Policy Brief

Cyclone Senyar and the Escalating Hydrometeorological Risks in Sumatra: Shaping Recommendations in Indonesia's Disaster Preparedness and Response

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Summary

The widespread Sumatra Floods, along with landslides triggered by Cyclone Senyar, served as the unprecedented hydrometeorological catastrophe in November 2025. With over 800 fatalities, more than 500 missing people, and at least 10,900 damaged houses, this disaster underscores the need for more robust preparedness measures toward hydrometeorological disasters. This policy brief examines notable gaps in addressing and responding to the hydrometeorological disaster crisis in Indonesia, particularly to extreme events such as cyclones. The findings suggest that strengthening early warning systems and local capacities, enhancing emergency response capacity through integrated coordination and rapid assessment with standardised tools and technologies, improving land-use practices, and revitalising crisis communications to maintain public trust can advance preparedness and capacity to respond to future hydrometeorological disaster risks in a changing climate.

Keywords: Cyclone Senyar, Early Warning, Information Gaps, Response Capacity, Sumatra Floods

The Rare Cyclone Amid Indonesia's Escalating Hydrometeorological Crisis

Cyclone Senyar, which formed in November 2025, triggered widespread flooding and landslides across Aceh, North Sumatra, and West Sumatra, marking one of Indonesia's most unprecedented hydrometeorological events this year. Critical infrastructure, housing, bridges, electricity networks, and public facilities were severely damaged, while disruptions to water supply, telecommunications, and port operations hampered emergency response efforts. With over 800 fatalities, more than 500 people reported missing, and at least 10,900 homes damaged as of 5 December 2025 (BNPB, 2025), the Sumatra floods and landslides became one of the deadliest disasters of the year. Beyond Indonesia, the impacts of Cyclone Senyar extended regionally, with Malaysia and Thailand also experiencing heavy rainfall, severe flooding, and widespread disruptions, highlighting Southeast Asia's growing vulnerability to extreme hydrometeorological hazards. According to the AHA Centre's Flash Update No. 2 (30 November 2025), Malaysia recorded at least 2 fatalities, while Thailand reported at least 168 fatalities linked to the event.

Senyar's destructive trail may indicate that the hydrometeorological disasters in Indonesia are intensifying in frequency, magnitude, and complexity. Over the past decade, a series of extreme weather episodes has increasingly challenged Indonesia's capacity to cope. Floods are becoming more prolonged and landslides more frequent. BNPB's national disaster data consistently show that hydrometeorological disasters account for the vast majority of annual incidents, often representing about 99% of recorded events annually. This trend indicates not only a climatic shift but also heightened exposure of communities living in rapidly urbanising coastlines, steep watersheds, and regions with limited protective infrastructure.

Figure 1. *Map of the Affected Areas and Satellite Imagery of the Flood Event*
Source: BNPB, 2025 (Retrieved from 4 December 2025)

This analysis uses secondary data from related government agencies, such as the *Badan Nasional Penanggulangan Bencana* (BNPB), *Badan Meteorologi, Klimatologi, dan Geofisika* (BMKG), and local authorities, along with reports and media coverage to highlight several critical gaps exposed by the event: uneven early-warning systems coverage; wide variations in preparedness and response capacities across districts; limited crisis-management skills and low-risk awareness.

Persistent Gaps in Hydrometeorological Disaster Preparedness

Challenges in Extreme Weather Early Warning and the Cascading Disasters

The BMKG first detected the disturbance that became Cyclone Senyar on 21 November 2025, issuing advisories several days before it intensified. On 26 November at 07:00 local time, BMKG officially declared it a tropical cyclone and repeated region-specific alerts, with officials stating that warnings had been circulated "eight days before disaster". The extreme rainfall peaked between 25–26 November, with some Aceh stations recording >300 mm per day, and flooding and landslides began almost simultaneously with the cyclone's strengthening. Areas in Aceh, North Sumatra, and West Sumatra, including Sibolga, experienced rapid-onset impacts, such as inundated settlements, blocked roads, damaged power and water networks, and widespread displacement. The short gap between warning and impact highlighted enduring weaknesses in translating meteorological alerts into rapid evacuation, infrastructure protection, and ground-level response.

