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Rethinking Resilience through a Comprehensive Review of Persistent Challenges in Natural Disaster Management in Southeast Asia

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Abstract *Southeast Asia is a global hotspot for natural disasters, where escalating frequency and severity, amplified by climate change, continuously test national and local resilience. This comprehensive review synthesizes and expands upon existing systematic analyses of disaster management in the region, offering a deep-dive exploration of persistent challenges. Building on a foundational systematic review that identified key literature (Samad et al., 2025), this article moves beyond simple identification to provide a deep, integrative discussion of the critical obstacles hindering effective disaster risk reduction (DRR). We analyze eight major thematic challenges: (1) inadequate preparedness, (2) inefficient response mechanisms, (3) deep-seated socio-economic vulnerabilities, (4) gaps in public education and risk perception, (5) fragile and exposed infrastructure, (6) economic constraints and resource misallocation, (7) fragmented government policies and governance, and (8) the complex role of local beliefs and culture. This review synthesizes findings from across the region, drawing on key studies from Indonesia, the Philippines, Thailand, Vietnam, and others. The analysis underscores the profound interconnectedness of these challenges, arguing that single-domain solutions are insufficient. The findings form the basis for a robust discussion on integrated policy-making, strategic investment, and community-centric approaches, concluding with actionable recommendations for scholars and practitioners to foster a more sustainable and resilient future for the region.*

Keywords: *Natural Disaster; Climate Change; Management; Disaster Risk Reduction; Southeast Asia*

1. INTRODUCTION

The Southeast Asian region, a tapestry of vibrant cultures, rapid economic growth, and immense ecological diversity, is simultaneously one of the most disaster-prone regions on Earth (Djalante & Thomalla, 2012). Its geographic position astride the Pacific Ring of Fire and in the path of major storm systems exposes its populations to a relentless barrage of natural hazards, including earthquakes, tsunamis, volcanic eruptions, typhoons, floods, and landslides (Howe & Bang, 2017; Rattanakanlaya et al., 2018; Tahira & Kawasaki, 2020; Leelawat et al., 2021). These recurrent events exact a devastating toll, not only in the tragic loss of human life but also in profound economic and social setbacks that can reverse decades of development progress (Bhatt et al., 2019). The increasing frequency and heightened severity of these disasters, widely attributed to climate change, have rendered effective disaster management not just a policy preference but an urgent imperative for regional stability and survival (Sperling & Szekely, 2005; Thomalla et al., 2006).

For decades, the global community has attempted to create frameworks to manage these risks. This began with the World Conference on Natural Disaster Reduction in Yokohama, Japan, in 1994 (United Nations, 1994; World Conference on Natural Disaster Reduction, 1994), which established foundational guidelines (Handmer, 1995; Tozier de la Poterie & Baudoin, 2015). This was followed by the Hyogo Framework for Action (HFA) 2005-2015, a significant step toward "Building the Resilience of Nations and Communities to Disasters" (UNISDR, 2005; Matsuoka et al., 2009). The HFA served as a foundational policy for many vulnerable nations (Stavins & Barrett, 2002; Olowu, 2010; Basabe, 2013; Burkle et al., 2014). More recently, the Sendai Framework for Disaster Risk Reduction (SFDRR) 2015-2030, adopted in March 2015, has become the guiding international agreement (Aitsi-Selmi et al., 2015; Kelman, 2015; Sendai Framework for Disaster Risk Reduction 2015-2030 1, 2015; Tozier de la Poterie & Baudoin, 2015; Sakurai & Sato, 2016; Adu-Gyamfi et al., 2022).

Despite these global endeavors and the proliferation of national disaster management agencies, Southeast Asian countries continue to face distinct and formidable challenges (Djalante & Thomalla, 2012). The literature reveals a persistent gap between policy aspiration and on-the-ground reality (Samad et al., 2025). Countries across the region struggle with a nexus of interconnected problems, including limited public education, poorly designed and vulnerable infrastructure, and cultural influences that complicate community responses (de Leon & Pittock, 2017; Kammerbauer et al., 2018; Mon et al., 2018; Robielos et al., 2020; Shoji

et al., 2020). For instance, the responses to Typhoon Nargis (2008) and Typhoon Haiyan (2013) exposed significant challenges in governance and the relationship between central and local authorities in managing large-scale disasters (Howe & Bang, 2017). Similarly, studies in Indonesia have revealed high-risk exposure for critical infrastructure, such as public schools in Banda Aceh, highlighting severe deficits in spatial planning and construction standards (Sakurai et al., 2018).

While several systematic literature reviews (SLRs) have been conducted (e.g., Djalante, 2018; Samad et al., 2025), they often focus on disaster management in general or on specific empirical cases (Licina, 2013; Haris et al., 2020; Hoffmann & Blecha, 2020; Islam & Khan, 2020; Fatema et al., 2021; Jang et al., 2021; Kusumastuti et al., 2021; Abid et al., 2022; Tucker et al., 2023). These SLRs have been crucial in identifying key research trends, such as the predominance of studies integrating disaster risk reduction (DRR) and climate change adaptation (CCA) (Sperling & Szekely, 2005; Thomalla et al., 2006; Djalante & Thomalla, 2012; Phongsapan et al., 2019; Muir et al., 2020; Astuti et al., 2021; Oktari et al., 2021a; Sagala et al., 2021; Warsito et al., 2021; Gundran et al., 2023; Thi Phuong et al., 2023). However, a comprehensive, thematic synthesis of the challenges themselves—one that moves beyond a systematic count to provide a deep, narrative exploration—remains underdeveloped (Samad et al., 2025). Understanding why failures persistently occur is essential for formulating policies that work (Samad et al., 2025).

This review article aims to fill that gap. Building on the foundational SLR by Samad et al. (2025), which identified 39 core studies and 8 primary challenge themes from the Scopus database, this article provides a comprehensive synthesis and deep-dive analysis of those challenges. We move beyond the systematic report to offer an extensive discussion of the nuances, complexities, and interdependencies of these challenges. This review is organized around the eight thematic areas of challenge identified by Samad et al. (2025): (1) Preparedness, (2) Response, (3) Vulnerability, (4) Education, (5) Infrastructure, (6) Economic factors, (7) Government policy, and (8) Local beliefs. By synthesizing the findings from key studies across Indonesia, the Philippines, Thailand, Myanmar, and other Southeast Asian nations, this article provides a robust platform for discussing integrated solutions and future research directions, aiming to be a cornerstone resource for academics and practitioners dedicated to building a more resilient Southeast Asia.

2. METHODOLOGY

This article is a comprehensive review of the literature, not a new systematic review. It takes as its foundation the systematic findings of Samad et al. (2025). That study employed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) protocol to identify and screen relevant literature from the Scopus database up to June 2022, resulting in a final corpus of 39 key articles published between 2015 and 2023. Samad et al. (2025) categorized the challenges discussed in these 39 articles into eight primary themes.

The present review takes those eight themes and the 39 foundational articles (as well as the supporting literature cited in the original review) as its starting point. The objective here is not to replicate the systematic search but to synthesize and dramatically expand upon those findings, providing the "deep insight" and detailed discussion that a standard SLR article format (Samad et al., 2025) does not permit. This review integrates the findings from that corpus to build a comprehensive narrative, explore the interconnections between themes, and provide a depth of analysis suitable for a top-tier review journal. All citations are drawn exclusively from the original review.pdf file (Samad et al., 2025) to maintain citation integrity as requested.

3. Thematic Analysis of Disaster Management Challenges

3.1 Theme 1: Deficiencies in Disaster Preparedness

Disaster preparedness encompasses the comprehensive strategies, protocols, and resources established *before* a disaster strikes (Nguyen & Tran, 2016; Kitagawa, 2020). It is the foundation upon which all other disaster management efforts are built. The literature on Southeast Asia, however, reveals that this foundation is often alarmingly weak (Samad et al., 2025). Deficiencies in preparedness are not a single-point failure but a systemic issue, manifesting in inadequate plans, flawed warning systems, and a lack of community readiness (Heinkel et al., 2022; Samad et al., 2025).

A primary challenge identified in the literature is the existence of disaster preparedness plans that are merely symbolic or poorly conceived. These plans may exist on paper but lack actionable protocols, clear chains of command, or sufficient resource allocation (Nguyen & Tran, 2016). Studies from Indonesia, for

example, have repeatedly pointed to gaps in planning. Timperio et al. (2020) highlighted significant shortcomings in preparedness for health-related impacts of disasters, noting that plans often fail to account for the specific needs of vulnerable populations. This aligns with findings from Suriani et al. (2021), who also identified major gaps in preparedness plans in Indonesia, suggesting a disconnect between national-level planning and local-level implementation.

This disconnect is a recurring theme. Even when protocols are established, their effectiveness is often compromised. In the Philippines, Grady (2017) examined preparedness in the context of typhoon response, finding that while procedures existed, their execution was hampered by logistical and coordination failures. This demonstrates that preparedness is not just about having a plan, but about the *capacity* to execute it (Hawa et al., 2023).

Furthermore, the literature points to a critical lag in integrating modern challenges, particularly climate change adaptation (CCA), into traditional disaster risk reduction (DRR) preparedness plans (Sperling & Szekely, 2005; Thomalla et al., 2006). While the integration of DRR and CCA is a dominant topic in the global literature (Djalante & Thomalla, 2012; Phongsapan et al., 2019; Muir et al., 2020), its practical application in Southeast Asian preparedness plans is slow (Astuti et al., 2021; Oktari et al., 2021a; Sagala et al., 2021; Warsito et al., 2021). This failure means that preparedness strategies are often based on historical risk data that no longer reflects the heightened and altered threat landscape of a changing climate (Gundran et al., 2023; Thi Phuong et al., 2023).

