

## **Disaster Communication Based on Local Wisdom and Spirituality: A Case Study of The Eruption of Mount Agung, Bali**

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### **ABSTRACT**

Disaster communication strategies often overlook cultural and spiritual dimensions, leading to ineffective responses during crises. This study investigates the symbolic meaning of local wisdom and the role of spirituality in disaster communication and environmental conservation during the eruption of Mount Agung in Bali. The research analyzes how traditional symbols, local rituals, and informal communication channels enhance community preparedness and trust. Using a qualitative case study approach, data were collected through in-depth interviews with community members and local leaders and analyzed using the Miles and Huberman model. The findings reveal that traditional tools like kentongan (bamboo slit drums), animal behavior, and wooden house design serve as effective early warning systems rooted in community heritage. Local spirituality embodied by religious figures (Jero Mangku), collective rituals, the Tri Hita Karana philosophy, and customary law (Awig Gawi) fosters psychological resilience and communal trust. Furthermore, community radio and WhatsApp are proven to be effective communication tools, especially when coordinated by trusted local leaders. This research underscores the value of integrating spiritual and cultural components into disaster mitigation strategies. The findings offer valuable insights for developing community-centered, culturally grounded disaster communication frameworks in similar high-risk regions.

**Keywords:** symbolic interactionism, local wisdom, spirituality, disaster communication, Mount Agung, community resilience

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### **INTRODUCTION**

After about 35 years of not showing significant volcanic activity, in August 2017, this volcano again showed symptoms of volcanic activity such as increasing seismicity, measured soil deformation, and the appearance of thermal anomalies in its summit crater (Syahbana et al., 2019). Mount Agung is located in Karangasem Regency is the highest point in Bali with an altitude of 3,421 meters above sea level, and plays an important spiritual role for the local community, especially because of the existence of Besakih Temple, the Hindu Dharma Temple which is considered the most sacred in Bali (Arya, 2013). In September 2017, there was an increase in seismic activity, prompting the government to raise the alert status of Mount Agung from "alert" to "highest level". This situation has caused more than 120,000 residents around the mountain to be forced to evacuate and leave their homes and livestock at various temporary evacuation sites.

The eruption occurred in November 2017, marked by a column of volcanic ash that rose 1.5 to 4 km above the crater peak. Volcanic ash moving southward caused significant disruption to flights, including the temporary closure of Ngurah Rai International Airport. This closure also had a wide impact, such as the cancellation of international flights to Australia and New Zealand (Projo, 2017). According to a report from the Australian Government

Meteorological Bureau, ash columns even reaching heights of more than 9 km can potentially affect the lives of around 5.6 million people in the area around Mount Agung.

This condition creates a major challenge for emergency response officials and government agencies at the local and national levels. Large-scale evacuations involved around 140,000 residents from 22 affected villages (Malau, 2017). This disruption has a social and economic impact, especially on the tourism sector, which has been the main contributor to the Bali economy. Various international agendas, such as World Tourism Day 2017 and Bali International Film Festival (Balinael), have been canceled or postponed, thus exacerbating the economic impact on the region.

During this critical period, the government tried various communication strategies to mitigate disasters through mass media and social media. However, the community's response was not as expected because most people believed more in the direction of local religious leaders, or Jero Mangku, than official government information. The Jero Mangku, who acted as opinion leaders, said they had not received a "wangsit" from Sang Hyang Widi Wasa about the potential for great danger. This causes people to often move between refugee camps and their homes (Lusia, 2022).

Hindu religious values that are very dominant in Bali make the public's interpretation of the eruption of Mount Agung symbolic and spiritual. The eruption was not considered solely a natural disaster, but a form of warning from Sang Hyang Widhi Wasa. Mount Agung is seen as a sacred place and a place for Shiva Village (Mahadewa) to live, so every volcanic activity is believed to have a deep spiritual meaning (Lumintu, 2024). This symbolic view confirms that disaster mitigation in Bali is not only limited to the physical aspect, but also closely related to the aspect of local spirituality.

The previous experience of the eruption of Mount Agung in 1963 caused significant casualties, providing important lessons for the government and the community about the importance of disaster mitigation. This event shows that mitigation cannot only rely on technical approaches, but must also pay attention to the socio-cultural factors of the community. However, in the 2017 eruption, the government was considered unprepared. This is reflected in the community's confusion in determining the evacuation's location due to unclear information on social media (Ragil et al., 2020).

