



## Evaluating the Effectiveness of Disaster Management Service Policy: Evidence from West Sumatra, Indonesia

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### ABSTRACT

Disaster management policy is increasingly expected to function as a reliable public service system across preparedness, response, and recovery. However, effectiveness is often inferred from completion-oriented indicators that may not capture service quality, coordination experience, or adaptive capacity. This study evaluates the effectiveness of disaster management service policy in West Sumatra, Indonesia, through qualitative document analysis of official provincial and national documents (2020–2025), focusing on the 2022–2024 planning and performance cycle. The corpus includes provincial regulation, strategic and annual plans, operational and coordination instruments, and performance accountability reports. Analysis followed a structured document-analysis workflow and reflexive thematic analysis to trace policy intent, implementation instruments, resourcing signals, performance indicators, and learning. Results show consistently high reported achievement on coverage/completion indicators in 2022–2023, alongside a notable decline in stakeholder satisfaction in 2023, indicating a gap between administrative attainment and experienced service quality. Documents also identify persistent constraints in operational facilities and support systems. The 2024 work plan signals adaptive intent by strengthening preparedness and risk-information services and specifying capacity-building outputs. Overall, West Sumatra's disaster management service policy appears administratively strong but quality-vulnerable, underscoring the need for quality-sensitive performance indicators, strengthened enabling capacity, and institutionalized coordination and learning loops.

*Keyword:*

*Disaster risk governance, Policy effectiveness, public service performance, Qualitative document analysis, Early warning services.*

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## INTRODUCTION

Natural disasters are increasingly recognized as a major constraint on development because they generate large and recurrent social and economic losses. Reviews in disaster economics show that observed (non-normalized) economic losses from natural hazards have risen in recent decades, driven largely by growing exposure as populations and assets concentrate in risk-prone areas (Botzen et al., 2019; Bouwer, 2011). At the same time, the literature is also clear that interpreting “increasing losses” requires care: once losses are normalized for changes in population and wealth, trend signals can become weaker or ambiguous, underscoring the importance of distinguishing hazard frequency from exposure and vulnerability dynamics (Visser et al., 2014). This nuanced evidence base strengthens, rather than weakens, the policy imperative: regardless of whether hazards intensify or exposure dominates, public institutions must improve how risks are governed and how essential disaster-related services are delivered to protect lives, livelihoods, and development gains.

The Sendai Framework for Disaster Risk Reduction (2015–2030) crystallized a global normative shift from managing disasters to managing disaster risk, emphasizing prevention, preparedness, and governance across all levels (Aitsi-Selmi et al., 2015; Maini et al., 2017). Sendai-inspired scholarship highlights that achieving this shift requires stronger risk-informed decision-making, accountability, and the ability of national and subnational governments to coordinate across sectors, especially where risks are systemic and cascading. The framework’s emphasis on evidence and multi-stakeholder action implies that disaster management should be evaluated not merely by the existence of regulations, but by whether policy intent translates into implementable instruments and

demonstrable service capacity on the ground (Aitsi-Selmi et al., 2016).

This article adopts a public-service lens: disaster management policy is treated as a bundle of services that citizens rely on across the disaster cycle, preparedness (risk communication, drills, early warning dissemination), response (incident command, evacuation operations, logistics and relief distribution), and recovery (temporary sheltering, rehabilitation and reconstruction coordination). Under this lens, “policy effectiveness” cannot be reduced to disaster outcomes alone, because outcomes are shaped by hazard intensity and exposure; instead, effectiveness must also be assessed through policy-implementation alignment and service-performance signals documented in official plans, standard operating procedures, budgets, and accountability reports. In other words, a policy can be considered more effective when its objectives and standards are clear and measurable, when implementation instruments are coherent and resourced, and when performance reporting provides credible evidence of delivery capacity and learning.

Indonesia offers a particularly important setting for evaluating disaster management service policy because institutional reform has unfolded alongside decentralization and evolving governance arrangements. Scholarship reviewing Indonesia’s progress and challenges in implementing international DRR agendas describes a transition toward more formalized disaster risk governance, while also noting persistent gaps in coordination, capacity, and integration with development planning (Djalante et al., 2012; Triyanti et al., 2023). Studies on Indonesia’s institutional arrangements for DRR and related policy domains emphasize the difficulty of achieving effective implementation across administrative

levels and sectors, including the need for better alignment between planning, implementation responsibilities, and local realities (Djalante & Thomalla, 2012). These challenges are consequential in decentralized systems because frontline service performance, how quickly warnings reach communities, how effectively evacuations are managed, how logistics are distributed, and how recovery is coordinated, depends substantially on subnational institutional capacity.

A recurring concern in the Indonesian literature is that resources and incentives may not systematically match risk. For instance, empirical work on local government disaster budgeting finds that disaster response budgets are not necessarily aligned with risk indicators, suggesting that resource allocation and preparedness investments can be weakly coupled with the actual risk profile (Fahlevi et al., 2019). Such findings raise a critical policy question: even when legal and organizational frameworks exist, do they produce effective, reliable services across localities, or do implementation and financing constraints undermine service outcomes?

