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Communicating Tsunami Preparedness: Digital Media, Women's Agency, and Unesco Recognition in Sidaurip Village

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Abstract
*This study was conducted in Sidaurip village, Central Java, Indonesia, which earned the UNESCO Tsunami Ready Recognition in 2024. Positioned at the intersection of cultural studies and disaster communication, this research examines the complex nexus among digital adaptability, female agency, and Disaster Risk Reduction. While coastal women disproportionately bear the brunt of disaster shocks, they also serve as the backbone of community cohesion. To explore these dynamics, qualitative fieldwork gathered empirical insights through semi-structured interviews, focus group discussions (n=24), and observations. Findings reveal that informal leadership and cross-generational learning unfold through cultural norms and emergent digital practices, including participatory mapping and messaging threads. Communicative localization transcends top-down bureaucratic compliance, establishing a robust hybrid early-warning system that combines traditional acoustic instruments (*kentongan*) with digital platforms (InfoBMKG, SIRITA, and WhatsApp). Furthermore, the UNESCO process provided women with a formalized entry point into the public sphere. Acting as trusted mediators, women ground state alerts using grassroots forums like PKK and Posyandu. Ultimately, this study demonstrates that long-term coastal safety cannot rely on technology alone, but must embed global disaster frameworks within existing cultural rhythms and women-led everyday networks.*

Keywords: women's agency; digital adaptation; resilience; disaster risk reduction; tsunami preparedness

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INTRODUCTION

Indonesia is located at the junction of the Indo-Australian plate, which is being forced under the Sunda plate. It is a geologically active spot. The truth is that cataclysmic earthquakes and tsunamis are not hypothetical. The benchmark is the harsh lesson learnt from the terrible Indian Ocean catastrophe of December 2004, which necessitated a fundamental rethink of warning systems, coastal infrastructure and community awareness. The Cilacap Regency on the southern coast of Central Java is especially susceptible since it lies immediately on the megathrust trench.

In the last two decades, a distinct change has been seen in disaster management research from a top-down technical approach to bottom-up participatory structures with people at the center of their safety (Wisner et al. 2004). Moreover, modern studies emphasize that media representations and inclusive strategies are deeply intertwined with social structures, where marginalized identities and community participation are increasingly highlighted across various public sectors (Akhlakulkarimah and Adipurwawidjana 2025). The totality of the image has led the Intergovernmental Oceanographic Commission of UNESCO to establish the Tsunami Ready Recognition (TRR) (UNESCO-IOC 2024). The technique scores coastal communities on 12 indicators in three categories: danger assessment, previous preparedness, and catastrophic response capabilities. This location is one of the early adopters of this worldwide accreditation in the District of Binangun, Cilacap. The region has completed a thorough field test in the Village of Sidaurip on 22–23 August 2024.

To label this a victory for bureaucratic box-ticking ignores a lot of the human story. Most of the work on catastrophes has been done on statistical surveys of awareness, design of sea barriers or technological hardware demands (Gaillard 2010; Gaillard and Mercer 2013). Furthermore, public trust in digital systems and technological innovations relies heavily on transparency and user literacy, as seen in evaluations of electronic systems where technological adoption is closely linked to public perception and institutional trust (Fitriananta et al. 2025). Similarly, the embedding of mobile messaging and social media into banal, daily routines has been startlingly under-theorised as a medium for gendered social capital, cultural negotiation and local authority, despite their apparent significance in moments of acute crisis (Houston et al. 2015). In many developing contexts, public dissatisfaction with formal legal mechanisms often drives individuals toward media-driven alternatives and trials by publicity, creating complex implications

for community justice and due process (Atanacio and Amparo 2024). Moreover, historical conflicts and systemic crises demonstrate that institutional breakdowns deeply impact societal stability and human well-being (Ike 2021).The main question is: How are the concepts, procedures, and tangible outcomes of the UNESCO Tsunami Ready certification perceived in the socio-cultural context and the changing media environment in Sidaurip? Three questions in particular help with this.

1) How can individuals mix digital chat channels with traditional wooden slit drums (kentongan) to produce a functioning hybrid communication ecology?

2) How does the UNESCO assessment process allow women to take part in informal leadership and act as trusted information brokers in family units?

