Understanding Community Resilience through Social Capital: A Qualitative Study of the 2024 Flood Disaster in an Inland Area

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ABSTRACT

Communities in Malaysia's inland regions remain highly vulnerable to recurring flood disasters, yet empirical understanding of how their internal social systems foster resilience is limited. This study addresses this gap by examining the role of social capital in shaping community resilience during the 2024 flood in Hulu Dungun, Terengganu, one of the most severely affected inland areas. Using a qualitative case study approach, semi-structured interviews were conducted with 15 residents selected through purposive sampling to explore their lived experiences, coping strategies and mobilisation of social networks throughout the disaster. Findings reveal that social capital serves as a pivotal mechanism enabling communities to withstand, adapt to and recover from flood impacts. Bonding capital provided immediate emotional support, shared labour and rapid neighbourhood level mobilisation. Bridging capital facilitated access to volunteers, inter village assistance and diversified external resources, while linking capital supported residents in navigating institutional aid, accessing early warning information and engaging with formal recovery programs. The interplay of these three dimensions demonstrates how social relationships form an integrative foundation for adaptive capacity and sustained recovery in vulnerable inland communities. The study underscores the importance of disaster governance, community planning and resilience building frameworks that prioritise the strengthening of social capital as a core component of flood management strategies.

Keywords: Community resilience, bonding–bridging–linking networks, flood disaster, inland communities, social capital

INTRODUCTION

Flood disasters continue to pose critical threats to inland and rural communities in Malaysia, particularly in the East Coast region, where monsoon patterns, river hydrology and land use changes intensify annual flood risks. Terengganu remains among the most affected states, with recurring floods causing severe disruptions to homes, livelihoods and local social systems. While climate variability, rapid development and environmental degradation contribute to the increasing severity of these events, disaster scholars increasingly acknowledge that community resilience is not shaped solely by physical or environmental factors. The robustness of internal social systems that support collective preparedness, response and recovery plays a critical role in determining how communities withstand and adapt to disaster shocks.

Disasters constitute major disruptions to the functioning and stability of a community or society, often resulting in extensive impacts on lives, assets, economies and environments, sometimes exceeding local capacities to cope (Bahmani & Zhang, 2022). Such events create immediate and long term disturbances in spatial, social and economic systems, leaving vulnerable populations at heightened risk of loss and hardship. Consequently, post disaster recovery must be implemented rapidly and systematically to restore living conditions, rebuild infrastructure and support affected households and sectors (Terumoto et al., 2022). Understanding how communities navigate this recovery process is therefore crucial for designing effective resilience strategies.

Despite growing attention to disaster impacts, existing studies typically prioritise structural and engineering based mitigation approaches, such as flood barriers, drainage upgrades and technological warning systems.

While these perspectives provide valuable insights, they offer limited understanding of how residents mobilise social networks, shared norms and interpersonal relationships to confront disaster challenges. For many victims, both immediate and long term recovery remains difficult due to disrupted livelihoods, limited resources and delayed external support. Moreover, the perceptions, strategies and local knowledge of affected communities who play a central role in their own recovery are often overlooked in disaster planning and post disaster research (Su & Le Dé, 2020).

Within this context, social capital has emerged as a critical lens for understanding community resilience. Social capital refers to networks of trust, norms of reciprocity and collective action that operate across different levels of society. These networks, whether among family members, neighbours, community groups, or institutions, constitute valuable resources that can be mobilised in times of crisis (Choo & Yoon, 2022; Liu et al., 2022). Bonding ties facilitate close-knit support, bridging ties connect communities to diverse groups and external resources and linking ties provide channels for institutional assistance. Together, these social processes shape how communities prepare for disasters, respond in the immediate aftermath and rebuild their lives during recovery from events such as floods.

However, empirical understanding of how these different forms of social capital support community resilience during major inland flood events remains limited, particularly in rural Malaysian settings. While post-disaster recovery often involves collaboration with government agencies, NGOs and community organisations, the extent to which social capital enhances the mobilisation of resources, information and collective action is not well documented (Kriegl et al., 2020). This gap is especially significant for inland communities, where formal assistance may be delayed and local networks play a decisive role in sustaining survival and recovery efforts.

To address this gap, the present study examines how bonding, bridging and linking social capital empower vulnerable inland communities to cope with, respond to and recover from the 2024 flood disaster. Focusing on Hulu Dungun, Terengganu, Malaysia, one of the severely affected areas, this study employs a qualitative case study design using semi-structured interviews to explore lived experiences and local coping practices. The analysis investigates how bonding ties facilitate immediate neighbourhood level responses, how bridging networks enable cross-community support and how linking relationships connect residents to institutional aid, early warning systems and long-term recovery mechanisms. This approach provides a holistic understanding of the multi-layered social processes involved in disaster resilience.

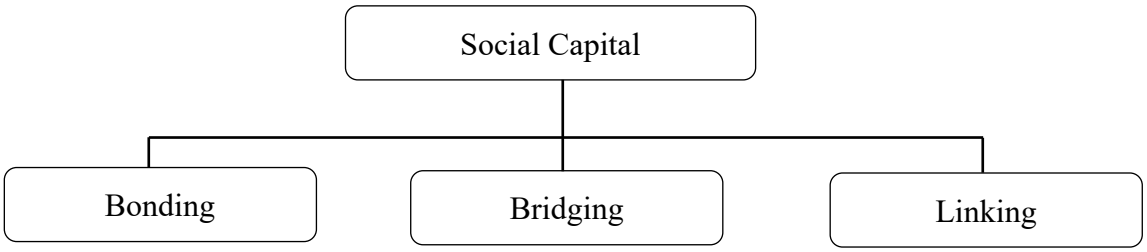
The significance of this study lies in its theoretical, empirical and practical contributions. Empirically, it offers insights from a rural inland context that is often understudied in Malaysian disaster research. Theoretically, it advances understanding of social capital as a multidimensional mechanism shaping disaster resilience. From a policy perspective, the findings underscore the need to integrate social capital considerations into disaster risk reduction strategies, particularly in regions where access to formal support is limited or delayed. Practically, the study highlights the importance of strengthening community led resilience efforts to ensure more adaptive and effective responses to recurring flood events.

LITERATURE REVIEW

Malaysia is frequently exposed to natural disasters, particularly floods, which disrupt social, economic and community stability (Bahmani & Zhang, 2022; Su & Le Dé, 2020). Post-disaster environments are characterised by high uncertainty, requiring rapid recovery measures to restore infrastructure, livelihoods and social systems (Terumoto et al., 2022). While physical interventions such as flood control infrastructure are essential, they are insufficient on their own to reduce community vulnerability. Social factors including community interactions, participation, informal leadership and local perceptions play a critical role in enhancing preparedness, response and recovery (Su, 2022; Abenir, Manzanero & Bollettino, 2022). Strong social networks facilitate the dissemination of early warnings, rapid mobilisation of resources and effective sharing of information, thereby improving disaster management outcomes (Yu et al., 2022; Jamshed, 2020; Roque, Pijawka & Wutich, 2020; Zander, 2023). Informal social support and local leadership further strengthen resilience by enabling communities to coordinate collective action in response to flood hazards (Abenir, Manzanero & Bollettino, 2022). This underscores that community based social systems are a vital component of disaster resilience, complementing technical and structural solutions.

Social capital, broadly defined as networks of trust, norms of reciprocity and collective action, constitutes a critical communal asset that supports community resilience and adaptive capacity (Putnam in Liu et al., 2022; Naithani & Saha, 2021). It operates at multiple levels. The micro level encompasses individual or household networks, the institutional level includes horizontal and vertical organisational relationships and the macro level pertains to broader societal structures and institutions that foster social norms. Theoretically, social capital is categorised into three primary forms. Bonding social capital represents close ties among family members, friends, or people with similar backgrounds (Behera, 2021). Bridging social capital connects individuals across diverse social identities for mutual benefit (Hudson, Hagedoorn & Bubeck, 2020). Linking social capital establishes vertical relationships between communities and external actors' such as government agencies or NGOs (Khalil et al., 2021). These forms of social capital enable communities to share resources, information and support effectively, enhancing disaster preparedness, response and recovery (Jamshed, 2020; Roque, Pijawka & Wutich, 2020; Zander, 2023). Strong social capital not only increases the capacity to cope with immediate crises but also facilitates learning and adaptation to recurrent hazards such as the monsoon floods in Terengganu, Malaysia. Figure 1 illustrates the three types of social capital and their interactions in disaster contexts.