West Sumatra is a compelling case for this evaluation because it is a high-risk, multi-hazard province where the stakes of service effectiveness are exceptionally high. The province has experienced destructive seismic events, including the 30 September 2009 earthquake (Mw 7.6) that severely affected Padang and surrounding areas and is reported to have caused substantial mortality and injury (Gratchev et al., 2011; Sudaryo et al., 2012). Beyond seismic shaking, tsunami risk along the Sumatran subduction margin has been extensively studied, and Padang has been highlighted as a location where evacuation and early warning services are crucial for risk reduction. A stochastic tsunami scenario study in Natural Hazards and Earth System Sciences shows that Padang may

face significant tsunamis, with modeled maximum tsunami inundation height and depth reaching approximately 15 m and 10 m, respectively, under future megathrust earthquake scenarios (Muhammad et al., 2017). These scientific results underscore why service-policy effectiveness, particularly warning dissemination, evacuation planning, and shelter readiness, must be treated as a governance and performance question, not merely a hazard characterization.

West Sumatra also illustrates that disaster governance is not only technical but socio-institutional. Community-based disaster management research in the province shows how religious values and Minangkabau local wisdom can be mobilized to strengthen preparedness and collective action, implying that effective service delivery depends on whether policy design and implementation mechanisms meaningfully engage local institutions and norms (Rozi et al., 2021). This socio-cultural dimension is highly relevant for a service-policy evaluation because policies that ignore community structures may struggle to convert formal plans into real preparedness behaviors and coordinated response.

Despite the growth of hazard and community-focused studies, fewer works systematically evaluate disaster management service policy effectiveness at the provincial level by tracing the chain from policy intent to implementation instruments and performance evidence across the disaster cycle. This gap is not trivial: without rigorous evaluation of service-policy coherence and documentary evidence of delivery capacity, reforms risk being judged by formal compliance rather than by institutional readiness and learning. To address this gap, the present study employs qualitative document analysis, a systematic method for identifying, evaluating, and interpreting documents to generate understanding and

empirical knowledge (Bowen, 2009). This approach is particularly suitable when the objective is to assess how effectiveness is defined, operationalized, and evidenced (or obscured) in the policy and accountability record.

Accordingly, this article addresses three focused research questions: (RQ1) How coherently do West Sumatra's disaster management policy documents specify service objectives, standards, and performance indicators across preparedness, response, and recovery, and how consistently are these translated into implementable instruments (plans, SOPs, and budget rationales)? (RQ2) What governance and implementation mechanisms documented in the record, especially coordination arrangements, resourcing signals, and accountability procedures, appear to enable or constrain service effectiveness? (RQ3) To what extent do performance and evaluation documents substantiate claims of effectiveness in high-stakes risk domains, particularly tsunami preparedness and evacuation service readiness for Padang?

The study offers three "sellable" contributions. First, it reframes disaster management policy as an evaluable service policy and proposes an explicit evaluation logic that links policy intent → implementation instruments → service-performance signals, aligning with contemporary DRR governance emphases on accountability and evidence (Aitsi-Selmi et al., 2016; Triyanti et al., 2023). Second, it provides province-level evidence from West Sumatra that connects multi-hazard risk and socio-cultural conditions with the practical machinery of service delivery (planning, SOPs, budgeting cues, and reporting) (Muhammad et al., 2017). Third, it operationalizes a transparent and replicable document-analysis protocol, strengthening rigor in policy evaluation based on secondary qualitative sources (Bowen, 2009).

The remainder of the article is organized as follows. The next section develops the conceptual framework for assessing disaster management service policy effectiveness through an implementation and service-performance perspective (Djalante et al., 2012). The Methods section details the document corpus, selection criteria, and coding strategy used for qualitative evaluation. The Results section presents cross-document findings on policy coherence, implementation mechanisms, and the strength of documentary evidence supporting effectiveness claims, with particular attention to tsunami preparedness and evacuation services. The Discussion interprets implications for strengthening governance and service delivery under decentralized risk, and the Conclusion summarizes key insights, limitations, and avenues for future research.

## LITERATURE REVIEW & CONCEPTUAL FRAMEWORK

### **Disaster management services as a policy instrument in multi-level disaster governance**

Disaster management "services" (e.g., early warning dissemination, preparedness training, evacuation support, emergency logistics, coordination and command functions) are not merely operational routines; they are policy instruments that translate legal mandates and political priorities into public value under conditions of uncertainty. In contemporary disaster governance, these services are increasingly judged not only by speed and coverage but also by coordination quality, inclusiveness, and the capacity to adapt when hazards cascade across sectors and jurisdictions. Yet disaster risk reduction (DRR) scholarship cautions that many widely repeated assumptions about "what works", for example, that local action, collaboration, or awareness automatically

improves outcomes, can become truisms that reduce analytical precision and weaken the knowledge-practice interface if they are not operationalized and tested carefully (Nohrstedt et al., 2022).

In Southeast Asia and Indonesia specifically, disaster governance is frequently shaped by compound risks and inter-agency coordination challenges. An assessment of the 2018 Central Sulawesi earthquake–tsunami response highlights persistent governance problems such as coordination gaps, complex actor landscapes, and uneven capacities, while also pointing to opportunities for improving joint response governance through clearer frameworks and cooperative practices (Trias & Cook, 2021). These findings reinforce a central implication for policy research: evaluating disaster management service policy requires an explicit governance lens that can capture how authority, resources, and coordination mechanisms interact across organizations and levels.

