reduction as a measure provided by authorities, it may indicate that operators are more familiar with preparedness language than with the broader structural work required to reduce underlying risk. This implies a need for clearer communication and practical guidance on what disaster-risk reduction means for tourism facilities.

Table 4. Compliance and response to disaster-risk protocols in Destination Cross River.

Compliance confidence	Frequency	Percentage (%)
Very confident	112	30
Somewhat confident	148	38
Not very confident	88	23
Not confident at all	36	9
Total	384	100

Source: Researchers' fieldwork, 2025.

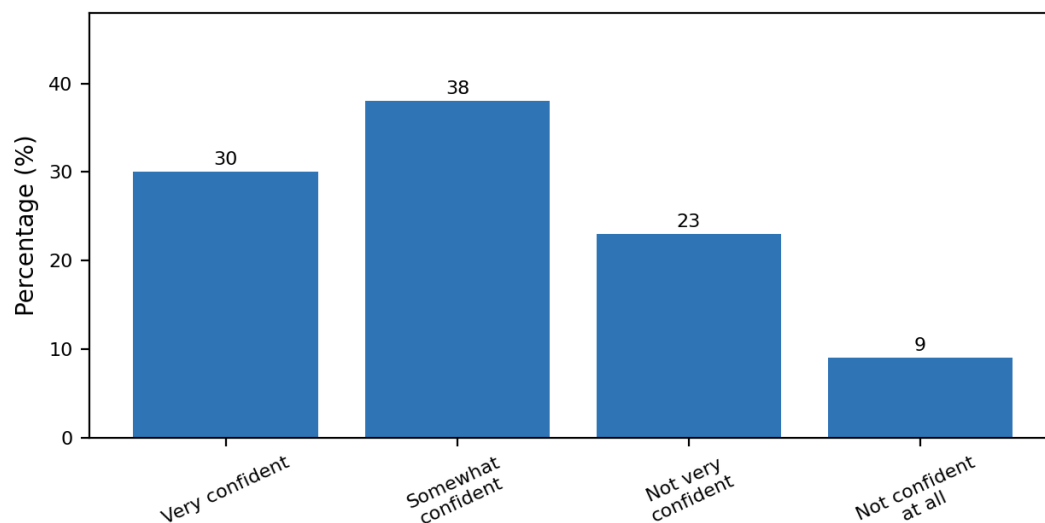


Figure 4. Operator confidence in compliance and response.

Source: Researchers' fieldwork, 2025.

Table 4 presents compliance and response confidence among tourism operators. The largest proportion of respondents, 148 (38%), reported being somewhat confident in compliance and response to disaster-risk protocols. A further 112 respondents (30%) reported being very confident. However, 88 respondents (23%) were not very confident, and 36 respondents (9%) were not confident at all. The result shows a mixed compliance environment. While 68% of respondents expressed at least some level of confidence, 32% reported low or no confidence. This is a significant finding because safety compliance requires more than partial awareness. During an emergency, uncertainty can delay response, weaken coordination and increase risk for tourists and employees. The confidence profile should be interpreted cautiously. Somewhat confident does not necessarily mean fully prepared. It may indicate that operators know basic procedures but are unsure about implementing them under pressure. The 23% who were not very confident and the 9% not confident at all point to gaps in training, drills, resources and institutional support. These findings align with Hu et al. (2021), who argue that deep compliance requires management commitment, psychological acceptance and organisational routines. They also align with Fitriani et al. (2023), who emphasise that user compliance with emergency systems is influenced by individual, technological and social factors. In Destination Cross River, compliance confidence is likely to improve when protocols are reinforced through repeated practice, clear communication and visible supervision.

Table 5. Method of communication used to inform tourists or visitors during disaster risk.

Communication method	Frequency	Percentage (%)
Social media	142	37
Email alerts	40	10.4
SMS notifications	24	6.3
On-site announcements	68	17.7
Radio/TV	110	28.6
Total	384	100

Source: Researchers' fieldwork, 2025.

