http://journal.uir.ac.id/index.php/JIAP
E-ISSN : 2622-934X
P-ISSN : 2502-9757

PUBLIKA :
Jurnal Ilmu Administrasi Publik
Vol. 12, No. 1 / 2026

Institutional Design of Collaborative Governance in Landslide Disaster Mitigation A Case Study of Sawahlunto City Indonesia

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Received : January 30, 2026; Accepted : April 15, 2026
DOI 10.25299/jiap.2026.22754

Abstract

This study aims to analyze the institutional design of collaborative governance in landslide disaster mitigation in Sawahlunto City. Employing a qualitative research approach, data were collected through in-depth interviews, document analysis, and field observations involving key governmental agencies, community representatives, and supporting stakeholders. The analytical framework is grounded in the collaborative governance model proposed by Ansell and Gash, with a specific focus on the institutional design dimension, encompassing inclusive participation, exclusive forums, ground rules, and transparency processes. The findings reveal that collaborative governance in Sawahlunto has been formally established through various coordination mechanisms; however, its effectiveness remains uneven. Inclusive participation is present but limited in practice, formal forums exist yet lack regularity and strategic authority, ground rules are partially institutionalized, and transparency mechanisms are inconsistently implemented across agencies. These conditions contribute to fragmented coordination and suboptimal mitigation outcomes. This study contributes to the literature by demonstrating that effective disaster mitigation requires not only collaborative engagement but also a coherent and well-structured institutional design. The study proposes an institutional design model that strengthens cross-sectoral coordination, accountability, and transparency to enhance landslide disaster mitigation at the local level.

Key Words : Collaborative Governance, Institutional Design, Landslide Disaster Mitigation, Disaster Risk Reduction, Local Government.

Introduction

Indonesia is internationally recognized as one of the most disaster-prone countries due to the convergence of complex geological, geographical, and climatic factors (Syukri et al., 2025). Located along the Pacific Ring of Fire, the country experiences intense tectonic activity resulting from the interaction of the Indo-Australian, Eurasian, and Pacific plates (Suprapto & Rizki, 2024). This geological setting generates frequent earthquakes and volcanic eruptions, which in turn trigger secondary hazards such as landslides and floods. Coupled with tropical rainfall patterns and mountainous terrain, these conditions significantly increase landslide susceptibility across many regions in Indonesia.

Recent national disaster statistics reveal that disaster risks in Indonesia remain persistently high. Between 2021 and 2025, disaster events caused substantial human displacement, fatalities, housing damage, and infrastructure losses.

Table 1. Impacts and Damages Caused by Natural Disasters in Indonesia, 2021–2025

Year	Disaster Impacts	Disaster-Related Damages			Total Disaster Events
	Fatalities	Displaced Population	Damaged Houses	Damaged Public Facilities	
2021	728	7.630.692	158.658	4.445	5.402
2022	858	6.144.534	95.403	1.983	3.544
2023	275	8.491.288	47.214	1.291	5.400
2024	239	3.526.054	37.287	706	3.472
2025	299	4.596.315	23.141	475	2.058

Source: Author's compilation based on BNPB Disaster Infographics (2025).

This table demonstrates that despite improvements in disaster management policies, the magnitude of losses remains significant, indicating structural vulnerabilities in disaster risk reduction efforts, particularly at the local level. West Sumatra Province represents one of the most disaster-exposed regions in Indonesia (Ramadhan, 2024). The province lies along an active tectonic zone, contains several active volcanoes, and is dominated by hilly and mountainous landscapes (Utama & Mulyasari, 2024). These conditions generate multi-hazard exposure, including earthquakes, floods, volcanic eruptions, and landslides.

Among all local governments in West Sumatra, Sawahlunto City exhibits the highest frequency of landslide events. Historical disaster records indicate that Sawahlunto experienced more landslide incidents than any other regency or city in the province.

Table 2. Landslide Occurrence by Regency/City in West Sumatra, 2017

No.	Regency / City	Number of Landslide Events
1	Lima Puluh Kota Regency	8
2	Agam Regency	15
3	Dharmasraya Regency	1
4	Mentawai Islands Regency	1
5	Padang Pariaman Regency	3
6	Pasaman Regency	8

7	West Pasaman Regency	9
8	South Pesisir Regency	7
9	Sijunjung Regency	12
10	Solok Regency	8
11	South Solok Regency	2
12	Tanah Datar Regency	9
13	Bukittinggi City	3
14	Padang City	12
15	Padang Panjang City	2
16	Pariaman City	0
17	Payakumbuh City	2
18	Sawahlunto City	126
19	Solok City	0
Total		226

Source: Disaster Operations Control Center (Pusdalops PB), Regional Disaster Management Agency (BPBD) of West Sumatra Province, 2017.