3) How can local actors use the symbolic validity of UNESCO to shift the identity of the community from the darkness of hazard vulnerability to a common narrative of competence?

As shown in this research, the dialectical component of Sidaurip's readiness operated on the basis of notions of cultural theory and media practice (Hall 1997; Couldry 2012). International standards, national languages. Social networks were used as a way of women's empowerment. In addition to the conventional aural ceremonies, other forms of communication arose. Globally, in digital communications, changes in communication methods are generally associated with shared realities (Alazzawie 2022). Sidaurip does not regard mobile phones as a 'simple upgrade' making the prior system obsolete, but as a socio-technical memory that includes traditional drums and smartphone apps as equal parts. In this situation, rural women are not passive viewers but essential cultural interpreters who translate, clean, and spread warnings via regular community meetings such as PKK, prayer groups, and local child clinics.

Community-Based Disaster Risk Reduction (CBDRR)

The basis of community-based disaster prevention methods is a simple fact: local people are the first responders when disaster strikes (Twigg 2007). No other entity can ever really know location and context as the people do. Thus, the fate of disaster plans after the withdrawal of foreign financing hinges on real local ownership and, more precisely, on the deliberate inclusion

of hitherto excluded demographic groups such as women, adolescents, and the elderly (Enarson 2012; Fordham 2020).

The UNESCO Tsunami Ready Framework

The Tsunami Ready Recognition Program was created to help communities achieve effective resilience on vulnerable coasts, via sustained hazard awareness and planned civic routines (UNESCO IOC, 2022). Twelve benchmarks are evaluated under the program's Assessment, Preparedness and Response framework, which is implemented by the Intergovernmental Oceanographic Commission of UNESCO (UNESCO IOC 2022):

Figure 1.

	TSUNAMI READY INDICATORS
I	**ASSESSMENT (ASSESS)**
1	**ASSESS-1**. Tsunami hazard zones are mapped and designated.
2	**ASSESS-2**. The number of people at risk in the tsunami hazard zone is estimated.
3	**ASSESS-3**. Economic, infrastructural, political, and social resources are identified.
II	**PREPAREDNESS (PREP)**
4	**PREP-1**. Easily understood tsunami evacuation maps are approved.
5	**PREP-2**. Tsunami information including signage is publicly displayed.
6	**PREP-3**. Outreach and public awareness and education resources are available and distributed.
7	**PREP-4**. Outreach or educational activities are held at least three times a year.
8	**PREP-5**: A community tsunami exercise is conducted at least every two years.
III	**RESPONSE (RESP)**
9	**RESP-1**. A community tsunami emergency response plan is approved.
10	**RESP-2**. The capacity to manage emergency response operations during a tsunami is in place.
11	**RESP-3**. Redundant and reliable means to timely receive 24-hour official tsunami alerts are in place.
12	**RESP-4**. Redundant and reliable means to timely disseminate 24-hour official tsunami alerts to the public are in place.

Tsunami Ready Indicators

However, the fulfillment of all 12 elements is voluntary in nature and needs focused commitment from regional authorities, field scientists, neighborhood organizers and citizens (UNESCO IOC, 2022). In general, the research on the regions corroborates the major engagement of women in such activities (Nurhayati et al. 2026), but these indicators also show the practical demands that communities need to address. But formal indicators are dead writing without local leadership structures actively integrating SOPs into the basic rhythms of communal life.

Digital Media, Communication, and Disaster Preparedness

Cultural studies and media practice theory has cautioned against the tendency to see communication platforms as neutral vehicles but as social sites that actively shape civic power, habit, and daily reality (Couldry 2012). WhatsApp, Facebook etc. played an important role in timely information, keeping in contact with each other and coordinating communities through different phases of a crisis (Velev and Zlateva 2012; Houston et al. 2015). But digital technologies are not in a cultural vacuum. Indeed, warnings are only received in places where social trust and representation already exist (Hall 1997). Furthermore, the present digital media systems are demanded to be quick, some of them are voracious for immediacy that sometimes might eliminate careful community voices and complicated gender perspectives from the mainstream media (Priyonggo and Adnan 2021). Thus, ensuring equal opportunity and female internet literacy are necessary to increase community security (Rahman et al. 2022). Recent empirical research has showed that a combination of physical community spaces and neighbourhood digital chat rooms are effective as a focal hub for disaster response in coastal Indonesian communities (Fakhruddin et al. 2025).