### **What “effectiveness” means in disaster management services, and why it is hard to measure**

“Effectiveness” in disaster management services is contested because disasters are low-frequency, high-impact events with attribution problems: outcomes (e.g., reduced mortality, reduced losses) are shaped by hazard intensity, exposure, vulnerabilities, and timing, factors that are not fully controlled by service policy. Recent crisis research therefore argues for moving beyond generic outcome claims toward structured performance indicators that are meaningful to practitioners and sensitive to context (contingency). For example, Deverell and Ganic propose crisis performance indicators derived from practitioner knowledge and use “contingency” as a corrective lens, implying that performance assessment should consider the fit between governance

arrangements, situational demands, and response practices (Deverell & Ganic, 2024).

From a policy-evaluation standpoint, this supports a two-layer view of effectiveness:

1. Institutional/service effectiveness (whether mandated services are deliverable with quality, readiness, timeliness, interoperability, accountability); and
2. Societal outcome effectiveness (whether risks and losses decline).

For document-based qualitative studies, the first layer is often more defensible because documentary evidence (plans, SOPs, budgets, after-action reports, audit notes, coordination decrees) can robustly reveal design logic, capacity commitments, and governance mechanisms even when causal links to final outcomes remain probabilistic.

### **Governance architecture: hierarchy, networks, and co-governance in emergency services**

A core theme in high-impact disaster governance research is that effective emergency services rarely come from either pure hierarchy or pure networks; instead, they emerge from hybrid arrangements that combine command authority with collaborative coordination. Evidence from Norway’s “collaborative emergency preparedness” model shows how mixing hierarchical and network elements, supported by formalized volunteer-public collaboration, can shape emergency outcomes, underscoring that governance design influences operational effectiveness (Enjolras et al., 2024).

However, multi-actor approaches also carry risks. A study of co-governance in DRR in Indonesia and Myanmar finds that while DRR can become more inclusive as actors multiply, systems may remain highly hierarchical and state-centered, and growing complexity and competition can

reduce the ability to conduct DRR effectively.

This is highly relevant for evaluating “service policy” because service delivery depends on who legitimately coordinates whom, how mandates are sequenced, and whether coordination forums reduce duplication rather than creating additional layers.

### **Policy coherence and cross-sector integration: why fragmentation undermines service delivery**

Disaster services are increasingly expected to align with climate adaptation, spatial planning, health services, and social protection, yet policy coherence is often weak. Policy-content work on coherence emphasizes that fragmentation in written policy objectives and instruments can translate into fragmented implementation. A summative content analysis of policies and legislation in South Africa finds incoherencies between DRR, climate change adaptation (CCA), and food security frameworks and argues that limited integration in policy texts contributes to fragmented implementation (Zembe et al., 2022).

In Indonesia-related contexts, fragmentation is repeatedly identified as a practical barrier to integrated risk governance. In Jakarta, institutional fragmentation between DRR and CCA is argued to create duplication, confusion, and reduced effectiveness; importantly, absent accountable leadership and inconsistent collaboration mechanisms are highlighted as major impediments to integration through collaborative governance (Dwirahmadi et al., 2023).

In Aceh, progress in DRR-CCA integration is constrained by fragmented policies, challenges in sustaining political commitment, limited fiscal capacity/earmarked funding, and deficits in community participation (Sufri & Lassa, 2024). Complementing these insights, Zimmermann’s work on Mumbai stresses

that understanding how the DRR-CCA link is established at local levels requires attention to ground-level actors and practices, not merely national frameworks (Zimmermann et al., 2023). For West Sumatra, this literature implies that the “effectiveness” of disaster management service policy plausibly depends on the coherence of service mandates across sectors and levels (e.g., how preparedness/response services are linked to land-use planning, coastal risk management, health response, and climate-related hazards).

### **Capacity and public finance: budgeting signals commitment but may not track risk**

Service effectiveness is constrained by administrative capacity and public finance. Evidence from Aceh shows disaster budgeting can be weakly aligned with risk: allocated disaster budgets within local disaster agencies were on average less than 1% of local budgets and were not significantly correlated with disaster risk indices; budget preparation often followed routine departmental logic rather than risk-based planning (Fahlevi et al., 2019).

This finding matters for West Sumatra because “service policy” (e.g., evacuation readiness, logistics stockpiles, training cycles) is only credible when resource allocations and procurement rules make those services feasible.

### **Community participation and local knowledge: from “nice to have” to operational capability**

A mature strand of DRR scholarship argues that local knowledge and community participation can strengthen preparedness and early warning systems, but only if integration is deliberate and methodologically explicit. A systematic review and evidence synthesis on integrating local and scientific knowledge in DRR and early warning examines motivations, processes, and outcomes of integration and shows that integration is

not automatic, it depends on how knowledge is combined, whose expertise is legitimized, and what institutional processes support uptake (Vasileiou et al., 2022).

