

Communicating Resilience: Indigenous Knowledge and Community-Based Disaster Self-Mitigation in Rural Indonesia

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ABSTRACT

Keywords

Communication Ethnography; Self-Mitigation; Indigenous Knowledge; Community Communication; Disaster Mitigation; Social Resilience

Indonesia is a country with a high level of disaster vulnerability, including Sumenep Regency in Madura, which routinely experiences floods, droughts, and tornadoes. The people of Sumenep have developed self-mitigation practices based on local knowledge (indigenous knowledge) despite limited disaster literacy and insufficient formal socialization from government institutions. This study aims to analyse how the ethnographic process of communication shapes and reproduces self-mitigation practices as a community resilience strategy. The research uses a qualitative approach with the ethnographic design of communication in the constructivism paradigm. The informants were purposefully chosen, and they were from BPBD, religious leaders, and people who lived in three villages that are likely to have disasters: Kebunagung, Pasongsongan, and Kertasada. We gathered data through passive participant observation, in-depth interviews, and documentation. Then, we analysed the data in relation to the components of communication situations, communicative events, and communicative actions. The results show that practices such as village rokad during floods, istisqa' prayers during droughts, and symbolic rituals of "cutting the wind" during tornadoes are not just spiritual expressions but are cultural communication systems that build social solidarity, transmit risk knowledge, and strengthen collective resilience. Symbol, narrative, and ritual-based communication serve as an adaptive mechanism that organizes the community's response to disaster threats. This research confirms that cultural communication is an important foundation in community-based mitigation and needs to be integrated into formal risk communication policies. This study contributes to the development of community-based disaster communication studies in the context of Southeast Asia.

1. Introduction

Indonesia is one of the countries with the highest level of disaster vulnerability in the world due to geographical conditions and the increasing impact of climate change on hydrometeorological disasters. The high frequency of disasters demands mitigation systems that are not only technology-based but also involve the social capacity of local communities. However, many regions still dominate disaster mitigation approaches with top-down and technocratic governance, often overlooking community-based communication practices that have developed over generations. The paradigm shift in disaster communication research in Indonesia indicates that a community-based

participatory approach is an important element in building resilience and more effective disaster risk governance. (Rudianto, 2026)

The community-based disaster risk reduction (CBDRR) approach is getting more attention in the latest literature because it is able to increase community preparedness through active community participation. In this framework, indigenous knowledge, or local knowledge, is recognized as an important resource in building the socio-ecological resilience of the community. Across generations, traditional knowledge accumulates empirical experience and transmits it through cultural practices and social communication within the community. Recent systematic studies have shown that local knowledge serves as an effective mitigation mechanism because it allows for multi-stakeholder cooperation and community-based adaptation in the face of disaster risk. (Hao & Lun, 2024)

In addition, the relationship between local knowledge and disaster governance is increasingly relevant in the context of sustainable development. Rural communities that depend on the natural environment have long used local knowledge to adapt to environmental threats, so the integration of indigenous knowledge, disaster risk management, and sustainable development goals can strengthen the resilience of communities across the board. The integration is also considered to be able to increase the effectiveness of mitigation policies that are more inclusive and environmentally just (Bang, 2024)

Recent studies in the field of disaster communication have demonstrated that local cultural practices and narratives function as collective communication systems that convey interpretations of disaster risk. Research on traditional communities in Indonesia found that natural landmarks, rituals, and local experiences are interpreted through cultural communication frameworks that shape people's responses to disasters. This shows that communication based on local wisdom has a strategic role in building community resilience. (Lestari et al., 2025)

Furthermore, recent research confirms that the integration of local knowledge with formal mitigation systems still faces gaps. Community-based disaster communication studies have found inconsistencies between institutional communication and local communication practices, resulting in the need for an integrative model that combines local knowledge, disaster education, and participatory communication to improve mitigation effectiveness. (Rizal et al., 2025)

In addition, recent research on community-based disaster communication confirms that local figures and cultural leaders play an effective role as mediators of risk information. Local narratives, folklore, and cultural practices are the medium of communication that shapes the perception of risk and encourages collective mitigation actions, as they resonate more deeply with community members and reflect their lived experiences and values. This community-based communication is considered more contextual and has a higher level of trust than formal communication, which is top-down. (Fakhruddin et al., 2022)