Conceptual Framework: Socio-Cultural Translation and Information Intermediaries

Most of the previous work has focused on formal monitoring infrastructure and institutional checklists (Gaillard 2010; Houston et al. 2015). Thus, these tales commonly frame digital platforms as megaphones and rural women as passive recipients. Informal arenas of women's social negotiation that occur in everyday life tend to be ignored. To fill this vacuum, this study provides a socio-cultural translation perspective. It is here that global imperatives are actively glocalized via hybrid communication routines that connect digital programs like WhatsApp with acoustic traditions like the kentongan (Robertson 1995). The UNESCO classification also serves as a kind of symbolic capital, which is part of the reconstruction of the public identity of a disadvantaged group (Bourdieu 1986). In this fabric, women are mediators of communal information. They check, translate, and provide technical warnings via social linkages based on long-standing trust, and are placed exactly at the junction of official state message and private family.

METHODS

Research Design and Fieldwork

The qualitative single-case research approach was employed in this project to study the negotiation of the Tsunami Ready Recognition process in Sidaurip Village (Yin 2017). The primary fieldwork was carried out for a period of 4 months between August and November 2025, just after the end of the official field assessments carried out by IOC-UNESCO. The timing was to provide a window into the reactions after identification, the continuing debates in the community, and the extension of emergency measures in the actual world.

Participants and Sampling Strategy

The participants were selected based on purposeful selection favoring those individuals actively involved in village administration, crisis management, informal civil society groups and local digital networks. Informants include village administrative officers, Regional Disaster Management Agency (BPBD Cilacap) district officials, program facilitators, members of the Village Disaster Risk Reduction Forum (FPRB), Family Welfare Empowerment (PKK) organizers, religious study coordinators, Posyandu health volunteers, youth leaders from Karang Taruna, and general villagers. Saturation was reached following in-depth semi-structured interviews and focus group discussions with a heterogeneous sample of 24 grassroots residents.

Table 1.

Participant Category	Number of Participant (n)	Methods
Village Apparatus	4 Key Informants	Interview
Cilacap Regional Disaster Management Agency Officials (BPBD)	3 Key Informant	Interview
Grassroots Citizens	24 participant	FGD

Detailed Overview of Research Participants and Data Collection Methods

Digital Media Observation and Ethical Considerations

Instead of intruding on private personal talks, digital monitoring targeted semi-public social spaces (Hine, 2015). It analyzed the structure, sharing and discussion of instructional

manuals, official early-warning photographs and evacuation drills on the village's official Facebook and Instagram pages and its public administration WhatsApp broadcast threads. All interviewers and discussants were recorded after obtaining written or verbal informed consent. All personal identities, telephone numbers and identifying local regions were fully anonymized to safeguard the anonymity of participants.

Data Triangulation and Analytical Procedures

The data set was triangulated with the recordings of the interviews, the transcripts of the focus group, the field notes and the institutional documentation such as the field verification audit of IOC-UNESCO and the standard operating procedures of Sidaurip. The textual content was coded according to the Reflexive Thematic Analysis (Braun and Clarke 2006, 2019) in six iterative steps:

1) To get broad familiarisation by repeatedly reading the raw transcripts and observation data.
2) Inductive coding of certain community activities line-by-line such as cross-checking screenshots of InfoBMKG, detecting the titir drum beats during outages, or talking about evacuation routes in women's savings clubs.
3) Organising and clustering new codes into bigger conceptual candidate themes
4) Reviewing prospective themes to check for internal homogeneity throughout the whole dataset.
5) Development, naming and editing of the conceptual nucleus.
6) Writing the Analytical Narrative: A Balance of Grounded Factual Quotes and Conceptual Reasoning.

RESULTS AND DISCUSSION

Hybridizing Global Standards with Local Knowledge Systems

In field experience, the twelve UNESCO Tsunami Ready criteria have never been applied in a rigorous, one-size-fits-all manner. The community was translated to meet the life of the hamlet. ASSESS-1 Indicator (Hazard Zone Mapping): Technical simulations of an evacuation scenario for

a magnitude 8.7 megathrust event were presented at open community meetings. Villagers on the ground measured official projection lines against local knowledge of features such as plots of land and dirt roads. The language limits would be known to the community facilitators. They mixed the conventional Indonesian language with the Banyumasan Javanese vocabularies, so the elderly people would easily grasp.