A study by Sadeka et al. (2020) in Malaysia further compounds this issue, identifying a lack of comprehensive preparedness strategies that encompass all phases of the disaster cycle. Preparedness is often siloed, focusing on immediate response while neglecting pre-disaster mitigation and post-disaster recovery planning (Kitagawa, 2020). This fragmented approach results in a reactive, rather than proactive, stance (Heinkel et al., 2022). The findings from the foundational review (Samad et al., 2025) strongly underscore the need for comprehensive decision support frameworks and strategic positioning of emergency aid supplies *before* a disaster, both of which are core components of effective preparedness that are currently lacking (Samad et al., 2025). Without robust, tested, and integrated preparedness plans, the capacity of Southeast Asian nations to manage disasters will remain fundamentally compromised.

3.2 Theme 2: Inefficiencies in Disaster Response

Effective disaster response is a complex, high-stakes logistical and social operation, hinging on rapid assessment, clear communication, and seamless coordination among diverse stakeholders (Simm, 2018). It is the phase where preparedness plans are put to the ultimate test. The literature examining Southeast Asian disasters consistently identifies *inefficient response* as a critical and recurring challenge, often resulting in delayed aid, avoidable suffering, and a chaotic post-disaster environment (Samad et al., 2025). These inefficiencies are not random but stem from systemic weaknesses in governance, resource management, and inter-agency communication (Howe & Bang, 2017).

One of the most prominent issues is the failure of coordination. In the critical hours and days following a disaster, a multitude of actors including national agencies, local government units (LGUs), military branches, non-governmental organizations (NGOs), and international aid groups converge on the affected area (Hawa et al., 2023). Without a clear, pre-established, and respected command structure, this convergence can lead to duplicated efforts, critical gaps in aid delivery, and "logistical gridlock" (Phongsapan et al., 2019). The response to Typhoon Nargis in Myanmar (2008) and Typhoon Haiyan in the Philippines (2013) are benchmark case studies in this regard. Howe & Bang (2017) analyzed the governance challenges in these responses, highlighting how political tensions, mistrust between central and local authorities, and a lack of a unified command structure severely hampered the delivery of aid, particularly in the initial, most critical phase.

A recent study by Hawa et al. (2023) in Malaysia reinforces this point, identifying significant challenges in stakeholder coordination for flood response. Their research pointed to unclear roles and responsibilities, a lack of data sharing between agencies, and insufficient joint training exercises as primary drivers of an inefficient response. This suggests that even in countries with relatively well-resourced disaster management agencies, the "connective tissue" between stakeholders remains fragile. This is precisely the gap that preparedness plans are meant to fill, but as Grady (2017) found in the Philippines, the *execution* of these plans under real-world stress often falters.

Compounding the problem of coordination is the challenge of logistics and resource allocation.

Southeast Asia is an archipelagic and geographically complex region (Djalante & Thomalla, 2012). Disasters like earthquakes and typhoons frequently destroy the very infrastructure—roads, bridges, ports, and communication networks—that responders rely on (Kawasaki et al., 2017). This creates what is often termed a "last mile" problem, where aid is available at the national level but cannot reach the isolated communities that need it most. The foundational review by Samad et al. (2025) explicitly identifies the need for "strategic positioning of emergency aid supplies" as a key recommendation. The literature supports this, showing that a centralized, top-down response model is often ill-suited for the geographic realities of the region. A more effective approach, as suggested by the literature, involves decentralized, pre-positioned stockpiles and greater empowerment of local-level responders who are often the first on the scene (Samad et al., 2025).

Finally, communication failures are a pervasive theme. This includes both communication *to* the public (early warning systems) and communication *between* response agencies (situational awareness). While the 2004 Indian Ocean Tsunami led to significant investment in early warning systems (EWS), their effectiveness remains inconsistent (Mon et al., 2018). In some cases, the technology exists, but the public does not understand the warnings, or the warnings are not disseminated effectively at the community level (Leelawat et al., 2021). In other cases, as identified by Samad et al. (2025), the EWS themselves are inadequate. Concurrently, response agencies struggle to build a common operating picture. The potential of modern information and communication technologies (ICT) to create real-time situational awareness is often unrealized due to a lack of interoperability, limited technical capacity, and a failure to integrate data from diverse sources, including social media and community reports (Moya et al., 2020). In essence, the response phase in Southeast Asia is consistently hampered by a triad of failures: actors who cannot coordinate, supplies that cannot be moved, and information that cannot be shared effectively.

3.3 Theme 3: Pervasive Socio-Economic Vulnerabilities

A fundamental truth, reinforced throughout the disaster management literature, is that hazards are natural, but disasters are social (Kitagawa, 2020). A typhoon, earthquake, or flood becomes a widespread catastrophe largely because it strikes a population with pre-existing vulnerabilities. In Southeast Asia, these vulnerabilities are deep, pervasive, and primarily socio-economic in nature (Samad et al., 2025). The literature is unequivocal on this point: disaster risk is not distributed equally. Instead, it systematically targets and disproportionately impacts the poorest and most marginalized segments of society (Bhatt et al., 2019; Cuaton & Su, 2020).

Vulnerability, in this context, is far more than simple physical exposure to a hazard. It is a complex, multi-dimensional condition shaped by social, economic, and political processes that limit a person's or a group's capacity to anticipate, cope with, resist, and recover from a disaster (Kitagawa, 2020). Cuaton & Su (2020), in their comprehensive review of DRR in the Philippines, frame this as an intrinsic development issue. They argue that the root causes of vulnerability are often identical to the root causes of poverty: limited access to resources, lack of political power, and social marginalization. This perspective shifts the focus of disaster management from a purely technical, hazard-focused exercise to a broader challenge of sustainable development and social equity (Djalante & Thomalla, 2012).

The literature highlights several specific demographic and social groups whose vulnerability is particularly acute. Lestari et al. (2022) conducted a focused study in Indonesia on the preparedness of vulnerable groups, specifically identifying women, children, and the elderly. These groups often face unique barriers; for example, women may be primary caregivers, limiting their mobility during an evacuation, while the elderly may have physical limitations or chronic health conditions that are exacerbated during a crisis (Timperio et al., 2020). Children, in turn, suffer unique psychological and physical impacts, and their educational continuity is often shattered post-disaster (Sakurai et al., 2018).

Furthermore, some vulnerable groups are rendered almost invisible in official disaster planning. Vickery (2018) uses an intersectional approach to study the vulnerability of homeless persons in the Philippines, a group that is frequently overlooked by traditional disaster management frameworks, which assume that all citizens have a "household" to return to or protect. These individuals often lack access to early warnings, have no safe place to shelter, and are excluded from post-disaster aid registration systems (Vickery, 2018). This highlights a critical failure in preparedness plans (Theme 1) and response mechanisms (Theme 2), which are often designed for a "standard" citizen and fail to account for the diverse realities of a socially stratified population.

The economic dimension of vulnerability is perhaps its most powerful driver. Poverty forces millions

of people in Southeast Asia to live in high-risk areas—such as low-lying floodplains, unstable hillsides, or crowded coastal zones—because it is the only land they can afford (de Leon & Pittock, 2017). This "choice" is, in reality, a lack of choice. When a disaster strikes, these communities are not only the first to be hit but also have the fewest resources to cope. They often live in substandard housing (Theme 5: Infrastructure) and lack the savings or insurance to absorb the economic shock (Mutiarni et al., 2022). As Bhatt et al. (2019) note, disasters create and perpetuate poverty traps; a single event can wipe out a family's entire asset base, reversing years of economic progress.

This is intricately linked to livelihood resilience. Gartrell (2020) discusses the challenges of post-disaster livelihood recovery, noting that those reliant on agriculture or coastal fishing—two mainstays of the region's rural economy—are exceptionally vulnerable. A flood, typhoon, or tsunami can destroy crops, ruin fishing boats, and contaminate agricultural land, effectively severing a community's primary source of income. This economic devastation has cascading effects, impacting health, nutrition, and the ability to invest in future preparedness, thus locking communities into a "cycle of risk" (Samad et al., 2025). The limited financial capacity of developing countries (Oktari et al., 2021b) further means that government support for this recovery is often slow and insufficient, placing the burden of rebuilding squarely on the shoulders of those least able to bear it.

3.4 Theme 4: Gaps in Education and Risk Perception

If infrastructure represents the "hardware" of disaster resilience, then education and public risk perception represent the critical "software" that determines its effectiveness. A community can be protected by the strongest sea wall, but that defense is rendered useless if residents do not know to evacuate when a warning is sounded. The literature on disaster management in Southeast Asia points to a significant and persistent gap in public education, coupled with a fundamental disconnect between objective risk and subjective perception (Samad et al., 2025). This gap undermines preparedness, complicates response, and ultimately leaves populations far more vulnerable than they need to be.

A primary challenge is the simple lack of widespread, continuous, and effective public education on disaster risks. Mon et al. (2018), in their study on tsunami risk in Thailand, found that despite the devastating experience of the 2004 tsunami, public education efforts had waned, and awareness remained inconsistently low. This finding is echoed across the region. Disaster education is often treated as a short-term project implemented in the immediate aftermath of a disaster rather than a core, permanent component of public and formal education. Samad et al. (2025) identify "inadequate awareness and limited public education" as a primary theme, suggesting that information is not reaching communities, or if it is, it is not being retained or understood.

Even when educational programs are implemented, they often face a second, more complex challenge: the gap between knowledge and action. Oktari et al. (2021a) explored this issue in Indonesia, emphasizing the need to move beyond simple information dissemination (e.g., distributing pamphlets) toward genuine capacity building. Their work, which calls for the integration of DRR and climate change adaptation (CCA) into educational programs, highlights that the goal of education is not just *knowing* about a risk, but *knowing what to do* about it and being motivated to act. Many studies reveal that residents may be able to state that they live in a flood- or earthquake-prone area but have not taken concrete preparedness steps, such as preparing an emergency kit or having a family evacuation plan (Nguyen & Tran, 2016).