Sumenep Regency is one of the regions in Indonesia that geographically has a high level of vulnerability to hydrometeorological disasters such as floods, droughts, and tornadoes. Based on the results of communication ethnographic research, the Sumenep community developed self-mitigation practices based on local knowledge through various rituals and cultural communication, such as village rokad during floods, istisqa' prayers during drought, and symbolic rituals to deal with tornadoes (Hidayanto, 2025). The practice serves not only as a religious expression but also as a means of social communication that strengthens community solidarity and builds collective preparedness for disasters. (Hidayanto, 2025)

However, integration between local knowledge and formal mitigation systems is still limited. Many disaster risk reduction policies tend to prioritize a technocratic approach that pays less attention to the social and cultural dimensions of the community, which can lead to ineffective responses during disasters and a failure to leverage local knowledge that is crucial for resilience. In fact, recent research shows that local communities are strategic actors in maintaining environmental sustainability and building socio-ecological resilience through the practice of local wisdom. This knowledge contributes to traditional early warning systems, resource management, and the strengthening of social solidarity that is the foundation of community resilience (Iskandar, Sabiq & Afrisal, 2025)

Despite the significant potential of communication practices rooted in local wisdom for disaster risk reduction, their incorporation into formal mitigation policies remains limited. Research on the integration of local knowledge in disaster mitigation shows that culture-based approaches can increase community resilience but still require a conceptual framework that links cultural communication to disaster governance systematically (Markolinda et al., 2025)

In addition, global research trends show a significant increase in studies on local knowledge in disaster mitigation since 2016, with a peak in 2024, signaling the growing importance of community-based approaches in disaster governance. However, most of the research still focuses on environmental aspects and has not in-depth examined the role of cultural communication as the main mechanism of mitigation knowledge transmission (Arizona & Sukarso, 2026)

Based on these gaps, this study offers the concept of communicating resilience, which is an approach that places cultural communication based on local knowledge as the foundation in community-based disaster self-mitigation. This study aims to analyze how the cultural communication practices of rural communities shape community resilience and how these practices can contribute to more inclusive and environmentally just disaster governance. By using an ethnographic approach to communication in the Sumenep community, this study is expected to make a theoretical contribution to the development of disaster communication studies as well as practical contributions in the integration of local knowledge into community-based disaster mitigation policies.

Community Resilience dan Disaster Governance

The concept of community resilience is a major focus in contemporary disaster research because climate change increases the frequency and complexity of disaster risk. Systematic studies show that community resilience is determined not only by physical capacity but also by social, communication, and community network factors that enable communities to adapt to environmental threats. Cross-disciplinary research confirms that a socio-ecological approach is needed to comprehensively understand the dynamics of community resilience (Zaman et al., 2023)

Environmental justice also relates to community resilience in the context of disaster governance. Recent literature highlights that vulnerable communities often bear the brunt of disasters disproportionately, so the concept of disaster justice emphasizes a fairer distribution of risks, resources, and protection in disaster policy. This approach places local communities as important actors in decision-making and disaster risk reduction (Pascal, 2026)

Furthermore, recent studies highlight the need to comprehend community resilience as a multidimensional process encompassing social, economic, and health aspects. Locally-based interventions are considered important to strengthen long-term strategies in adaptation to climate change and natural disasters (Syamsaputri & Hermon, 2025)

Indigenous Knowledge in Disaster Risk Reduction

Indigenous knowledge is increasingly recognized as an important component in disaster risk reduction. This knowledge is an accumulation of empirical experience of the community that is inherited across generations and is used as an adaptation strategy to environmental changes. A Scopus-based bibliometric study shows that research on indigenous knowledge in disaster mitigation continues to develop and has great potential to improve the effectiveness of community-based disaster management (Widuri & Yoganingrum, 2023). Recent research also confirms that the integration of local knowledge and formal policies can strengthen adaptation to climate change and improve community preparedness. Studies on indigenous peoples show that local knowledge can be used to identify threats, design adaptive strategies, and improve the socio-ecological resilience of communities (Markolinda et al., 2025). In addition, the systematic literature suggests that disaster risk management becomes more effective when local communities and policymakers work collaboratively. The integration between scientific knowledge and local knowledge allows for a more contextual and sustainable mitigation approach. (Banerjee, 2023)

