



Community Social Capital and Disaster Resilience in Rural Indonesia: An Integrative Social Science Review

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ARTICLE INFO

Article history:

18 August 2026

Received in revised form

19 October 2026

Accepted 19 October 2026

Available online 20 October 2026

Keywords:

social capital, disaster resilience, rural communities, Indonesia, community participation.

Kata Kunci:

modal sosial, ketangguhan bencana, masyarakat pedesaan, Indonesia, partisipasi masyarakat.

ABSTRACT

Disaster outcomes in rural Indonesia are shaped not only by the intensity of hazards but also by the social relationships through which communities communicate, cooperate, and access resources. This integrative review examined how community social capital contributes to disaster resilience in rural Indonesia and under what conditions it fails to do so. A purposive corpus of 39 sources (22 peer-reviewed articles, 5 scholarly books or chapters, 3 national regulations, and 9 institutional documents) was identified through 150 database, giving priority to publications from 2016 to 2026 while retaining foundational works. The sources were synthesized thematically using four analytical categories: bonding, bridging, and linking social capital, and participatory knowledge. The synthesis indicated that bonding ties accelerate information sharing, mutual assistance, and psychosocial support in the first hours after a hazard strikes, although most of this evidence comes from outside Indonesia. However, dense internal networks may exclude women, migrants, persons with disabilities, poor households, and other groups with weaker access to community institutions. Bridging and linking relationships are therefore needed to widen participation and to connect villages with government agencies, health services, humanitarian organizations, and technical expertise. Local knowledge was most useful when it was documented and integrated with scientific risk information through participatory planning. Situation reports from the 2025–2026 floods and landslides in Sumatra are

consistent with the need for multisectoral coordination and institutional learning. The review proposes a social resilience chain, a conceptual framework not yet tested empirically, that links trust, communication, coordination, collective action, and reflective learning, and concludes that rural resilience is a social process requiring investment in relationships alongside infrastructure and early-warning systems.

ABSTRAK

Dampak bencana di perdesaan Indonesia tidak hanya ditentukan oleh intensitas bahaya, tetapi juga oleh hubungan sosial yang memungkinkan masyarakat berkomunikasi, bekerja sama, dan mengakses sumber daya. Kajian literatur integratif ini menelaah bagaimana modal sosial komunitas berkontribusi terhadap ketangguhan bencana di perdesaan Indonesia serta dalam kondisi apa kontribusi tersebut tidak berjalan. Korpus purposif berisi 39 sumber (22 artikel peer-review, 5 buku atau bab buku ilmiah, 3 regulasi nasional, dan 9 dokumen kelembagaan) diidentifikasi melalui 150 database, dengan prioritas publikasi 2016–2026 dan tetap mempertahankan karya-karya fundamental. Sumber-sumber tersebut disintesis secara tematik menggunakan empat kategori analitis, yaitu modal sosial bonding, bridging, dan linking, serta pengetahuan partisipatif. Hasil sintesis menunjukkan bahwa ikatan bonding mempercepat penyebaran informasi, bantuan timbal balik, dan dukungan psikososial pada jam-jam pertama setelah bahaya terjadi, meskipun sebagian besar buktinya berasal dari luar Indonesia. Namun, jejaring internal yang padat dapat mengesampingkan perempuan, pendatang, penyandang disabilitas, rumah tangga miskin, dan kelompok lain yang aksesnya terhadap institusi komunitas lebih lemah. Karena itu, hubungan bridging dan linking diperlukan untuk memperluas partisipasi serta menghubungkan desa dengan pemerintah, layanan kesehatan, organisasi kemanusiaan, dan keahlian teknis. Pengetahuan lokal paling bermanfaat ketika didokumentasikan dan dipadukan dengan informasi risiko ilmiah melalui perencanaan partisipatif. Laporan situasi banjir dan longsor di Sumatra

pada 2025–2026 sejalan dengan perlunya koordinasi multisektor dan pembelajaran kelembagaan. Kajian ini mengusulkan rantai ketangguhan sosial, sebuah kerangka konseptual yang belum diuji secara empiris dan menghubungkan kepercayaan, komunikasi, koordinasi, aksi kolektif, dan pembelajaran reflektif, serta menyimpulkan bahwa ketangguhan perdesaan merupakan proses sosial yang menuntut investasi pada hubungan antarwarga di samping infrastruktur dan sistem peringatan dini.

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1. INTRODUCTION

Disasters are commonly described through their physical triggers, such as floods, landslides, earthquakes, storms, or epidemics. Yet the same hazard can produce very different outcomes in different places, because losses are mediated by poverty, livelihoods, governance, access to information, and the organization of everyday social life (Wisner et al., 2004). The Sendai Framework for Disaster Risk Reduction 2015–2030 reflects this understanding by calling for all-of-society engagement, in which understanding risk, strengthening governance, and involving communities are treated as inseparable tasks (United Nations Office for Disaster Risk Reduction [UNDRR], 2015). The Global Assessment Report 2019 similarly described disaster risk as increasingly systemic, arising from interactions among social, economic, and environmental processes rather than from hazards alone (UNDRR, 2019).

Social capital offers a productive social science lens for explaining this variation. Although its definitions differ, the concept generally refers to resources embedded in social relationships, including networks, norms, trust, and reciprocity, that enable people to act collectively (Bourdieu, 1986; Coleman, 1988; Putnam, 2000), and it has been widely applied to questions of development and collective action (Woolcock & Narayan, 2000). Scholars distinguish bonding ties among people who are alike, bridging ties across social divides, and linking ties across gradients of power and authority, such as those connecting communities with public agencies (Szreter & Woolcock, 2004). In disaster settings, these relationships act as substitutes for, and multipliers of, formal systems. Neighbors share shelter, food, transportation, information, and emotional support before formal assistance arrives, and comparative evidence suggests that the density of social ties explains part of the variation in recovery between otherwise similar communities (Aldrich, 2012; Aldrich & Meyer, 2015).