This "knowing-doing" gap is further complicated by the interplay of formal education and local socio-cultural factors (which will be explored in Theme 8). A compelling study by Shoji et al. (2020) in Indonesia examined the complex relationship between tsunami education and local beliefs. They found that while education *did* improve preparedness behavior, its effects were sometimes moderated or even counteracted by fatalistic beliefs or traditional interpretations of risk. This suggests that a "one-size-fits-all" educational model, particularly one imported from a Western context, may fail if it does not engage with and respect the local cultural context (James & Paton, 2015).

Finally, flawed risk perception directly undermines the effectiveness of critical systems, particularly early warning systems (EWS). An EWS is only effective if the population it serves trusts the warning, understands its urgency, and knows the correct life-saving action to take (Leelawat et al., 2021). If the public perceives the risk as low (e.g., "it won't happen to me") or if they have experienced false alarms in the past, they may ignore the warning, leading to catastrophic and avoidable loss of life. This failure is not a technical failure of the EWS, but a failure of the socio-educational component of the disaster management system. As the

foundational review (Samad et al., 2025) concludes, "enhanced risk perception and education" are not optional add-ons but are fundamental pillars required for building genuine community resilience.

3.5 Theme 5: Fragile and Exposed Infrastructure

The resilience of a nation is often visibly expressed in its built environment. Infrastructure comprising not just "hard" structures like roads, bridges, hospitals, and schools, but also "soft" infrastructure like communication networks and power grids forms the physical backbone for societal functioning and, critically, for disaster management (Samad et al., 2025). The literature on Southeast Asia reveals that this backbone is often fragile, poorly planned, and dangerously exposed, turning predictable natural hazards into large-scale catastrophes. This theme is not merely about structural engineering; it is a critical nexus where challenges of economic constraints (Theme 6), governance (Theme 7), and response (Theme 2) converge.

A fundamental issue, as identified by Samad et al. (2025), is the systemic underinvestment in disaster-resilient infrastructure. Kawasaki et al. (2017), in their study on Myanmar, highlight that limited resources and inadequate investment in disaster management infrastructure are primary obstacles. This economic reality (which will be detailed in Theme 6) means that essential facilities are often not built to withstand the specific hazards of their location. This includes a failure to retrofit older, vulnerable buildings and a lack of enforcement of modern, hazard-specific building codes. In many rapidly urbanizing areas, informal settlements are constructed without any regulatory oversight, placing millions in structures that offer little to no protection (de Leon & Pittock, 2017).

Beyond the quality of construction, the *location* of infrastructure is a profound challenge. Sakurai et al. (2018) provide a stark example in their study of public elementary schools in Banda Aceh, Indonesia. They found that a staggering 56% of these schools critical pieces of infrastructure that often double as evacuation centers were located in high-risk tsunami zones. This demonstrates a critical failure in spatial planning and land-use management. When a disaster strikes, this poor planning results in a cascading failure: the very places communities are told to flee to are themselves compromised. This exposure of essential services directly undermines preparedness (Theme 1) and cripples the capacity to respond.

The literature also emphasizes that infrastructure failure is a primary driver of vulnerability. De Leon & Pittock (2017) illustrated this in the context of Typhoon Haiyan. The storm's destruction of roads, ports, and communication lines did not just represent a loss of assets; it created an immediate and near-total breakdown of the logistics chain. This physical isolation, as discussed in Theme 2, is what prevents aid from reaching afflicted populations, turning a manageable crisis into a humanitarian disaster (Howe & Bang, 2017). The inability to move resources, personnel, and information is a direct consequence of a fragile and non-redundant infrastructure system.

Finally, the potential of modern technology to mitigate these infrastructural weaknesses remains largely unfulfilled. The literature discusses the promise of Information and Communication Technologies (ICT) in disaster management (Tahira et al., 2013; Moya et al., 2020). In theory, ICT can create "smart" infrastructure—networks that can self-diagnose, re-route traffic (both data and physical), and provide real-time situational awareness to response managers. For example, sensor networks could provide real-time data on river levels (Tahira & Kawasaki, 2020) or structural integrity. However, the reality on the ground is one of fragmented systems, a lack of interoperability, and a significant digital divide. As Moya et al. (2020) discuss, without a robust, integrated, and resilient underlying communication infrastructure, these advanced technological solutions cannot be deployed effectively. Therefore, the "fragile infrastructure" challenge is twofold: a failure to build basic physical resilience and a failure to fully leverage the technological advancements that could create smarter, more adaptive systems.

3.6 Theme 6: Economic Constraints and Resource Allocation

The effectiveness of any disaster management strategy is ultimately underpinned by the financial resources available to implement it. In Southeast Asia, a region characterized by a mix of rapidly emerging economies and developing nations, economic constraints and challenges in resource allocation represent a fundamental and cross-cutting obstacle (Samad et al., 2025). This theme is not a standalone issue; it is the financial engine that dictates the quality of infrastructure (Theme 5), the robustness of preparedness plans (Theme 1), and the depth of socio-economic vulnerability (Theme 3). The literature clearly articulates that a persistent lack of funding, and the inefficient allocation of available funds, severely curtails the region's capacity for genuine resilience.

A primary challenge is the "limited resources in developing countries," as identified by Oktari et al. (2021b). National governments in the region face immense competition for limited public funds, often having to prioritize immediate developmental needs such as poverty reduction, healthcare, and education over long-term, probabilistic investments like disaster risk reduction. DRR is frequently viewed as a "cost" rather than an "investment," leading to it being chronically underfunded (Kawasaki et al., 2017). This forces nations into a perpetually reactive posture. Funds are scraped together in the aftermath of a disaster for response and recovery, but the proactive, pre-disaster investments in mitigation, preparedness, and resilient infrastructure—which are proven to be far more cost-effective—are consistently deferred (Mutiarni et al., 2022).

This underinvestment is compounded by the staggering economic *impact* of the disasters themselves. Cuaton & Su (2020) provide a detailed analysis of this issue in the Philippines, framing DRR as an essential component of economic development. Disasters inflict devastating direct losses (e.g., destroyed homes, roads, and factories) and even larger indirect losses (e.g., disrupted supply chains, lost income, and diversion of development funds). As Bhatt et al. (2019) argued, this creates a vicious cycle: poverty leads to higher vulnerability, which leads to greater disaster impacts, which in turn deepens poverty. This "poverty trap" operates at both the household level (Theme 3) and the national level. A single, large-scale event can wipe out a significant percentage of a nation's GDP, reversing years of hard-won development gains and further shrinking the budget available for future resilience-building.

Furthermore, even when funds are allocated for DRR, significant challenges exist in financing and managing these resources effectively. Mutiarni et al. (2022) explored the complexities of financing post-disaster recovery in Indonesia, highlighting issues with the flow of funds, bureaucratic inefficiencies, and a lack of transparency. This connects directly to the theme of governance (Theme 7). Poor coordination between national and local government bodies (Sagala et al., 2021) can lead to misallocation, where funds do not reach the communities or projects that need them most. In a resource-constrained environment, this inefficiency is not just a procedural failing; it represents a critical loss of opportunity to build resilience.

The consequences of these economic constraints are tangible and are detailed in the other themes of this review. The "inadequate investment in disaster management infrastructure" (Kawasaki et al., 2017) is a direct result of this financial pressure, leading to the fragile and exposed schools, hospitals, and transportation networks discussed in Theme 5. Similarly, preparedness plans (Theme 1) fail not just because of a lack of will, but because of a lack of budget for training, equipment, stockpiling emergency supplies (Samad et al., 2025), and maintaining early warning systems (Mon et al., 2018). Ultimately, the literature demands a paradigm shift: viewing disaster management not as a financial drain, but as the essential, non-negotiable protection of all other economic and development investments.

3.7 Theme 7: Fragmented Government Policies and Governance

While economic constraints (Theme 6) limit the *resources* for disaster management, it is government policy and governance that dictates how effectively those resources are used. This theme is arguably the most critical, as it functions as the "operating system" for all other aspects of DRR. The literature on Southeast Asia points to a deep and persistent challenge in this domain: a fragmentation of policy, a lack of coordination between agencies, and a significant gap between policies drafted at the national level and the realities of their implementation at the local level (Samad et al., 2025). These governance failures often render even well-funded and technically sound strategies ineffective.

A central issue is the persistent conflict and ambiguity in roles and responsibilities, particularly between central and local government bodies. Howe & Bang (2017) provide a powerful comparative analysis of this very issue in their study of the responses to Typhoon Nargis in Myanmar and Typhoon Haiyan in the Philippines. In both cases, despite vastly different political systems, the disaster response was severely hampered by a "lack of clear primary governance responsibility." Tensions between national and local authorities, political mistrust, and bureaucratic infighting led to crippling delays in aid distribution and a breakdown of the command structure. This highlights that disaster governance is not just a technical problem of management but a deeply political one.

This policy-implementation gap is a recurring motif in the literature. De Leon & Pittock (2017), also studying the Haiyan response, reinforce this finding, noting significant gaps between national DRR policies and their actual execution on the ground. Similarly, Sagala et al. (2021) analyzed policy integration in Indonesia and found a disconnect between national-level DRR ambitions and the capacity or willingness of

local governments to translate those policies into concrete action. This often leaves local communities in a state of confusion, caught between conflicting directives from different levels of government (Warsito et al., 2021).

The problem is further exacerbated by a lack of *horizontal* coordination among different government agencies and stakeholders. An effective disaster management system requires the seamless integration of multiple sectors: transportation, health, infrastructure, education, social welfare, and more (Hawa et al., 2023). However, these agencies often operate in "silos," with different mandates, separate budgets, and no culture of data sharing or joint planning. Hawa et al. (2023) identified this as a major challenge in Malaysian flood response, where a lack of coordination among key stakeholders led to inefficiencies. This fragmentation means that, for example, the agency responsible for infrastructure (Theme 5) may not be communicating with the agency responsible for spatial planning and school location (Sakurai et al., 2018), leading to the kinds of high-risk exposure discussed earlier.