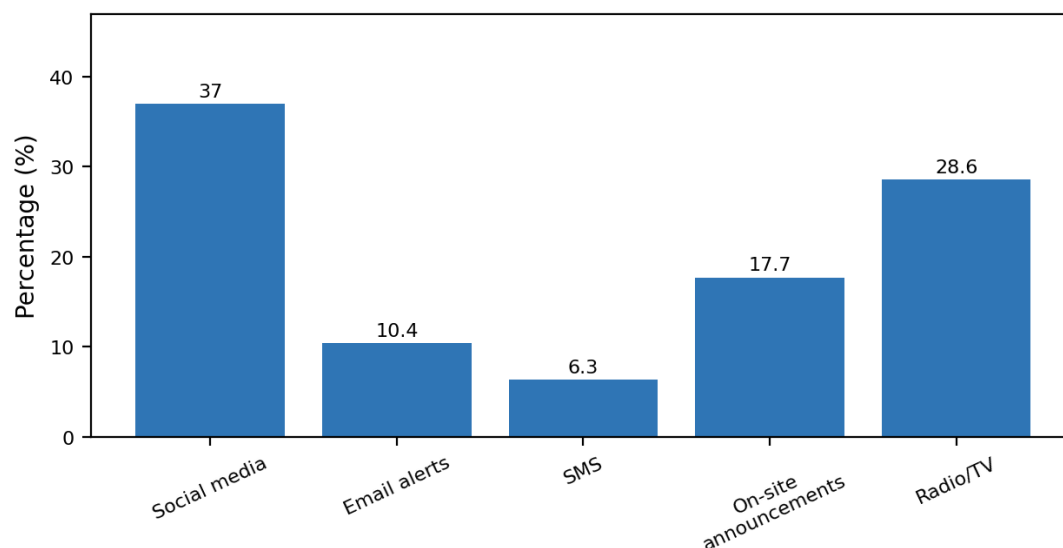


Figure 5. Communication channels used during disaster-risk situations.

Source: Researchers' fieldwork, 2025.

Table 5 presents the communication methods used to inform tourists or visitors during disaster-risk situations. Social media was the most reported method, with 142 respondents (37%). Radio and television followed with 110 respondents (28.6%). On-site announcements were reported by 68 respondents (17.7%), while email alerts were reported by 40 respondents (10.4%) and SMS notifications by 24 respondents (6.3%). The dominance of social media reflects the growing importance of digital communication in tourism risk management. Social media is fast, inexpensive and capable of reaching visitors, operators and community members simultaneously. It can also support real-time updates and destination-wide alerts. Nevertheless, reliance on social media alone can create exclusion and misinformation risks. Some visitors may not follow official pages, some areas may have weak internet access, and social-media messages may be crowded by rumours during emergencies. Radio and television remain important because they can reach broader audiences and may be more trusted during severe weather or large-scale incidents. On-site announcements are essential inside facilities because they provide immediate behavioural instructions. The low use of SMS notifications is noteworthy because SMS can reach visitors directly without requiring internet access. Destination Cross River should therefore adopt a multi-channel communication system that combines social media, radio/television, SMS, email, signage and on-site public-address systems.

Table 6. ANOVA result for compliance with disaster-risk protocols among tourism operators.

Source of variation	SS	df	MS	F	p-value	F crit
Between groups	12.5	1	12.5	0.005114	0.945317	5.987378
Within groups	14667	6	2444.5			
Total	14679.5	7				

Source: Researchers' fieldwork, 2025.

Table 6 presents the ANOVA result used to examine differences in compliance with disaster-risk protocols among tourism operators. The result showed $F = 0.005114$ and $p = 0.945317$. Since the p-value is greater than 0.05, the result indicates that there was no statistically significant difference in compliance levels among the operators assessed. This finding should not be interpreted as proof that compliance is satisfactory. Rather, it indicates that variations in compliance were statistically insignificant across the groups or categories analysed. In practical terms, operators appear to share similar conditions, constraints or levels of exposure to disaster-risk management practices. The absence of significant difference has important policy implications. If compliance challenges are broadly similar, then interventions should not be limited to a single category of operator or a small number of facilities. A destination-wide strategy is required. Such a strategy should include standard operating

procedures, compulsory safety orientation, periodic inspection, emergency drills, hazard-specific checklists, visitor briefing templates and coordination platforms linking operators with CRSEMA, NEMA, the Cross River State Tourism Bureau and local authorities. Uniform minimum standards can help reduce uneven practice and ensure that tourists receive comparable safety protection across facilities.