Previous studies have shown the importance of local religious leaders as opinion leaders in disaster communication. Research on the role of Mount Merapi locksmiths, such as Mbah Marijan, shows that the public trusts traditional leaders more than official government information. However, the situation in Bali has its dynamics of local wisdom, so the role of religious leaders in Bali is important to be studied further, especially from the perspective of disaster communication and local spirituality.

Based on the description above, this study aims to answer the formulation of the problem, namely, how is the symbolic meaning of local wisdom in communication and disaster mitigation around Mount Agung, the extent to which local spirituality is a pillar in disaster communication practices and environmental conservation, and how effective communication channels are in disseminating disaster mitigation information around Mount Agung, Bali.

Although previous studies have highlighted the importance of local leadership and spirituality in disaster communication, in-depth research remains lacking, integrating symbolic interactionism with community-based communication practices in volcanic disaster contexts. Most research focuses on technical mitigation or religious rituals in isolation. This study fills the gap by systematically exploring how local symbols, spiritual beliefs, and traditional leaders operate collectively as a cultural communication system during disasters, specifically in the unique socio-spiritual setting of Bali during the Mount Agung eruption.

The novelty of this research lies in its interdisciplinary integration of symbolic interactionism, local wisdom, spirituality, and disaster communication. It uniquely examines the roles of kentongan, animal behavior, spiritual rituals, and local leadership in forming a symbolic communication network during a disaster. Moreover, it evaluates how informal and traditional communication channels like WhatsApp groups and community radio serve as culturally rooted early warning systems, offering a holistic model of culturally-sensitive disaster mitigation.

This research aims to explore the symbolic meaning of local wisdom in disaster communication, evaluate the role of local spirituality as a pillar of disaster preparedness and environmental stewardship, and assess the effectiveness of traditional and digital communication channels in disseminating disaster mitigation information during the Mount Agung eruption in Bali.

The study contributes valuable insights to disaster risk reduction by demonstrating the importance of integrating cultural symbols, spiritual practices, and traditional leadership into communication strategies. These findings offer practical benefits for policymakers, NGOs, and disaster response agencies in designing culturally respectful and community-driven disaster preparedness programs in other high-risk regions with strong cultural identities.

## **METHOD**

This study uses a qualitative approach as a research strategy to explore in depth the meaning given by individuals or groups to social phenomena, by involving data collection naturally in the field and inductive data analysis to develop relevant patterns or themes (Creswell & Creswell, 2023). Case studies are the type of research used, as they allow researchers to explore phenomena in real-life contexts in detail, especially when the boundaries between phenomena and contexts are less clear (Yin, 2018).

The research sample was determined using the snowball sampling technique, which is a non-probabilistic approach that starts from certain information that meets the criteria, then develops based on the recommendations of previous informants (Alvesson & Kärreman, 2011). The sample in this study consists of resource persons, including the Village Head, the Village Head, and the general public. Data were obtained through in-depth interviews with open-ended questions that allowed for a detailed and free exploration of participants' views and experiences (Mills & Birks, 2014). The interview data were then analyzed using the Miles et al. (2014) method through four stages: data collection, data reduction, data presentation, and conclusion drawing to obtain findings relevant to the research objectives (Creswell & Creswell, 2023).

On the other hand, this study has limitations in the form of subjectivity in the researcher's interpretation, limitations in generalization because the number of samples is small, and the potential for bias from both informants and researchers during the data collection and analysis process. These limitations must be realized to provide the proper context for the research results and as a consideration for future studies (Creswell & Creswell, 2023).

## **RESULTS AND DISCUSSION**

### **The Symbolic Meaning of Local Wisdom in Communication and Disaster Mitigation Around Mount Agung, Bali**

The local wisdom of the people living around Mount Agung has become an integral part of daily life as a form of adaptation to disaster risk. One of the most obvious forms of local wisdom is the use of bamboo and wood kentongan. Kentongan is not just a simple tool to wake up the community when a disaster occurs, but also a symbol of social communication passed down from generation to generation. The sound of the kentongan has a powerful symbolic meaning, understood as a signal of danger that demands immediate action to escape.