The evolution of global frameworks from the Hyogo Framework for Action (HFA) (UNISDR, 2005) to the Sendai Framework (SFDRR) (Aitsi-Selmi et al., 2015) was intended to address these very issues. The Sendai Framework, in particular, places a strong emphasis on good governance, calling for clear institutional roles, multi-stakeholder engagement, and policy coherence (Aitsi-Selmi et al., 2015; Kelman, 2015). However, the literature from Southeast Asia suggests that the *adoption* of these principles has been slow and uneven (Tozier de la Poterie & Baudoin, 2015). While many nations in the region have updated their national DRR plans to reflect the language of Sendai (Sendai Framework for Disaster Risk Reduction 2015-2030 1, 2015; Sakurai & Sato, 2016), the systemic, bureaucratic, and political barriers to *implementing* this integrated vision remain formidable (Adu-Gyamfi et al., 2022). Without a concerted effort to break down these institutional silos and bridge the gap between national policy and local reality, governance itself will continue to be one of the greatest risks the region faces.

3.8 Theme 8: The Role of Local Beliefs and Social Capital

The preceding themes have largely focused on the "hard" and "soft" systems of disaster management: infrastructure, economics, governance, and education. However, the literature makes it clear that disaster resilience is, at its core, a human and social endeavor. The final theme explores the profound influence of local culture, traditional beliefs, and the strength of community networks (social capital) on disaster outcomes. These factors are not peripheral; they are powerful mediators that can either significantly amplify risk or provide a crucial, grassroots foundation for resilience (Samad et al., 2025).

The cultural context of a community shapes how it perceives risk, interprets warnings, and decides to act. James & Paton (2015) argue that culture can be both a barrier and a facilitator. As a barrier, certain traditional or fatalistic beliefs can run counter to scientific warnings and preparedness education. A powerful example of this is found in the work of Shoji et al. (2020) in Indonesia. Their study on tsunami preparedness found that while formal education positively influenced preparedness behavior (as discussed in Theme 4), its effects were complicated by deep-seated local beliefs. A fatalistic worldview—a belief that one's fate is predetermined and that disasters are "acts of God" beyond human control—can lead to passivity, undermining the motivation to evacuate or take preparatory measures even when the risk is known. This finding is critical, as it implies that top-down educational programs (Theme 4) that ignore or dismiss these beliefs are likely to fail.

Conversely, local culture and social structures can be an immense source of strength. This is where the concept of "social capital" becomes paramount. Social capital refers to the networks of relationships, shared norms, and trust within a community that enable its members to act collectively (Samad et al., 2025). In many parts of Southeast Asia, where formal government response (Theme 2) can be slow or inefficient (Howe & Bang, 2017), it is these informal community networks that provide the *actual* first response. Neighbors helping neighbors, local community groups organizing informal shelters, and religious institutions mobilizing volunteers and resources are all manifestations of social capital in action (Htut et al., 2014).

Htut et al. (2014) specifically examined the role of religious institutions in Myanmar's disaster response, noting their deep community embeddedness and high levels of public trust. These institutions often have the logistical and moral capacity to mobilize a response far more quickly than external agencies. Ignoring or bypassing these existing social structures is a common mistake made by external responders. Effective disaster management, as the literature suggests, does not try to *replace* these local systems but rather seeks to

partner with them, strengthening their capacity and integrating their deep local knowledge into formal preparedness and response plans (James & Paton, 2015). This "community-based" approach, which is a cornerstone of modern DRR frameworks like the Sendai Framework (Kelman, 2015), is essential for bridging the gap between national policy (Theme 7) and effective, localized action.

3.9 Summary Tables from the Literature

Table 1: Synthesis of Key Empirical Studies on Disaster Management Challenges in Southeast Asia

Author(s) (Year)	Country of Research	Disaster Type(s) Addressed	Key Challenge(s) Identified	Key Finding / Implication	Ref.
de Leon & Pittock (2017)	Philippines	Typhoon (Haiyan)	Vulnerability, Government Policy	Highlights the critical gaps between national DRR policies and their implementation at the local level, revealing significant community vulnerability.	(de Leon & Pittock, 2017)
Kawasaki et al. (2017)	Myanmar	Flood, Cyclone (Nargis)	Infrastructure, Response	Inadequate investment in disaster management infrastructure and limited resources severely hamper effective early warning and response mechanisms.	(Kawasaki et al., 2017)
Sakurai et al. (2018)	Indonesia	Tsunami	Infrastructure, Preparedness	Found that a high percentage (56%) of public elementary schools in Banda Aceh were exposed to high tsunami risk, indicating poor spatial planning and infrastructure vulnerability.	(Sakurai et al., 2018)
Phongsapan et al. (2019)	Myanmar	General	Response, Preparedness	Identifies significant weaknesses in coordination between government agencies and other stakeholders during disaster response, limiting overall effectiveness.	(Phongsapan et al., 2019)
Cuaton & Su (2020)	Philippines	General	Economic, Vulnerability	Provides a comprehensive review of DRR, linking disaster impacts to economic development and highlighting how vulnerability is a developmental issue.	(Cuaton & Su, 2020)
Shoji et al. (2020)	Indonesia	Tsunami	Education, Local Beliefs	Reveals that while education can improve preparedness, local beliefs and fatalistic views can sometimes counteract formal education efforts.	(Shoji et al., 2020)
Oktari et al. (2021a)	Indonesia	Tsunami	Preparedness, Education	Emphasizes the need to integrate DRR and climate change adaptation (CCA) into educational programs to build long-term community	(Oktari et al., 2021a)

Author(s) (Year)	Country of Research	Disaster Type(s) Addressed	Key Challenge(s) Identified	Key Finding / Implication	Ref.
				resilience.	
Lestari et al. (2022)	Indonesia	Multiple	Vulnerability, Preparedness	Focuses on the specific vulnerabilities of demographic groups (e.g., women, children, elderly) and the necessity for inclusive disaster preparedness plans.	(Lestari et al., 2022)

Table 2: Thematic Analysis of Governance, Policy, and Community-Level Challenges

Thematic Challenge	Key Dimensions Explored in Literature	Specific Obstacles Identified	Countries of Focus (Examples)	Illustrative Ref.
Government Policy & Governance	Central vs. Local Government Roles; Policy Integration (DRR/CCA); Stakeholder Coordination.	Lack of clear primary governance responsibility (Howe & Bang, 2017); Poor coordination (Hawa et al., 2023); Gaps between policy and implementation (Sagala et al., 2021).	Philippines, Indonesia, Myanmar	(Howe & Bang, 2017; Sagala et al., 2021; Hawa et al., 2023)
Socio-Economic Vulnerability	Poverty; Marginalized Groups (e.g., homeless, elderly); Livelihood Resilience.	Disasters disproportionately affect the poor (Bhatt et al., 2019); Specific vulnerabilities of groups like the homeless are often overlooked (Vickery, 2018).	Regional (SEA), Philippines	(Bhatt et al., 2019; Cuaton & Su, 2020; Vickery, 2018)
Education & Risk Perception	Public Awareness; Formal Education Curricula; Access to Information.	Limited public education on disaster risks (Mon et al., 2018); Gaps in knowledge (Oktari et al., 2021a); Need for enhanced risk perception (Samad et al., 2025).	Indonesia, Philippines, Thailand	(Mon et al., 2018; Shoji et al., 2020; Oktari et al., 2021a)
Local Beliefs & Social Capital	Cultural Influences; Role of Religion; Community Networks.	Cultural context can be a barrier or a facilitator (James & Paton, 2015); Local beliefs may conflict with scientific warnings (Shoji et al., 2020).	Myanmar, Taiwan, Indonesia	(James & Paton, 2015; Shoji et al., 2020)

4. Discussion: The Interconnected Web of Challenges

The eight themes detailed in this review—Preparedness, Response, Vulnerability, Education, Infrastructure, Economics, Governance, and Local Beliefs—are not discrete, independent failures. To treat them as a simple checklist would be to misdiagnose the core problem of disaster management in Southeast Asia. The central thesis of this review, synthesizing the findings of the foundational literature (Samad et al., 2025; Djalante, 2018), is that these challenges form a deeply interconnected and self-reinforcing *web*. The failure in one domain directly causes or exacerbates failures in others, creating a systemic vulnerability that is far greater than the sum of its parts.

The summary tables provided earlier (Table 1 and Table 2) illustrate these connections. At the center of this web lies the challenge of **Fragmented Governance (Theme 7)**. When government policy is unclear and coordination between agencies is poor (Hawa et al., 2023; Sagala et al., 2021), the entire system falters.

This governance deficit leads directly to **Economic Constraints (Theme 6)**, not just through a lack of funds, but through the *misallocation* of the limited resources that are available (Mutiarni et al., 2022). This chronic under-investment and inefficiency, in turn, creates **Fragile Infrastructure (Theme 5)**, where critical facilities are not built to code and are placed in high-risk zones (Kawasaki et al., 2017; Sakurai et al., 2018).

This combination of poor governance and weak infrastructure makes robust **Preparedness (Theme 1)** a near impossibility. Preparedness plans remain on paper (Nguyen & Tran, 2016), and early warning systems are not maintained (Mon et al., 2018). When a disaster inevitably strikes, this lack of preparedness guarantees an **Inefficient Response (Theme 2)**. Responders are faced with impassable roads (de Leon & Pittock, 2017), a breakdown in communication (Moya et al., 2020), and a chaotic command structure (Howe & Bang, 2017).

These systemic failures then crash upon the population, but they do not do so equally. They are filtered and amplified by the pre-existing **Socio-Economic Vulnerabilities (Theme 3)**. The poorest communities, living in the most exposed areas, are hit the hardest (Bhatt et al., 2019; Cuaton & Su, 2020; Vickery, 2018). Their ability to cope is then mediated by the "human software" of **Education (Theme 4)** and **Local Beliefs (Theme 8)**. A community with low risk perception (Samad et al., 2025) and fatalistic beliefs (Shoji et al., 2020) will be less likely to heed warnings, regardless of their technical sophistication. Conversely, a community with high social capital (Htut et al., 2014) may mount an effective local response, succeeding *in spite of* the systemic government failures.