Earlier IJDRR work also develops a theoretical framing for integrating scientific and indigenous knowledge to build community capacity for DRR (Wang et al., 2019). West Sumatra provides a particularly policy-relevant context because local governance units (nagari) and Minangkabau socio-cultural systems preserve disaster-related practices and interpretations. In Pasaman Barat (West Sumatra), indigenous signs and interpretations, embedded in customs, architectural practices, and social norms, continue to inform how communities understand and respond to hazards, suggesting that “service effectiveness” should include whether formal services recognize and work with such living knowledge systems (Nopriyasman et al., 2024). Complementary evidence from West Sumatra also shows attempts to formalize

community-based disaster management models grounded in local and religious values, indicating a pathway for institutionalizing participation and culturally rooted preparedness.

### **Conceptual Framework for Evaluating Disaster Management Service Policy Effectiveness**

Drawing from the above literature, this article conceptualizes policy effectiveness as the degree to which West Sumatra’s disaster management service policy creates implementable, coherent, and adaptive service capacity across four interdependent domains: (1) policy design coherence, (2) institutional capacity and finance, (3) collaborative governance performance, and (4) community-knowledge integration. The framework treats “effectiveness” primarily as service-system effectiveness (credible readiness and operational interoperability), while acknowledging that ultimate societal outcomes are mediated by hazard severity and vulnerability conditions.

**Table 1.** Constructs and indicative evidence in documents

<b>Construct (domain)</b>	<b>Working definition (what is evaluated)</b>	<b>Examples of documentary indicators (secondary qualitative data)</b>
Policy coherence (design)	Alignment and non-contradiction of objectives/instruments across DRR-CCA-development sectors and across levels	Consistency of goals/definitions across plans; cross-references between DRR and sector plans; presence of coordination mandates; avoidance of duplicative or conflicting SOPs (Dwirahmadi et al., 2023; Zembe et al., 2022).
Capacity & finance	Whether mandates are matched with feasible resources, staffing, and risk-based budgeting	Budget shares/trends; earmarked preparedness/response lines; procurement/logistics rules; staffing/training plans; evidence of risk-based allocation versus routine allocation (Fahlevi et al., 2019; Sufri & Lassa, 2024).
Collaborative governance performance	How hierarchy-network arrangements enable coordination, accountability, and rapid joint action	Incident command/coordination structures; MoUs and interoperability protocols; volunteer integration mechanisms; accountability lines; after-action notes on coordination failures/successes (Enjolras et al., 2024).
Adaptive service performance	The presence of context-sensitive performance indicators and learning mechanisms	Defined performance indicators for preparedness/response; contingency-based adjustments; monitoring and learning loops; revisions after

Community & knowledge integration	Extent to which services incorporate community participation and local knowledge in preparedness/response	Formal roles for nagari/community groups; culturally grounded communication strategies; integration of local warning interpretations; participatory risk mapping/training; evidence of deliberate knowledge integration (Nopriyasman et al., 2024; Vasileiou et al., 2022).
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Based on the reviewed evidence, the study advances three qualitative propositions to guide interpretation of secondary data:

1. Coherence proposition: Where DRR service mandates are fragmented across DRR-CCA-sector policies, documentary evidence will show duplicated instruments, unclear coordination, and weaker service readiness (Dwirahmadi et al., 2023; Sufri & Lassa, 2024).
2. Capacity proposition: Where budgeting and staffing are not risk-aligned, policy texts and plans will overpromise service functions without credible operationalization, revealing “paper readiness.” (Fahlevi et al., 2019)
3. Integration proposition: Where formal services deliberately integrate community participation and local knowledge (rather than treating them as symbolic add-ons), documents will show clearer outreach protocols, locally legible warnings, and stronger preparedness routines at the community interface (Nopriyasman et al., 2024; Vasileiou et al., 2022).

This conceptual framework is designed to be directly operationalized through qualitative secondary analysis (policy texts, plans, budgets, evaluation reports, and credible published studies) while meeting expectations for theoretical clarity: constructs are defined, their relationships are explicit, and indicators are specified in a way that supports transparent coding and credible inference.

## METHODS

### Research design and case selection

This study adopts a qualitative policy document analysis design to evaluate the effectiveness of disaster management service policy in West Sumatra, Indonesia. Document analysis is particularly appropriate for policy evaluation when the policy problem, intent, instruments, and implementation architecture are formally codified through regulations, strategic plans, standard operating procedures (SOPs), performance accountability reports, and budget documents. These materials also provide a stable empirical basis to examine policy coherence across planning, delivery standards, resourcing, coordination mechanisms, and performance claims over time. To structure the work systematically, the study follows the READ approach (Ready materials, Extract data, analyze data, distil findings), which has been widely used to strengthen rigor in policy-oriented document analysis (Dalglish et al., 2020).

### Case setting and policy boundary

The case is bounded to provincial-level disaster management services governed and delivered through the West Sumatra Provincial Disaster Management Agency (Badan Penanggulangan Bencana Daerah, BPBD Provinsi Sumatera Barat) and associated provincial policy instruments. “Disaster management service policy” in this study refers to the set of formal rules and organizational

events/exercises (Deverell & Ganic, 2024; Nohrstedt et al., 2022).

commitments that shape service delivery across the disaster management cycle, including prevention and mitigation, preparedness, early warning and emergency response, and post-disaster recovery. The unit of analysis is the policy system as expressed in official documents, not individual disaster events.