The WSA statement shows that kentongan has a practical gungsi as an early warning tool and has internalized social values and collective solidarity among the Indigenous peoples around Mount Agung. Birsyada & Utami (2024) emphasized that kentongan is an important communication tool in disaster communication that is specifically used to convey various types of warnings through sound patterns that are understood together. In other words, kentongan can gather people, strengthen social ties, and initiate collective action in emergency situations.

In addition to the functional aspect, this study found that kentongan also contains a deep cultural meaning. Kentongan represents the values of empathy, social care, and cultural heritage passed down across generations, making it an important part of local knowledge in building community resilience to disasters (Birsyada & Utami, 2024). This is reinforced by other studies, where the community uses traditional sound-based communication tools and community social structures to convey self-warnings and build disaster preparedness Andung et al. (2024); Putra et al., 2023). This means that traditional tools based on local knowledge are still very relevant as a community-based disaster mitigation strategy.

From the perspective of symbolic interactionism theory, kentongan is a symbol of danger and solidarity that is actively understood by the community. The symbolic meaning of the sound of the kentongan being hit continuously moves social interaction instantly without additional words. People instinctively understand the symbolic message of the sound of kentongan as a sign of urgency to take action to save themselves and their families immediately.

The description clarifies how the symbol of the kentongan sound has become part of a collective sign system that has a deep meaning in society's social context. (Charon, 2009) explained that within the framework of symbolic interactionism theory, symbols such as the sound of kentongan are social constructions that are only meaningful because they are jointly interpreted through shared experiences (Bush et al., 2015) The study found that when the kentongan is sounded endlessly without verbal explanation, it is a highly efficient form of nonverbal communication in emergencies. Symbols such as the sound of alarms can create collective awareness and mobilize social action quickly because they have been internalized as a danger sign (Sandstrom et al., 2006). This means that kentongan is not only a sign of emergency but also strengthens the collective spirit.

In addition to kentongan, people can also read natural signs as a form of symbol-based environmental communication inherited between generations. One of them is animal behavior, which has been believed to be a harbinger of disaster for generations. Through symbolic interactionism, the community interprets the exit of wild animals from their habitat as a natural message, implying that Mount Agung will erupt soon. This natural sign is considered part of wisdom that can provide early warning to the community to prepare for danger.

Animal behavior is interpreted as a symbol of warning formed through the collective experience of society. The symbolic interactionism theory shows that the meaning comes not only from the animal itself, but from the results of social interactions that link natural events to human responses (Wyndham & Park, 2018). The Irvine (2017) confirms that sensitivity to animal behavior has become part of traditional warning systems born from communities' historical experiences of disasters. Human interaction with animals also strengthens emotional connections and connections with nature, as described by Yerbury & Lukey (2021). These findings reinforce that natural symbols remain relevant and function effectively in environmental communication based on local wisdom.

In addition, other adaptations of local wisdom can be seen in traditional house construction using wood-based materials. These wooden houses are surrounded by elastic structures, symbolically showing the community's collective awareness of the dangers of the earthquake. This reflects the local community's technical intelligence and becomes a symbol of a harmonious and adaptive lifestyle with the geographical conditions of disaster-prone areas.

These findings illustrate that flexible wooden house structures can be a technical solution and reflect the community's cultural values in dealing with disaster risks. This finding aligns with the study of Yani et al. (2016), studying stilt houses in Naga Village, showing that light materials and flexible construction allow buildings to remain stable when earthquakes occur. A similar principle is also found in Japan's Gassho-Zukuri architecture, which is designed to respond to earthquake forces through an unrigid architecture. This means locality-based architectural adaptations are common based on historical experiences of risky natural environments. Other studies have also found that traditional home design reflects a deep ecological understanding and a harmonious relationship with nature. The process of building houses, which is carried out in a participatory manner, strengthens the sense of belonging to the community's cultural identity. Therefore, these findings confirm the importance of preserving local knowledge in the form of buildings as part of adaptive disaster mitigation and cultural heritage strategies (Indramanik et al., 2024; Izziah et al., 2020).

Knowledge about disaster signs and mitigation practices is transmitted from generation to generation through informal education delivered by community leaders. The stories of the experiences of the generation that experienced the great eruption in 1963 have symbolic value in shaping the consciousness of the younger generation. This process shows the important role of community leaders as the main communicators in conveying symbols of local wisdom to the next generation, so that they remain relevant and understood in the future (Eslamian & Eslamian, 2021).