Sawahlunto City is empirically confirmed as the most landslide-prone locality in West Sumatra Province. In 2017 alone, Sawahlunto recorded 126 landslide events, a figure that far exceeds those of other regencies and cities in the province. By comparison, Agam Regency experienced 15 landslide events, Padang City recorded 12 events, Sijunjung Regency 12 events, Tanah Datar Regency 9 events, and West Pasaman Regency 9 events, while several cities such as Pariaman and Solok reported no landslide occurrences. This stark disparity highlights Sawahlunto's exceptional exposure to landslide hazards and underscores the urgency of implementing more effective and integrated mitigation strategies.

The city's extreme vulnerability is closely linked to its geomorphological characteristics. Sawahlunto is situated within the Bukit Barisan mountain range, with elevations ranging from approximately 250 to 650 meters above sea level. Its terrain is dominated by hilly and mountainous landscapes, with a substantial proportion of land characterized by steep and very steep slopes. A significant share of the city's land area falls within slope categories exceeding 25 percent, and many zones exhibit slope gradients greater than 40 percent. These conditions considerably increase landslide susceptibility, particularly during periods of prolonged or intense rainfall, when soil saturation reduces slope stability.

Spatial hazard assessments further reinforce the severity of landslide risk in Sawahlunto. Medium- to high-level landslide hazard zones are distributed across almost all districts and villages within the city. These hazard-prone areas collectively cover thousands of hectares and expose tens of thousands of residents to potential landslide impacts. The widespread distribution of hazard zones indicates that landslide risk in Sawahlunto is systemic rather than confined to isolated locations, affecting both densely populated settlements and critical infrastructure corridors.

The social and economic consequences of landslides in Sawahlunto are substantial and recurrent (Purnama et al., 2025). Recent flood and landslide events have caused extensive damage to residential housing, road networks, irrigation systems, educational facilities, and agricultural land (Alcántara-Ayala, 2025). Economic losses from these events have reached billions of rupiah, accompanied by fatalities, injuries, and large-scale

displacement of residents (Maryani et al., 2025). The cumulative nature of these impacts demonstrates that landslides in Sawahlunto are not sporadic incidents but recurring disasters that continuously undermine local development, public safety, and community resilience.

Despite the availability of detailed risk assessments and hazard analyses, Sawahlunto's overall disaster resilience remains at a moderate level. Institutional capacity related to disaster governance, particularly in policy strengthening, inter-agency coordination, and mitigation effectiveness, has not yet translated into a substantial reduction in disaster risk (Swaris et al., 2024). This condition suggests that while physical risk factors are well documented, governance and institutional challenges continue to constrain the effectiveness of landslide mitigation efforts in the city.

In Indonesia, disaster management is formally structured through a multi-phase framework encompassing mitigation, preparedness, emergency response, rehabilitation, and reconstruction. Among these phases, mitigation is considered the most strategic stage for reducing disaster risks before hazards occur. However, mitigation effectiveness is not solely dependent on physical interventions such as slope stabilization or drainage construction. Instead, it is strongly influenced by institutional coordination, governance arrangements, and collaboration among multiple actors.

In Sawahlunto, landslide mitigation involves a wide range of stakeholders, including the Regional Disaster Management Agency (BPBD), public works, housing and settlement agencies, environmental agencies, planning institutions, sub-district governments, village administrations, and community-based initiatives such as Disaster Resilient Villages. While this multi-actor involvement reflects a collaborative approach, empirical evidence suggests that coordination remains fragmented, forums are irregular, responsibilities often overlap, and information sharing is inconsistent.

From a governance perspective, these challenges highlight the relevance of collaborative governance as an analytical and practical framework for disaster risk reduction. Collaborative governance emphasizes shared decision-making, cross-sectoral coordination, and consensus-oriented processes among public and non-public actors (Cristofoli et al., 2022). Among various models, the framework proposed by Ansell and Gash identifies institutional design as a critical determinant of collaborative success, encompassing inclusive participation, formal forums, clear ground rules, and transparent processes (Ansell & Gash, 2018).