Figure 1: Types of Social Capital



Source : Hudson et al., (2020), Behera (2021), Khalil et al., (2021)

Social vulnerability refers to the susceptibility of individuals or groups to harm from hazards, shaped not only by physical exposure but also by social, economic and institutional factors (Bucherie et al., 2022; Limante & Tereskinas, 2022; Fan & Huang, 2023). Vulnerable populations often include the elderly, children, low-income households, persons with disabilities and socially marginalised groups, whose capacity to anticipate, respond and recover from disasters is constrained. For example, elderly residents in flood-prone inland villages may experience mobility limitations, making them dependent on neighbours and informal networks for evacuation and immediate support, while low-income households may lack financial means to reinforce property or replace lost assets, heightening their exposure to loss (Hauer et al., 2021). Social vulnerability is further compounded by structural inequalities, such as weak governance, inequitable access to resources and unsustainable development practices, which can amplify the adverse impacts of floods (Tinggeloven et al., 2020; Abunyewah et al., 2023). Assessing social vulnerability is therefore critical for designing targeted interventions and adaptive strategies that not only mitigate immediate risks but also enhance long-term resilience.

Community resilience refers to the capacity of social systems to anticipate, respond to and recover from hazards while maintaining essential functions and protecting collective well-being (Imperiale & Vanclay, 2021; Ungar & Lustig, 2020). Beyond restoring pre-disaster conditions, resilience encompasses the ability to adapt, learn from past experiences and implement proactive strategies that reduce vulnerability. Social resilience emphasizes the role of networks, institutions and informal leadership in shaping the community's ability to share knowledge, coordinate resources and make collective decisions (Fitzgerald et al., 2021). In practice, resilience emerges from the interplay between social cohesion, local knowledge and coordinated action. For instance, residents of inland area or villages like Hulu Dungun often rely on strong neighbourhood ties to mobilise boats and resources, alert vulnerable households and provide emotional support during floods. This collective action ensures that immediate survival needs are met while strengthening the community's adaptive capacity for future hazards.

Climate change has increasingly intensified the frequency, magnitude and unpredictability of floods around the world, including in Malaysia (Tellman et al., 2021; Setiani, 2020). In particular, rising monsoon rainfall and

changing climate patterns have disrupted natural hydrological cycles, increasing flood risks in areas already prone to seasonal inundation (Nursey-Bray et al., 2022; Tew et al., 2022). These environmental pressures place communities under significant strain, as households and local economies are forced to adapt to maintain livelihoods, social cohesion and essential services, while also aligning with broader sustainable development goals (Terblanche et al., 2022; Echendu & Georgeou, 2021).

In Hulu Dungun, Terengganu, historical flood events in 1984, 1994, 2004, 2014 and 2024 illustrate both the recurrent nature of the hazard and the cumulative damage to physical infrastructure, property and homes (National Security Council of Terengganu, 2024). Beyond the material impact, repeated exposure has generated a repository of local knowledge, fostering community-driven strategies for disaster preparedness, response and recovery. Residents have learned to anticipate flood patterns, prioritise vulnerable households and leverage both local networks and external support to reduce harm. This history of recurring floods also underscores the centrality of social capital**,** the trust, networks and norms within communities, in facilitating not just immediate survival but also adaptive learning over time. Communities are therefore not passive victims; rather, they develop collective knowledge and practical coping mechanisms that increase resilience against subsequent flood events.

Quantitative data from the Malaysian Department of Irrigation and Drainage and the Department of Statistics Malaysia show that between 2014 and 2022, floods affected hundreds of thousands of people in Malaysia, with economic losses accumulating to billions of ringgit (Department of Irrigation and Drainage Malaysia, 2024; Department of Statistics Malaysia, 2024). Table 1 summarises these events, highlighting the persistent and escalating nature of flood risk, particularly in East Coast states such as Terengganu. Here, livelihoods are predominantly reliant on natural resources and traditional occupations such as fisheries and small-scale agriculture, which are extremely sensitive to flood disruption.

Table 1: Flood Incidents and Losses in Malaysia, 2014–2022

Year	Number of Cases	Estimated Number of Victims	Estimated Losses (million)
2014	381	500,000	RM 218
2015	496	46,000	RM 30
2016	404	95,000	RM 53
2017	1, 239	68,000	RM 63
2018	844	12,000	RM 44
2019	535	49,000	RM 26.5
2020	869	60,000	RM 1.15
2021	1,057	208,643	RM 6.1
2022	963	192,707	RM 622.4

Source: Department of Irrigation and Drainage Malaysia (2024), Department of Statistics Malaysia (2024)

The vulnerability of these sectors is compounded by socio-demographic factors such as age, education level and mobility limitations, which affect the capacity of households to respond effectively. Consequently, flood risk management cannot rely solely on structural mitigation measures such as embankments or drainage systems. Instead, it requires a holistic approach that integrates social capital with vulnerability assessment and adaptive resilience strategies. By leveraging bonding, bridging and linking networks, communities can access local knowledge, pool resources, coordinate with external aid organizations and influence institutional responses.

These social networks act as a buffer, mitigating immediate damage while fostering long-term community preparedness and adaptive capacity.

Taken together, the empirical evidence and historical context indicate that floods in Hulu Dungun are not isolated incidents but part of a recurring cycle that interacts with social, economic and environmental systems. Understanding these dynamics is crucial for designing flood adaptation strategies that are locally grounded, socially inclusive and capable of enhancing both household-level and community-level resilience. It also situates social capital as a foundational resource in disaster recovery, enabling communities to transform experiential knowledge into actionable strategies that improve survival, reduce economic loss and strengthen social cohesion.

METHODOLOGY

This study adopts a qualitative approach using a case study design within an interpretivist paradigm to explore the lived experiences of flood-affected residents in their natural social context, guided by social capital theory. A case study approach was considered appropriate because it allows for an in-depth understanding of how social networks, norms and trust influence community resilience during and after disaster events. Social capital theory informed both data collection and analysis, facilitating the identification of bonding, bridging and linking social relationships and their roles in disaster preparedness, response and recovery. The research was conducted in four villages in Hulu Dungun, like Kampung Pasir Raja, Kampung Shukor, Kampung Jongok Batu and Kampung Belimbing, selected based on the severity of impact from the 2024 flood and the diversity of residents' social and economic profiles. Selection criteria included the extent of property damage, the number of affected households and representation of diverse livelihoods such as fishing, farming and informal work. Brief contextual descriptions of each village were collected to situate the findings within local demographic, geographic and livelihood realities.

A purposive sampling strategy was employed to recruit 20 informants, whose socio-demographic profiles presented a holistic picture of how varied backgrounds, responsibilities and lived experiences shaped community resilience during the flood. Participants included heads of households, mothers caring for children, elderly residents, fishermen, farmers, informal workers and community leaders. Participants were selected based on direct experience of the flood and their ability to articulate both personal and communal responses. The sample size was guided by data saturation, with interviews continuing until no new themes or patterns emerged. Data were collected through semi-structured in depth interviews lasting 45 to 90 minutes through semi-structured questions covering pre-flood preparedness, immediate responses and survival strategies, social support networks, coping mechanisms and interactions with NGOs, volunteers and government agencies. In depth interviews provided participants the flexibility to elaborate on their experiences while ensuring consistent coverage of key research areas. All interviews were audio-recorded with informed consent, transcribed verbatim and securely stored to maintain confidentiality and the interview guide was pilot-tested with two participants to ensure clarity, cultural appropriateness and relevance.

Thematic analysis, following Braun and Clarke's (2006) framework, was applied to the transcribed data. This process involved familiarisation with the data, systematic coding, theme generation and iterative refinement. Codes and preliminary themes were derived inductively from participants' narratives, while social capital theory provided a theoretical lens to identify patterns related to bonding, bridging and linking relationships and their contribution to community resilience. Credibility was enhanced through triangulation across participant perspectives, iterative review of codes and themes and reflexive journaling, which allowed the researcher to critically examine assumptions and minimize potential biases. Trustworthiness was further strengthened through member checking, where selected participants validated preliminary findings and peer debriefing with academic colleagues to provide external perspectives on coding and theme development. Ethical considerations were rigorously observed, including informed consent, voluntary participation, anonymity and adherence to national and institutional guidelines for research involving human subjects. Ethical approval was obtained from the Faculty of Social Sciences and Humanities, ensuring that participants' rights and welfare were fully protected throughout the study.

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RESULTS

Socio-Demographic Profile of Informants

The socio-demographic profile of the 20 informants presents a holistic picture of how varied backgrounds, responsibilities and lived experiences shaped community resilience during the 2024 flood in the inland area of Hulu Dungun. As shown in Table 2, informants in this study includes residents from multiple socioeconomic strata as well as institutional actors such as local authorities, community leaders, youth volunteers, NGO personnel and members of marginalised groups. This diversification strengthens the representativeness and analytical depth of the findings, offering a more comprehensive understanding of resilience-building processes within the affected community.