Inconsistent logic is also evident in the presentation of the warnings (Indicators RESP-3 and RESP-4). The earthquake information may be transmitted directly via digital media, such as the InfoBMKG program, the SIRITA warning sirens, and neighbourhood WhatsApp groups. But electronic media has not just replaced the classic acoustic instruments like the wooden kentongan. The kentongan is the main practical warning when transmission poles fall down in tropical storms, or local wi-fi routers are fried from blackouts. It's fast, it's physical, it taps into shared experience, it's visceral and exhilarating. The local co-ordinator of the disaster forum summed up the balance:

> *" When there was an earthquake last year, many of us instantly checked WhatsApp to see whether there was a tsunami warning. But if the earth shakes in the middle of nite and the lights goes out, you can't wake up the whole block on a phone screen. Then block heads take the kentongan And they beat the titir rhythm of hurry. WhatsApp tells them the same factual information from the meteorological department but it is the auditory shock of the wooden drum that actually gets them out the door."*
>
> — Male informant, 42 years old, BPBD

Sidaurip is an integrated socio-technical memory system, an ancient acoustic instrument working in conjunction with contemporary smartphone alerts to offer true communicative redundancy.

Mobilizing Women's Agency and Informal Information Channels

The procedure of TRR certification gave an opportunity for the rural women to influence the actual functioning of disaster management. Before the campaign, the official disaster committees consisted of men from the community. But as the hamlet oriented itself to fulfill UNESCO's stringent requirements, women's collectives in the shape of the PKK, regular Qur'an reading circles and teams of Posyandu were invited right to planning tables and exercises. The official report of the IOC-UNESCO singled out this vast female network as a kind of typical community readiness.

The women's networks did well in door-to-door education and home-level planning. Women did more than follow the routes in long evacuation exercises. They also took responsibility of supply logistics, cared for frail relatives and supervised tiny children. These women are not knowledge gatekeepers who hoard information, but community information brokers. When the warnings come in from the agency on mobile phones they check the claims with their supervisors, translate complicated language into clear English and pass the advise on to family and neighbours. This is how it looks from the eyes of two women leaders:

> *"During our monthly PKK gatherings and rotating credit meets, we no longer just balance household finances or health checks. We spend 15 minutes on tsunami escape routes and preparing grab packs. If the mothers get the warning graphics on WhatsApp, they question us in the group if this actually comes from BMKG or is it just sensational gossip. Once we check and confirm it is authentic, we send it along to our households and closest neighbors."*
>
> — Female informant, 48 years old, PKK Administrator

> *"During the BPBD evacuation simulation, women did not just show up carrying infants; we took charge of setting up field kitchens and organizing the children's movement. This TRR initiative helped village leadership understand that community safety stalls out if women are not driving coordination across households."*
>
> — Female informant, 39 years old, Posyandu Cadre

Everyday neighborhood contacts have been transformed into a functional safety net by the women who took part in first aid and emergency kitchen management courses organized by BPBD Cilacap, guaranteeing that correct warnings reach residential kitchens without delay.

Digital Media Practices, Social Capital, and Norms of Communication

Sidaurip has fully adopted digital instruments to support emergency planning. Indicator RESP-3 (Receiving Alerts) was easily met by the hamlet on numerous mobile channels, with reliable cell service available across the region. There are at least 10 formal WhatsApp groups for daily coordination, grouped by administrative neighborhood lines (RT/RW) and by the duties of specialized volunteers (disaster forums, women's organizations, neighborhood watch, and youth associations). Membership in these channels is constantly urged during village meetings, during religious recitations, and during clinical weigh-ins.