Rural communities are particularly instructive. They frequently possess dense kinship and neighborhood networks and detailed experiential knowledge of local environments, yet they often face long distances to hospitals, limited technical services, and fragile infrastructure. Resilience in such settings therefore depends on both internal solidarity and external relationships. From a communication perspective, this means that the channels through which warnings, rumors, requests for help, and coordination messages travel are themselves social structures. Norris et al. (2008) made this explicit by identifying information and communication, social capital, community competence, and economic development as the networked adaptive capacities from which community resilience emerges.

Indonesia illustrates the stakes. Its geography exposes rural and coastal communities to recurring earthquakes, tsunamis, floods, and landslides, and its disaster governance has evolved through legal and institutional reform, including Law No. 24 of 2007 on Disaster Management and the resilient village (Desa/Kelurahan Tangguh Bencana) guidelines issued

by the national disaster management agency (Badan Nasional Penanggulangan Bencana [BNPB], 2012; Djalante et al., 2017; Republik Indonesia, 2007). Documented Indonesian cases show both the strength and the fragility of community-based knowledge and recovery arrangements, from the oral tradition of *smong* on Simeulue Island to the locally led housing recovery in Bantul (Kusumasari & Alam, 2012; Syafwina, 2014). The floods, flash floods, and landslides that struck Aceh, North Sumatra, and West Sumatra in late November 2025 had caused more than 1,200 deaths and displaced over one hundred thousand people by the end of January 2026 (Indonesian Humanitarian Coordination Platform [IHCP], 2026a), and the World Health Organization's after-action review of the health response stressed multi-stakeholder learning (World Health Organization Indonesia [WHO Indonesia], 2026).

Social capital is, however, not automatically beneficial. Adger (2003) emphasized that collective action for adaptation depends on institutional arrangements, including the state, and cannot be assumed to arise from social relations alone, while Pelling and High (2005) argued that the contribution of social capital to adaptive capacity depends on how community relationships connect to formal institutions. Strongly bonded groups may also exclude outsiders and leave some residents dependent on weaker ties (Hawkins & Maurer, 2010). Recent emergency-management guidance has moved in the same direction: the World Health Organization (WHO, 2021) framed emergencies as a shared responsibility requiring whole-of-society action, and subsequent WHO frameworks emphasize meaningful community engagement, local capacities, and context-specific resilience (WHO, 2024, 2026).

Despite this growing body of work, three gaps limit its usefulness for rural Indonesia. Recent reviews have consolidated parts of the evidence without closing these gaps. Susanto et al. (2023) mapped research on social capital in disaster management published between 1998 and 2019 and concluded that the trust and network components have the greatest effects on community resilience; because their corpus ends in 2019, it cannot address the 2025–2026 Sumatra disasters. Bin Waseem et al. (2024) reviewed the role of social capital in flood risk reduction, which concerns a single hazard type. Zhao et al. (2025) screened 1,021 records, retained 24 empirical studies in a PRISMA-guided systematic review, and identified five mechanisms (social learning, collective action, disaster preparedness, information communication, and moral or civic responsibility) through which social capital supports community disaster resilience; however, only two of the 24 studies were conducted in Indonesia, the review was limited to original empirical studies, and it excluded studies that examined only the negative effects of social capital. Against this background, the three gaps remain. First, evidence on bonding, bridging, and linking capital is dispersed across disciplines and is often treated separately from research on local knowledge and risk communication. Second, enthusiasm for community solidarity has tended to overshadow questions of who is included in, or excluded from, community decision-making. Third, the lessons of the recent Sumatra disasters are only beginning to be examined.

This review adds to these syntheses in three ways. First, it combines the bonding, bridging, and linking typology with participatory knowledge and risk communication, and draws on policy and institutional sources as well as empirical studies. Second, it retains findings on the limits and exclusionary effects of social capital and treats inclusion as a central analytical dimension, whereas the most recent systematic review set such studies aside by design. Third, it focuses on rural Indonesia, incorporates documentation of the 2025–2026

Sumatra disasters, and states explicitly where evidence is drawn from other countries. It is guided by three questions:

1. How does community social capital support disaster preparedness, response, and recovery in rural settings, including Indonesia?
2. What limitations and risks of exclusion arise from community-based networks?
3. What strategies and policy measures can strengthen inclusive rural resilience?

The review contributes a conceptual synthesis, the social resilience chain (proposed here and not yet tested empirically), which connects social capital to the communication and coordination processes through which resilience is produced, and it draws out practical implications for disaster policy and rural development.

2. METHOD

Review Design

This study is an integrative literature review, an approach that allows theoretical, empirical, and policy sources with different designs to be combined into a coherent understanding of a complex phenomenon (Snyder, 2019; Whitemore & Knafl, 2005). An integrative design was chosen over a systematic or meta-analytic design because the literature on social capital and disaster resilience spans sociology, communication, public health, development studies, and disaster management, and because it uses heterogeneous concepts and indicators that cannot be pooled statistically. It is not a systematic review: sources were selected purposively, and the synthesis neither claims exhaustive coverage nor reports how often a finding occurs.

Source Identification and Selection

Academic and institutional literature was identified purposively. Priority was given to publications from 2016 to 2026, particularly for policy guidance and Indonesian evidence, while foundational theoretical works and landmark empirical studies were retained where they remain the principal reference points of the field. A source was included when it met all of the following criteria, and opinion pieces without a clear evidentiary basis were excluded:

1. was a peer-reviewed article, scholarly book, national regulation, or institutional guidance document;
2. addressed social networks, trust, reciprocity, participation, local knowledge, institutional coordination, psychosocial resilience, or inclusive governance in the context of hazards or emergencies;
3. provided conceptual, empirical, or policy evidence relevant to rural, coastal, or low- and middle-income settings, with Indonesian cases used wherever available; and
4. was available in English or Indonesian.