Table 2: Socio-Demographic Profile of Informants

Name	Age	Gender	Role	Education	Length of Residence	Experience
Ali	45	Male	Informal Worker	Secondary	25	Lost crops, home partially flooded
Siti	38	Female	Housewife	Primary	20	Evacuated with children, property damaged
Mat	62	Male	Fisherman	Primary	40	Experienced multiple floods, lost fishing equipment
Lina	29	Female	Informal Worker	Secondary	10	Evacuated, home inundated
Rahman	55	Male	Farmer	Secondary	30	Crops destroyed, livestock lost
Aida	47	Female	Public Servant	Primary	22	Evacuated, relied on community support
Hassan	70	Male	Retiree	Primary	50	Home flooded, limited mobility
Zainal	34	Male	Fisherman	Secondary	15	Lost boat and nets, dependent on aid
Farah	41	Female	Informal Worker	Secondary	18	Home partially flooded, relied on relatives
Ismail	60	Male	Farmer	Primary	35	Property damaged, crops destroyed
Jamaliah	50	Female	Housewife	Primary	28	Evacuated, social support critical
Anuar	28	Male	Public Servant	Secondary	12	First major flood, lost equipment
Rahimah	65	Female	Retiree	Primary	45	Experienced multiple floods, limited mobility
Fauzi	39	Male	Informal Worker	Secondary	20	Home flooded, dependent on aid
Noraini	43	Female	Housewife	Secondary	18	Evacuated with family, property partially damaged

Sarip	52	Male	Village Head	Secondary	30	Coordinated evacuation and aid distribution
Mira	27	Female	NGO Volunteer	Tertiary	-	Supported rescue, psychosocial care
Azman	33	Male	District Officer	Tertiary	-	Oversaw logistics/relief assessment
Rohan	48	Male	Disable (OKU)	Primary	25	Required assisted evacuation
Wani	32	Female	Youth Volunteer/ Teacher	Tertiary	8	Coordinated inter-village communication

Source: Field Study (2024)

The sociodemographic composition reveals how resilience during the 2024 flood was shaped by diverse social positions and lived realities among residents of Hulu Dungun. The informants ranged from 27 to 70 years old, reflecting substantial variation in physical abilities, disaster experience and social roles. Older adults, who had resided in the village for more than four decades, possessed extensive historical knowledge of past flood cycles. However, age-related mobility constraints made them heavily dependent on close relatives and neighbours for evacuation and immediate assistance. In contrast, younger adults leveraged digital communication tools and broader external networks, playing pivotal roles in linking the community to NGOs, youth groups and district authorities. Gendered responsibilities further shaped coping strategies. Women in caregiving roles managed domestic safety, cared for children and elderly dependents and provided emotional reassurance, illustrating how bonding social capital was activated within household settings. At the same time, women engaged in formal work or volunteerism played significant bridging roles by mobilising external assistance, disseminating information and facilitating community coordination. This highlights the intersection of gender, education and leadership in strengthening communal resilience.

Occupational diversity also influenced vulnerability and access to recovery resources. For examples, farmers and fishermen suffered substantial livelihood losses, including destroyed crops and damaged fishing equipment, making them reliant on bridging and linking networks for financial aid and material support. Informal workers faced heightened economic fragility due to unstable income flows during the disaster. Meanwhile, a disabled individual (OKU), underscores the presence of layered vulnerabilities and the critical importance of community-based support systems in facilitating safe evacuation and post-disaster care. The presence of formal actors within the informant group, particularly the village head and district officer deepens the analysis by illustrating how institutional roles intersected with community-led efforts. Their involvement demonstrates how linking social capital was effectively activated to ensure coordinated evacuation, efficient dissemination of aid and timely damage assessments.

Educational backgrounds, which ranged from primary to tertiary, influenced communication patterns and preparedness responses. Individuals with higher education managed digital communication channels, mobilised inter-village information flows and supported analytical decision-making. In contrast, residents with primary schooling relied more on interpersonal networks and long-standing community relationships. Length of residence also played a defining role. Long-term residents demonstrated strong place attachment, deep familiarity with flood-prone zones and well-established neighbourhood ties that facilitated rapid mobilisation and mutual support. Newer residents displayed varying degrees of preparedness and dependency on established social networks.

Overall, the socio-demographic profile highlights that community resilience during the 2024 flood was shaped by intersecting factors such as age, gender, livelihood, education, physical ability and institutional affiliation. This broader demographic variation enriches the analysis by illustrating how different groups activated bonding, bridging and linking social capital in distinct yet complementary ways. It also emphasises the necessity of recognising community heterogeneity in designing equitable and effective disaster resilience strategies.

Bonding Social Capital: Solidarity, Trust and Immediate Survival

Bonding social capital, reflecting close and enduring ties among family members, neighbours and long-term residents, emerged as the most immediate and indispensable lifeline during the 2024 flood in Hulu Dungun, Terengganu. Beyond social interaction, these tightly knit networks served as the primary mechanism through which the community mobilised, shared scarce resources and provided emotional support, collectively sustaining both physical survival and psychological resilience. The significance of bonding capital was particularly pronounced among elderly residents, whose deep-rooted knowledge of the local terrain, memory of previous floods and long-standing relationships enabled them to act as anchors of community cohesion. Simultaneously, younger heads of households often assumed leadership roles, coordinating evacuation efforts, mobilising neighbours and distributing limited resources. This interplay demonstrates how age, household roles and occupation intersected with social capital to shape effective and context-sensitive disaster response.

Collective Preparedness and Early Mobilisation

The importance of bonding social capital in Hulu Dungun was evident in the community's capacity to mobilise rapidly and cohesively, often long before formal responders arrived. What might appear as spontaneous action was, in reality, the result of accumulated local knowledge, deeply rooted neighbourly trust and shared memories of past floods. These experiences conditioned residents to recognise danger at its earliest signs. Rather than waiting passively, villagers acted instinctively as a collective, demonstrating a form of grassroots disaster governance that operated with remarkable fluidity and precision. Similar patterns have been reported in other inland flood-prone areas, suggesting that long-standing social networks and shared local knowledge are key determinants of early disaster response in Malaysian rural contexts.

Informant Ali, a forty-five-year-old informal worker who had lived in the village for twenty-five years and experienced crop loss and partial flooding of his home, recalled the tense moment when the water began to rise:

"We noticed the water creeping up in the middle of the night. I didn't even think twice. I rushed out and started knocking on doors, especially homes with small children and older people. What amazed me was how quickly everyone jumped into action. In just minutes, our whole street felt like a rescue squad, each person helping the other without needing to be asked." (Ali, 45, informal worker)

Informant Ali's familiarity with the rhythms of the river, combined with the vulnerability he faced from losing his crops and seeing his own home flooded, strengthened his determination to protect his neighbours. His account illustrates how long-term residents with deep community ties often become the first responders, driven not by official roles but by lived experience, shared history and an unspoken moral commitment to collective survival.

Informant Siti, a thirty-eight-year-old housewife who had lived in the village for two decades, reflected on the organic emergence of informal leadership from long-standing social relationships:

"Authorities had not arrived yet, but the village was already in motion. The men were launching the small boats we had kept ready from previous floods and the women were coordinating who needed help first. Because we had lived together for so many years, we already knew who had babies, who had elderly parents and who could not move quickly. That familiarity guided us. It was what saved people who were trapped in their homes." (Siti, 38, housewife)

For first-time flood victims, bonding ties served not only as practical guidance but also as a stabilising emotional anchor. Informant Anuar, a twenty-eight-year-old public servant experiencing his first major flood, described how neighbourly support restored a sense of control amid fear and uncertainty:

"It was my first serious flood and I honestly felt lost. I kept thinking about my responsibilities and how to keep my family safe. The neighbours acted immediately. They explained what I needed to take, showed me the safest route to higher ground and even helped move my family into the boat. Their clear instructions stopped me from panicking. Without them, I don't know how I would have managed." (Anuar, 28, public servant)

These findings illustrate how bonding social capital becomes a lifeline for individuals lacking prior disaster experience. For residents like Informant Anuar, neighbourly support did more than provide guidance; it restored a sense of control at a moment when fear and confusion threatened to overwhelm him.