### **Data sources and document corpus (2020 to 2025)**

The corpus consists entirely of secondary documents produced by authorized institutions and publicly accessible through official portals. The core institutional sources are (1) BPBD West Sumatra official website and its administrative publications, and (2) the provincial public information portal (PPID) where regulatory and accountability documents are disclosed. To anchor provincial policy within national direction, the study also includes national-level disaster policy and risk publications from BNPB and its official risk information portal.

Primary provincial documents included (examples of the main analytical corpus):

1. Provincial strategic plan for BPBD (Renstra BPBD 2021 to 2026) as the mid-term policy and service planning backbone.
2. Annual work plan (Renja) for BPBD (Renja 2024) to operationalize priorities, programs, and annual performance targets.
3. Annual performance accountability reports (LKj) for BPBD (LKj 2022; LKj 2023) to evaluate targets, indicators, and claimed results.
4. Provincial disaster management regulation (Perda No. 4/2023 on Disaster Management) as the binding legal framework for governance and service mandate.
5. SOP for early warning system and emergency handling (2023) to capture

operational standards for preparedness and response services.

6. Budget planning document (RKA BPBD FY2025) to assess alignment between policy priorities and resourcing.
7. Provincial disaster information publication (Data and Information on Disasters in West Sumatra 2024) as an official compilation supporting evidence use for policy and research.

Complementary national documents used for contextual anchoring and benchmarking:

1. Indonesia National Disaster Management Plan (Renas PB 2020 to 2024) to map national policy priorities relevant to provincial alignment.
2. Indonesia Disaster Risk Index (IRBI) 2024 and associated InaRISK portal outputs to contextualize risk framing and indicators.

### **Inclusion and exclusion criteria**

Documents were included if they met all criteria below:

1. Authority: produced or formally endorsed by BPBD West Sumatra, the Government of West Sumatra, or BNPB (including official portals hosting the documents).
2. Relevance: directly addresses disaster management services, governance, programs, SOPs, performance indicators, budgets, or accountability linked to service delivery.
3. Time window: published or in force within 2020 to 2025 (with allowance for multi-year plans that govern the period, such as 2021 to 2026 Renstra).
4. Accessibility and completeness: retrievable in full text (PDF or official web publication) with identifiable publication year and document identity.

Documents were excluded if they were purely ceremonial news items without policy or service content, duplicates, or documents with unclear provenance.

## Document quality and credibility appraisal

Because policy evaluation in practice draws heavily on “grey literature” (plans, regulations, reports, SOPs), the study applied a structured appraisal to reduce the risk of treating low-quality or outdated documents as authoritative. Grey literature searching and synthesis requires explicit critical reflection on provenance and credibility, especially when documents are used as primary evidence (Adams et al., 2016). Each document was assessed using the AACODS logic (Authority, Accuracy, Coverage, Objectivity, Date, Significance) as a screening and documentation checklist (Burls, 2014). A document appraisal log was maintained, recording source URL, issuing body, year, document purpose, scope limitations, and any internal inconsistencies.

## Data extraction procedures

Following the READ approach, the analysis proceeded in four systematic stages: (1) preparing and organizing the document set, (2) extracting data using a structured matrix, (3) analyzing and coding, and (4) distilling findings into evaluative claims grounded in evidence (Dalglish et al., 2020). A standardized extraction matrix was used to capture: (a) document metadata (issuer, year, document type, legal status), (b) policy goals and service standards, (c) institutional roles and coordination arrangements, (d) policy instruments (regulatory, financial, informational, operational), (e) resource commitments (budget lines, capacity development), and (f) performance logic (indicators, targets, reported achievements, and explanations for gaps). This matrix was designed to support cross-document comparison and to trace consistency from strategy and legal mandate to annual work plans, budgets, SOPs, and performance accountability narratives.

## Analytic strategy: reflexive thematic analysis with an evaluative lens

The study uses reflexive thematic analysis to identify patterns of meaning relevant to policy effectiveness across the corpus. This approach is appropriate for policy systems where “effectiveness” is multi-dimensional and must be interpreted through how documents define problems, justify instruments, allocate responsibilities, and claim results. Reflexive thematic analysis is implemented through a transparent, iterative process that emphasizes the researcher’s active role in interpretation (Byrne, 2022).

Analytically, coding followed two linked cycles:

1. Cycle 1 (deductive coding) applied a small set of evaluative categories derived from the article’s conceptual framework (for example, policy coherence across the disaster cycle, implementation readiness, coordination architecture, resourcing alignment, accountability and learning).
2. Cycle 2 (inductive coding) allowed new themes to emerge from the documents, especially where local governance practices, operational constraints, or implementation narratives diverged from formal policy intent.

Themes were developed through repeated reading, memo writing, comparison across document types (legal, planning, operational, performance, budget), and explicit tracking of contradictory statements. The final outputs are evaluative theme statements, each supported by a chain of evidence across multiple documents rather than a single source.

## Trustworthiness and rigor

To meet international expectations for qualitative rigor, the study operationalized trustworthiness through credibility, transferability, dependability, and confirmability, with reflexivity treated as an integral practice rather than an add-

on (Johnson et al., 2020; Korstjens & Moser, 2018).