Intercultural Communication in Disaster Mitigation

The role of communication in disaster mitigation is getting more and more attention in recent research. Studies on ecological communication show that communication is an important element in responding to environmental challenges and building community resilience. Increasing publications in the field of disaster communication show that community-based communication is becoming a strategic approach in disaster risk reduction (Resa et al., 2023). Local knowledge-based cultural communication also serves as a mitigation and knowledge transmission mechanism. Local knowledge is often tacit and transmitted through rituals, narratives, and social practices that develop within the community, which can include storytelling traditions, community gatherings, and local ceremonies that reinforce shared values and collective memory. This communication process shapes risk interpretation and mobilizes collective action in the face of disasters (Furqan Ishak, 2020). Other studies indicate that social communication following a disaster can expedite adaptation and community recovery. Social interaction and sharing of experiences are a means of collective learning that strengthens community resilience (Suryani & Soedarso, 2019)

Integrasi Indigenous Knowledge, Communication, dan Environmental Justice

Recent literature emphasizes the significance of the integration of local knowledge, community communication, and equitable disaster governance. The concept of disaster justice emphasizes that local communities must be involved in decision-making to ensure equitable distribution of risks and resources. This approach places community communication as a participatory mechanism in environmental policy (Pascal, 2026). In addition, studies on the sustainability of community resilience show that strengthening local communication can increase adaptation capacity to disasters and climate change. Community-based approaches allow for the integration of cultural values, social solidarity, and more sustainable resource management (Syamsaputri & Hermon, 2025)

Based on these gaps, this research offers the concept of communicating resilience, which is a framework that integrates local knowledge-based cultural communication with community-based disaster governance. This approach places communication as a social process that transmits mitigation knowledge, strengthens community solidarity, and supports more inclusive and equitable disaster policies. The conceptual framework of this research connects three main components, namely Indigenous knowledge as a source of local mitigation strategies, cultural communication as a knowledge transmission mechanism, and Community resilience as an outcome in disaster governance. The integration of these three components is expected to make a theoretical contribution to the development of disaster communication studies as well as practical contributions in community-based mitigation policies oriented towards environmental justice

2. Method

Research Design

This study used a qualitative approach with a communication ethnographic design to understand local knowledge-based communication practices in disaster mitigation in rural communities. The qualitative approach was chosen because it allows for an in-depth exploration of social meaning, cultural symbols, and communication practices in the natural context of society. Community-based disaster research uses a lot of qualitative design because it is able to capture social dynamics and communication processes that cannot be quantitatively measured. Recent studies show that community-based disaster mitigation research generally uses a combination of field observation, in-depth interviews, and document analysis to understand local resilience practices (Lunga et al., 2025). The ethnographic approach of communication was chosen because it is able to explain how risk information is received, shared, and acted upon in local communities through cultural communication practices. Ethnographic research in disaster communication is used to identify the mechanisms of community participation and communication dynamics in disaster risk reduction (Cooper et al., 2021). This approach is also in line with integrative research on indigenous disaster risk reduction that combines ethnographic methods, interviews, and participatory observation to understand the interactions between local culture and disaster mitigation practices (Ali et al., 2021). This research uses a constructivist paradigm that views social reality as the result of the construction of meaning through social interaction. Disaster communication research finds this

paradigm relevant, as society collectively interprets risk perceptions and mitigation practices. Community-based disaster communication research shows that social constructions of risk determine how communities respond to disaster threats (Rudianto, 2026)