Previous studies on collaborative governance in disaster management largely focus on describing coordination processes and stakeholder roles. For instance, Masyhuri (2021) examined stakeholder collaboration in landslide disaster management in Semarang City, finding that coordination remained weak and private sector participation was minimal (Masyhuri et al., 2021). Puspita et al. (2024) analyzed collaborative governance in landslide mitigation in Bojonegoro Regency and identified limitations in dialogue intensity, actor involvement, and resource availability (Puspita & Junadi, 2024). Similarly, Abdurrahman (2025) studied collaborative governance in landslide disaster handling in Purwakarta, emphasizing the importance of dialogue and trust-building among stakeholders (Abdurrahman, 2025). While these studies contribute valuable insights, they primarily remain descriptive and normative, with limited attention to how institutional structures are systematically designed and sustained.

This study addresses this gap by focusing explicitly on the institutional design of collaborative governance in landslide disaster mitigation. Unlike previous studies, which

emphasize collaboration outcomes or interaction dynamics, this research examines how institutional arrangements such as participation mechanisms, coordination forums, rules of engagement, and transparency processes are structured and implemented in practice. By doing so, the study offers a more systematic and operational understanding of collaborative governance.

More specifically, this study asks not only whether multiple actors are involved in mitigation, but how institutional design weaknesses produce concrete governance consequences. In this article, fragmented coordination is understood as the outcome of four mutually reinforcing deficiencies: (1) participation that is formally broad but substantively unequal, (2) forums that exist administratively but do not function as stable decision-making arenas, (3) rules that regulate coordination in principle but lack enforcement capacity, and (4) transparency mechanisms that are partial and therefore insufficient to support trust, joint monitoring, and corrective learning.

The novelty of this research lies in positioning institutional design not as a background variable, but as the central explanatory mechanism linking collaborative arrangements to the effectiveness of local disaster mitigation. In addition, the article develops an operational design framework for local governments in landslide-prone areas by specifying institutional components that must be present for collaboration to move from ad hoc coordination to sustained governance.

Method

This study employed a qualitative research approach with an exploratory–descriptive design to examine the institutional design of collaborative governance in landslide disaster mitigation in Sawahlunto City, West Sumatra Province, Indonesia. The qualitative approach was selected to capture in-depth empirical insights into governance processes, inter-organizational relations, and institutional arrangements that cannot be adequately measured through quantitative methods. The analysis was theoretically grounded in the collaborative governance framework proposed by Ansell and Gash, with a specific focus on the institutional design dimension, encompassing inclusive participation, exclusive coordination forums, ground rules, and transparency processes.

The fieldwork focused on actors directly involved in disaster mitigation planning, coordination, and implementation at the local level. Primary data were generated through in-depth semi-structured interviews with key informants representing the principal institutional actors in Sawahlunto's disaster governance system, namely BPBD, Bappeda, PUPR, the Housing and Settlement Agency (Perkim), the Environmental Agency (DLH), sub-district administrations, village governments, and community-based disaster initiatives such as Disaster Resilient Villages (Destana). In addition, triangulation informants were involved to compare institutional narratives and assess consistency across administrative and community perspectives.

The total number of informants interviewed was 27, consisting of 11 key informants and 16 triangulation informants. The key informants represented the City Secretary, BPBD Sawahlunto, Bappeda, and technical agencies directly involved in landslide mitigation planning and implementation, while the triangulation informants consisted of sub-district governments, village and urban ward governments, Disaster-Resilient Villages (Destana), civil society and disaster-related organizations, the Provincial BPBD, and the local legislature

(DPRD). Data collection was conducted from November to December 2025. Each interview lasted approximately 45–90 minutes, and was recorded and transcribed with the consent of the participants.

In addition, trend analysis was applied to identify patterns and dynamics of disaster mitigation practices and institutional collaboration over time. Data were collected through three primary techniques: in-depth semi-structured interviews, document analysis, and field observations.

The semi-structured interview guide was organized around four analytical dimensions derived from Ansell and Gash's institutional design framework. The main interview questions explored: (1) which actors were involved in landslide mitigation and how they participated in planning and implementation; (2) what formal or informal forums were used for coordination and how often they functioned; (3) what rules, procedures, or standard operating mechanisms governed inter-agency coordination; and (4) how disaster information, budgeting, planning decisions, and mitigation data were communicated across institutions and to the public. Follow-up questions were used to identify episodes of coordination difficulty, overlapping authority, budget constraints, delayed responses, and barriers to data sharing.