The findings confirm that conveying disaster experiences from the older generation to the younger generation is not only a form of historical narrative but can also be considered a means of informal education that forms a collective awareness of disaster risk. Fakhruddin & Elmada (2022) stated that community leaders have a strategic role as key communicators in conveying mitigation messages based on local wisdom and scientific knowledge. This process is carried out through stories of past experiences that can foster awareness and preparedness among the younger generation (Fauzi & Bahri, 2022).

It is important to integrate local wisdom in formal education so that knowledge about disaster mitigation is not interrupted in the midst of modernization. Even so, both reminded us of the importance of synergy between local wisdom and scientific knowledge to make mitigation strategies more comprehensive. In this context, these findings confirm that the narrative of the 1963 eruption experience is not just a cultural heritage, but a strategic instrument in building a disaster-resilient generation that has strong roots in local culture and can face future challenges (Iskandar et al. (2025); Kosim et al., 2024). Thus, local wisdom, symbols of environmental communication, and disaster mitigation practices passed down from generation to generation in the community around Gunung Gaung are the results of effective symbolic interactions. These symbols show a purely functional aspect and the power of social, spiritual, and cultural interaction that can build collective awareness in the face of the threat of natural disasters.

### **Local Spirituality as a Pillar of Disaster Communication and Environmental Conservation**

The community around Mount Agung, Bali, has made local spirituality an important foundation in disaster communication and environmental conservation. Traditional and religious leaders in the villages around Mount Agung are believed to be key in communicating information about disasters to the local community. When there is a threat of an eruption, the community is only willing to evacuate if there are instructions from spiritual leaders or traditional leaders. This belief is not due solely to the formal position of the leader, but because of the spiritual authority that is considered to have a relationship with nature and the creator

The description emphasizes the role of spiritual figures in disaster communication. Which is not only because of social authority but also because of inherent spiritual legitimacy. Previous studies corroborate this by stating that Balinese culture emphasizes cosmic balance, where natural disasters are viewed through a spiritual lens, so that instructions from traditional leaders have a strong driving force (Paramita, 2018). The vital role during the eruption of Mount Agung in 2017 through ceremonies and collective rituals also shaped community preparedness. This practice creates a bond of trust that encourages people to follow evacuation instructions more disciplined. The success of disaster communication is greatly influenced by public trust in information sources. The Pasebaya community is a real example of collaboration between traditional leaders and government agencies, capable of creating an effective communication system based on local (Hasmira, 2021).

The role of religious leaders such as Jero Mangku is very important, as are rituals carried out by the community to prevent or reduce the impact of disasters. The ritual suggested by religious leaders is a symbolic form of spirituality believed to change the destiny of disasters. This ritual is carried out spontaneously through cooperation by the local community. This shows how strong social solidarity driven by shared spiritual beliefs is in the face of the threat of natural disasters.

The findings of this study are in line with the study of Amin et al. (2024) This highlights how the Ternate community combines traditional rituals and local knowledge as an effective disaster mitigation strategy. Barutu et al. (2022) also noted the role of religious institutions in disseminating disaster preparedness education to the congregation. This shows that spirituality can go hand in hand with practical risk reduction efforts. Mutual cooperation from the same spiritual beliefs strengthens social cohesion and community resilience (Rokib, 2012).

The uniqueness of the spirituality of the local community can be seen in the form of indirect communication carried out by religious leaders to the community. Religious leaders often get premonitions or signs through a spiritual way called "whispering." This message is then conveyed indirectly through the intermediary of trusted figures, such as the Village Head, so that the community is more receptive (Haddow & Haddow, 2014). This reflects an effective form of spiritual communication because it involves a deep belief in the spiritual abilities of religious leaders, especially Jero Mangku.

These findings are in line with the study of Alhaddad & Effendi (2022) showing that religious leaders often act as recipients of spiritual messages through signs or premonitions that cannot be explained rationally (Aisyah, 2022). Then convey it through indirect channels. This process affirms spiritual authority and strengthens people's trust in religious leadership. These findings also confirm findings that describe the use of intermediary figures such as the Village Head. Trust in socially close figures increases the acceptance of messages in the community (Yaqin & Faris, 2022).

This form of communication is also found in ritual practices such as "Kololi Kie" in Ternate as a symbolic medium to convey spiritual messages and strengthen social cohesion (Alhaddad & Effendi, 2022). In other words, this pattern of spiritual communication remains effective in a cultural context that upholds spirituality and a collective belief in sacred symbols. However, indirect spiritual communication models risk different interpretations, depending on who the intermediary is and the social context in which the message is delivered (Aksa, 2020).