No formal record was kept of the number of records identified, screened, and excluded at each stage. A PRISMA-style flow diagram is therefore not reported, and the review makes no claim to systematic reproducibility.

The final corpus comprises 39 sources: 22 peer-reviewed articles, 5 scholarly books or chapters, 3 national regulations, and 9 institutional documents (frameworks, guidance, and reports). Fifteen were published between 2016 and 2026; the others are foundational theoretical works and earlier landmark studies. Three further references (Braun & Clarke, 2006; Snyder, 2019; Whitemore & Knafl, 2005) are methodological and are not counted in the

corpus. Evidence from Indonesian communities is distinguished from evidence drawn from other countries in the Results (Table 4).

Analytical Framework

Four analytical categories, derived from the social capital literature (Szreter & Woolcock, 2004; Woolcock & Narayan, 2000) and from community resilience research (Berkes & Ross, 2013; Norris et al., 2008), structured the analysis. They are summarized in Table 1.

Table 1. Analytical categories used in the synthesis

Category	Definition	Illustrative disaster-related functions
Bonding social capital	Close ties among people with similar identities, such as family members, neighbors, and close-knit groups	Rapid information sharing, mutual aid, shelter, and psychosocial support
Bridging social capital	Ties across social, occupational, cultural, or geographic boundaries	Wider pools of information and resources, cross-group participation, inter-village cooperation
Linking social capital	Vertical ties to institutions that hold power, resources, and technical expertise	Access to early warning, evacuation support, health services, and recovery programs
Participatory knowledge	Processes through which local and scientific knowledge are documented, compared, and combined	Community mapping, shared risk assessment, and context-specific planning

In practice, each finding extracted from a source was assigned to one or more categories according to the relational direction it described: ties among people of similar identity (bonding); ties across horizontal social, occupational, cultural, or geographic boundaries (bridging); ties to institutions that hold power, resources, or expertise (linking); and processes that document and compare local and scientific knowledge (participatory knowledge). A finding could receive more than one code, for example when a village disaster committee connected neighbors (bonding) to the district disaster agency (linking). Inclusion was not coded as a fifth category but applied as a lens to every coded finding, asking who was represented and who was missing.

Synthesis Procedure

The synthesis followed the general logic of thematic analysis (Braun & Clarke, 2006). Sources were read repeatedly, relevant findings were coded against the four categories, and codes were compared across sources to identify convergent findings, tensions, and gaps. The analysis then examined how each category operated across the disaster cycle, from preparedness to response, recovery, and adaptation. Inclusion was treated as a cross-cutting lens that asked who participates, whose knowledge is recognized, and who can reach external resources. Because social capital can simultaneously strengthen solidarity and reproduce social boundaries, findings that complicated a favorable account of community networks were deliberately retained. The synthesis is qualitative, and no effect sizes were calculated. As a purposive integrative review, it is not presented as a systematic review and does not claim exhaustive coverage; this limitation and its practical implications are discussed in the Limitations paragraph below. Table 2 illustrates how a source finding was coded and developed into a cross-source theme.

Table 2. Illustrative example of coding and theme development

Source finding (paraphrased)	Code (category)	Cross-source theme
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Source finding (paraphrased)	Code (category)	Cross-source theme
In cyclone-affected villages in Bangladesh, bridging ties became less active over time and sometimes broke down under poverty, disaster impact, and competition over external support, whereas bonding ties persisted (Islam & Walkerden, 2014).	"Bridging ties fragile without institutional support" (bridging); "bonding ties persist through recovery" (bonding)	Bridging capital needs institutional anchoring, such as joint committees, shared training, and cross-village agreements, to endure beyond the emergency phase.
The oral tradition of <i>smong</i> on Simeulue Island transmitted an evacuation instruction across generations (Syafwina, 2014), and its effect depends on sustaining collective memory as evocation fades (Sutton et al., 2020).	"Oral tradition as transmitted warning"; "local knowledge fades without renewal" (participatory knowledge)	Local knowledge protects when it is documented, compared with hazard data, and renewed through participatory processes.
A government task-force meeting summarized in a situation report flagged stress and trauma among women, a growing number of women-headed households, exposure to gender-based violence, and a lack of women-friendly and child-friendly spaces in evacuation sites (IHCP, 2026a).	"Women's concerns unrecognized in dominant networks"; "unsafe evacuation sites" (inclusion lens; linking)	Strong bonding can coexist with weak inclusion; representation and accessible communication are conditions of resilience.

3. RESULT AND DISCUSSION

The synthesis produced four interrelated sets of findings, one cross-cutting tension (inclusion), and one cross-cutting theme (youth and digital communication). Table 3 summarizes the principal findings, which are elaborated in the subsections that follow. Because most empirical evidence on bonding, bridging, and linking capital comes from outside Indonesia, Table 4 distinguishes evidence from Indonesian rural communities from evidence drawn from other countries and states the limits on transferability.

Table 3. Thematic synthesis of the reviewed literature

Theme	Key finding	Principal sources	Social implication
Bonding	Strong local ties support rapid mutual assistance, information sharing, and psychosocial support.	Aldrich & Meyer (2015); Islam & Walkerden (2014); Norris et al. (2008); Zhao et al. (2025)	Community solidarity is a preparedness resource that should be protected during relocation.
Bridging	Cross-group relationships broaden information and participation but need institutional support to endure.	Hawkins & Maurer (2010); Islam & Walkerden (2014)	Inclusive networks reduce social fragmentation.
Linking	Institutional connections provide technical and material resources and sustain long-term recovery.	Adger (2003); Pelling & High (2005); WHO (2021)	Local preparedness should connect to government, health services, and humanitarian actors.
Participatory knowledge	Local knowledge complements scientific risk information when documented and discussed.	Syafwina (2014); Kusumasari & Alam (2012); Hiwasaki et al. (2014); WHO (2026); Sutton et al. (2020)	Participatory mapping and planning should be institutionalized.
Inclusion (cross-cutting)	Strong bonding can coexist with weak inclusion of women, migrants, persons with disabilities, and poor households.	Adger (2003); Hawkins & Maurer (2010); IHCP (2026a), 2026b; Neumayer & Plümper (2007); Hanson-Easey et al. (2018)	Representation and accessible communication are conditions of resilience.
Youth and digital communication (cross-cutting)	Digital channels can extend bonding, bridging, and linking ties but also spread rumors and exclude people without access or skills.	Alexander (2014); Zhao et al. (2025); Hanson-Easey et al. (2018)	Digital inclusion and offline alternatives belong within community resilience strategies.