This analysis underscores the critical importance of integrating Disaster Risk Reduction (DRR) and Climate Change Adaptation (CCA), a dominant topic in the literature (Sperling & Szekely, 2005; Thomalla et al., 2006; Djalante & Thomalla, 2012). Climate change acts as a "threat multiplier," amplifying the frequency and intensity of hazards (Gundran et al., 2023; Thi Phuong et al., 2023). A fragmented, siloed approach is no longer tenable. As researchers like Oktari et al. (2021a) and Sagala et al. (2021) argue, policies *must* integrate these two fields, moving toward a holistic, long-term vision of resilience that addresses the root causes of vulnerability, not just the symptoms of hazards.

5. Conclusion and Recommendations

This comprehensive review, building upon the systematic analysis of Samad et al. (2025), has synthesized and deeply explored the eight persistent challenges that undermine natural disaster management in Southeast Asia. We have moved beyond a simple enumeration of problems to analyze the complex, interconnected web that links fragmented governance, economic constraints, fragile infrastructure, and deep-seated social vulnerabilities. The literature is clear: the region remains trapped in a reactive cycle, where a lack of proactive, integrated planning perpetuates the very conditions that turn natural hazards into human and economic catastrophes.

Breaking this cycle requires a paradigm shift, moving away from siloed, top-down response measures toward a holistic, community-centric, and long-term resilience strategy. Based on the synthesized findings, this review concludes with several key recommendations for both policy and future research, which echo the guidelines proposed in the foundational literature (Samad et al., 2025).

a. **Develop Comprehensive, Integrated Decision Support Frameworks:** The current fragmentation of governance is the single greatest barrier to progress. Governments must invest in unified decision-support systems that integrate data and coordinate action across all relevant agencies (e.g., Hawa et al., 2023). This framework must explicitly merge DRR and CCA strategies (Djalante & Thomalla, 2012; Sagala et al., 2021) to ensure that spatial planning, infrastructure development, and economic policy are all viewed through the lens of long-term risk.
b. **Prioritize Education for Enhanced Risk Perception:** It is not enough to simply build warning systems; nations must invest in sustained public education to cultivate genuine risk perception (Oktari et al., 2021a). This education must be community-based and culturally sensitive, engaging with, rather than dismissing, local beliefs and social structures (Shoji et al., 2020; James & Paton, 2015).
c. **Invest in Integrated and Resilient Infrastructure:** Future investments must be "risk-informed." This requires more than just enforcing building codes; it demands intelligent spatial planning to move critical infrastructure, such as schools and hospitals, out of high-risk zones (Sakurai et al.,

2018). Furthermore, this includes the strategic positioning of emergency aid supplies *before* disasters strike to overcome the "last mile" problem (Samad et al., 2025).

d. **Strengthen and Empower Local Capacity:** Top-down response consistently fails (Howe & Bang, 2017). Policy and funding must be redirected to empower local government units and community-based organizations. This involves strengthening social capital and formally integrating trusted local institutions (e.g., religious bodies) into preparedness and response plans (Htut et al., 2014).

Future research must move beyond simply identifying these challenges again. The urgent need is for implementation science: research that tests *how* to overcome these well-documented barriers in the complex political and cultural contexts of Southeast Asia. Without this practical, solutions-oriented focus, the region's resilience will remain a policy aspiration rather than a lived reality.

REFERENSI

Abid, S. K., Sulaiman, N., Mahmud, N. P. N., Nazir, U., & Adnan, N. A. (2020). A review on the application of remote sensing and geographic information system in flood crisis management. *Journal of Critical Reviews*, *7*(16), 491–496. Scopus.

Adu-Gyamfi, B., Ariyaningsih, A., Zuquan, H., Yamazawa, N., Kato, A., & Shaw, R. (2024). Reflections on science, technology and innovation on the aspirations of the Sendai framework for disaster risk reduction. *International Journal of Disaster Resilience in the Built Environment*, *15*(2), 289–302. Scopus. https://doi.org/10.1108/IJDRBE-06-2022-0062

Aitsi-Selmi, A., Egawa, S., Sasaki, H., Wannous, C., & Murray, V. (2015). The Sendai Framework for Disaster Risk Reduction: Renewing the Global Commitment to People's Resilience, Health, and Well-being. *International Journal of Disaster Risk Science*, *6*(2), 164–176. Scopus. https://doi.org/10.1007/s13753-015-0050-9

Alam, A. S. A. F., Begum, H., Masud, M. M., Al-Amin, A. Q., & Filho, W. L. (2020). Agriculture insurance for disaster risk reduction: A case study of Malaysia. *International Journal of Disaster Risk Reduction*, *47*. Scopus. https://doi.org/10.1016/j.ijdrr.2020.101626

Amri, A., Bird, D. K., Ronan, K., Haynes, K., & Towers, B. (2017). Disaster risk reduction education in Indonesia: Challenges and recommendations for scaling up. *Natural Hazards and Earth System Sciences*, *17*(4), 595–612. Scopus. https://doi.org/10.5194/nhess-17-595-2017

Anuar, F. A. W., Sarmila, M. S., & Zaimah, R. (2022). The journey of women's career to top management: A systematic literature review using PRISMA. *International Journal of Academic Research in Business and Social Sciences*, *12*(12), 188–206. Scopus.

Azimi, M. A., Zakaria, S. A. S., & Majid, T. A. (2017). Technical and Non-Technical Factors of Risk Identification for Sustainable Coastal Development in Malaysia. *IPTEK Journal of Proceedings Series*, *3*(6), 1–3. Scopus.

Bailey, S., & Harvey, P. (2015). Shaping Policy for Development State of Evidence on Humanitarian Cash Transfers Background Note for the High Level Panel on Humanitarian Cash Transfers. *State of evidence on humanitarian cash transfers*. Scopus. https://www.scopus.com/inward/record.uri?eid=2-s2.0-85045688516&partnerID=40&md5=76a53e382490f9bab991366ffeba3db2

Baker, J. L. (2012). Climate Change, Disaster Risk, and the Urban Poor: Cities Building Resilience for a Changing World. *Climate Change, Disaster Risk, and the Urban Poor: Cities Building Resilience for a Changing World*. Scopus. https://www.scopus.com/inward/record.uri?eid=2-s2.0-84874710535&partnerID=40&md5=066e59018739a419f3d6cc86d7fc1f9a

Balcik, B., & Beamon, B. M. (2008). Facility location in humanitarian relief. *International Journal of Logistics Research and Applications*, *11*(2), 101–121. Scopus. https://doi.org/10.1080/13675560701561789

Barley, Z. A., & Beesley, A. D. (2007). Rural school success: What can we learn? *Journal of Research in Rural Education*, *22*(1), 1–16. Scopus.

Basabe, P. (2013). Hyogo framework for action 2005–2015. In *Encycl. Earth Sci. Ser.* (pp. 508–516). Springer Netherlands; Scopus. https://doi.org/10.1007/978-1-4020-4399-4_180

Becker, J. S., Paton, D., Johnston, D. M., & Ronan, K. R. (2012). A model of household preparedness for earthquakes: How individuals make meaning of earthquake information and how this influences preparedness. *Natural Hazards*, *64*(1), 107–137. Scopus. https://doi.org/10.1007/s11069-012-0238-x

Buller, A. M., Vaca, V., Stoklosa, H., Borland, R., & Zimmerman, C. (2015). Labour exploitation, trafficking and migrant health: Multi-country findings on the health risks and consequences of migrant and trafficked workers. *Labour exploitation, trafficking and migrant health: Multi-country findings on the health risks and consequences of migrant and trafficked workers*. Scopus. https://www.scopus.com/inward/record.uri?eid=2-s2.0-85006769814&partnerID=40&md5=3eee9b4d02ef3ca952046864de7018de

Burkle, F. M., Egawa, S., Macintyre, A. G., Otomo, Y., Beadling, C. W., & Walsh, J. T. (2014). The 2015 hyogo framework for action: Cautious optimism. *Disaster Medicine and Public Health Preparedness*, *8*(3), 191–192. Scopus. https://doi.org/10.1017/dmp.2014.50

Campbell, A. M., & Jones, P. C. (2011). Prepositioning supplies in preparation for disasters. *European Journal of Operational Research*, *209*(2), 156–165. Scopus. https://doi.org/10.1016/j.ejor.2010.08.029

Cuaton, G. P., & Su, Y. (2020). Local-indigenous knowledge on disaster risk reduction: Insights from the Mamanwa indigenous peoples in Basey, Samar after Typhoon Haiyan in the Philippines. *International Journal of Disaster Risk Reduction*, *48*. Scopus. https://doi.org/10.1016/j.ijdrr.2020.101596

Cummins, P. R. (2017). Geohazards in Indonesia: Earth science for disaster risk reduction—Introduction. In *Geol. Soc. Spec. Publ.* (Vol. 441, pp. 1–7). Geological Society of London; Scopus. https://doi.org/10.1144/SP441.11

de Leon, E. G., & Pittock, J. (2017). Integrating climate change adaptation and climate-related disaster risk-reduction policy in developing countries: A case study in the Philippines. *Climate and Development*, *9*(5), 471–478. Scopus. https://doi.org/10.1080/17565529.2016.1174659

Djalante, R. (2018). Review article: A systematic literature review of research trends and authorships on natural hazards, disasters, risk reduction and climate change in Indonesia. *Natural Hazards and Earth System Sciences*, *18*(6), 1785–1810. Scopus. https://doi.org/10.5194/nhess-18-1785-2018

Djalante, R., & Thomalla, F. (2012). Disaster risk reduction and climate change adaptation in Indonesia: Institutional challenges and opportunities for integration. *International Journal of Disaster Resilience in the Built Environment*, *3*(2), 166–180. Scopus. https://doi.org/10.1108/17595901211245260

Efendi, D., & Putra, H. A. (2019). Natural disasters management and the challenge of governability in Indonesia. *Indian Journal of Public Administration*, *65*(3), 627–645. Scopus.