The research was conducted in Sumenep Regency, Indonesia, which has susceptibility to floods, droughts, and tornadoes. The research location was chosen purposively because the people in the region developed self-mitigation practices based on local knowledge. Communication practices such as community rituals and local narratives are the focus of the research analysis. Empirical data was obtained from communication ethnographic research on the Sumenep community, which shows the existence of mitigation practices based on cultural communication (Hidayanto, 2025). The research informants were selected using purposive sampling techniques with criteria: (1) People living in disaster-prone areas; (2) Religious leaders or community leaders involved in local mitigation practices; (3) Representatives of local government institutions, namely the Regional Disaster Management Agency / BPBD. Purposive sampling techniques were commonly used in disaster ethnographic research to obtain informants who have firsthand experience of community mitigation practices. An ethnographic study of disaster preparedness using purposive sampling to select participants who are directly involved in the community's response to disasters

Data collection was carried out through three main techniques, namely participant observation, in-depth interviews, and documentation. Observations were carried out to understand communication practices and disaster mitigation rituals in the social context of the community. Field observation is an important method in community resilience research because it allows researchers to capture direct social interactions. Semi-structured interviews were used to explore informants' experiences related to local knowledge-based mitigation practices. In-depth interview methods are widely used in disaster communication research to understand risk perceptions and community adaptation practices (Salsabila et al., 2024). Documentation is done through the collection of photographs, field notes, and documents related to community mitigation practices. The combination of observation, interviews, and documentation is a common technique in qualitative disaster communication research (Permatasari & Sinduwiatmo, 2024). Data analysis was carried out using thematic analysis of communication ethnography with the stages of data reduction, categorization based on communication situation, analysis of communicative events, interpretation of communicative actions, and drawing conclusions.

The thematic analysis approach is widely used in risk communication research to identify communication patterns and community-based mitigation strategies (Kusuma et al., 2026). Research on disaster communication indicates that qualitative analysis facilitates the identification of correlations among communication, community engagement, and community resilience (Rudianto, 2026). The validity of the data was tested through triangulation of sources and methods. Triangulation was carried out by comparing the results of observations, interviews, and documentation. The triangulation approach is a standard in qualitative disaster research to increase the credibility of the findings (Lunga et al., 2025). Member checking and discussions with key informants also strengthen validity by ensuring data interpretation aligns with the community's social context. Based on this approach, this study uses an analytical framework that connects cultural communication, indigenous knowledge, community resilience, and disaster governance. This framework allows for an analysis of the relationship between local communication practices and community resilience in community-based disaster mitigation.

3. Result and Discussion

Ritual as Risk Communication Mechanism

The findings show that ritual practices are the main medium of disaster risk communication in the Sumenep community. The community performs rituals like village rokads when confronted with the threat of flooding. This practice serves not only as a religious activity but also as a forum for collective communication to build preparedness.

One of the informants of a religious figure explained:

"Kalau banjir mulai sering terjadi, biasanya masyarakat melakukan rokad desa agar diberi keselamatan. Di situ warga juga berkumpul dan saling mengingatkan untuk lebih waspada."

"If floods start to occur frequently, the community usually conducts a village rokad to ensure their safety. During this time, residents also gather and remind each other to be more vigilant."

The quote shows that rituals function as a medium for disseminating risk information while building collective awareness. The communication process that takes place during the ritual allows for the exchange of experiences and community-based mitigation strategies, such as sharing personal stories of past floods and discussing effective measures to prepare for future events. The community performs the *istisqa'* prayer when confronted with drought. An informant stated:

"Saat musim kemarau panjang, masyarakat mengadakan sholat istisqa' bersama agar segera turun hujan, sekaligus membicarakan kondisi air di desa."

"During the long dry season, the community holds Istisqa' prayers together so that it rains immediately, as well as talking about the water condition in the village."

These findings show that rituals function as a space for community deliberation in managing environmental risks.

Role of Local Leaders in Disaster Communication

Religious leaders and community leaders have a central role in conveying disaster mitigation messages. The informant stated that the public trusts information conveyed by local figures rather than formal sources.

A religious informant explained,

"Usually people follow the directions of religious leaders, especially when there are signs of disaster. We remind ourselves to be more prepared and help each other."

These findings suggest that the social legitimacy of local figures strengthens the effectiveness of mitigation communication.