Table 4. Evidence base of the principal findings: Indonesian and other contexts, and transferability

Theme	Evidence from Indonesia	Evidence from other contexts	Transferability to rural Indonesia
Bonding	Indirect only: transmission of <i>smong</i> on Simeulue (Syafwina, 2014; Sutton et al., 2020) and household-led recovery in Bantul (Kusumasari & Alam, 2012); these cases were not designed to test bonding capital.	Cyclone-affected villages in Bangladesh (Islam & Walkerden, 2014); comparative studies of several countries (Aldrich, 2012; Aldrich & Meyer, 2015); rural British Columbia, Canada (Cox & Perry, 2011); systematic review (Zhao et al., 2025).	Plausible for kinship-dense rural villages, but studies differ in hazard, institutions, and (in some cases) urban setting. Treated as a mechanism, not a demonstrated Indonesian effect.
Bridging	Little direct evidence in the reviewed Indonesian sources.	Hurricane Katrina survivors in the United States (Hawkins & Maurer, 2010); coastal Bangladesh (Islam & Walkerden, 2014).	Lowest transferability: an urban United States case and coastal Bangladesh. Fragility of bridging ties may differ where village governments and community organizations structure cross-group ties.
Linking	Institutional design: resilient village guidelines and Law No. 24 of 2007 (BNPB, 2012; Republik Indonesia, 2007); health-sector after-action review of the 2025–2026 Sumatra response (WHO Indonesia, 2026). Outcomes of the design are largely not evaluated.	Conceptual and adaptation research (Adger, 2003; Pelling & High, 2005); Bangladesh (Islam & Walkerden, 2014); global guidance (WHO, 2021).	Conceptual arguments transfer well; the effectiveness of Indonesia's institutional arrangements remains an empirical question.
Participatory knowledge	Strongest Indonesian evidence: <i>smong</i> (Syafwina, 2014; Sutton et al., 2020) and Bantul (Kusumasari & Alam, 2012).	Regional synthesis for coastal and small-island communities (Hiwasaki et al., 2014); WHO guidance on community mapping (WHO, 2026).	Cases concern earthquake-tsunami and island contexts; generalizing to river-flood and landslide hazards in upland rural Sumatra needs caution.
Inclusion	Situation reports on the 2025–2026 Sumatra emergency (IHCP, 2026a, 2026b) and Law No. 8 of 2016 (Republik Indonesia, 2016). No peer-reviewed rural Indonesian study on migrants or low-income households in the reviewed sources.	Cross-national mortality analysis (Neumayer & Plümper, 2007); risk communication for new and emerging communities (Hanson-Easey et al., 2018); Hurricane Katrina (Hawkins & Maurer, 2010); conceptual work (Adger, 2003; Wisner et al., 2004).	Illustrates risk rather than measuring it: situation reports compile information at one date without systematic sampling. Evidence is strongest for women and thinnest for migrants and low-income households.
Digital communication	None specific to rural Indonesia in the reviewed sources.	Social media in disaster risk reduction (Alexander, 2014); studies synthesized by Zhao et al. (2025), including Iranian villages during COVID-19.	Mechanisms are plausible, but effects depend on local connectivity and digital literacy; offline alternatives are needed.

Bonding Social Capital: Mutual Assistance and Psychosocial Support

The most consistent finding was that bonding social capital supports immediate mutual assistance. The sources reviewed report this most consistently, but their empirical basis lies mostly outside Indonesia (Table 4). In rural settings, neighbors usually know which households include older adults, young children, or persons with limited mobility; which

routes remain passable; and which local resources can be mobilized. This situated knowledge becomes critical when formal communication and transport systems are disrupted. Studies of cyclone-affected villages in Bangladesh found that affected households drew heavily on family, neighbors, and friends to meet immediate needs such as food, comfort, and shared labor (Islam & Walkerden, 2014), and comparative research across major disasters associates dense social ties with faster recovery (Aldrich, 2012; Aldrich & Meyer, 2015). These settings resemble many Indonesian villages in being rural, kinship-dense, and resource-poor, but they differ in hazard regime and institutional arrangements, and the comparative studies include urban cases. The findings are therefore treated as plausible mechanisms for rural Indonesia and not as demonstrated Indonesian effects. Indonesian evidence in the reviewed sources is indirect: the intergenerational transmission of *smong* on Simeulue (Syafwina, 2014; Sutton et al., 2020) and household-led rebuilding in Bantul (Kusumasari & Alam, 2012) can be read as expressions of close local ties, although neither was designed to test bonding capital. A recent systematic review likewise found bonding capital to be the most frequently reported form (15 of 24 studies), but only two of its 24 studies were conducted in Indonesia (Zhao et al., 2025).

Bonding capital also supports psychosocial resilience. Family cohesion, peer support, and community support can moderate distress and strengthen coping after displacement and loss, so that social relationships contribute not only to material survival but also to emotional recovery (Norris et al., 2008; WHO, 2024). These sources are a conceptual synthesis and a regional policy framework, so they support the plausibility of the mechanism rather than measure it in rural Indonesia. Place matters here. Cox and Perry (2011) argued, on the basis of two rural communities in British Columbia, Canada, that social capital is bound up with place, so that disruptions of place can weaken the networks on which recovery depends. Recovery planning that disperses neighbors across temporary shelters or relocation sites without regard to social networks may therefore erode a resource that communities cannot easily replace.