To ensure data credibility and triangulation, additional triangulation informants were involved, consisting of local government officials, community leaders, and stakeholders with indirect roles in disaster mitigation and policy implementation. Documentary data were obtained from official policy documents, disaster risk assessments, spatial plans, standard operating procedures, regional regulations, disaster reports, and institutional coordination records related to landslide mitigation in Sawahlunto.

The main documents reviewed included regional disaster management regulations, disaster risk assessment reports, local development planning documents, sectoral technical documents related to slope stabilization and drainage, disaster coordination records, and other written materials relevant to inter-organizational responsibilities in landslide mitigation. These documents were used not only as background material but also as a means of verifying interview claims regarding institutional authority, planning alignment, and coordination practice.

The researcher served as the primary research instrument, conducting data collection, interpretation, and analysis. Data analysis followed an interactive qualitative analysis model involving data reduction, data display, and conclusion drawing, conducted iteratively throughout the research process.

Analytically, the interview transcripts, field notes, and documents were coded through a thematic procedure. First, open coding was used to identify recurrent empirical issues such as unequal participation, irregular meetings, mandate overlap, weak rule enforcement, budget coordination barriers, and limited information access. Second, these initial codes were grouped into axial themes corresponding to the four institutional design dimensions: inclusive participation, collaborative forums, ground rules, and transparency processes. Third, cross-source comparison was conducted to examine causal links between institutional design weaknesses and mitigation outcomes, particularly fragmented coordination, delayed implementation, and limited strategic integration among agencies.

The trustworthiness of the findings was ensured through source triangulation, method triangulation, and iterative verification between interview narratives, documentary evidence, and field observation results. Preliminary interpretations were continuously

checked against the consistency of evidence across data sources in order to reduce single-source bias and strengthen the validity of the analytical conclusions.

Results and Discussion

Trends in Disaster Management Policies and Landslide Mitigation Practices

The findings reveal that disaster management policies in Indonesia have undergone a gradual shift from reactive emergency response toward a more preventive and mitigation-oriented approach. National disaster management regulations increasingly emphasize disaster risk reduction, community resilience, and cross-sectoral coordination. However, at the local level, the translation of these policy shifts into concrete mitigation practices remains uneven. In Sawahlunto City, landslide mitigation policies formally align with national directives, yet their implementation reflects persistent institutional and coordination challenges.

Empirical findings from Sawahlunto show that the evolution of landslide mitigation has been incremental rather than transformative. Although the policy framework has increasingly recognized disaster risk reduction and pre-disaster mitigation, the dominant pattern in practice remains strongly influenced by emergency-response routines and sectoral administrative procedures. In this context, structural measures such as slope reinforcement, drainage improvement, and rehabilitation of damaged infrastructure continue to receive greater institutional attention than non-structural measures, including routine cross-sectoral coordination, preventive risk governance, collaborative monitoring, and community-based deliberation. This indicates that mitigation in Sawahlunto is still not fully embedded as an integrated governance process, but is more often treated as a technical and administrative extension of disaster response.

This imbalance has important institutional implications. When mitigation is understood primarily through the lens of technical handling and post-event response, agencies with operational and engineering mandates tend to dominate institutional action, while planning, environmental management, settlement governance, and community-based actors are positioned more peripherally. As a result, coordination tends to become situational and project-based rather than preventive and system-based. In Sawahlunto, this pattern reflects not merely a programmatic preference, but a deeper institutional tendency in which disaster governance continues to be shaped by inherited bureaucratic routines and response-oriented practices. In other words, the weakness of mitigation is closely related to the fact that collaborative governance has not yet been institutionalized as a preventive, deliberative, and sustainable arrangement across sectors.

This finding is also consistent with the wide interpretation that the main challenge does not lie in the absence of actors or formal policy instruments, but in the limited transformation of those instruments into a coherent institutional design. Although Sawahlunto already possesses collaborative forums, planning documents, and multiple government actors, these elements have not yet operated as a single preventive governance system. Consequently, mitigation remains fragmented, reactive, and insufficiently integrated into the pre-disaster phase, which should be the core domain of disaster risk reduction.

Achievement of Minimum Service Standards in Disaster Management

An assessment of the achievement of Minimum Service Standards (SPM) in the disaster management sector indicates mixed performance. While certain indicators related to emergency response capacity and basic coordination mechanisms have been fulfilled, indicators related to prevention, mitigation effectiveness, and institutional strengthening remain moderate.