Symbolic Communication and Collective Preparedness

In addition to rituals, people also use cultural symbols as a form of mitigation communication. The practice of "wind cutting" is carried out to address tornadoes. An informant explained:

"If there is a strong wind, there is usually a joint prayer and a certain symbol to reject it so as not to damage the residents' houses."

This practice shows that cultural symbols serve as a communication mechanism that builds the psychological preparedness of the community.

There is a gap between Indigenous communication practices and formal policy.

The findings also show the limitations of integration between community-based communication and institutional communication. The informant noted that the government's socialization efforts for mitigation remain limited.

"We rarely receive direct socialization about disaster mitigation, usually only information from village officials or social media."

This shows that local practices are still the main source of community mitigation

Analytical Themes Table

Analytical Theme	Sub-Theme	Empirical Evidence	Interpretation	Conceptual Link
Ritual as Risk Communication	Rokad desa	Residents gather to pray during floods	Ritual as a medium of risk communication	Communicating resilience
Ritual as Risk Communication	Istisqa prayer	Prayer together during drought	Ritual as a community deliberation	Community-based DRR
Cultural Symbolic Communication	Wind-cutting ritual	Use of cultural symbols in the wind	Symbolic communication builds preparedness	Cultural communication
Role of Local Leaders	Religious Figures	Religious leaders give mitigation instructions	Social legitimacy strengthens communication	Trust-based communication
Knowledge Transmission	Narrative of the experience	Residents share disaster experiences	Local knowledge transmission	Indigenous knowledge
Governance Gap	Lack of formal socialization	Limited mitigation information	Institutional communication gap	Environmental justice

Discussion

Cultural Communication as Community-Based Risk Governance

The findings of the study show that rituals such as village rokad and istisqa' prayers function as community-based risk communication mechanisms. This practice shows that cultural communication is not only symbolic but also a system of risk governance that is built collectively. Various global studies on local and indigenous knowledge in disaster risk reduction have also uncovered similar phenomena. Cross-border research shows that local communities develop "time-tested knowledge and practices" to prepare for and respond to disasters, which then becomes an important part of community-based disaster risk reduction (Hadlos et al., 2022). In the Pakistani context, research on Indigenous community-based disaster risk reduction shows that community-based communication enables cross-sectoral engagement and strengthens community resilience through a bottom-up approach. (Ali et al., 2021)

These findings corroborate that the cultural communication practice of the Sumenep community can be understood as a form of community-based disaster governance that develops organically through social interaction.

Indigenous Knowledge and Knowledge Transmission

The study's findings reveal that local narratives, rituals, and collective experiences transmit mitigation knowledge. This transmission mechanism is in line with the global literature, which states that most mitigation knowledge is tacit and stored in the social practices of local communities. (Furqan Ishak, 2020). Studies in the Mentawai community, Indonesia, show that integrating local knowledge with mitigation practices can improve community resilience to climate change and natural disasters. The research emphasizes that local traditions, education, and technology support need to be synergized to strengthen community resilience, particularly by incorporating traditional ecological knowledge and modern scientific approaches to enhance adaptive capacity in the face of climate change. (Dede et al., 2024). These findings reinforce that

cultural communication in the Sumenep community functions as a mechanism for transmitting mitigation knowledge across generations.

Role of Trust and Community Intermediaries in Disaster Communication

The results of the study show that religious leaders play a role as mediators of mitigation communication. This is in line with recent research that emphasizes that trust-building and the use of community intermediaries increase the effectiveness of disaster communication. Other research shows that community-based communication improves mitigation literacy and shapes community resilience behaviors in disaster-prone areas.(Rizal et al., 2025). Thus, the social legitimacy of local figures in the Sumenep community is a key factor in building trust in mitigation information.

Environmental Justice and Recognition of Local Knowledge

The study's findings indicate that formal policies have not fully integrated local knowledge-based mitigation practices. This reflects the issue of environmental justice in disaster governance. Recent literature on disaster justice reveals that disasters disproportionately affect vulnerable communities, necessitating a fairer distribution of risks and resources. Disaster justice approaches include distributive, procedural, and recognition of local knowledge (Pascal, 2026). In this context, community-based communication can be a participatory mechanism to ensure community involvement in mitigation policies.