1. Credibility was strengthened through triangulation across multiple document genres (regulation, plans, SOPs, performance reports, budgets), allowing policy intent, implementation design, and performance claims to be assessed together.
2. Dependability was strengthened through an audit trail consisting of a document registry, appraisal log, extraction matrices, coding memos, and versioned thematic maps. Guidance on audit trails emphasizes that transparent documentation enables others to follow analytic decisions and judge stability of findings (Carcary, 2020).
3. Confirmability was supported by reflexive memos documenting analytic choices, assumptions, and how competing interpretations were handled (Johnson et al., 2020).
4. Transferability was supported by thick description of the provincial policy context and explicit boundary setting of what the findings do and do not claim (Korstjens & Moser, 2018).

## Ethical considerations

All materials analyzed are publicly available documents produced by governmental institutions and accessed through official disclosure channels. No personal data were collected and no human participants were involved; therefore, formal human-subject ethical review is typically not required for this design. When quoting documents in the Results section, the study will cite the issuing institution, year, and document title to ensure traceability.

## RESULTS AND DISCUSSION

### Performance snapshot and KPI trajectory (2022–2024)

Table 1 consolidates the core service-performance indicators reported by BPBD West Sumatra for 2022–2023 and the forward-looking performance targets/outputs that are explicitly stated in the 2024 Work Plan (Renja). In 2022–2023, the KPI set is dominated by “coverage/compliance” indicators (targets met at 100% or full counts), while perceived service quality shows a notable weakening in 2023.

**Table 2.** KPI snapshot (reported outcomes 2022–2023; planned targets/outputs 2024)

Domain	Indicator (as stated in official documents)	2022 realization	2023 realization	2024 target/plan (Renja)
Preparedness (institutional/community)	Number of institutions and communities ready to face disasters	20	20	Program-level preparedness indicator stated as “percentage of preparedness” (73%)
Preparedness (infrastructure)	Number of disaster-standard infrastructures	5	5	Not stated in the extracted 2024 activity output table
Response (operational)	Percentage of disaster events that can be handled	100%	100%	Disaster management program readiness indicator (73%); disaster-risk information dissemination (58%)
Recovery	Percentage of post-disaster areas that can be restored	100%	100%	Not stated in the extracted 2024 activity output table

Governance (accountability)	Government Agency Performance Accountability (AKIP/SAKIP) score	"BB"	"BB"	Not stated in the extracted 2024 activity output table
Service quality (stakeholders)	Stakeholder/community satisfaction with BPBD services	86	77.71	Not stated in the extracted 2024 activity output table
Risk information services (output)	Percent of provincial disaster-risk information disseminated	Not stated	Not stated	58%
Capacity building (output)	Certified provincial rapid response (TRC) personnel	Not stated	Not stated	45 persons
Preparedness exercise (output)	Citizens and officials involved in preparedness drills	Not stated	Not stated	200 persons
Life-saving logistics (output)	Disaster victims receiving rescue/evacuation logistics distribution	Not stated	Not stated	500 persons

Sources: BPBD West Sumatra performance report (LKj) 2023 KPI comparison table for 2022–2023.

Renja BPBD West Sumatra 2024 (program and activity outputs including 73% preparedness and 58% dissemination, plus TRC certification and drill/logistics targets).

Key reading of Table 1:

1. KPI "full achievement" is structurally easy to claim when indicators are framed as counts (20, 5) or binary coverage (100%).
2. Service quality is more sensitive and reveals friction: satisfaction drops from 86 (2022) to 77.71 (2023), despite stable "100% handled" outputs.
3. The 2024 plan explicitly prioritizes preparedness and information services (73% preparedness; 58% dissemination), plus operational capacity outputs (TRC certification; drills; logistics reach).

### Thematic results

Theme 1. "100% handled" outputs coexist with operational strain and measurement ambiguity. BPBD reports 1,047 disaster incidents handled in 2022, with an indicator definition that equates performance to the ability to "handle" the reported incidents. In the 2022–2023 KPI

set, the response performance appears maximized (100% handled in both years).

However, the 2023 performance narrative explicitly acknowledges that disaster handling is supported by apparatus and facilities that are not yet adequate, and frames "optimization of coordination and deployment" as necessary for performance delivery. This matters analytically: "handled" can range from minimal coordination (recording, initial response, referral) to full-spectrum response (rapid assessment, evacuation, logistics, shelter, early recovery). A single coverage indicator can therefore mask variability in timeliness, inter-agency integration, and beneficiary experience.

This pattern is consistent with performance-management research showing that quantified indicators can improve focus and accountability, but effects depend heavily on indicator design and the organizational context. A meta-analysis in Public Administration Review highlights heterogeneous impacts of performance management across settings, implying that "good-looking" performance scores do not automatically translate into

improved service experience (Gerrish, 2016).

Theme 2. Stakeholder-facing quality (satisfaction) is the “stress test” indicator. The most informative divergence in 2023 is the drop in satisfaction (86 to 77.71). BPBD’s satisfaction measurement is explicitly described as a survey directed to service users and stakeholders, including penta-helix actors (government, academia, business, community, media). That design is advantageous for validity, because it captures perceptions across actors who experience BPBD not only as a responder but also as a coordinator and information provider. The satisfaction decline is also consistent with an operational narrative that identifies resource constraints as a continuing issue.