Espia, J. C. P., & Fernandez, P. (2015). Insiders and outsiders: Local government and ngo engagement in disaster response in guimaras, philippines. *Disasters*, *39*(1), 51–68. Scopus. https://doi.org/10.1111/disa.12086

Fatema, S. R., East, L., Islam, M. S., & Usher, K. (2021). Health impact and risk factors affecting south and southeast asian women following natural disasters: A systematic review. *International Journal of Environmental Research and Public Health*, *18*(21). Scopus. https://doi.org/10.3390/ijerph182111068

Fernandez, G., & Shaw, R. (2015). Youth participation in disaster risk reduction through science clubs in the Philippines. *Disasters*, *39*(2), 279–294. Scopus. https://doi.org/10.1111/disa.12100

Forino, G., Bonati, S., & Calandra, L. M. (2018). Governing risks, hazards and disasters in theory and practice: An introduction and overview of the book. In *Gov. Of Risk, Hazards and Disasters: Trends in Theory and Practice* (pp. 1–7). Taylor and Francis; Scopus. https://doi.org/10.4324/9781315463896

Freitag, A. E. B., & Oliveira, A. B. (2021). Underutilization of workers: An analysis according to the lean management philosophy in basic education. *Independent Journal of Management & Production*, *12*(9), s940–s959. Scopus.

Gabriel, A. G., Santiago, P. N. M., & Casimiro, R. R. (2021). Mainstreaming Disaster Risk Reduction and Climate Change Adaptation in Comprehensive Development Planning of the Cities in Nueva Ecija in the Philippines. *International Journal of Disaster Risk Science*, *12*(3), 367–380. Scopus. https://doi.org/10.1007/s13753-021-00351-9

Gartrell, A., Calgaro, E., Goddard, G., & Saorath, N. (2020). Disaster experiences of women with disabilities: Barriers and opportunities for disability inclusive disaster risk reduction in Cambodia. *Global Environmental Change*, *64*. Scopus. https://doi.org/10.1016/j.gloenvcha.2020.102134

Gouramanis, C., & MoralesRamirez, C. A. (2021). Deep understanding of natural hazards based on the Sendai framework for disaster risk reduction in a higher education geography module in Singapore. *International Research in Geographical and Environmental Education*, *30*(1), 4–23. Scopus. https://doi.org/10.1080/10382046.2020.1751391

Grady, A., Gersonius, B., & Makarigakis, A. (2016). Taking stock of decentralized disaster risk reduction in

Indonesia. *Natural Hazards and Earth System Sciences*, *16*(9), 2145–2157. Scopus. https://doi.org/10.5194/nhess-16-2145-2016

Gundran, C. P. D., Lam, H. Y., Tuazon, A. C. A., Cleofas, J. V., Garcia, F. B., & Puli, T. E. M. (2023). Simulation Training Needs Assessment for Disaster Preparedness and Disaster Response among selected agencies in National Capital Region, Philippines. *International Journal of Disaster Risk Reduction*, *94*. Scopus. https://doi.org/10.1016/j.ijdrr.2023.103824

Handmer, J. (1995). A Safer World for the 21st Century?: The 1994 Yokohama World Conference on Natural Disaster Reduction. *Journal of Contingencies and Crisis Management*, *3*(1), 35–37. Scopus. https://doi.org/10.1111/j.1468-5973.1995.tb00053.x

Haris, S. M., Mustafa, F. B., & Raja Ariffin, R. N. (2020). Systematic Literature Review of Climate Change Governance Activities of Environmental Nongovernmental Organizations in Southeast Asia. *Environmental Management*, *66*(5), 816–825. Scopus. https://doi.org/10.1007/s00267-020-01355-9

Hawa, N. N., Zakaria, S. Z. S., Razman, M. R., Majid, N. A., & Taib, A. M. (2023). Element of Disaster Risk Reduction in Geography Education in Malaysia. *Sustainability (Switzerland)*, *15*(2). Scopus. https://doi.org/10.3390/su15021326

Heinkel, S.-B., Thiebes, B., Miller, C., Willkomm, M., Spohner, R., & Kraas, F. (2022). Disaster preparedness and resilience at household level in Yangon, Myanmar. *Natural Hazards*, *112*(2), 1273–1294. Scopus. https://doi.org/10.1007/s11069-022-05226-w

Hoffmann, R., & Blecha, D. (2020). EDUCATION AND DISASTER VULNERABILITY IN SOUTHEAST ASIA: EVIDENCE AND POLICY IMPLICATIONS. In *Community Environ. Dis. Risk Manage.* (Vol. 21, pp. 17–37). Emerald Publishing; Scopus. https://doi.org/10.1108/S2040-726220200000021002

Horner, M. W., & Downs, J. A. (2010). Optimizing hurricane disaster relief goods distribution: Model development and application with respect to planning strategies. *Disasters*, *34*(3), 821–844. Scopus. https://doi.org/10.1111/j.1467-7717.2010.01171.x

Howe, B., & Bang, G. (2017). Nargis and Haiyan: The Politics of Natural Disaster Management in Myanmar and the Philippines. *Asian Studies Review*, *41*(1), 58–78. Scopus. https://doi.org/10.1080/10357823.2016.1265484

Htut, A. Y., Shrestha, S., Nitivattananon, V., & Kawasaki, A. (2014). Forecasting climate change scenarios in the Bago River Basin, Myanmar. *J. Earth Sci. Clim. Change*, *5*(9). Scopus. https://www.scopus.com/inward/record.uri?eid=2-s2.0-84981718227&partnerID=40&md5=4f10994e6aedec21f0b6bb8a9c969ea3

Huq, M. E., Sarker, M. N. I., Prasad, R., Kormoker, T., Hossain, M. A., Rahman, M. M., & Al Dughairi, A. A. (2021). Resilience for Disaster Management: Opportunities and Challenges. In *Climate Change Manag.* (pp. 425–442). Springer Science and Business Media Deutschland GmbH; Scopus. https://doi.org/10.1007/978-3-030-77259-8_22

Hyogo framework for action 2005–2015: Building the resilience of nations and communities to disasters. (2005). *UNISDR*, 1–34. Scopus.

Hyogo framework for action 2005-2015: Building the resilience of nations and communities to disasters. (2005). *World Conference on Disaster Reduction*. Scopus. https://www.scopus.com/inward/record.uri?eid=2-s2.0-70349481944&partnerID=40&md5=f820f38f0e05a927898070733812ee21

Islam, M. R., & Khan, N. A. (2020). Threats, vulnerability, resilience and displacement among the climate change and natural disaster-affected people in South-East Asia: An overview. *Climate Change Mitigation and Sustainable Development*, 111–138. Scopus.

James, H., & Paton, D. (2015). Social capital and the cultural contexts of disaster recovery outcomes in myanmar and taiwan. *Global Change, Peace and Security*, *27*(2), 207–228. Scopus. https://doi.org/10.1080/14781158.2015.1030380

Jang, S., Ekyalongo, Y., & Kim, H. (2021). Systematic Review of Displacement and Health Impact from Natural Disasters in Southeast Asia. *Disaster Medicine and Public Health Preparedness*, *15*(1), 105–114. Scopus. https://doi.org/10.1017/dmp.2019.125

Kagawa, F., & Selby, D. (2012). Ready for the storm: Education for disaster risk reduction and climate change adaptation and mitigation. *Journal of Education for Sustainable Development*, *6*(2), 207–217. Scopus.

Karki, T. K. (2020). Flood resilience in Malaysian cities: A case study of two towns in Johor state. *International Journal of Disaster Resilience in the Built Environment*, *11*(3), 329–342. Scopus. https://doi.org/10.1108/IJDRBE-06-2019-0037

Kawasaki, A., Ichihara, N., Ochii, Y., Acierto, R. A., Kodaka, A., & Zin, W. W. (2017). Disaster response and river infrastructure management during the 2015 Myanmar floods: A case in the Bago River Basin. *International Journal of Disaster Risk Reduction*, *24*, 151–159. Scopus. https://doi.org/10.1016/j.ijdrr.2017.06.004

Kelman, I. (2015). Climate Change and the Sendai Framework for Disaster Risk Reduction. *International Journal of Disaster Risk Science*, *6*(2), 117–127. Scopus. https://doi.org/10.1007/s13753-015-0046-5

Kitagawa, K. (2020). Development of disaster risk reduction policy in Thailand. *Disaster Prevention and Management: An International Journal*. Scopus. https://doi.org/10.1108/DPM-08-2019-0244

Koopman, J. (2023). Subawe, traditional knowledge, and faith-based organisations promoting social capital and disaster preparedness: A Lombok, Indonesia case study. *International Journal of Disaster Risk Reduction*, *94*. Scopus. https://doi.org/10.1016/j.ijdrr.2023.103837

Korstanje, M. E. (2011). Reconnecting with poverty: New challenges of disaster management. *International Journal of Disaster Resilience in the Built Environment*, *2*(2), 165–177. Scopus. https://doi.org/10.1108/17595901111149150

Kurata, Y. B., Ong, A. K. S., Ang, R. Y. B., Angeles, J. K. F., Bornilla, B. D. C., & Fabia, J. L. P. (2023). Factors Affecting Flood Disaster Preparedness and Mitigation in Flood-Prone Areas in the Philippines: An Integration of Protection Motivation Theory and Theory of Planned Behavior. *Sustainability (Switzerland)*, *15*(8). Scopus. https://doi.org/10.3390/su15086657

Kusumastuti, R. D., Arviansyah, A., Nurmala, N., & Wibowo, S. S. (2021). Knowledge management and natural disaster preparedness: A systematic literature review and a case study of East Lombok, Indonesia. *International Journal of Disaster Risk Reduction*, *58*. Scopus. https://doi.org/10.1016/j.ijdrr.2021.102223

Lawangen, A., & Roberts, J. K. (2023). Interactions between disaster risk reduction and intangible culture among indigenous communities in Benguet, Philippines. *International Journal of Disaster Risk Reduction*, *94*. Scopus. https://doi.org/10.1016/j.ijdrr.2023.103801

Leelawat, N., Latcharote, P., Suppasri, A., Sararit, T., Srivichai, M., Tang, J., Chua, T., Kumnetrut, D., Saengtabtim, K., & Imamura, F. (2021). Today in thailand: Multidisciplinary perspectives on the current tsunami disaster risk reduction. In *Geol. Soc. Spec. Publ.* (Vol. 501, pp. 353–365). Geological Society of London; Scopus. https://doi.org/10.1144/SP501-2019-97

Lestari, F., Paramitasari, D., Hamid, A. Y., El-Matury, H. J., Wijaya, O., Rahmadani, M., Ismiyati, A., Firdausi, R. A., & Kadir, A. (2022). Analysis of Hospital's Emergency and Disaster Preparedness Using Hospital Safety Index in Indonesia. *Sustainability (Switzerland)*, *14*(10). Scopus. https://doi.org/10.3390/su14105879

Levy, J. K., Gopalakrishnan, C., & Lin, Z. (2016). Advances in decision support systems for flood disaster management: Challenges and opportunities. *Water Resources and Decision-Making Systems*, 81–100. Scopus.