The findings also suggest that disaster-risk compliance in Destination Cross River is still developing as an institutional culture. Authority measures are visible, and some operators express confidence, but practical weaknesses remain in confidence levels and communication systems. This pattern is common in tourism destinations where emergency planning exists at policy level but is not fully embedded into daily operations. Liu et al. (2024) observe that disaster, risk and crisis management in tourism requires holistic frameworks that connect prevention, preparedness, response, recovery and resilience. The present findings support that argument because the strongest results relate to preparedness, while risk reduction, communication diversity and deep compliance require further improvement. Another important issue is the relationship between safety compliance and destination competitiveness. Tourism is trust-sensitive. Visitors choose destinations not only for attractions but also for perceived safety, reliability and quality of management. When operators cannot confidently respond to flooding, fire, landslide, windstorm or crowd emergencies, the destination's reputation is exposed. This is especially important for Cross River State because its tourism identity includes flagship attractions that may attract domestic and international attention. Safety lapses in one facility can affect the image of the wider destination. Disaster-risk compliance should therefore be treated as a strategic asset rather than a bureaucratic requirement.

The spatial evidence in Figure 1 reinforces the need for hazard-specific planning. The map shows selected tourism facilities and sites across different parts of Cross River State, including riverine, urban, rainforest, upland and heritage locations. This dispersion means that operators may not face the same hazard intensity, but they require a shared safety architecture. For example, Obudu Mountain Resort and Afi Mountain Wildlife Sanctuary require special attention to landslides, erosion, access roads and emergency evacuation. Marina Resort requires attention to riverine flooding, crowd safety and windstorm warnings. Hotels and event centres require fire prevention, drainage maintenance and evacuation drills. A standard destination policy must therefore be flexible enough to accommodate site-specific risks.

The results further highlight the importance of staff training. Training should not only describe disaster-risk protocols; it should build practical competence. Operators should know how to interpret warnings, activate communication chains, guide tourists to safe areas, account for guests, use basic emergency equipment, contact agencies and document incidents. Regular simulation exercises can convert written protocols into behaviour. Jiang et al. (2023) show that tourism organisations require knowledge, human, relational and financial resources to build dynamic disaster-management capabilities. For Destination Cross River, training should be linked to inter-agency collaboration so that operators know whom to contact and what to expect during response. The role of communities should also be recognised. Several tourism attractions in Cross River State are embedded in host communities. Community members may observe early signs of local hazards, provide informal support during incidents and influence visitor safety through local knowledge. A destination-wide safety strategy should therefore include community leaders, youth groups, transport unions and local volunteers. This is consistent with the multi-stakeholder logic of disaster governance and with the Nigerian National Policy on Disaster Management, which emphasises participation and local knowledge. Community involvement can improve early warning, evacuation support and post-disaster recovery, especially in rural or difficult-access tourism sites.

Overall, the results show that Destination Cross River has made some progress in disaster-risk awareness and preparedness, but safety compliance remains moderate and uneven in practical confidence. Authority measures are present, but operators need clearer protocols, stronger drills, wider communication channels and more consistent monitoring. The ANOVA result suggests that the issue is sector-wide rather than isolated. Therefore, improving compliance requires institutionalising safety as a normal part of tourism

operations, not as an occasional reaction to disasters. This is the basis for the implications and conclusion that follow.

Implications/conclusion

The study has significant policy implications for tourism governance in Cross River State. First, the Cross River State Tourism Bureau and emergency-management agencies should jointly develop a tourism-specific disaster-risk management framework. Such a framework should translate general disaster-management policies into practical tourism protocols for hotels, resorts, parks, waterfront facilities, heritage sites, event centres and tour operators. It should define minimum safety requirements, risk-assessment procedures, emergency contacts, reporting formats, evacuation rules, communication responsibilities and post-incident review processes. A tourism-specific framework would reduce ambiguity and make compliance easier to monitor.