Bridging Social Capital: Connecting Groups and Widening Participation

Bridging relationships connect groups that would otherwise remain separate. In rural disaster management they may link youth organizations, women's groups, farmer groups, religious congregations, schools, and neighboring villages. Such connections widen the pool of information, skills, and material resources on which a community can draw, and they carry information across social boundaries that bonding ties rarely cross. Bridging capital is especially important where communities are socially differentiated by wealth, ethnicity, occupation, or institutional access. If preparedness planning relies solely on established leaders or dominant networks, less visible groups are easily overlooked, and the experience of survivors of Hurricane Katrina in the urban United States shows how access to bridging and linking ties shaped who obtained help beyond immediate networks (Hawkins & Maurer, 2010).

Bridging ties are also not self-sustaining. In cyclone-affected villages in Bangladesh, bridging relationships became less active over time and sometimes broke down under conditions of poverty, disaster impact, and competition over external support, whereas bonding relationships persisted and continued to support recovery (Islam & Walkerden, 2014). Bridging capital therefore needs institutional support, such as joint committees, shared training, and cross-village agreements, if it is to endure beyond the emergency phase. These dynamics were documented in Bangladesh; whether they hold in Indonesian villages, where institutional settings differ, remains to be tested.

Linking Social Capital: Institutional Access and Coordination

Communities also need vertical connections to institutions that control resources and technical expertise. Relationships with village governments, district disaster management agencies, health centers, universities, humanitarian organizations, and infrastructure providers increase access to early-warning information, evacuation support, emergency supplies, and recovery programs. Studies of adaptation suggest that the benefits of local social capital depend on how well it connects to formal institutions (Adger, 2003; Pelling & High, 2005), and evidence from Bangladesh indicates that longer-term recovery increasingly depends on linking ties to external support (Islam & Walkerden, 2014). This finding is consistent with whole-of-society approaches, which hold that disasters affect health, livelihoods, businesses, and essential services and therefore demand coordinated action across sectors (WHO, 2021).

Community resilience thus cannot be produced solely at the village level; local participation must be connected to institutional systems. In Indonesia, the resilient village approach institutionalizes this connection by positioning villages as units of planning within a wider disaster management system (BNPB, 2012; Republik Indonesia, 2007). Its effectiveness nevertheless depends on avoiding the paternalistic and command-and-control approaches that Imperiale and Vanclay (2021) identified as cultural and political barriers to community resilience. Most of the Indonesian sources reviewed here describe the design of the resilient village approach rather than evaluate its outcomes, so its effectiveness in practice remains an empirical question.

Participatory Knowledge: Integrating Local and Scientific Knowledge

Rural residents often hold detailed knowledge of rivers, drainage patterns, seasonal weather, evacuation routes, agricultural cycles, and past disasters. Indonesian cases show that such knowledge can save lives. On Simeulue Island in Aceh, the oral tradition of *smong* transmitted across generations the instruction to move to higher ground after strong shaking and receding seawater, and it is widely credited with limiting casualties during the 2004 Indian Ocean tsunami (Syafwina, 2014). In Bantul, Yogyakarta, recovery after the 2006 earthquake drew on local culture and allowed households themselves to decide how to rebuild their homes, with government assistance concentrated on earthquake-resistant construction (Kusumasari & Alam, 2012). Regional syntheses likewise conclude that local and indigenous knowledge contributes to hydro-meteorological risk reduction in coastal and small-island communities (Hiwasaki et al., 2014). Indonesian cases provide the strongest evidence in this strand, but they concern earthquake-tsunami and island contexts, and generalizing them to river-flood and landslide hazards, such as those of Sumatra in 2025, requires caution.

Local knowledge should not, however, be romanticized as automatically accurate or universally shared. It may fade as the memory of past events recedes, a concern raised in research on sustaining *smong*-based risk communication (Sutton et al., 2020), and it may be held unevenly by age, gender, and occupation. It therefore needs to be documented, discussed, and compared with technical hazard information through participatory processes. Recent WHO guidance on community mapping describes such processes as a way of identifying local resources, capacities, structures, and risks through meaningful participation

(WHO, 2026). Mapping and oral-history methods can preserve knowledge that would otherwise remain in memories and everyday practice, allow technical agencies to test it against hazard data, and build trust, because residents become contributors to preparedness rather than passive recipients of external plans.

Solidarity and Exclusion: The Inclusion Paradox

A central tension emerged between solidarity and exclusion. Bonding capital can be strong while inclusion remains weak. Community decision-making may be dominated by established leaders, while women, young people, persons with disabilities, migrants, and poorer households have limited voice. In such cases the networks that enable rapid mutual aid may also reproduce unequal access to warnings, shelter, and aid (Adger, 2003; Hawkins & Maurer, 2010). The strength and origin of the evidence differ by group, as summarized below.

Women. A cross-national analysis of disasters between 1981 and 2002 found that disasters lower women's life expectancy more than men's, and that this effect weakens where women's socioeconomic status is higher (Neumayer & Plümper, 2007). A systematic review also reports that, in a conflict-affected setting, women relied mainly on informal bonding networks whereas men made greater use of formal bridging and linking networks (Tippens, 2020, as cited in Zhao et al., 2025). Neither source concerns rural Indonesia. For the Sumatra emergency, the evidence is situational: a government task-force meeting summarized in an IHCP (2026a) situation report flagged stress and trauma among women who had lost family members and livelihoods, a growing number of women-headed households, heightened exposure to gender-based violence, and a lack of women-friendly and child-friendly spaces in evacuation sites. Situation reports compile information from coordination meetings and agencies at a given date, are not based on systematic sampling, and do not isolate the role of social networks; they illustrate risks and cannot show how common these problems were.