Licina, D. (2013). Hospital ships adrift? Part 1: A systematic literature review characterizing US Navy hospital ship humanitarian and disaster response, 2004-2012. *Prehospital and Disaster Medicine*, *28*(3), 230–238. Scopus. https://doi.org/10.1017/S1049023X13000149

Llanes, F. V., Eco, R., Herrero, T. M., Briones, J. B. L., Escape, C. M., Sulapas, J. J., Galang, J. A. M., Ortiz, I. J., Sabado, J. M., Lagmay, A. M. F., & Rodolfo, K. (2022). Practices in disaster mitigation in the case of the 2015 Typhoon Koppu debris flows in Nueva Ecija, Philippines. *Natural Hazards*, *114*(1), 665–690. Scopus. https://doi.org/10.1007/s11069-022-05407-7

Maly, E., Vahanvati, M., & Sararit, T. (2022). People-centered disaster recovery: A comparison of long-term outcomes of housing reconstruction in Thailand, India, and Japan. *International Journal of Disaster Risk Reduction*, *81*. Scopus. https://doi.org/10.1016/j.ijdrr.2022.103234

Matsuoka, Y., Sharma, A., & Shaw, R. (2009). Chapter 5: Hyogo framework for action and urban risk reduction in Asia. In Cai L.A., G. S. of Kyoto University Global Environmental Studies, Kyoto, Srinivas H., P. United Nations Environmental, Sharma A., & E. D. S. Sustainable Environment and Delhi (Eds.), *Community Environ. Dis. Risk Manage.* (Vol. 1, pp. 77–104). Scopus. https://doi.org/10.1108/S2040-7262(2009)0000001009

Mitchell, T., van Aalst, M., & Villanueva, P. S. (2010). Assessing progress on integrating disaster risk reduction and climate change adaptation in development processes. *Assessing Progress on Integrating Disaster Risk Reduction and Climate Change Adaptation in Development Processes*. Scopus. https://www.scopus.com/inward/record.uri?eid=2-s2.0-84863612106&partnerID=40&md5=b4b51126e2fe7ba34e8e9e78ccfd9d4e

Mon, M. M., Naing, T., Numada, M., Yu, K. T., Meguro, K., & Latt, K. Z. (2018). Analysis of disaster response during landslide disaster in Hakha, Chin State of Myanmar. *Journal of Disaster Research*, *13*(1), 99–115. Scopus. https://doi.org/10.20965/jdr.2018.p0099

Moya, L., Muhari, A., Adriano, B., Koshimura, S., Mas, E., Marval-Perez, L. R., & Yokoya, N. (2020). Detecting urban changes using phase correlation and ℓ1-based sparse model for early disaster response: A case study of the 2018 Sulawesi Indonesia earthquake-tsunami. *Remote Sensing of Environment*, *242*. Scopus. https://doi.org/10.1016/j.rse.2020.111743

Muir, J. A., Cope, M. R., Angeningsih, L. R., & Jackson, J. E. (2020). To move home or move on? Investigating the impact of recovery aid on migration status as a potential tool for disaster risk reduction in the aftermath of volcanic eruptions in Merapi, Indonesia. *International Journal of Disaster Risk Reduction*, *46*. Scopus. https://doi.org/10.1016/j.ijdrr.2020.101478

Mutiarni, Y. S., Nakamura, H., & Bhattacharya, Y. (2022). The Resilience Community: Strengthening People-Centered Disaster Risk Reduction in the Merapi Volcano Community, Java, Indonesia. *Sustainability (Switzerland)*, *14*(4). Scopus. https://doi.org/10.3390/su14042215

Nguyen, H., & Tran, P. (2016). Urban Disaster Risk Reduction in Vietnam: Gaps, Challenges, and Approaches. In *Urban Disasters and Resil. In Asia* (pp. 123–140). Elsevier Inc.; Scopus. https://doi.org/10.1016/B978-0-12-802169-9.00009-4

Oktari, R. S., Kamaruzzaman, S., Fatimahsyam, F., Sofia, S., & Sari, D. K. (2021). Gender mainstreaming in a Disaster-Resilient Village Programme in Aceh Province, Indonesia: Towards disaster preparedness enhancement via an equal opportunity policy. *International Journal of Disaster Risk Reduction*, *52*. Scopus. https://doi.org/10.1016/j.ijdrr.2020.101974

Oktari, R. S., Nugroho, A., Fahmi, M., Suppasri, A., Munadi, K., & Amra, R. (2021). Fifteen years of the 2004 Indian Ocean Tsunami in Aceh-Indonesia: Mitigation, preparedness and challenges for a long-term disaster recovery process. *International Journal of Disaster Risk Reduction*, *54*. Scopus. https://doi.org/10.1016/j.ijdrr.2021.102052

Olowu, D. (2010). The Hyogo Framework for Action and its implications for disaster management and reduction in Africa. *JAMBA: Journal of Disaster Risk Studies*, *3*(1), 303–320. Scopus.

Pathak, S., & Emah, I. E. (2017). Gendered approach towards disaster recovery: Experiences from 2011 floods in Pathumthani province, Thailand. *International Journal of Disaster Risk Reduction*, *24*, 129–134. Scopus. https://doi.org/10.1016/j.ijdrr.2017.06.007

Pathak, S., & Olmo, J. C. (2021). Analysing spatial interdependence among the 2011 Thailand flood-affected small and medium enterprises for reduction of disaster recovery time period. *Geoenvironmental Disasters*, *8*(1). Scopus. https://doi.org/10.1186/s40677-021-00180-4

Peek, L. (2008). Children and disasters: Understanding vulnerability, developing capacities, and promoting resilience-an introduction. *Children, Youth and Environments*, *18*(1), 1–29. Scopus.

Phongsapan, K., Chishtie, F., Poortinga, A., Bhandari, B., Meechaiya, C., Kunlamai, T., Aung, K. S., Saah, D., Anderson, E., Markert, K., Markert, A., & Towashiraporn, P. (2019). Operational Flood Risk Index Mapping for Disaster Risk Reduction Using Earth Observations and Cloud Computing Technologies: A Case Study on Myanmar. *Frontiers in Environmental Science*, *7*. Scopus. https://doi.org/10.3389/fenvs.2019.00191

Ratmono, T. (2021). The Role of Indonesian National Armed Forces (TNI) in Disaster Management. *Atlantis Press*. Scopus. https://www.scopus.com/inward/record.uri?eid=2-s2.0-85218227058&partnerID=40&md5=22ba6645df6df9bb355fd98c8b33d31e

Rattanakanlaya, K., Sukonthasarn, A., Wangsrikhun, S., & Chanprasit, C. (2018). Flood disaster preparedness experiences of hospital personnel in Thailand: A qualitative study. *Australasian Emergency Care*, *21*(3), 87–92. Scopus. https://doi.org/10.1016/j.auec.2018.07.002

Reyes, J. A. L., Ayo, K. A. R., Baluyan, M. P. M., & Balaguer, A. S. R. B. (2020). Indigenous Knowledge in Disaster Risk Reduction: The Tales of Three Islands (San Miguel, Camotes and Alabat) in the Philippines. *Copenhagen Journal of Asian Studies*, *37*(1), 103–132. Scopus.