Second, destination authorities should introduce regular training and simulation exercises for tourism operators. The finding that many operators are only somewhat confident or not confident in compliance indicates that awareness alone is insufficient. Training should be practical and repeated. It should include fire drills, flood-response exercises, first aid, crowd control, evacuation planning, tourist briefing, incident documentation and use of emergency communication channels. Training should also be adapted to facility type. A mountain resort, riverfront facility, wildlife sanctuary and event centre do not face identical hazards, and therefore require both common standards and hazard-specific modules. Third, communication systems should be expanded beyond social media. Social media is useful, but it should be complemented by SMS alerts, radio/television announcements, on-site public-address systems, signage, email alerts and direct coordination with tour operators. The low use of SMS notifications suggests a missed opportunity for direct and internet-independent communication. Operators should maintain emergency contact lists for staff and, where possible, guest notification systems. Tourism agencies should also maintain verified official channels to reduce rumour circulation during emergencies.

Fourth, compliance monitoring should be institutionalised. Safety inspections should not occur only after incidents. Periodic audits should assess whether operators have emergency plans, trained staff, functional fire extinguishers, visible exit signage, first-aid kits, evacuation routes, visitor registers, hazard notices and agency contact lists. Compliance should be documented and linked to licensing, renewal or certification systems. Such monitoring should be supportive rather than punitive at the initial stage, helping operators understand and meet standards. Over time, however, minimum compliance requirements should become part of destination quality assurance. Fifth, disaster-risk planning should be integrated with sustainable tourism development. Safety compliance protects lives, but it also protects destination reputation, investment confidence and community livelihoods. A major disaster at a tourism facility can reduce visitor arrivals, weaken business income and create long-term reputational damage. Investing in safety is therefore an investment in sustainable tourism. Cross River State should treat resilience as part of its tourism brand by demonstrating that its attractions are not only beautiful and culturally significant but also responsibly managed.

The study concludes that tourism destinations within Cross River State are exposed to multiple disaster risks, including flooding, erosion, landslides, windstorms, road accidents and fire outbreaks. Measures such as disaster preparedness, prevention, mitigation and risk assessment have been introduced by authorities, but compliance confidence among tourism operators remains moderate. The leading communication channels are social media and radio/television, while SMS and email alerts are less used. The ANOVA result showed no significant difference in compliance levels among operators, indicating that compliance challenges are broadly shared across the sector. The study therefore concludes that Destination Cross River requires a coordinated, destination-wide approach to safety compliance and disaster-risk governance. The main contribution of the study is its destination-specific evidence on tourism safety compliance in a Nigerian setting. It shows that disaster-risk management in tourism should be evaluated through operator confidence, communication systems, authority

measures and statistical comparison of compliance levels. It also demonstrates that the absence of significant variation in compliance does not necessarily mean strong compliance; it may point to a common sector-wide need for capacity building. This distinction is important for policymakers because it prevents complacent interpretation of non-significant inferential results.

The study recommends that the State Emergency Management Agency, in collaboration with the Cross River State Tourism Bureau, should establish a tourism disaster-management strategy tailored to the needs of tourism operators, facilities and tourists. Tourism operators should organise regular preparedness training, simulation exercises and awareness programmes for employees. Government agencies should strengthen monitoring, provide clear protocols and support operators with technical guidance. Communication systems should be expanded to include multiple channels, and communities around tourism sites should be included in preparedness and response planning. The study was limited to selected tourism operators and relevant government agencies within Cross River State, which may restrict generalisation to other Nigerian destinations. The use of self-reported data may also have introduced response bias. Future studies should combine surveys with field observation, facility safety audits, interviews with tourists, spatial risk modelling and comparative analysis across Nigerian tourism destinations. Longitudinal studies would also help determine whether training and policy interventions improve compliance over time. Despite these limitations, the study provides useful evidence for strengthening safety compliance, destination resilience and sustainable tourism governance in Cross River State.

Declarations

Ethics approval and consent to participate: The study was conducted in accordance with accepted ethical principles for social research. Approval was obtained from the appropriate departmental research committee, and respondents participated voluntarily after being informed of the purpose of the study.

Consent for publication: All authors approved the manuscript for journal submission and publication.

Availability of data and materials: The datasets used for the analysis are available from the corresponding author on reasonable request.

Competing interests: The authors declare that they have no competing interests.

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Authors' contributions: The authors contributed to the conception of the study, fieldwork, data analysis, manuscript drafting, revision and final approval of the article.

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