Migrants and newcomers. Research on risk communication for new and emerging communities describes the role of social capital as contingent (Hanson-Easey et al., 2018), and a study of Fijian communities found weaker bonding and bridging ties, and lower resilience, among Indo-Fijian communities, which lack the descent-based structure of indigenous Fijian villages (Nakamura & Kanemasu, 2020, as cited in Zhao et al., 2025). Neither study concerns rural Indonesia, and none of the reviewed sources examines in-migrants, transmigrants, or seasonal workers in Indonesian villages. Applying the exclusion mechanism to migrants in rural Indonesia is therefore an inference and not an established finding.

Persons with disabilities. Indonesian Law No. 8 of 2016 on persons with disabilities provides in Article 29 for accessible disaster information, priority in rescue and evacuation, and accessible evacuation processes and facilities (Republik Indonesia, 2016). An assessment of high-risk groups in Sibolga City and Central Tapanuli Regency, reported in an IHCP situation report, found that people with disabilities and older adults still faced significant limitations in accessing humanitarian assistance and basic services (IHCP, 2026b). This is a single summary from two districts and does not describe the community networks involved, but it suggests a gap between legal entitlement and practice that bonding networks alone are unlikely to close.

Low-income households. Vulnerability analysis holds that poverty limits access to resources and thereby shapes disaster outcomes (Wisner et al., 2004), and in coastal Bangladesh bridging relationships weakened under conditions of poverty and competition over external support (Islam & Walkerden, 2014). Direct evidence on how social networks shape the experience of poor households in rural Indonesia is limited in the reviewed sources.

Taken together, the evidence on exclusion is strongest for women and weaker for migrants, persons with disabilities, and low-income households, for which the reviewed sources rely on single studies, policy documents, and conceptual arguments. The inclusion paradox is therefore best read as a well-grounded risk and not as a measured effect in rural Indonesia.

Inclusive resilience therefore requires attention to representation and to communicative access. Community disaster committees should include groups that are frequently underrepresented, warnings and instructions should use accessible formats and multiple channels, and preparedness exercises should involve people with different mobility, health, livelihood, and communication needs.

Youth and Digital Communication as a Cross-Cutting Theme

Youth participation and digital communication are treated here as a cross-cutting theme, like inclusion, and not as a fifth category of social capital. Digital channels are not a separate form of capital; they are media through which each form operates. Messaging groups among neighbors and relatives extend bonding ties; platforms that connect youth organizations, women's groups, and neighboring villages extend bridging ties; and official accounts, hotlines, and village information systems are channels for linking ties with government and humanitarian agencies. This mapping is the authors' interpretation, informed by Alexander (2014), and is not a finding established for rural Indonesia. Young people contribute to resilience through digital communication, mapping, volunteer coordination, documentation, and peer education, and their participation strengthens the intergenerational exchange of knowledge. Youth should not, however, be treated merely as volunteers; they can be partners in planning, risk communication, and evaluation. Digital technology complements social capital when it strengthens rather than replaces community relationships. Messaging platforms and social media can disseminate warnings, coordinate volunteers, and sustain contact during emergencies, but they also circulate rumors, and their value depends on users' trust in the source and their skill in interpreting information (Alexander, 2014). Digital inclusion, including access, literacy, and offline alternatives, therefore belongs within community resilience strategies rather than being treated as a separate technical matter. A recent systematic review similarly recommends reinforcing both face-to-face and social media-based risk communication (Zhao et al., 2025). Because digital channels can fail where roads and telecommunication systems are damaged, offline alternatives remain essential.

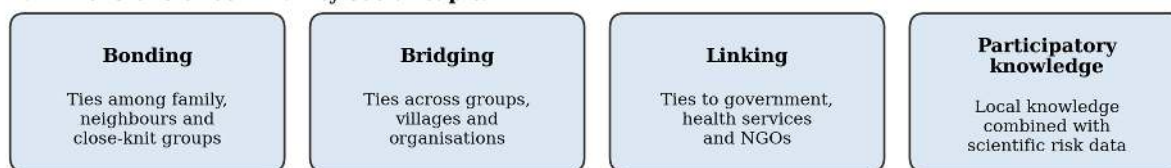
Discussion

Taken together, the findings suggest that social capital contributes to resilience less as a static stock of ties than as a set of processes. The review therefore proposes a social resilience chain (Figure 1), a conceptual framework that has not been tested empirically: trust supports communication; communication supports coordination; coordination supports collective action; collective action supports response and recovery; and reflective learning feeds back into future preparedness. Each dimension of social capital strengthens a different link in the chain. Bonding ties build the everyday trust on which credible communication depends; bridging ties carry messages and resources across groups; linking ties connect community coordination with institutional systems; and participatory knowledge ensures that what is communicated reflects both local realities and technical evidence. The chain weakens when

groups are excluded or when local and institutional systems remain disconnected. This formulation is consistent with Norris et al. (2008), who placed information and communication alongside social capital among the capacities from which resilience arises, and with Cutter et al. (2008), who treat social resilience as one component of place-based disaster resilience.

The chain is consistent with, but differs from, existing community-resilience models. Norris et al. (2008) identified information and communication, social capital, community competence, and economic development as parallel adaptive capacities; Cutter et al. (2008) treat social resilience as one component of a place-based model; Aldrich (2012) shows how dense social ties are associated with faster recovery; and the logic model of Zhao et al. (2025) organizes mechanisms around risk perception, risk response, and risk communication. The chain differs in three respects. It orders the processes through which capacities become outcomes (trust, communication, coordination, collective action, response and recovery, and learning) instead of listing capacities in parallel; it assigns each category of social capital, including participatory knowledge, to the link in the chain that it most plausibly strengthens; and it treats inclusion as a condition across all links, not as an additional capacity. It builds on these models and does not replace them. Table 5 shows which relationships in the chain rest on prior evidence and which are the authors' proposals.