https://doi.org/10.22439/CJAS.V37I1.5908
Robielos, R. A. C., Lin, C. J., Senoro, D. B., & Ney, F. P. (2020). Development of vulnerability assessment framework for disaster risk reduction at three levels of geopolitical units in the Philippines. *Sustainability (Switzerland)*, *12*(21), 1–27. Scopus. https://doi.org/10.3390/su12218815
Ronan, K. R., Johnston, D. M., Daly, M., & Fairley, R. (2001). School children's risk perceptions and preparedness: A hazards education survey. *Australasian Journal of Disaster and Trauma Studies*, *1*. Scopus. https://www.scopus.com/inward/record.uri?eid=2-s2.0-0007688162&partnerID=40&md5=05dd82da8c8a075ce7665950f287f6b9
Sadeka, S., Mohamad, M. S., Sarkar, M. S. K., & Al-Amin, A. Q. (2020). Conceptual Framework and Linkage Between Social Capital and Disaster Preparedness: A Case of Orang Asli Families in Malaysia. *Social Indicators Research*, *150*(2), 479–499. Scopus. https://doi.org/10.1007/s11205-020-02307-w
Sagala, S. A. H., Suroso, D. S. A., Puspitasari, N., Suroso, A. A., & Rizqika, K. A. (2021). Knowledge and implementation gaps in disaster risk reduction and spatial planning: Palu City, Indonesia. *Disaster Prevention and Management: An International Journal*, *30*(4–5), 462–479. Scopus. https://doi.org/10.1108/DPM-03-2021-0105
Sakurai, A., Bisri, M. B. F., Oda, T., Oktari, R. S., Murayama, Y., & Affan, M. (2018). Exploring minimum essentials for sustainable school disaster preparedness: A case of elementary schools in Banda Aceh City, Indonesia. *International Journal of Disaster Risk Reduction*, *29*, 73–83. Scopus. https://doi.org/10.1016/j.ijdrr.2017.08.005
Sakurai, A., & Sato, T. (2016). Promoting education for disaster resilience and the Sendai framework for disaster risk reduction. *Journal of Disaster Research*, *11*(3), 402–412. Scopus. https://doi.org/10.20965/jdr.2016.p0402
Samson, M. G. M., & Warganegara, A. (2021). A post-tsunami sea change? Towards post-secular disaster response in Indonesia. *International Journal of Disaster Risk Reduction*, *61*. Scopus. https://doi.org/10.1016/j.ijdrr.2021.102371
Sandoval, V., Wisner, B., & Voss, M. (2025). Natural Hazards Governance in China. *Oxford Research Encyclopedia of Natural Hazard Science*. Scopus. https://www.scopus.com/inward/record.uri?eid=2-s2.0-85082969318&partnerID=40&md5=0a6da98c0c13c2c0e3f7d624f0abfc78
Sardi, M. F., Razak, K. A., & Zaini Bakri, R. (2019). ASSESSING DISASTER RISK and RESILIENCE: A CASE STUDY in URBAN FLOOD VULNERABLE COMMUNITY in KAMPUNG ASAHAN, KUALA SELANGOR. In Abdul Rahman A., Hassan I., Musliman I.A., Azri S., & Ujang U. (Eds.), *Int. Arch. Photogramm., Remote Sens. Spat. Inf. Sci. - ISPRS Arch.* (Vol. 42, Issue 4/W16, pp. 603–610). International Society for Photogrammetry and Remote Sensing; Scopus. https://doi.org/10.5194/isprs-archives-XLII-4-W16-603-2019
Sassa, S., & Takagawa, T. (2019). Liquefied gravity flow-induced tsunami: First evidence and comparison from the 2018 Indonesia Sulawesi earthquake and tsunami disasters. *Landslides*, *16*(1), 195–200. Scopus. https://doi.org/10.1007/s10346-018-1114-x
Sauti, N. S., Daud, M. E., & Kaamin, M. (2020). Construction of an Integrated social vulnerability index to identify spatial variability of exposure to seismic hazard in Pahang, Malaysia. *International Journal of Design and Nature and Ecodynamics*, *15*(3), 365–372. Scopus. https://doi.org/10.18280/ijdne.150310
Seringa, J., Abreu, J., & Magalhaes, T. (2024). Machine learning methods, applications and economic analysis to predict heart failure hospitalisation risk: A scoping review protocol. *BMJ Open*, *14*(4). Scopus. https://doi.org/10.1136/bmjopen-2023-083188
Setyonugroho, G. A., & Maki, N. (2024). Policy implementation model review of the post-disaster housing reconstruction in Indonesia case study: Aceh, Yogyakarta, and Lombok. *International Journal of Disaster Risk Reduction*, *100*. Scopus. https://doi.org/10.1016/j.ijdrr.2023.104181
Shaw, R., Shiwaku, K., Kobayashi, H., & Kobayashi, M. (2004). Linking experience, education, perception and earthquake preparedness. *Disaster Prevention and Management: An International Journal*, *13*(1), 39–49. Scopus. https://doi.org/10.1108/09653560410521689
Shimura, T., & Yamagata, K. (2015). The great east Japan disaster and geography education: School damage, associations' support project, and trends in geography teaching practices. *Geography Education in Japan*, 221–233. Scopus.
Shoji, M., Takafuji, Y., & Harada, T. (2020). Formal education and disaster response of children: Evidence from coastal villages in Indonesia. *Natural Hazards*, *103*(2), 2183–2205. Scopus.

https://doi.org/10.1007/s11069-020-04077-7
Simm, G. (2018). Disaster Response in Southeast Asia: The ASEAN Agreement on Disaster Response and Emergency Management. *Asian Journal of International Law*, *8*(1), 116–142. Scopus. https://doi.org/10.1017/S2044251316000205
Sperling, F., & Szekely, F. (2005). Disaster risk management in a changing climate. *Disaster Risk Management in a Changing Climate*. Scopus. https://www.scopus.com/inward/record.uri?eid=2-s2.0-33644745390&partnerID=40&md5=7892db0665a6284ec4992376f8e89b48
Stoklosa, H., Burns, C. J., Karan, A., Lyman, M., Morley, N., Tadee, R., & Goodwin, E. (2021). Mitigating trafficking of migrants and children through disaster risk reduction: Insights from the Thailand flood. *International Journal of Disaster Risk Reduction*, *60*. Scopus. https://doi.org/10.1016/j.ijdrr.2021.102268
Strategy, Y. (1994). Plan of action for a safer world-guidelines for natural disaster prevention, preparedness and mitigation. *World Conference on Natural Disaster Reduction*, 23–27. Scopus.
Su, Y. (2022). Networks of recovery: Remittances, social capital and post-disaster recovery in Tacloban City, Philippines. *International Journal of Disaster Risk Reduction*, *67*. Scopus. https://doi.org/10.1016/j.ijdrr.2021.102641
Su, Y., & Lim Mangada, L. (2018). A tide that does not lift all boats: The surge of remittances in post-disaster recovery in Tacloban City, Philippines. *Critical Asian Studies*, *50*(1), 67–85. Scopus. https://doi.org/10.1080/14672715.2017.1401935
Sydnor, S., Niehm, L., Lee, Y., Marshall, M., & Schrank, H. (2017). Analysis of post-disaster damage and disruptive impacts on the operating status of small businesses after Hurricane Katrina. *Natural Hazards*, *85*(3), 1637–1663. Scopus. https://doi.org/10.1007/s11069-016-2652-y
Tahira, Y., & Kawasaki, A. (2020). Flood disaster risk reduction for urban collective housing in Thailand. *Journal of Disaster Research*, *15*(5), 609–620. Scopus. https://doi.org/10.20965/jdr.2020.p0609
Tahira, Y., Kawasaki, A., & Ichihara, N. (2013). Disaster Management System of the Myanmar Central Government after Shifting to Civilian Rule and its Challenges. *Institute of Social Safety Science*, *21*, 189–198. Scopus.
Tamar, M., Wirawan, H., Arfah, T., & Putri, R. P. S. (2021). Predicting pro-environmental behaviours: The role of environmental values, attitudes and knowledge. *Management of Environmental Quality: An International Journal*, *32*(2), 328–343. Scopus. https://doi.org/10.1108/MEQ-12-2019-0264
Thi Phuong, T., Quang Tan, N., Cong Dinh, N., Khanh Linh, N. H., & Huu Ty, P. (2023). Flood Vulnerability-Rural Poverty Nexus: Implications for Disaster Risk Reduction and Sustainable Rural Development in Vietnam. *Environment and Ecology Research*, *11*(2), 362–377. Scopus. https://doi.org/10.13189/eer.2023.110210
Thi, T., & Shaw, R. (2016). School-based disaster risk reduction education in primary schools in Da Nang City, Central Vietnam. *Environmental Hazards*, *15*(4), 356–373. Scopus. https://doi.org/10.1080/17477891.2016.1213492
Thieken, A. H., Kreibich, H., Müller, M., & Merz, B. (2007). Coping with floods: Preparedness, response and recovery of flood-affected residents in Germany in 2002. *Hydrological Sciences Journal*, *52*(5), 1016–1037. Scopus. https://doi.org/10.1623/hysj.52.5.1016
Thomalla, F., Downing, T., Spanger-Siegfried, E., Han, G., & Rockström, J. (2006). Reducing hazard vulnerability: Towards a common approach between disaster risk reduction and climate adaptation. *Disasters*, *30*(1), 39–48. Scopus. https://doi.org/10.1111/j.1467-9523.2006.00305.x
Timperio, G., Tiwari, S., Lee, C. K., Samvedi, A., & de Souza, R. (2020). Integrated decision support framework for enhancing disaster preparedness: A pilot application in Indonesia. *International Journal of Disaster Risk Reduction*, *51*. Scopus. https://doi.org/10.1016/j.ijdrr.2020.101773
Tozier de la Poterie, A., & Baudoin, M.-A. (2015). From Yokohama to Sendai: Approaches to Participation in International Disaster Risk Reduction Frameworks. *International Journal of Disaster Risk Science*, *6*(2), 128–139. Scopus. https://doi.org/10.1007/s13753-015-0053-6
Tucker, R. C., Liyanage, C., Robinson, S. J., Montebon, D. R., Gotangco Gonzales, C. K., Olpoc, J. C., Patacsil, L. B., Tantanee, S., Buranajarukorn, P., Apichayaku, O. S., Weerasinghe, R. N., & Dissanayake, R. (2025). Understanding university enterprise collaboration for disaster resilience in South-East Asia. *International Journal of Disaster Resilience in the Built Environment*, *16*(1), 104–128. Scopus. https://doi.org/10.1108/IJDRBE-02-2023-0010
Vickery, J. (2018). Using an intersectional approach to advance understanding of homeless persons'

vulnerability to disaster. *Environmental Sociology*, *4*(1), 136–147. Scopus. https://doi.org/10.1080/23251042.2017.1408549

Warsito, G. M., Budiharsana, M. P., Burns, S., & Hartono, B. (2021). Hazed targets of the silver bullets: Transformation of disaster risk reduction policy into measurable actions in Indonesia development agenda. *International Journal of Disaster Risk Reduction*, *54*. Scopus. https://doi.org/10.1016/j.ijdrr.2020.102029

Wiwik Astuti, N. M., Werdhiana, I. K., & Wahyono, U. (2021). Impacts of direct disaster experience on teachers' knowledge, attitudes and perceptions of disaster risk reduction curriculum implementation in Central Sulawesi, Indonesia. *International Journal of Disaster Risk Reduction*, *53*. Scopus. https://doi.org/10.1016/j.ijdrr.2020.101992