But these online venues are only as reliable as the trust and rigid etiquette of the group. Administrators take an active role in deleting forwarded chain letters and unconfirmed rumors to safeguard members from false alarms and information fatigue. One neighborhood unit head said:

> *"We enforce clear guidelines within our RT WhatsApp room. If someone shares a warning about high swells or an earthquake, group administrators immediately verify it against the InfoBMKG feed or confirm with local officials. Because we uphold that discipline, our neighbors know that an alert posted in the room is verified, not clickbait."*
>
> — Male informant, 51 years old, Resident and Neighborhood Head

Young Karang Taruna organizers are also utilizing Facebook and Instagram, as well as communications platforms, to promote evacuation drills, coastal tree-planting initiatives and sand-dune preservation. The posts are a record of the archiving and a source of pride, and they urge people to enjoy, discuss, and debate the current activities. In this view, catastrophic safety is not an abstract paper gathering dust on an office shelf (Rahman and Gaillard 2021) but a palpable feature of daily digital expression.

From Vulnerability Stigma to Symbolic Resilience

The image of the town has transformed by becoming a UNESCO Tsunami Ready. But Sidaurip speaks of readiness in the present, not the guilt of being a helpless high-risk coast. The UNESCO title is symbolic capital (Bourdieu 1986) that gives the community more prominence in the regional and national debates about catastrophic governance. Syafuddin and colleagues (2026) argue that establishing resilience to natural and climatic disasters in rural Indonesia involves the integration of adaptive social protection and grassroots risk communication.

“The Tsunami Ready certification provides a concrete capability, builds local pride, and recognizes community efforts.” The Village Head spoke about this change:

> *"In the past, outsiders looked at Sidaurip merely as an endangered red zone—a perilous place too close to the sea. But hanging that UNESCO certificate on the village hall wall changed how people hold their heads. We still live right next to the sea, of course, but now everyone recognizes that we know exactly what steps to take when a warning sounds."*
>
> — Female informant, 46 years old, Village Head

But an example of how an indicator of internationality could be appropriated locally to promote social cohesiveness is the shift from passive exposure to active competence . Trust and local messaging is the social capital that keeps Sidaurip going in the long run.

Theoretical Discussion

These patterns lead to three important discoveries analytically:

The employment of the kentongan and of WhatsApp networks indicates that the tale of digital adoption in rural places is not one of pure technological substitution (Robertson 1995; Couldry 2012). Digital signage needs a good electrical infrastructure, smartphone know-how, and a continual mobile connection. Sidaurip (redundant maintenance system communication) The power interruptions demonstrate the requirement for the acoustic instrument. The digital pulses carry the certified meteorological information. And in this way, it becomes a practice of socio-cultural translation to the technical determinism of catastrophe communication.

This notion of women as custodians of communal knowledge undermines a reductionist understanding of rural women as passive victims or technical custodians of gender agency. Women's empowerment via formation of Sidaurip groups (PKK, Posyandu, prayer meetings) For example, by integrating danger map assessments and evacuation preparedness into rotating credit sessions, they weave technical safety literacies into the family's daily routines. Here, rural catastrophe resilience is not so much about top-down instructions as about relational social networks.

Finally, the UNESCO title represents a strong symbolic capital (Bourdieu 1986). Institutional recognition in outer coastal danger warning zones redefines community self-identity. It converts a risky red zone into a certified resilient community that enables civic engagement and community cooperation. It reminds us that international frameworks may be socially liberating as long as local communities can read them in their own way.

CONCLUSION

The results are of substantial practical and philosophical importance. In terms of policy, catastrophe frameworks should be flexible enough to enable local cultures to adopt global objectives in their own way. 'Sirens and sensors are important, but cultural familiarity is also important and trusted informal networks and field facilitators and catastrophic authorities need to understand that', he said. Early warning measures also need to be forward-leaning in promoting hybrid communications systems that maintain acoustic warnings in combination with digital ones, so alerts continue to work when storms knock out cell towers or cut power supply.

The research stresses the need of bringing together cultural studies and media practice perspectives within the field in the theoretical formulation of disaster communication. community resilience is not built in concrete seawalls and technical checklists, but in negotiated daily encounters, shared civic rituals, and symbolic shifts in common identity. The study was done for four months (August-November 2025) and was based on the routines of the community following the UNESCO accreditation. These therapies still need long-term testing of endurance spanning years. The cross-coastal comparative field research will also emphasise further the influence of varied cultural practices and levels of technological literacy on the localisation of global crisis frameworks.

Declaration of AI

The authors declare that no AI tool was used for preparing this manuscript except for language editing.

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