A. Dimensions of community social capital



B. Social resilience chain across the disaster cycle



Feedback: lessons learned strengthen future preparedness

Cross-cutting conditions: inclusive participation (women, youth, persons with disabilities, migrants, poor households) and enabling context (infrastructure, early warning, livelihoods, social protection)

Figure 1. The social resilience chain: dimensions of social capital and their contribution to resilience across the disaster cycle (authors' synthesis; conceptual framework, not tested empirically. Dashed arrows: dimensions of social capital supplying the chain; solid arrows: proposed sequence; curved arrow: feedback loop)

Figure 1 has two panels. Panel A shows the four dimensions of social capital that supply the relational resources of the chain; the dashed gray arrows indicate that each dimension feeds the chain as a whole and not a single link. Panel B shows the proposed sequence of six processes, from trust to reflective learning, with solid arrows marking the direction of influence. The curved brown arrow is the feedback loop: lessons from response

and recovery, drawn from after-action reviews and community reflection meetings, return to strengthen preparedness and the trust on which communication depends. The box at the bottom shows cross-cutting conditions, namely inclusive participation and an enabling context, that affect every link.

Table 5. Evidence status of the relationships in the social resilience chain

Relationship in the chain	Supporting literature	Status
Trust → communication	Information and communication are treated as a capacity linked to social capital (Norris et al., 2008); reliable disaster messaging depends on trust between those who produce and those who receive messages (Zhao et al., 2025).	Supported by prior evidence (mostly outside Indonesia)
Communication → coordination	Whole-of-society guidance and the health-sector after-action review of the 2025–2026 Sumatra response stress multi-stakeholder coordination (WHO, 2021; WHO Indonesia, 2026).	Partly supported: institutional sources, no outcome evaluation
Coordination → collective action	Collective action for adaptation depends on institutional arrangements and on how community ties connect to formal institutions (Adger, 2003; Pelling & High, 2005).	Supported conceptually
Collective action → response and recovery	Dense ties and mutual assistance are associated with faster recovery (Aldrich & Meyer, 2015; Islam & Walkerdn, 2014); locally led housing recovery in Bantul (Kusumasari & Alam, 2012).	Supported (mostly outside Indonesia)
Reflective learning → preparedness (feedback loop)	Learning and transformation are central to resilience (Berkes & Ross, 2013; Imperiale & Vanclay, 2021); social learning is a mechanism of community resilience (Zhao et al., 2025); after-action review (WHO Indonesia, 2026).	Partly supported; the return of learning to trust is proposed by the authors
Allocation of the four categories to specific links	Derived from the synthesis summarized in Table 3 (for example, bonding ties to trust and linking ties to coordination).	Authors' proposal, not tested
Inclusion as a condition across all links	Exclusion from access to warnings, shelter, and aid (Adger, 2003; Hawkins & Maurer, 2010; Neumayer & Plümper, 2007).	Partly supported for access to aid and warnings; extension to every link is the authors' proposal

The literature also indicates that resilience is better understood as a process than as a fixed community characteristic. A community may cope well with one event and be more vulnerable in the next because demographic, economic, environmental, or institutional conditions change. Continuous learning is therefore necessary, and after-action reviews, community reflection meetings, participatory mapping, and simulation exercises are practical ways of converting experience into preparedness. A related distinction separates resilience as resistance, which aims to restore pre-disaster conditions, from resilience as transformation, which uses recovery to change unsafe practices, improve institutions, diversify livelihoods, and widen participation (Berkes & Ross, 2013; Imperiale & Vanclay, 2021). Social capital supports transformation when networks are used to question existing arrangements rather than simply to restore them.

The Indonesian experience is consistent with this perspective, although it is documented mainly in situation reports and an after-action review and not yet in peer-reviewed evaluations. The floods and landslides in Aceh, North Sumatra, and West Sumatra in late November 2025 affected 53 districts and cities, and by 31 January 2026 the national disaster management agency had reported 1,204 deaths and about 106,000 displaced people (IHCP, 2026a). The WHO after-action review of the health response highlighted the value of

multi-stakeholder assessment involving government agencies, health clusters, NGOs, and partners (WHO Indonesia, 2026). Such experience suggests that resilience requires institutional learning as well as local solidarity. Village networks can carry a community through the first hours, but a sustained response depends on data systems, surge capacity, and coordination mechanisms that link communities to the wider system (Djalante et al., 2017; WHO Indonesia, 2026). Where floods and landslides damage roads and telecommunication systems, local networks can also become the only available channels for information, which underlines the communicative dimension of coordination.

Resilience also has an economic dimension. Households with fragile incomes may face prolonged recovery even when physical infrastructure has been restored, and poor households may be forced to prioritize immediate survival over preparedness or recovery planning. Community-based savings, livelihood diversification, agricultural adaptation, food systems, and social protection can strengthen recovery capacity, and social capital can support these measures by facilitating collective economic action and the exchange of information (Adger, 2003; Wisner et al., 2004). Disaster resilience is thus connected to broader questions of inequality and rural development. Resilience indicators should accordingly include distributional outcomes rather than relying only on infrastructure recovery or the speed of service restoration, because a community may recover quickly in aggregate while vulnerable households remain displaced or economically insecure (Cutter et al., 2008).

Trust between communities and institutions deserves particular attention. Residents may distrust external actors when earlier interventions were poorly coordinated or promises were not fulfilled. Transparent communication, participatory planning, and feedback mechanisms can gradually strengthen institutional trust. Trust should therefore be treated as an outcome that must be maintained, not as a resource that can be assumed (Imperiale & Vanclay, 2021; WHO, 2024).

For policy, the main implication is that disaster programs should invest in relationships before disasters occur. Training, community mapping, simulation, local leadership development, and inter-organizational agreements are likely to create a social infrastructure that becomes valuable during crises, and preparedness is better understood as relationship-building than as the stockpiling of equipment alone. Funding mechanisms should recognize community participation as a substantive component of resilience rather than a ceremonial consultation (Imperiale & Vanclay, 2021). Table 6 translates the findings into strategies for each phase of the disaster cycle. For each strategy it names the finding on which the strategy rests and states its basis: “literature-supported” where a reviewed source recommends or documents it, “partly literature-supported” where only some components are so supported, and “authors’ proposal” where the strategy is our inference from the synthesis and has not been evaluated in rural Indonesia. The strategies should therefore be read as an agenda for piloting and evaluation, not as proven interventions.