Integrating Indigenous Communication into Disaster Policy

The findings of the study show that there is a gap between community communication and institutional communication, which hinders effective collaboration and the implementation of disaster mitigation policies. Global studies show that the integration of local knowledge with mitigation policies can improve the process of community resilience (Firdaus, 2023). In addition, recent research emphasizes that environmental communication serves as a means of increasing public awareness and reducing disaster risk through community education (Meidina & Murfi, 2024). Thus, the integration of culture-based communication in disaster policy can strengthen community-based early warning systems by ensuring that local cultural practices and knowledge are incorporated into the communication strategies used to inform and prepare communities for potential disasters.

Conceptual Contribution: Communicating Resilience

Based on a dialogue with the global literature, this research offers the concept of communicating resilience, which is a framework that places cultural communication as the foundation of community resilience. This concept integrates indigenous knowledge, community communication, and disaster governance. and environmental justice. This approach expands the study of disaster communication by placing cultural communication as the primary mechanism in community-based risk governance, which enhances the effectiveness of disaster response and recovery efforts by ensuring that local cultural contexts and values are respected and integrated into the planning process

Matrix of Theme – Data – Theory

Theme	Data Citation	Meaning of Findings	Supporting Theories	Kontribusi
Communication rituals	"The community does a village rokad..."	Ritual as risk communication	Risk communication theory	Model communicating resilience
Local figures	"Religious leaders remind residents..."	Social legitimacy	Trust and risk communication	Community governance
Cultural symbols	"There is a symbol to resist the wind..."	Symbolic communication	Cultural communication	Indigenous mitigation

Theme	Data Citation	Meaning of Findings	Supporting Theories	Kontribusi
Community solidarity	"Residents gather and help each other..."	Collective resilience	Community resilience	Social resilience
Policy gaps	"Rarely socialization from the government..."	Gap governance	Environmental justice	Participatory policy

4. Conclusion

This research shows that local knowledge-based cultural communication practices play an important role in building community resilience to disaster risk in rural areas. Empirical findings from the Sumenep community show that cultural rituals such as village rokad, istisqa' prayers, and other symbolic practices not only function as spiritual expressions but also as risk communication mechanisms that transmit mitigation knowledge, strengthen social solidarity, and mobilize collective action. The communication process forms what in this study is called "communicating resilience," which is a social mechanism where cultural communication becomes the foundation of community resilience in the face of disasters.

These findings expand the study of disaster communication by showing that community resilience depends not only on structural capacity but also on culture-based communication practices that develop organically within society. The results of the study also confirm that local knowledge plays a role as an effective mitigation system because it is based on people's empirical experiences and is transmitted through social interactions and community rituals. These findings are in line with the global literature that emphasizes that the integration of local knowledge in disaster risk reduction can improve community preparedness and adaptation to disasters.

In addition, this study reveals a gap between community-based communication and institutional communication in disaster mitigation policies. Local knowledge-based mitigation practices remain under integrated into formal disaster governance, limiting the optimal utilization of community communication potential. This condition demonstrates the importance of an environmental justice approach that recognizes local knowledge as part of the decision-making system in disaster risk reduction.

Theoretically, this research contributes to the development of the concept of communicating resilience that integrates cultural communication, local knowledge, community resilience, and environmental justice. This concept provides a new analytical framework in the study of disaster communication by placing community-based communication as the main mechanism in inclusive and participatory disaster risk governance. The concept of communicating resilience makes a theoretical contribution to the development of community-based disaster communication studies and environmental justice.

These findings also have policy implications, where cultural communication based on local knowledge needs to be integrated into formal disaster mitigation strategies. The involvement of religious leaders and community leaders in risk communication can increase the effectiveness of mitigation information dissemination and strengthen community-based early warning systems, particularly by leveraging their influence and trust within the community to ensure that critical information reaches vulnerable populations. This approach supports the environmental justice perspective by ensuring the participation of local communities in disaster governance so that mitigation policies become more inclusive, adaptive, and equitable.

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