Cyclone events cannot be considered impossible in Indonesia, as historical cyclones clearly indicated that such hazards can occur.. In November 2017, Cyclone Cempaka, which evolved from a low-pressure system detected on 22 November to a destructive storm by 26 November, caused 41 deaths, over 20,000 evacuees, and USD 83.6 million in losses across Java and Bali despite early warnings. Tropical Storm Vamei in 2001 likewise produced extreme rainfall and mudslides near the equator, even though regional meteorological agencies issued alerts four days prior, with more than 13,000 people evacuated after rapid-onset flooding. Cyclone Seroja in 2021 similarly exhibited strong forecasting but catastrophic impacts in East Nusa Tenggara, with limited documentation on how warnings were operationalised at local levels. The limited anticipatory measures taken before the cyclone and its cascading impacts indicate that the provincial government has not yet fully incorporated cyclone preparedness, despite the province having been struck by the devastating Cyclone Flores in 1973, which caused more than 1,500 fatalities. Across all events, the core issue remains consistent: Indonesia can detect extreme weather in advance, but the utilisation and conversion of forecasts into fast, coordinated, community-ready action remains the most persistent gap in hydrometeorological disaster preparedness. It is also shown in other disaster events in Indonesia, such as flooding in the Greater Jakarta area in March 2025, which also highlighted challenges in governance and disaster preparedness, particularly in early warning dissemination (Alam et al., 2025). Furthermore, the early actions implemented in response to the early warning become a critical factor in minimizing potential impacts and ensuring timely preparedness.

Critical Gaps in Disaster Response Capacity, Policy, and Coordination

The nation of Indonesia has witnessed significant advancements in its disaster management framework subsequent to major disaster events. A

significant policy development was the National Disaster Management Agency (*Badan Nasional Penanggulangan Bencana*/BNPB) Regulation Number 2 of 2024, which aimed to enhance the national early-warning system. The regulation defines Early Warning Response Action (*Aksi Merespon Peringatan Dini*/AMPD) as a set of actions taken by the government and communities based on forecasts and early detection of potential disasters. While this creates a clear expectation for early action, its implementation remains uneven across regions.

Initial response capacity continues to demonstrate significant gaps. Prior to the onset of Cyclone Seroja on April 5, 2021, the BMKG, in collaboration with the Australian Bureau of Meteorology, had disseminated numerous alerts. However, the warnings were widely interpreted as routine severe weather, leading government agencies, civil society groups, and communities to discount the potential severity (Siap Siaga, 2021). This discrepancy in risk perception hindered the initiation of preparedness measures and delayed the commencement of early actions. A parallel phenomenon was observed during Cyclone Senyar, wherein the broader dissemination of warnings did not necessarily translate into tangible operational measures at the district level. In both cases, the absence of clear activation triggers and the non-activation of cyclone-specific contingency plans resulted in reactive rather than anticipatory responses.

It is evident that governance challenges continue to impede preparedness. Despite the fact that national ministries have initiated the dissemination of operational guidance, including technical guidelines from the Ministry of Agrarian Affairs and Spatial Planning/National Land Agency on integrating climate change adaptation into spatial plans, these instruments are not yet applied consistently across different regions. Risk assessments are often outdated and not systematically embedded in local spatial planning processes, allowing development to proceed in high-risk areas. The implementation of the AMPD regulation, which establishes a more robust national framework for early-warning governance, exhibits significant variations across provinces. Contingency planning similarly reflects this unevenness. However, it is noteworthy that only Yogyakarta and East Nusa Tenggara have developed specific contingency plans for tropical cyclones. This leaves most regions without clear procedures, activation thresholds, or defined role assignments. The absence of a nationally consistent Standard Operating Procedure (SOP) for tropical cyclone response further contributes to differing practices in evacuation, asset protection, and emergency communication.

The degree of coordination among institutions is inadequate. The Cyclone Seroja Response Lessons Learned Report (2021) emphasises the absence of a unified command structure, with the authorities relying on disparate information systems that hindered data exchange and decision-making processes. Cyclone Senyar demonstrated signs of improvement, as the BNPB employed the Dashboard Penangan Darurat Bencana to compile data regarding the impacts of flooding and landslides. In addition, Indonesia has implemented a cluster approach through BNPB Head Decree Number 308 of 2024, with the objective of enhancing coordination across various sectors. However, the implementation of this approach exhibits significant variations, primarily attributable to disparities in disaster risk management capacity across different regions. The dissemination of real-time data remains constrained, and the manner in which communication is conducted with various communities exhibits considerable variation

across different regions. These conditions result in persistent fragmentation and insufficient alignment among government entities during cyclone events, reducing the effectiveness of a unified national response.

Information Gaps and Public Distrust During Cyclone Senyar

The communication challenges surrounding Cyclone Senyar in Sumatra reveal significant weaknesses in Indonesia's current crisis communication system. As the cyclone unfolded, social media platforms rapidly became the dominant source of information, with citizens circulating real-time images, impact reports, and urgent calls for assistance. In contrast, official updates did not match the pace of public information needs. This condition generated a perception that authorities were out of step with on-the-ground realities and unable to provide timely situational awareness.

Public dissatisfaction was intensified by the tone of official statements, which many interpreted as minimising the severity of the disaster. From a crisis communication perspective, failure to convey empathy and urgency undermines institutional credibility, particularly in the early hours when uncertainty is highest. As a result, social media narratives filled the information vacuum and shaped public opinion more quickly than government messaging.