In spiritually based disaster management, local leadership utilizes collaborative strategies. Formal leaders sought to embrace spiritual figures to manage citizens' calm in the face of the threat of eruptions. Residents convey information not only in the form of technical instructions but also spiritual messages that are believed to provide psychological calm. This shows that the approach to disaster management in this region is not separated from the spiritual aspect because it is more trusted and effective in mobilizing the community.

These findings are reinforced by studies by Wardhana et al. (2023) and Wempi et al. (2024) showing that spiritual leaders play an important role in interpreting disasters as "divine messages" that strengthen citizens' trust and encourage them to follow directions calmly. Similar practices are also found in Wonolelo Villages (Widodo & Hastuti, 2019) and Sawangan Dewanti et al. (2016), where spiritual meetings are used as a moment of coordination and mental strengthening of the community in dealing with disasters.

In addition to the role of communication in disaster mitigation, local spirituality based on the Tri Hita Karana philosophy is also an important pillar in environmental conservation. Tri Hita Karana, which includes the harmonious relationship between humans and humans, humans and nature, and humans with God, is a basic principle in the life of the people around Mount Agung. This concept is applied daily, such as prohibiting the throwing of plastic waste or the carelessness of lighting a campfire on Mount Agung. By maintaining harmony between humans and the environment, people believe that nature will also provide positive feedback to humans.

These findings align with Sena's (2020) and Emy's (2024) studies, both of which emphasized that Tri Hita Karana is not just an abstract philosophy but is the basis for cultural values that are actualized in Balinese people's lives, including in waste management and land management. Kirani et al. (2022) also noted that the prohibition against environmentally damaging actions, such as littering, reflects the application of the "Palemanan" principle in maintaining balance with nature. Furthermore, if properly maintained, the belief in the positive reciprocity of nature is a spiritual form of ecology that strengthens the collective concern for environmental sustainability (Brekhus et al., 2024; Brown & Smith, 2022).

The preservation of the environment and the spiritual values of the local community are also formally strengthened through the local customary rules of "Awig Gawi." This rule is a tangible manifestation of local spirituality institutionalized in the form of customary regulations. This regulation directly regulates community actions towards the surrounding environment, making local spirituality a strong legal basis in maintaining the ecological balance and social life of the village community around Mount Agung.

Previous studies have similarities that explain "Awig Gawi" as a concrete form of the Tri Hita Karana philosophy, combining spiritual, social, and ecological values in one customary law order (Qodim, 2023). Dewi et al. (2020) emphasized that "Awig Gawi" is not only a moral guideline, but also has binding power as a community law that regulates the sustainable management of natural resources. The active participation of the community in implementing this rule, as noted by Budiarta et al. (2018) and Astawa et al. (2019) shows a high level of collective compliance in maintaining environmental sustainability on land and in coastal areas.

Thus, this study's findings underscore the importance of local spirituality as the basis for disaster communication and environmental conservation in Bali. Spiritual-based communication can mobilize collective action, form social awareness, and maintain a harmonious relationship between humans, nature, and the Creator.

### **The Effectiveness of Communication Channels in the Dissemination of Disaster Mitigation Information**

Communication channels such as radio and WhatsApp groups play a vital role in conveying information related to the Mount Agung disaster. However, the area around Mount Agung has wide access to digital devices such as Android-based mobile phones. The public still believes in radio as an emergency communication tool. Radio is a mainstay because it is considered more credible and faster in conveying valid information directly from official sources, compared to news circulating on social media, which is often inaccurate.

This finding aligns with Shukla's (2023) study, which found that community radio has the advantage of delivering information quickly, directly, and reliably during emergencies. Public trust is driven by its ability to reach various levels of society without technological barriers and its flexibility in conveying local messages appropriate to the cultural context. Combining radio and WhatsApp as a community-based messaging medium becomes an adaptive communication strategy in disaster management, as long as it remains controlled by credible sources to prevent the spread of false information.

In disaster crisis situations, WhatsApp social media accelerates the dissemination of verified information. Village heads and local leaders use WhatsApp groups as an official communication channel to share the latest information and direct confirmation results from agencies such as the Agung Volcano Observation Center and the Regional Disaster Management Agency.