In a disaster-prone context, stakeholder satisfaction is often driven by perceived speed, clarity of information, fairness of support distribution, and the coordination experience across agencies and communities. It is precisely these dimensions that are most exposed when capacity is stretched and when communication across the response network becomes fragmented.

The emergency-management network literature is clear that communication and coordination are complementary mechanisms shaping network effectiveness; weaknesses in either can reduce perceived effectiveness even when formal targets appear met (Sienkiewicz-Malyjurek & Owczarek, 2021).

A systematic review of emergency management network research similarly points to recurring challenges in how networks form, operate, and are evaluated, reinforcing that performance in emergencies is inherently inter-organizational rather than single-agency (Hu et al., 2022).

Theme 3. Policy implementation shows “capability-building intent,” but

external shocks and budgeting decisions still disrupt delivery. Two pieces of evidence illustrate the implementation challenge. First, BPBD’s 2022 report notes that a disaster risk reduction jamboree was not implemented due to budget refocusing, indicating that preparedness and community engagement programs are vulnerable to fiscal shocks.

Second, the same report flags the need for monitoring and evaluation of the Disaster Risk Reduction Forum (Forum PRB), implying that coordination platforms exist but require stronger governance and follow-through. In 2024, the Renja indicates concrete capability-building outputs such as TRC certification (45 personnel), preparedness drills (200 participants), and logistics distribution for rescue/evacuation (500 people).

It also makes preparedness and information dissemination explicit in percentage terms (73% preparedness; 58% risk-information dissemination), signaling an effort to operationalize service quality through more granular program outputs.

#### **Policy logic chain**

The empirical results suggest that high achievement on completion-oriented indicators may coexist with unresolved constraints in service quality and coordination. To interpret this pattern, Figure 1 maps the policy logic chain that underpins BPBD’s disaster management service delivery, showing where effectiveness is expected to be generated and where it may break down under capacity and budget pressures.

**Policy intent:** Reduce disaster risk and losses through reliable service across preparedness, response, and recovery.

**Inputs:** Legal mandate and provincial programs; budget allocations; trained staff; equipment; data systems; coordination platforms (Forum PRB).

**Activities:** Risk information production and dissemination; preparedness training and drills; TRC

capacity development; activation of command systems; logistics deployment; inter-agency coordination during incidents; early recovery facilitation.

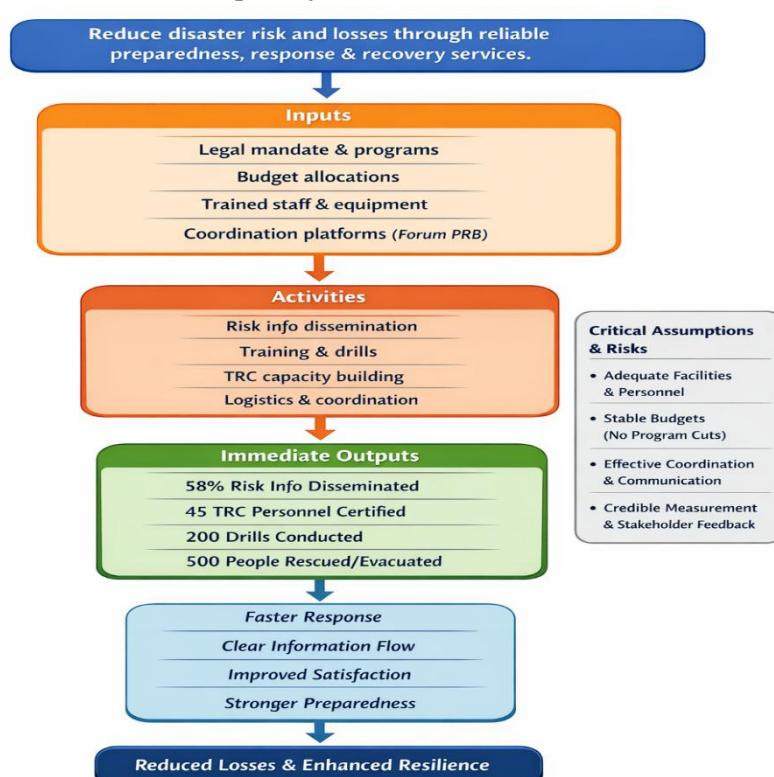
**Immediate outputs:** Disseminated risk information (target 58%); certified TRC personnel (target 45); drills conducted (target 200 participants); logistics reach (target 500 people); incident handling coverage (target 100%).

**Outcomes:** Faster and more coherent response; clearer information flows; improved perceived service quality

(satisfaction); strengthened local preparedness capacity.

**Impact:** Lower losses, faster recovery, and improved resilience at provincial and district/city levels.

Critical assumptions and risks: Adequate facilities and personnel (identified as not fully adequate in 2023); stable budgets (refocusing can cancel preparedness programs); effective network coordination and communication; credible measurement and feedback loops from stakeholders.



**Figure 1.** Policy logic chain of disaster management service policy

### Discussion and explicit answers to the research questions

#### RQ1. What measurable service outcomes indicate policy effectiveness in West Sumatra (2022–2024)?

The policy appears “effective” under coverage-based indicators: 2022–2023 show full attainment for preparedness counts (20 communities/institutions; 5 infrastructures) and response and recovery coverage (100% handled; 100% restored).