Importantly, bonding ties also shaped how external actors connected with the community. Informant Azman, a thirty-three-year-old district officer, observed that the speed and cohesiveness of villagers' self-organised evacuation helped responders target assistance more effectively:

"When we arrived, many households had already mobilised on their own. Their coordination made it easier for us to identify who still needed help. The community's unity actually accelerated our assessment and logistics." (Azman, 33, district officer)

Similarly, Informant Mira, a twenty-seven-year-old NGO volunteer, highlighted how strong internal bonding networks allowed aid workers to integrate quickly into village operations:

"The villagers knew exactly who was missing, who needed medical attention and which houses were unsafe. We depended on their information. Without that level of trust within the community, our rescue work would have been much slower." (Mira, 27, NGO volunteer)

The insights from these external actors enrich the interpretation of linking social capital, showing that strong internal cohesion not only aids self-rescue but also enhances the efficiency of formal assistance.

These findings highlight the sophisticated nature of bonding social capital as more than mere social closeness. It functions as an informal yet highly effective safety net, capable of prioritising the needs of the most vulnerable, including children, older adults and residents with limited mobility or chronic health issues. The community's ability to anticipate each other's needs, coupled with reciprocal trust built over years of shared experiences, enabled residents to take pre-emptive actions that minimised harm before conditions worsened.

In essence, the early hours of the flood revealed a form of collective intelligence embedded within everyday social relationships. Through the convergence of local knowledge, household leadership and communal responsibility, residents transformed what could have been a chaotic and isolating disaster into a coordinated and humane response. The outcome was not only physical survival but also the preservation of dignity, emotional stability and a strengthened sense of shared agency at the height of the crisis.

Shared Resources and Emotional Support

The 2024 flood in the inland area of Hulu Dungun, Terengganu revealed that resource sharing and emotional support were not merely acts of kindness, but fundamental coping mechanisms that sustained communities through the crisis. Informant Lina, a twenty-nine-year-old informal worker who had lived in the village for a decade and whose home was fully inundated during the flood, offered a vivid account of how collective action transformed a moment of fear into a profound experience of solidarity. She recalled how the water rose with alarming speed, leaving families with little time to react:

"The water came up so fast that evacuation was impossible. People started rushing to my house because it was on slightly higher ground. Within minutes, the place was filled with neighbours, their children, bags of clothes and whatever they managed to grab. The children tried to play to distract themselves and we adults sat together quietly at first, then talked, then prayed. We held on to each other emotionally. That night, it felt like all of us were breathing with the same heartbeat, trying to survive together." (Lina, 29, informal worker)

Informant Lina's experience demonstrates how social capital becomes most powerful when everyday relationships are activated under stress. Despite her limited economic security and her home being inundated, she became a focal point of refuge for surrounding families. Her household transformed into a temporary communal space where tangible resources such as food, dry clothing, candles and drinking water were pooled alongside intangible forms of support, including companionship, reassurance and shared prayer. These acts formed a protective emotional canopy that softened the psychological shock of displacement, especially for children and adults confronting uncertainty amidst the darkened, rising waters. By opening her home and

participating in this spontaneous collective sheltering, Informant Lina exemplified how bonding social capital operates across both physical and emotional dimensions. The convergence of material sharing and mutual emotional care not only ensured immediate survival but also reinforced the community's psychological resilience at a time when fear could easily have overwhelmed them.

Intergenerational solidarity emerged as a crucial dimension of coping, particularly for elderly residents and those facing physical limitations. Informant Aida, a forty-seven-year-old public servant, recalled how the collective spirit of her neighbours became indispensable during her family's evacuation. Despite her stable occupation and extensive experience in the community, the severity of the flood placed her in a position of profound vulnerability. She described how the compassion and readiness of those around her preserved not only safety but also dignity during the most difficult hours:

"My neighbours came with blankets and immediately helped carry my father, who has mobility challenges. They made sure we were safe before thinking of themselves. Even though we lost our belongings, the emotional strength they gave us kept us going. I honestly don't think we could have survived the night without their presence and reassurance." (Aida, 47, public servant)

Reciprocity further reinforced the strength and resilience of this close-knit network. Informant Mat, a sixty-two-year-old fisherman with decades of flood experience, described a cycle of mutual aid that reflected the deeply ingrained ethic of collective responsibility within the village:

"When I saw my neighbour struggling with their flooded home, I did not hesitate to carry their food and essentials to safety. In return, they helped me pack my fishing gear and other important items for evacuation. We completely relied on one another, as if each household was a lifeline for the others." (Mat, 62, fisherman)

Beyond bonding social capital, the flood also highlighted the critical role of linking social capital, which involved connections between local communities and formal institutions. Informant Sarip, the fifty-two-year-old village head, coordinated evacuation and aid distribution, ensuring that vulnerable households received immediate assistance. He recalled the challenge of mobilising limited resources while maintaining fairness across households:

"We had to prioritise the elderly and families with young children, making sure each area received food, water and basic necessities. Coordination with NGOs and volunteers was key; without their help, it would have been impossible to reach everyone in time." (Sarip, 52, village head)

Similarly, Informant Mira, a twenty-seven-year-old NGO volunteer, provided psychosocial support and assisted in rescues, observing how community trust facilitated smoother collaboration:

"People were willing to follow guidance because they knew we were from trusted organisations. Emotional support went hand-in-hand with material aid; comforting families and helping children reduced panic and made evacuation safer." (Mira, 27, NGO volunteer)

These accounts illustrate how linking social capital complemented bonding networks by providing structured, external support that enhanced both efficiency and morale. Coordination between villagers, local officials and volunteers not only ensured equitable distribution of scarce resources but also strengthened the psychological resilience of residents by showing that broader institutional networks were engaged in their recovery.

Together, these findings demonstrate that survival during the 2024 flood depended on a combination of bonding and linking social capital**.** Shared resources, reciprocal assistance, emotional solidarity and coordinated support from officials and humanitarian volunteers created a multilayered safety net that preserved both material well-being and psychosocial stability. While intimate neighbourhood ties sustained immediate survival, connections with formal actors amplified the community's capacity to navigate logistical challenges and maintain dignity under extreme stress. These intertwined networks of support cultivated a collective resilience that allowed communities in Hulu Dungun to withstand the immediate threats of flooding while mitigating longer-term psychological impacts.

Psychological Resilience through Social Cohesion

While the immediate threat of rising waters demanded swift physical action, it was the invisible threads of bonding social capital that strengthened the psychological resilience of the Hulu Dungun community. Residents drew courage and calm not only from their own abilities but also from the shared presence of neighbours, bound together by trust, familiarity and collective care. Informant Hassan, a seventy-year-old retiree with limited mobility who had lived in the village for five decades, reflected on how communal practices and neighbourly support transformed fear into resilience:

"Even as the floodwaters surrounded my home and I struggled to move, I felt a quiet strength in seeing my neighbours praying together, checking on one another and offering small reassurances. It was as if the fear itself had no space to grow. In those moments, our unity became stronger than the flood and I felt truly supported despite my age and limitations." (Hassan, 70, retiree)

Informant Farah, a forty-one-year-old informal worker who had lived in the village for eighteen years, described how community solidarity became an essential emotional anchor amid the devastation of her partially flooded home:

"My home was almost entirely swept away and we lost so many of our belongings, yet the support from those around me such as my neighbours and relatives, made me feel protected, as if we were facing the flood together. That feeling of being seen, of belonging, of not being alone, gave me the strength to carry on, to face each terrifying moment with courage." (Farah, 41, informal worker)

For Informant Jamaliah, a fifty-year-old housewife the psychological support derived from bonding social capital went far beyond immediate relief, fostering enduring calm and stability amidst chaos:

"There were moments when the stress felt unbearable, like a weight pressing down on every thought. But when neighbours shared food, comforted one another and prayed together, it felt as though the chaos had a pause button. That collective calm, that sense of togetherness, was far more sustaining than anything material we could have received." (Jamaliah, 50, housewife)

Informant Noraini, a forty-three-year-old informal worker whose home was partially flooded and who relied heavily on relatives, highlighted how social ties transformed fear into reassurance:

"The water entered quickly and I didn't know what to do. But my family and neighbours rallied around us. Even small gestures such as handing over a blanket, guiding us to safer spots and checking on each other gave me a sense that we were not alone. It wasn't just about survival; it was about feeling grounded, protected and part of a network that would carry us through." (Noraini, 43, housewife)

In addition to bonding capital, linking social capital, manifested through interactions with local officials and humanitarian volunteers, enhanced both practical and psychological resilience. Informant Sarip, a fifty-two-year-old village head, coordinated evacuations and aid distribution, noting how residents' trust in his leadership reduced panic and provided reassurance:

"When we guided families to safe zones and distributed food, the villagers' calm and willingness to follow instructions reflected the trust built over decades. It wasn't just about logistics; it was about giving people a sense that someone was looking out for them, which eased anxiety during the worst moments." (Sarip, 52, village head)

Similarly, Informant Mira, a twenty-seven-year-old NGO volunteer, emphasized the importance of psychosocial support in sustaining emotional resilience:

"Beyond physical rescue, our role in offering reassurance, listening to fears and providing small comforts helped people feel seen and cared for. That human connection made a tangible difference in how families coped with stress." (Mira, 27, NGO volunteer)

These additional perspectives illustrate how linking social capital complemented bonding capital. By connecting residents to formal resources, coordinated aid and structured support, officials and volunteers reinforced the psychological resilience already fostered by close-knit neighbourhoods. Comparative insights from other inland flood-affected areas suggest that while bonding capital remains the core of immediate emotional support, linking relationships, especially involving trusted local leaders and humanitarian actors, play a critical role in sustaining morale and reducing trauma, highlighting a pattern of resilience that may be consistent across similar rural contexts.