The government's hesitation to declare Cyclone Senyar a national disaster became a focal point of criticism. In the absence of clear and proactive explanations of the criteria for such declarations, the delay fueled confusion and competing interpretations online. This ambiguity highlighted a broader structural issue, such as the lack of a transparent and publicly understood framework for classifying disaster severity and mobilizing national-level resources.

Evidence from the Region on Stronger Early Warning Response

In comparison to neighboring countries, Indonesia's preparations for cyclone hazards are currently constrained. The Philippines serves as a compelling case study due to its well-established legal and institutional framework for early action. Pursuant to Republic Act 10121, also known as the DRRM Act, local governments are obligated to establish Disaster Risk Reduction and Management Offices at the village level. These offices are responsible for the following: contingency planning, early-warning dissemination, and evacuation management. The Act stipulates the implementation of multi-channel early-warning systems and clearly defined protocols that link alerts to predefined actions. This legal foundation is operationalised through the National Disaster Risk Reduction and Management Plan (NDRRMP), which incorporates anticipatory measures such as pre-emptive evacuation, resource pre-positioning, and rapid public communication. Consequently, evacuation is regarded as a proactive measure rather than a last resort.

In Indonesia, early warnings do not consistently activate similar anticipatory measures. Evacuation procedures are frequently delayed, and numerous regions are deficient in hazard-specific contingency plans that delineate roles, thresholds, and evacuation routes. This phenomenon leads to reactive decision-making processes and heightened exposure in situations where impacts intensify. The Philippine practice offers a foundation for Indonesia to strengthen early action through the implementation of explicit activation thresholds, the institutionalisation of

preemptive evacuation protocols, and the assurance of comprehensive local preparedness structures.

Key Recommendations

Learning from Cyclone Senyar 2025, its status as a rare event does not mean that nothing can be done. Instead, this event exposed systemic vulnerabilities that require building more resilient capacity to face similar disasters in the future. Early warning and early action are crucial to minimising risk. Therefore, recommendations focus on four key dimensions, namely (1) strengthening the early warning system, (2) increasing emergency response capacity through accurate coordination and rapid assessment, (3) revitalising crisis communication, and (4) future planning: integrating climate risk into spatial planning and development.

- **Strengthening early warning systems.**
  - Develop early warning Standard Operating Procedures (SOPs) for major disasters, such as tropical cyclones with widespread impacts and associated hazards (e.g., strong winds, flash floods, and landslides). These SOPs should clearly define actionable and time-bound responses, ensuring warnings trigger immediate early action such as evacuation and asset protection.
  - Integrate BMKG warnings into an integrated risk communication system at the village/sub-district level using multiple channels (e.g., VHF radio, WhatsApp groups, sirens), using simple, uniform, and locally tailored messages.
  - Improve the accuracy and specificity of early warnings. Enhance forecasting capabilities so that warnings are not overly general or frequently off-target. This helps reduce public and local government apathy and rebuilds trust in official warnings.
  - Implement impact-based early warning systems. Shift from hazard-focused alerts to warnings that clearly describe expected impact, which areas are likely to be affected, and what consequences are anticipated. This enables local governments and communities to understand risk levels and take appropriate, timely action.
- **Enhancing emergency response capacity and coordination.**
  - Strengthen integrated command and coordination mechanisms across BMKG, BNPB/BPBD, ministries, TNI–Polri, and local governments and address disparities in the implementation of the cluster approach for faster, more coherent response.
  - Institutionalise cyclone-specific contingency planning nationwide, following examples from Yogyakarta and East Nusa Tenggara, requiring at-risk provinces and districts to regularly update plans aligned with BMKG hazard monitoring.
  - Adopt standardised rapid assessment tools and interoperable information systems to produce timely and accurate impact analyses.
  - Conduct regular evacuation drills and simulation exercises in cyclone- and flash flood-prone areas, involving government agencies, communities, schools, and critical infrastructure operators.
- **Revitalising crisis communications to maintain public trust**
  - Establishing real-time information dashboards that synchronise verified updates from government agencies and community networks, matching the pace of social media.
  - Implement a "rapid first message" protocol, emphasising empathy, urgency, and transparency during the initial hours when uncertainty is high.

- Conduct regular public briefings, delivered by trained spokespersons with consistent messaging, to minimise confusion and prevent contradictory narratives.
- Engage digital communities and civil society actors, using citizen-generated information as a structured input for situational awareness while mitigating misinformation risks.

- **Future planning: integrating climate risk into spatial planning and development.**
  - Embed climate and disaster risk assessments into spatial planning instruments (RTRW, RDTR) to guide safer land-use decisions and prevent development in high-risk zones.
  - Apply the Build Back Better (BBB) principle in the post-disaster recovery and reconstruction phase, and align with spatial planning updates to reduce future exposure.
  - Strengthen climate-resilient infrastructure standards for roads, bridges, drainage, power, telecommunications, and water systems to withstand extreme weather.
  - Promote risk-sensitive investment and development practices, ensuring long-term infrastructure and housing plans incorporate climate projections and multi-hazard scenarios.

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