Table 6. Strategies for strengthening inclusive rural resilience across the disaster cycle

Phase	Recommended strategy	Linked finding	Supporting evidence	Basis
Preparedness	Hold regular community meetings, joint training, and simulation exercises that deliberately include underrepresented groups.	Bonding and bridging ties support preparedness; exclusion persists without deliberate inclusion (Tables 3 and 4)	Aldrich & Meyer (2015); WHO (2021)	Partly literature-supported: joint training and exercises are supported; deliberate targeting of underrepresented groups is the authors' proposal
Preparedness	Institutionalize participatory community mapping and the documentation of local knowledge, including oral histories.	Participatory knowledge	Hiwasaki et al. (2014); Syafwina (2014); WHO (2026)	Literature-supported
Preparedness	Provide accessible, multi-channel risk communication and invest in digital inclusion.	Digital communication; inclusion	Alexander (2014); Zhao et al. (2025)	Partly literature-supported: multi-channel communication is supported; investment in digital inclusion is the authors' proposal
Response	Agree in advance on links between village disaster committees and district agencies, health services, and NGOs.	Linking	BNPB (2012); WHO (2021); WHO Indonesia (2026)	Literature-supported in policy guidance; outcomes not yet evaluated in rural Indonesia
Response	Provide protective measures and safe spaces for women, children, and persons with disabilities in evacuation sites.	Inclusion	IHCP (2026a, 2026b); Republik Indonesia (2016)	Authors' proposal grounded in situation reports and law; effectiveness of specific measures not evaluated
Recovery	Keep social networks intact in shelter and relocation planning, and support livelihoods and community-based savings.	Bonding and place	Cox & Perry (2011); Islam & Walkerden (2014); Adger (2003)	Partly literature-supported: network preservation is supported; community-based savings is the authors' proposal
Adaptation and learning	Conduct after-action reviews and community reflection meetings, and monitor distributional outcomes of recovery.	Reflective learning; inclusion	Cutter et al. (2008); WHO Indonesia (2026)	Partly literature-supported: after-action review and distributional monitoring are supported; community reflection meetings are the authors' proposal

Several limitations qualify these conclusions. The review was purposive rather than exhaustive and relied largely on secondary sources, so its synthesis reflects the scope and quality of the literature reviewed. The evidence base is also uneven. Much of the empirical work on bonding, bridging, and linking capital comes from other national contexts, and Indonesian evidence is dominated by a few well-studied events, notably the 2004 tsunami and the 2006 Yogyakarta earthquake. The 2025–2026 Sumatra disasters are documented mainly in situation reports and institutional documents that have not yet been fully evaluated in peer-reviewed research.

Because sources were selected purposively and no formal search-and-screening count was recorded, the review cannot be replicated exactly, and the corpus may over-represent well-known, English-language, and positively framed studies. Three practical implications

follow. First, the findings should be read as an analytical synthesis that identifies plausible mechanisms and tensions, not as an estimate of how often or how strongly each mechanism operates. Second, the absence of a topic from the corpus, for example migrants in Indonesian villages, should not be taken as evidence that it is unimportant, only that this review did not find evidence on it. Third, the strategies in Table 6, particularly those labeled as authors' proposals, should be treated as hypotheses to be piloted and evaluated.

Future studies should compare communities with different configurations of bonding, bridging, and linking capital to clarify whether particular combinations are more effective for particular hazards. Participatory and mixed-methods designs would be especially valuable because they can capture informal cooperation that administrative indicators miss, and longitudinal research could examine how different forms of social capital influence recovery outcomes and distributional equity in rural Indonesian communities. Future reviews could also register a protocol, record search and screening counts, and use two independent coders, and primary research is needed on the experiences of migrants, persons with disabilities, and low-income households in rural Indonesia.

4. CONCLUSION

This integrative review examined how community social capital contributes to disaster resilience in rural Indonesia and under what conditions its contribution is limited. It was guided by three questions, which are answered in turn.

Regarding the first question, the sources reviewed indicate that bonding ties support rapid mutual assistance, information sharing, and psychosocial support in the first hours of an event; bridging ties widen the pool of information, skills, and participants; linking ties give access to early warning, technical expertise, and recovery programs; and participatory knowledge allows local experience to be tested against scientific information. Most direct evidence on these mechanisms comes from outside Indonesia, and the strongest Indonesian evidence concerns local knowledge.

Regarding the second question, dense community networks can coexist with weak inclusion: women, persons with disabilities, migrants, and poor households may have limited voice and unequal access to warnings, shelter, and aid. The evidence is strongest for women and thinner for the other groups, and bridging ties are themselves fragile without institutional support.

Regarding the third question, the review points to investing in relationships before disasters occur: regular joint training and exercises, institutionalized participatory mapping, advance agreements between villages and district agencies, protective measures and accessible communication for underrepresented groups, shelter and relocation planning that keeps networks intact, and after-action learning. Some of these strategies are directly supported by the reviewed sources and others are the authors' proposals that require evaluation (Table 6). The central implication is that investment in relationships should proceed together with investment in infrastructure and early-warning systems.

The review contributes the social resilience chain, a conceptual framework that links trust, communication, coordination, collective action, and reflective learning and shows which of its relationships rest on prior evidence and which are proposed (Table 5). Future research should test the chain empirically, compare communities with different combinations of bonding, bridging, and linking capital across hazards, and generate direct evidence on the

experiences of migrants, persons with disabilities, and low-income households in rural Indonesia.

Acknowledgment

The authors acknowledge the published scholarship and institutional guidance that informed this review, particularly resources concerning community resilience and emergency preparedness. No external funding was received for this article.

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