In inland area as Hulu Dungun, Terengganu social resilience during the 2024 floods was forged not only in visible actions but in the invisible, binding power of trust, care and community solidarity. Emotional security, cultivated through shared rituals, empathy, mutual support and trusted institutional guidance, equipped residents with the mental fortitude to confront uncertainty and danger. This cohesion ensured that the most vulnerable including elderly residents, mothers with young children and individuals with mobility challenges were supported both physically and emotionally, demonstrating the intertwined roles of bonding and linking social capital in fostering comprehensive psychological resilience.

Bridging Social Capital: External Networks and Resource Mobilisation

Bridging social capital extended the reach of the Hulu Dungun community beyond immediate family and neighbours, connecting residents to neighbouring villages, volunteer groups and non-governmental organizations. These horizontal networks became vital lifelines during the 2024 flood, providing access to material resources, practical knowledge and emotional support that complemented the cohesion fostered by bonding capital. Younger residents with digital skills emerged as key facilitators, using social media platforms and inter-village messaging groups to mobilize aid rapidly. For households experiencing floods for the first time, as well as for elderly or mobility-limited residents, these external connections were essential in navigating the disaster effectively.

Access to NGOs, Volunteers and External Aid

Informants consistently highlighted the critical importance of timely external support during the flood. Informant Zainal, a thirty-four-year-old fisherman with secondary education who had lost both his boat and fishing nets, vividly recalled how his community's digital outreach quickly translated into immediate aid:

"I posted photos of our homes swallowed by water on WhatsApp and Facebook. Within hours, strangers arrived with food, clean water and blankets. Volunteers even helped carry elderly neighbours to safety. Seeing them arrive so quickly felt like a lifeline amid the chaos. Losing my boat and nets had left us vulnerable, but that support reminded us that we were not alone." (Zainal, 34, fisherman)

Informant Zainal's experience underscores how bridging social capital, facilitated through digital networks, connected vulnerable residents, particularly those whose livelihoods were directly impacted, to essential resources and life-saving assistance. This not only reinforced material survival but also provided crucial psychological reassurance, highlighting the multidimensional role of bridging networks in disaster resilience.

Informant Noraini, a forty-three-year-old housewife with secondary education who had evacuated with her family while her property sustained partial damage, recounted the vital role of bridging social capital in linking the village to external support. She emphasized how urban volunteer networks collaborated seamlessly with local residents to deliver timely aid:

"We sent messages to youth volunteer groups in the city. They coordinated closely with NGOs, bringing boats, food and essential supplies directly to the areas where we were trapped. Without these networks connecting our village to the outside world, many of us would have felt completely abandoned, especially as the floodwaters surrounded our homes. It was as if these connections extended a lifeline just when we needed it most." (Noraini, 43, housewife)

For Informant Fauzi, a thirty-nine-year-old informal worker with secondary education who had lived in the village for two decades, the 2024 flood marked his first encounter with a disaster of such magnitude. His home

was completely inundated, leaving him heavily dependent on external aid. Coming from a household with limited financial security and minimal exposure to formal disaster preparedness practices, he recalled feeling profoundly disoriented amid the unfolding chaos:

"It was my first major flood. I really did not know where to start or how to protect my family or belongings. I felt completely lost. But the volunteers who arrived from outside the village guided us patiently, step by step. They showed us how to secure whatever we could, how to move safely and what to bring to the evacuation centre. Without them, we would have been in real danger." (Fauzi, 39, informal worker)

Additional perspectives from local officials and volunteers further illustrate the bridging of social capital across formal and informal networks. Informant Sarip, a 52-year-old village head with extensive experience coordinating disaster response, highlighted the importance of linking the village to district-level resources:

"We had to communicate constantly with district offices to ensure boats, food and medical supplies reached the right places. Our connections with NGOs and youth volunteers were critical, they acted as a bridge between what the village could provide and what external agencies could offer." (Sarip, 52, village head)

Informant Mira, a 27-year-old NGO volunteer with tertiary education, emphasized the psychological and practical support provided during evacuation and rescue operations:

"Beyond delivering food and supplies, we assisted with psychosocial care, calming anxious families, explaining safety procedures and guiding them to the evacuation points. These bridging networks were about more than material aid; they helped people feel secure and informed in a very chaotic situation." (Mira, 27, NGO volunteer)

Similarly, Informant Wani, a thirty-two-year-old youth volunteer and teacher, described her role in coordinating inter-village communications:

"Our WhatsApp groups connected several villages. We shared real-time flood updates, coordinated boats and ensured that isolated households were not left behind. These networks amplified our collective capacity to respond efficiently." (Wani, 32, youth volunteer/teacher)

These accounts highlight that bridging social capital functions not merely as a channel for material aid. It delivers practical knowledge, guidance and reassurance to households facing their first flood. By connecting residents to external actors and resources, including NGOs, volunteers and local officials, bridging networks reduce vulnerability, prevent early-stage crises from escalating and enhance the community's overall capacity to respond effectively to disasters.

Knowledge Sharing Across Communities

Bridging networks played a crucial role in extending adaptive knowledge and preparedness strategies beyond the boundaries of individual villages, creating a broader web of cooperation that significantly strengthened collective resilience. Informant Siti, a thirty-eight-year-old housewife who had lived in the village for two decades, described how these horizontal connections became essential safeguards during the 2024 flood. As someone responsible for evacuating her children while also managing damage to her home, she relied heavily on communication channels linking her village to surrounding communities:

"After the 2014 flood, we created a WhatsApp group connecting our village with nearby villages. It became our shared warning system. When the waters rose in 2024, messages poured in. People reminded each other to move quickly, shared simple but crucial tips, like lifting furniture onto higher shelves and alerted us when certain roads were becoming dangerous. Those early warnings gave me time to evacuate my children safely. Without that network, everything would have felt chaotic and the damage to our property would have been far worse." (Siti, 38, housewife)

Informant Siti's account illustrates the importance of bridging social capital in practice. These inter-village networks not only transmitted timely information but also reduced uncertainty, enabling residents to coordinate actions more effectively. In doing so, bridging ties provided a stabilizing force that complemented internal family

and neighbourhood support, ultimately minimising losses and enhancing preparedness across multiple communities.

Informant Lina, a twenty-nine-year-old informal worker who had lived in the village for a decade and whose home was inundated during the flood, offered a compelling account of how cross-village collaboration strengthened community preparedness. Her reflections reveal how bridging social capital functioned as both a practical and psychological buffer in the days leading up to the disaster:

"We began stockpiling food and drinking water even before the rain intensified because nearby villages shared their preparation strategies with us. That exchange of ideas saved us precious time and prevented panic from spreading when the water suddenly started rising. Knowing that other communities were preparing at the same time made us feel more in control and far less alone." (Lina, 29, informal worker)

Informant Lina's experience illustrates how individuals in informal and often economically vulnerable occupations rely heavily on social networks beyond their immediate neighbourhoods. Through these inter-village connections, households like hers were able to prepare more systematically, bridging knowledge gaps and reinforcing a shared sense of security across community boundaries. Her narrative demonstrates that bridging networks do more than supply information; they cultivate confidence, solidarity and collective psychological resilience even before a crisis fully unfolds.