Table 3. Achievement of Minimum Service Standards (SPM) in Disaster Management, Sawahlunto City (2025)

Indicator	Status
Policy and Institutional Strengthening	Moderate
Disaster Risk Assessment and Integrated Planning	Moderate
Disaster Information Systems, Training, and Logistics	Moderate
Management of Disaster-Prone Areas	Moderate
Effectiveness of Disaster Prevention and Mitigation	Low–Moderate
Emergency Preparedness and Response Capacity	Moderate
Disaster Recovery System Development	Moderate

Source: BPBD Sawahlunto, 2025

These findings suggest that institutional capacity remains a critical bottleneck. Although formal structures exist, their operational effectiveness is constrained by limited coordination, fragmented responsibilities, and insufficient integration between planning and implementation.

The SPM profile is important because it confirms that the problem in Sawahlunto is not the total absence of disaster governance instruments, but the incomplete institutionalization of those instruments into an effective collaborative system. The persistence of "moderate" performance across policy strengthening, integrated planning, thematic handling of disaster-prone areas, and information systems suggests that institutional arrangements have been established formally, yet have not fully matured into robust cross-sectoral capacity. More importantly, the relatively weaker position of prevention and mitigation effectiveness compared with emergency preparedness and response indicates that local disaster governance is still more accustomed to acting after risk materializes than to organizing sustained preventive action beforehand. This strengthens the study's central argument that the key institutional challenge lies in the pre-disaster phase, where collaboration demands routine forums, role clarity, enforceable coordination, and shared monitoring rather than temporary operational mobilization.

Institutional Design of Collaborative Governance in Landslide Mitigation

Inclusive Participation

The results demonstrate that landslide mitigation in Sawahlunto involves a wide range of stakeholders, including the Regional Disaster Management Agency (BPBD), Regional Development Planning Agency (Bappeda), Public Works and Spatial Planning Agency (PUPR), Housing and Settlement Agency (Perkim), Environmental Agency (DLH), sub-district and village governments, and community-based initiatives such as Disaster Resilient Villages (Destana). However, participation remains uneven across actors.

Table 4. Stakeholder Involvement in Landslide Disaster Mitigation

Stakeholder	Level of Involvement
BPBD	High
Bappeda	Moderate
PUPR	High
Housing and Settlement Agency	Moderate
Environmental Agency	Moderate
Sub-district and Village Governments	Moderate
Disaster Resilient Villages (Destana)	Moderate
Private Sector	Low

Source: Researcher's processing, 2026

Although participation is formally inclusive, decision-making authority remains concentrated within a limited number of government agencies. Community participation is often confined to implementation stages rather than strategic planning, reducing the potential for shared ownership and long-term sustainability.

In this study, the categorization of involvement refers not merely to nominal institutional presence, but to the degree of substantive influence in agenda setting, planning, coordination, and decision-making. Thus, "high" involvement refers to actors that consistently shape operational or strategic decisions; "moderate" involvement refers to actors that participate but do not exercise equal influence over final priorities; and "low" involvement refers to actors whose participation is irregular, peripheral, or limited to specific moments. This distinction is important because the empirical problem in Sawahlunto is not whether actors are present, but whether they participate on equal terms within collaborative governance.

The main institutional issue is therefore the unequal distribution of effective participation. Cross-sectoral involvement has taken place factually, but it has not yet ensured equality in decision-making. Government institutions remain dominant in defining strategic priorities, while village governments, community groups, and other non-governmental actors are more often positioned as implementers, recipients of information, or participants in socialization activities. This unequal arrangement limits the incorporation of local knowledge, narrows opportunities for shared problem definition, and weakens collective ownership of mitigation efforts. In consequence, collaborative governance in Sawahlunto still tends to reflect hierarchical consultation rather than genuinely shared decision-making.

This finding is aligned with the conclusion that participation in Sawahlunto has not yet become fully deliberative. Although multiple actors are involved, participation remains structurally uneven because the institutional design has not yet redistributed authority, information, and agenda-setting capacity in a balanced way across actors. As long as participation is broad in form but unequal in influence, collaborative governance will remain vulnerable to sectoral dominance and limited long-term sustainability.

Exclusive Forums for Collaboration

Formal coordination forums exist in Sawahlunto, including disaster coordination meetings, planning forums, and sectoral coordination mechanisms. However, these forums are not consistently institutionalized and often function on an ad hoc basis.