Previous studies have also found the same thing, namely that social media can be an effective means of crisis communication, due to its ability to disseminate information quickly and reach a wide community (Sennert et al., 2015; Stovall et al., 2023). The use of WhatsApp by local leaders as an official channel also strengthens public trust in the information received, minimizing the impact of hoaxes commonly circulated on digital platforms (Manners, 2024). However, Lang & Benbunan-Fich (2010) emphasized that the biggest challenge of social media is its uncontrolled nature, so without good management, it can exacerbate panic.

The use of WhatsApp groups is also not limited to the general public. Strategic collaboration was built with the mass media through a special group between the village and journalists. The latest information on the condition of Mount Agung is periodically conveyed through WhatsApp groups and then directly disseminated by the mass media. This practice helps maintain public calm and avoid misunderstandings of information that can trigger panic.

In line with the findings of this study, a study from Andayana et al. (Jamaludin et al., 2021), (2022) and Saputri (2024) emphasize that WhatsApp is an effective and fast communication medium in conveying disaster information in real-time. Collaboration between the Village Government and Journalists through WhatsApp groups increases the credibility of information received by the public, as confirmed by Cunha et al. (2021) stating that media involvement in group-based communication can strengthen public trust. In addition, Himpong et al. (2023) added that WhatsApp's interactive feature allows the public to discuss and ask for clarification directly, thereby reducing anxiety due to information uncertainty (Cvetković et al., 2023).

One of the effective communication strategies developed by the village government is to distribute radio devices to every resident's house in the villages around Mount Agung. This step ensures that important information about the disaster reaches all residents equally and simultaneously. This strategy succeeded in placing radio as the most reliable communication tool in times of emergency, as well as showing the high awareness of the village government in preparing communication channels (Joakim & White, 2015).

Shukla (2023) confirms the findings, calling radio the fastest and most convenient medium for conveying information during emergencies, mainly due to its wide range and ease of access. The village government's initiative to distribute radios to all residents' homes is also in line with a strategy based on local empowerment. Community radio can strengthen community involvement and increase awareness of disaster preparedness (Hafida et al., 2018).

The effectiveness of communication through radio and WhatsApp was improved by the establishment of official communication forums such as Pasebaye Agung. This forum consists of several communication groups that continue to operate today. This forum ensures that the public does not lose access to important information about disaster risk mitigation. Socialization, education, and risk communication efforts continue to be carried out periodically through these groups so that public awareness and preparedness are maintained (Kapur et al., 2017).

Nurjanah et al. (2019) corroborate the above findings by highlighting the effectiveness of the Pasebaye community in building a community-based disaster communication system during the eruption of Mount Agung. This forum is a strategic link between the government and citizens who rely on technology such as WhatsApp and radio, and strengthens local participation in education and disaster dissemination (Khumairoh et al., 2021).

Thus, radio and social media, such as WhatsApp, as official communication channels, showed a high level of effectiveness in mitigating the Mount Agung disaster. This strategy shows the importance of combining modern technology and traditional communication devices trusted by the public to maintain accurate information, prevent panic, and increase community preparedness in dealing with disaster situations.

## **CONCLUSION**

This research aims to uncover the symbolic meaning of local wisdom in disaster communication and mitigation practices surrounding Mount Agung, while also examining the role of local spirituality as a foundation for disaster communication and environmental conservation. The study evaluates the effectiveness of communication channels such as kentongan (bamboo slit drums), animal behavior, and traditional wooden house structures, which are used symbolically and practically to strengthen preparedness and social solidarity in disaster-prone communities. Spirituality—expressed through the influence of religious leaders (Jero Mangku), collective rituals, the Tri Hita Karana philosophy, and customary law (Awig Gawi)—has been shown to enhance trust, psychological resilience, and environmental stewardship. Furthermore, the research confirms that community radio and WhatsApp are effective and credible tools for disseminating disaster information, especially when managed by local leaders and integrated with official sources. These findings suggest that effective disaster mitigation in culturally rich and spiritually driven communities must involve a hybrid model of traditional, symbolic, and digital communication strategies. For future researchers, it is recommended to explore cross-regional comparative studies on the role of cultural symbols in disaster resilience, integrate community-based early warning systems with mobile app development, and assess the scalability of culturally rooted models for national disaster preparedness frameworks.

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