Even elderly residents with long histories of flood experience found value in this cross-community exchange of knowledge. Informant Rahimah, a sixty-five-year-old retiree with limited mobility and decades of exposure to floods, described how these interactions enhanced her preparedness in ways she had not anticipated:

"I have lived through many floods, but this time I learned new techniques from the younger villagers and from people in nearby communities. They showed me easier ways to prepare the house and organise things so I would not have to move too much because of my condition. Even with all my past experience, these new ideas helped me guide my family better and take early steps before the water arrived." (Rahimah, 65, retiree)

Bridging networks also extended beyond residents to include local officials and humanitarian actors, further strengthening community-level coordination. Informant Sarip, a fifty-two-year-old village head, described his role in facilitating the horizontal flow of knowledge between villages:

"During the floods, I coordinated with nearby village heads to share information about water levels, safe evacuation routes and which households needed immediate assistance. This network allowed us to act faster and avoid duplication of effort. The community's response was much more organised than in previous floods." (Sarip, 52, village head)

Similarly, Informant Mira, a twenty-seven-year-old NGO volunteer, highlighted how cross-community collaboration supported practical disaster management and psychological care:

"We were able to move quickly because communities were already in touch with each other. Sharing updates on who needed help, which roads were flooded and how families were coping made our rescue and psychosocial support much more effective." (Mira, 27, NGO volunteer)

These additional accounts underscore that bridging social capital is not limited to resident-to-resident interactions. By linking households with both neighbouring communities and formal actors, the horizontal exchange of knowledge improved disaster preparedness, response coordination and psychological resilience across multiple villages.

Reducing Isolation Through Wider Support

Bridging social capital did more than provide material assistance; it served as a powerful emotional and psychological link, connecting residents to broader social networks at a time when isolation could have intensified their sense of loss. For long-term residents like Informant Ismail, a sixty-year-old farmer whose home

and crops were severely damaged, support from external actors carried significance that went far beyond physical relief. He reflected on the arrival of volunteers, describing the experience as both surprising and deeply moving:

"Help came from people we had never seen before. NGOs, volunteers, young students… they travelled all the way here just to lend a hand. After losing my crops and seeing my home damaged, I felt empty. But when strangers stood beside us, carrying supplies and speaking kindly, it felt as if someone out there truly understood our struggle. That feeling lifted our spirits in a way we could not explain." (Ismail, 60, farmer)

For Informant Ismail and other long-term residents, bridging ties provided reassurance that their suffering was neither unnoticed nor endured alone. The presence of outsiders conveyed recognition, solidarity and compassion, easing emotional burdens that local networks alone could not address. This external engagement strengthened community morale and renewed residents' determination to rebuild after the devastation.

Informant Mat, a sixty-two-year-old fisherman who had spent four decades living along the riverbanks and had endured multiple major floods, reflected on the profound comfort brought by assistance from outside the village. Having previously lost valuable fishing equipment to past disasters, he understood both the emotional and economic toll each flood imposed:

"When help arrived from people beyond our village, it felt like a tide of relief washing over us. We had been battling the rising waters with our own strength, but knowing that others saw our struggle and came to help eased a fear that had been building in our chests. It reminded us that even though the river often isolates us, we were never truly facing the disaster alone." (Mat, 62, fisherman)

Even long-term residents, familiar with the rhythms of the river and seasoned by previous floods, found reassurance in the presence of external networks. Informant Rahman, a fifty-five-year-old farmer who had lived in the village for three decades and lost both crops and livestock during the disaster, described the emotional impact of receiving help from beyond his immediate community:

"I could not leave my house because the water surged too quickly, trapping me inside. But volunteers and neighbours from nearby villages kept coming to check on us. They helped carry food, drinking water, medicines and other essentials through the strong currents. Seeing people who were not even from our village risk the rising waters to reach us gave me a deep sense of togetherness and safety. It reminded me that we were not fighting the flood alone." (Rahman, 55, farmer)

Adding perspectives from local officials and humanitarian volunteers further illustrates the multidimensional nature of bridging social capital. Informant Sarip, a fifty-two-year-old village head emphasized the importance of coordination between local leadership and external aid providers:

"Our role was to make sure that every household received the assistance they needed. We worked closely with NGOs and volunteers, mapping out evacuation routes and distributing supplies efficiently. The collaboration with outsiders not only helped save lives but also reassured villagers that support extended beyond their immediate neighbours." (Sarip, 52, Village Head)

Similarly, Informant Mira, a twenty-seven-year-old NGO volunteer reflected on the emotional support embedded in her relief work:

"We were not just delivering food and medicine; we were listening to their fears and frustrations. Many elderly residents had never left their homes during floods before and just knowing that someone from outside cared made a huge difference. Our presence helped reduce their sense of isolation." (Mira, 27, NGO Volunteer)

These findings demonstrate that bridging social capital serves a dual purpose, providing both essential material support and emotional reassurance. This wider network complements bonding capital by extending resilience beyond individual households, strengthening the community's collective capacity to respond, recover and adapt in the face of severe flood disasters. By linking local experiences with external resources, bridging networks ensured that even the most isolated, elderly, or inexperienced residents felt supported, empowered and connected.

Linking Social Capital: Institutional Connections and Governance Support

Linking social capital refers to vertical connections that link community members with formal institutions, including government agencies, NGOs and policy-making bodies. These networks enable residents to access structured aid, participate in organized recovery programs and engage in long-term adaptation strategies. During the 2024 flood, village heads and local volunteers often acted as critical intermediaries, bridging the gap between residents and institutional actors. Their roles were essential in ensuring that community needs were effectively communicated, while households relied on these intermediaries to navigate complex bureaucratic processes, demonstrating how domestic responsibilities and institutional engagement intersect in disaster recovery.

Access to Financial and Materials Relief

Formal assistance emerged as a lifeline for many households, providing not only essential supplies but also guidance and psychological reassurance during a period marked by fear and uncertainty. This support was particularly crucial for residents whose livelihoods were directly affected by the flood. Informant Rahman, a fifty-five-year-old farmer who had lived in the village for three decades, experienced significant losses when both his crops and livestock were swept away. With his primary source of income abruptly disrupted, the arrival of formal aid carried significance far beyond its material value. He recalled the experience vividly, his voice heavy with exhaustion and gratitude:

“District officers came before the flood reached its worst point and returned again once the water receded. They brought mattresses, canned food and cash assistance. At that time, it felt like they were bringing hope to our doorstep. Without their help, I do not know how we would have endured those first few days.” (Rahman, 55, farmer)

Informant Rahman’s account illustrates how linking social capital operates during moments of acute vulnerability, particularly for rural farmers whose livelihoods depend on fragile environmental conditions. The timely delivery of aid not only addressed immediate physical needs but also restored a sense of stability, enabling households like his to begin the gradual process of recovery and rebuilding.

For some residents, the most meaningful support during the recovery phase was not the distribution of food or household supplies but assistance in navigating complex bureaucratic procedures. Informant Aida, a forty-seven-year-old public servant who had lived in the village for twenty-two years and was forced to evacuate with her family, described the moment officials and volunteers stepped in to help her manage the overwhelming paperwork:

“They sat with us and helped fill out the forms for housing repairs and welfare aid. By then, we were emotionally exhausted and still trying to absorb the extent of the damage. Having someone patiently explain each step and guide us through the process made a world of difference. It reminded us that the government was not distant or unreachable. They were present, attentive and genuinely willing to help.” (Aida, 47, public servant)

Her experience illustrates how linking social capital operates not only as a pathway to formal assistance but also as an emotional buffer during moments of uncertainty. For residents like Informant Aida, institutional support provided reassurance, dignity and a sense of being truly seen amid the chaos.

Elderly informants, particularly those with limited mobility and long-established households, often experienced the deepest sense of vulnerability during the flood. Informant Hassan, a seventy-year-old retiree with primary-level education who had lived in the village for over five decades, faced both fear and physical constraints that prevented him from evacuating independently. His home was fully inundated, leaving him reliant on the responsiveness of external actors. Reflecting on the assistance he received, Informant Hassan conveyed both relief and gratitude, highlighting how institutional support can bridge gaps created by age and physical limitations:

“My legs are not strong anymore and moving around is a struggle. When the flood came, I could not wade through the water like the younger ones. But the officers and volunteers came straight to my house. They helped me fill out the forms, explained everything patiently and even accompanied me to collect the relief supplies.