Yet the more discriminating outcome is stakeholder satisfaction, which declines in 2023 (77.71). This divergence implies that effectiveness cannot be concluded from coverage indicators alone. The 2024 work plan’s shift toward specific preparedness and information-service targets (73% preparedness; 58% dissemination) is a move toward outcome-relevant service dimensions.

Interpretation using the literature: performance management can support improvement, but indicator design shapes what agencies prioritize and what gets obscured (Gerrish, 2016). In addition, studies on performance systems caution that target regimes can incentivize “gaming” or narrow optimization when indicators are weak proxies for real outcomes (Aboubichr & Conway, 2023; Chen, 2025).

In this case, the stable “100% handled” indicator, combined with a satisfaction decline, is a strong signal that the KPI set is incomplete for capturing service quality.

**RQ2. Which governance mechanisms most plausibly explain performance patterns observed in the policy implementation?**

The evidence points to network governance mechanisms centered on coordination platforms and cross-actor engagement. BPBD explicitly situates satisfaction measurement across penta-helix stakeholders, implying multi-actor service delivery and evaluation.

At the same time, the 2022 report identifies the need for stronger monitoring of Forum PRB, suggesting coordination exists institutionally but may be uneven in execution. The broader scholarship shows that emergency management effectiveness depends on the joint functioning of communication and coordination, which can develop in parallel and reinforce each other (Sienkiewicz-Malyjurek & Owczarek, 2021).

A systematic review of emergency management network research further supports the idea that network structure and resource sharing are central drivers of performance (Hu et al., 2022; Saputra et al., 2024). Therefore, the most plausible governance explanation for mixed outcomes is that coverage targets were met through basic operational routines, but network quality (information flow, role

clarity, trust, and coordination) was insufficiently robust in 2023 to sustain stakeholder satisfaction.

**RQ3. What constraints and implementation gaps most strongly limit the effectiveness of the disaster management service policy?**

Two constraints are strongly evidenced. First is resource inadequacy: the 2023 report acknowledges that disaster handling is supported by apparatus and facilities that are not yet adequate. Second is budget fragility and program disruption, illustrated by the cancellation of a preparedness-focused activity due to budget refocusing.

These constraints help explain why satisfaction can deteriorate even when “handled” targets appear perfect: service users and stakeholders experience delays, unclear information, or inconsistent coordination when the system is stressed.

A related measurement gap is the reliance on indices whose production is external. BNPB describes the Regional Resilience Index (IKD) as a capacity measurement using 71 indicators with standardized mechanisms.

BPBD’s own report notes dependence on official values from BNPB for IKD reporting, reinforcing that part of performance assessment is institutionally external and may not align with local learning cycles.

**CONCLUSION**

Overall, the documentary record for 2022–2024 suggests that West Sumatra’s disaster management service policy is administratively effective in meeting coverage- and completion-oriented targets, while remaining vulnerable on service quality and enabling capacity. Across 2022–2023, BPBD reports full attainment on core operational indicators (including “100% of disaster events handled” and

completion-style recovery indicators), and it documents substantial operational volume (1,047 incidents handled in 2022), indicating an active and routinized response posture. However, the same performance system reveals a critical stress signal: the stakeholder satisfaction score declines to 77.71 in 2023 against a higher target, even as completion indicators remain maximal. This divergence is consistent with BPBD's own acknowledgement that disaster handling is still supported by apparatus and facilities that are not yet adequate, suggesting that "coverage success" can coexist with constraints in response quality, coordination experience, and citizen-facing service performance. The 2024 planning set strengthens the policy logic by specifying preparedness and risk-information service outputs (e.g., dissemination and training targets, certified rapid response personnel, drills, and logistics reach), indicating an adaptive shift toward upstream capacity-building that can plausibly improve the quality of services, not merely the completion of activities.

Based on these findings, the most feasible policy priorities are as follows. First, BPBD and the provincial government should tighten KPI definitions and rebalance measurement by complementing completion indicators with quality-sensitive measures (timeliness, adequacy, equity of service reach, and service experience), because performance-management research shows that indicator design strongly shapes organizational behavior and can create blind spots when output metrics dominate. Second, the province should strengthen the enabling backbone of service delivery by prioritizing operational facilities and the information-to-action chain (including the functionality of operations and coordination support), directly addressing the capacity limitations already documented in the 2023

performance narrative. Third, coordination should be made more durable by institutionalizing intergovernmental and multi-actor collaboration routines, including clearer follow-through and monitoring for formal coordination platforms such as Forum PRB, which BPBD itself identifies as requiring stronger monitoring and evaluation. Fourth, preparedness investments should be protected from fiscal volatility by adopting more stable preparedness financing arrangements, because the cancellation of preparedness-oriented activities due to budget refocusing signals that core readiness services can be disrupted without protective budgeting mechanisms. Finally, community-facing readiness targets should be designed as enabling (not symbolic) by linking training, drills, and risk-information dissemination to clear local roles, support structures, and feedback loops, so that participation strengthens service effectiveness and improves stakeholder experience rather than merely increasing activity counts.

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