That kind of help made me feel acknowledged as a person. It gave me a sense of calm, knowing I was not left behind." (Hassan, 70, retiree)

Village heads like Informant Sarip, a fifty-two-year-old, village head played a particularly pivotal role in coordinating evacuation efforts and distributing aid efficiently:

"I worked closely with both district officers and local volunteers to make sure families were evacuated safely and received the relief items they needed. Sometimes, that meant going door to door or helping elderly residents fill out forms. Our role was to make the connection between the people and the institutions as smooth as possible." (Sarip, 52, village head)

Similarly, NGO and youth volunteers, such as Informant Mira, a twenty-seven-year-old NGO volunteer and Informant Wani, a thirty-two-year-old youth volunteer and teacher reinforced linking capital by supporting rescue operations, psychosocial care and inter-village communication:

"We helped coordinate communication between villages and ensured that families who were isolated received food and emergency supplies. Many residents had never interacted with the government in such a structured way before, so our presence helped them feel supported and connected." (Wani, 32, youth volunteer/teacher)

"During the flood, our team assisted in both rescue and emotional support. Residents trusted us to communicate their needs to the authorities, which helped make the relief response more efficient." (Mira, 27, NGO volunteer)

Together, these experiences reveal that linking social capital provides far more than material relief. It offers institutional knowledge, procedural guidance, emotional reassurance and a sense of inclusion. For households with limited mobility or minimal familiarity with bureaucratic processes, these vertical connections become essential pathways to effective recovery. Linking capital enables residents to navigate complex aid systems with dignity, ensures that vulnerable groups remain visible in institutional responses and strengthens the community's capacity to rebuild not only its physical environment but also its collective confidence in the aftermath of flooding.

Participation in Recovery Programs

Active participation in post-flood recovery initiatives illustrates how linking social capital can transform feelings of loss into renewed strength and collective empowerment. In Hulu Dungun, these programs were far more than administrative procedures; they became communal rituals of healing, where residents, despite their varied backgrounds and hardships, found solidarity and regained a sense of control.

For Informant Zainal, a thirty-four-year-old fisherman who had lost his boat and nets and suddenly faced the loss of his livelihood, the arrival of organised recovery programs carried profound emotional significance. Dependent on external aid and uncertain about the future, he described how the government's clean-up campaign shifted the atmosphere in the village:

"When the government launched the communal clean-up after the flood, it felt like a spark of hope had returned to the village. Volunteers came, officers came and suddenly we were no longer facing the destruction alone. Each sweep of the mud felt like we were reclaiming our dignity. It was as if we were taking back pieces of our lives that the flood had washed away." (Zainal, 34, fisherman)

For someone whose identity and income had been closely tied to the river for fifteen years, the loss of fishing equipment represented more than material damage; it symbolised a rupture in his role as a provider. The communal clean-up provided him not only with practical assistance but also with emotional reassurance, reinforcing that recovery was a shared responsibility rather than a burden he had to bear alone. Through such structured initiatives, linking social capital strengthened the connection between residents and institutions, fostering a sense of partnership and collective ownership in rebuilding the community's future.

For Informant Noraini, a forty-three-year-old housewife, what resonated most profoundly was the spirit of intergenerational cooperation that emerged during the flood recovery. She painted a vivid picture of the collective energy and determination that animated the village:

"I saw children carrying small buckets and teenagers hauling debris alongside the adults. Their strength may not have matched ours, but their willingness to step in lifted everyone's spirits. It reminded us that recovery is not just about clearing mud and wreckage. It is about rebuilding confidence, reconnecting with one another and feeling supported by the authorities who were there with us every step of the way." (Noraini, 43, housewife)

Informant Noraini's reflection underscores that the recovery process extended far beyond physical restoration. It fostered emotional connections between residents and institutions, creating a shared sense of purpose and belonging. Her account highlights how community resilience is strengthened not only through material assistance but also through the reinforcement of social bonds and trust, where every member, regardless of age or physical ability, plays a meaningful role in the collective effort.

Complementing these community perspectives, local officials and volunteers offered additional insight into how linking social capital functioned during recovery. Informant Sarip, a fifty-two-year-old village head, coordinated evacuation and aid distribution, noting:

"Our role was not just to manage logistics. We had to assure villagers that the government and volunteers were here to support them. Trust is built when people see actions following promises." (Sarip, 52, village head)

Informant Mira, a twenty-seven-year-old NGO volunteer who provided psychosocial care during the recovery, emphasized the emotional dimensions of linking social capital:

"Sometimes, what families needed most was not food or clean-up help, but someone to listen and guide them. Our presence reassured them that recovery was a shared responsibility." (Mira, 27, NGO volunteer)

Informant Azman, a thirty-three-year-old district officer overseeing relief logistics, observed how structured programs strengthened institutional-community ties:

"Coordinating with both the community and local authorities revealed the importance of clear communication. Residents gained confidence in formal institutions and we learned from their resilience and initiative." (Azman, 33, district officer)

These findings reveal that structured recovery programs did far more than mobilize physical assistance. They activated emotional resilience, strengthened trust in formal institutions and transformed the recovery process into a shared community endeavour. The active involvement of household heads who coordinated family participation, mothers who motivated their children and neighbours to join and volunteers and officials who facilitated logistics illustrates the crucial role of linking social capital in recovery efforts. Moreover, the participation of residents across age groups demonstrates how social and institutional capital intertwine. Through these programs, collective action evolved into a meaningful pathway for empowerment, fostering pride, unity and a renewed sense of agency within the community.

Infrastructure and Long-Term Adaptation

Institutional enhancements following earlier flood disasters were not merely observed by residents; they were experienced as tangible safeguards that evoked relief, gratitude and a renewed sense of security. These improvements illustrate how linking social capital, cultivated through sustained interaction between communities and formal institutions, can shape long-term resilience in meaningful ways.

Informant Mat, a sixty-two-year-old fisherman with primary education who had endured multiple floods and suffered the loss of fishing equipment over decades, recalled the infrastructural changes with remarkable clarity

and emotion. His reflections reveal the perspective of someone who had lived through repeated devastation and could discern genuine progress:

"After the 2014 flood, everything around here changed. The embankments were strengthened, the drainage systems were repaired and for the first time, we had a proper warning system. When the water rose again this year, it was frightening, but the damage was far less. We could feel the difference immediately and it gave us a sense of security we hadn't felt before." (Mat, 62, fisherman)

Informant Mat's account illustrates that infrastructural upgrades are more than technical interventions; they are lived experiences that alleviate fear, enhance trust in institutional support and reinforce the community's confidence in its ability to withstand future floods. His repeated exposure to disasters and the losses he endured underscore how these improvements are interpreted not only through practical lenses but also through accumulated personal and communal memory, effectively linking physical adaptation with social resilience.

The contributions of local officials and volunteers further highlight the role of linking social capital in long-term adaptation. Informant Sarip, a fifty-two-year-old village head with three decades of local leadership experience, coordinated evacuation efforts and aid distribution during floods. He emphasized how formal authority and established relationships with government agencies facilitated timely infrastructural repairs and emergency response:

"Our coordination with district officers and the public works department meant that when the rains came, we could quickly assess weak points and reinforce the embankments before the water rose too high. People felt safer knowing someone was managing the response systematically." (Sarip, 52, village head)

Similarly, Informant Mira, a twenty-seven-year-old NGO volunteer with tertiary education, noted how collaboration between civil society and local authorities bridged the gap between technical solutions and community needs:

"We weren't just distributing aid; we were helping people understand why embankments were being built and how warning systems worked. This made them more confident and willing to cooperate during evacuations." (Mira, 27, NGO volunteer)

Informant Azman, a thirty-three-year-old district officer, reflected on the institutional perspective, observing how linking social capital enabled strategic planning and long-term infrastructure improvements:

"The post-2014 improvements weren't only about building structures; they were about building trust. When the community trusts the institutions, they participate in the monitoring, reporting and maintenance of flood prevention measures, which makes the system more resilient." (Azman, 33, district officer)

The patterns emerging from the 2024 inland flood in Hulu Dungun indicate that community resilience did not depend on a single form of social connection. Rather, it was sustained through the complementary interaction of bonding, bridging and linking social capital. Bonding capital facilitated immediate survival by enabling collective mobilisation, mutual aid and emotional support. Bridging capital expanded access to external resources, new knowledge and broader networks of solidarity, which helped the community adapt and recover. Linking capital strengthened connections with formal institutions, allowing households to access financial assistance, participate in organised recovery programmes and benefit from infrastructural improvements that reduced future risks.

Together, these forms of social capital create a layered and interconnected framework of resilience. Internal cohesion, horizontal collaboration and vertical institutional support intertwine to protect households during crises and empower them throughout recovery. The findings confirm that resilience is not the product of any single resource or actor; it emerges from the dynamic integration of relationships across local, regional and institutional levels. This multi-dimensional framework reinforces the applicability of social capital theory in explaining how communities withstand, adapt to and recover from flood disasters.

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DISCUSSION

The 2024 flood in inland areas such as Hulu Dungun, Terengganu, highlights the pivotal role of social capital in fostering community resilience. Residents relied on a combination of bonding, bridging and linking social capital to navigate immediate threats, access external resources and participate in long-term recovery initiatives (Choo & Yoon, 2022; Liu et al., 2022). These forms of social capital operated dynamically, with household roles, generational status, prior flood experience and occupational responsibilities shaping how individuals mobilized, shared resources and engaged with institutions (Su & Le Dé, 2020). Long-term residents and elderly individuals contributed critical local knowledge and historical experience, enabling the community to anticipate hazards and maintain cohesion, while younger heads of households coordinated collective responses and leveraged external networks. Mothers and informal workers played key roles in sustaining emotional support, caring for children and facilitating resource sharing, highlighting the intersection of socio-demographic factors with social capital dynamics (Behera, 2021; Hudson, Hagedoorn & Bubeck, 2020). Integrating these narratives provides nuanced insights into how social networks facilitate survival, adaptation and empowerment in rural disaster contexts.

Community resilience during the flood emerged as an interconnected system of social capital. Bonding social capital, evident in strong family and neighbour ties, was essential for immediate survival, enabling early mobilization, resource sharing and emotional support (Jamshed, 2020; Roque, Pijawka & Wutich, 2020). Bridging social capital complemented these internal networks by connecting the community to external actors, including NGOs, volunteers and inter-village networks, thereby broadening access to resources, knowledge and psychosocial guidance (Abenir, Manzanero & Bollettino, 2022; Zander, 2023). Linking social capital further reinforced resilience by facilitating engagement with formal institutions, ensuring continuity of aid, participation in organized recovery programs and long-term infrastructural adaptation (Khalil et al., 2021; Liu et al., 2022).

Figure 2 presents a conceptual diagram illustrating the interplay of bonding, bridging and linking social capital, highlighting the value of visual aids in improving clarity and reader engagement. The interplay between bonding, bridging and linking social capital demonstrates a multi-layered mechanism in which internal cohesion, horizontal networks,and vertical institutional links mutually reinforce one another. For example, households with children or residents with limited mobility relied on bonding ties to coordinate immediate evacuation while simultaneously leveraging bridging networks to secure external assistance and linking ties to access formal aid and guidance during the flood. This dynamic interdependence aligns with Putnam's (2000) conceptualization of social capital and is visually summarized in a conceptual diagram illustrating the flow and synergy between the three dimensions. Empirical evidence from Hulu Dungun extends this framework by showing how these dimensions interact in inland Malaysian flood contexts to produce adaptive and resilient community responses (Liu et al., 2022; Choo & Yoon, 2022).

Social capital functioned not only as a survival mechanism but also as a tool for community empowerment. Bonding ties enabled residents to act collectively in the face of immediate threats, reducing fear and providing psychological support (Ungar & Lustig, 2020). Bridging ties expanded access to external resources and knowledge, allowing communities to prepare more effectively for future floods and ensuring that first-time flood-affected households received essential support. Linking ties strengthened connections with formal institutions, providing residents with the capacity to participate in recovery programs, navigate bureaucratic processes and influence adaptive policy decisions (Khalil et al., 2021; Su, 2022). These interactions can be mapped geographically in a thematic map, showing how homes, NGOs and institutions coordinate responses in flood-affected areas, linking social and spatial dimensions of resilience.

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Figure 2: Social capital in Flood Resilience

Through these mechanisms, social capital transformed affected residents from passive victims into active agents of recovery. Collective action facilitated by strong family and neighbour ties, combined with strategic engagement with external and institutional networks, enhanced both individual and community agency. These findings are consistent with other Malaysian and regional flood studies (e.g., inland floods in Kelantan, 2014; Thailand, 2020), which highlight context-specific pathways through which local knowledge, household leadership and social cohesion operate in rural communities (Rustinsyah et al., 2021).

The study has important implications for disaster governance and policy planning. Authorities should recognize and actively support community-based systems, particularly the leadership of household heads, long-term residents and local leaders who facilitate rapid mobilization (Imperiale & Vanclay, 2021). Formalized partnerships between villages and NGOs can streamline the delivery of external aid and resources during emergencies, as evidenced in the 2024 inland flood. Additionally, digital platforms, social media, community messaging groups and early-warning systems can strengthen bridging and linking social capital by connecting residents to timely information, volunteers and institutional support (Yu et al., 2022; Tellman et al., 2021). Disaster governance strategies should integrate social capital into planning, recognizing that structural mitigation measures alone are insufficient (Terblanche et al., 2022). Supporting community networks, nurturing grassroots leadership and facilitating cross-community and institutional connections enhance both immediate response capabilities and long-term adaptive capacity, particularly for vulnerable populations such as children, the elderly and informal workers (Fan & Huang, 2023; Bucherie et al., 2022).

This study contributes to disaster sociology by empirically validating the bonding-bridging-linking framework in a rural Malaysian flood context. It demonstrates how these dimensions operate interdependently, with socio-demographic characteristics mediating the mobilization and effectiveness of social networks. By combining qualitative narratives with conceptual and thematic visualizations, the study provides grounded insights into the mechanisms through which social capital empowers communities, illustrating how internal cohesion, external networks and institutional ties collectively enable survival, adaptation and resilience (Su & Le Dé, 2020; Liu et al., 2022). Despite its contributions, the study has several limitations. Its focus on four inland villages may limit generalizability to urban, coastal, or geographically distinct flood contexts. Reliance on qualitative interviews, while providing depth, may introduce recall bias and subjectivity. Furthermore, social capital and resilience outcomes were not quantitatively measured. Future research could employ mixed-methods approaches, incorporate larger and more diverse samples, or conduct comparative studies across different flood-affected regions (Kriegl et al., 2020; Setiani, 2020). Nonetheless, the study provides robust, contextually grounded evidence of how bonding, bridging and linking social capital function synergistically to enhance community

resilience in flood situations, which can be effectively communicated through conceptual diagrams and thematic maps.

CONCLUSION

The experiences of inland residents in Hulu Dungun during the 2024 flood highlight that community resilience is deeply rooted in social capital. Bonding ties within families and neighbourhoods were crucial for immediate survival, enabling collective preparedness, resource sharing and emotional support that alleviated fear and reinforced psychological stability. These close-knit connections fostered a sense of solidarity, allowing households to respond rapidly and cohesively to rising floodwaters, particularly for vulnerable groups such as the elderly, children and residents with limited mobility. Household social roles, occupational responsibilities and prior flood experience further influenced how individuals mobilised resources and supported one another, illustrating the nuanced mechanisms of bonding social capital in practice. Bridging social capital extended the community's reach beyond immediate members, connecting residents with NGOs, volunteer groups and inter-village networks. These horizontal linkages enhanced access to critical resources, practical assistance and adaptive knowledge from previous flood events. By facilitating both material recovery and social inclusion, bridging networks reduced isolation and strengthened solidarity across villages and the broader region. Households experiencing floods for the first time particularly benefited from these networks, demonstrating how bridging capital supports preparedness and resilience among less-experienced community members.

Linking social capital connected communities with formal institutions and government agencies, enabling access to financial aid, organized recovery programs and long-term adaptation measures, such as improved drainage systems, embankments and early-warning mechanisms. These vertical networks underscore the importance of institutional responsiveness and governance in translating local resilience into sustainable adaptation. By integrating institutional guidance with local knowledge and social cohesion, linking capital facilitated faster recovery and empowered residents to participate in adaptive planning and policy consultations. Together, bonding, bridging and linking social capital form a multi-layered framework of resilience, in which internal cohesion, horizontal networks and institutional linkages operate synergistically to support both immediate survival and long-term adaptation. This study demonstrates that community resilience is not solely dependent on structural or top-down interventions but emerges from the dynamic interaction of social relationships across local, regional and institutional levels.

The findings carry important implications for disaster management in Malaysia. Strengthening local leadership, formalizing partnerships between villages and NGOs and enhancing communication and early-warning systems can reinforce the synergy among bonding, bridging and linking social capital. Policymakers should recognise that fostering trust, social networks and institutional linkages is as critical as infrastructural and technical measures in enhancing adaptive capacity in flood-prone communities. In sum, the Hulu Dungun case study provides empirical evidence that social capital functions as both a protective and empowering mechanism in disaster contexts. By integrating immediate survival strategies, external support systems and institutional partnerships, communities can achieve multi-layered resilience. This study contributes to disaster sociology by illustrating how bonding, bridging and linking capital operate synergistically in practice, offering both theoretical insights and practical guidance for enhancing community resilience in flood-affected regions.

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COMPETING INTEREST

The authors declare no competing interest.

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