Table 5. Formal Coordination Forums in Landslide Mitigation

Forum Type	Existence	Functional Effectiveness
Disaster Coordination Meetings	Yes	Moderate
Multi-Stakeholder Disaster Forums	Limited	Low–Moderate
Inter-Agency Technical Meetings	Yes	Moderate
Community-Based Forums	Limited	Low

Source: Researcher's processing, 2026

The irregularity of these forums weakens collective learning, limits sustained dialogue, and reduces the capacity to resolve cross-sectoral conflicts. As a result, collaboration tends to be reactive rather than strategic.

The key problem is not simply that forums exist irregularly, but that they have not functioned optimally as routine and preventive deliberative arenas. In Sawahlunto, formal forums have been established, yet they have not consistently become institutional spaces where actors meet regularly, deliberate on shared risk priorities, align programs, and review mitigation performance before disaster events occur. Instead, forum activity remains strongly shaped by situational needs and administrative momentum. This weak institutionalization produces at least three consequences: first, coordination is activated more easily after risk becomes visible than during preventive planning; second, overlaps in mandate and sectoral fragmentation are not resolved through continuous deliberation; and third, institutional learning remains weak because previous experiences are not systematically translated into routine collective review.

This finding strengthens the article's contribution to collaborative governance theory by showing that the formal existence of a forum is insufficient unless the forum functions as a stable institutional arena with routine, preventive, and risk-based deliberation. In the Sawahlunto case, collaborative forums exist administratively, but their limited regularity and preventive orientation prevent them from operating as fully institutionalized platforms for joint problem-solving.

This also explains why the study emphasizes the need for strengthening formal forums that are routine and based on risk agendas. Without that shift, forums remain consultative or reactive spaces rather than institutional mechanisms capable of steering collaborative mitigation governance.

Ground Rules of Collaboration

The study finds that the existence of formal regulations, standard operating procedures, and coordination guidelines provides a basic framework for collaboration. However, compliance and enforcement remain inconsistent.

Table 6. Ground Rules and Regulatory Framework for Landslide Mitigation

Regulatory Aspect	Status
Regional Disaster Management Regulations	Available
Standard Operating Procedures (SOPs)	Partially Available
Inter-Agency Coordination Guidelines	Limited
Sanctions and Enforcement Mechanisms	Weak

Source: Researcher's processing, 2026

The absence of clear sanctions and enforcement mechanisms results in weak accountability. Consequently, collaboration often relies on informal arrangements and personal commitment rather than institutionalized obligations.

This is a central institutional finding. Sawahlunto already possesses various formal instruments, including disaster-related documents, regulations, and organizational mechanisms. However, the study findings show that operational rules governing pre-disaster collaboration have not yet been formulated in a specific, binding, and cross-sectoral manner. As a result, existing rules provide a formal basis for action, but do not yet function as enforceable collaborative instruments that clearly regulate who must coordinate, when coordination must occur, how follow-up should be ensured, and what accountability mechanisms apply when commitments are not fulfilled. Under these conditions, inter-agency collaboration depends heavily on administrative initiative, personal commitment, and situational leadership rather than on stable institutional obligations.

Therefore, the institutional weakness lies not in the complete absence of regulations, but in the limited operationalization of those regulations into enforceable pre-disaster ground rules. This explains why collaborative practice can occur factually while still remaining partial and weakly institutionalized. When rules are available only at the general or sectoral level, without sufficiently clear inter-agency obligations, collaboration tends to remain dependent on routine bureaucracy and emergency momentum rather than becoming a durable governance arrangement.

Transparency Processes

Transparency mechanisms related to disaster information, budgeting, and decision-making exist but are not uniformly accessible to all stakeholders.

Table 7. Transparency in Landslide Mitigation Governance

Transparency Aspect	Level
Disaster Risk Information	Moderate
Budget Transparency	Moderate
Decision-Making Transparency	Low–Moderate
Public Access to Mitigation Data	Limited

Source: Researcher's processing, 2026

Limited transparency constrains trust among stakeholders and reduces opportunities for public oversight, thereby weakening collaborative governance outcomes. Transparency in Sawahlunto has not been absent, but it remains predominantly administrative rather than substantively participatory. This means that information is more often presented as an output of government administration—such as reporting, publication, or formal dissemination—than as a collaborative process through which actors gain equal access to the basis of decisions, understand the reasoning behind priorities, and participate meaningfully in oversight and evaluation. Consequently, transparency has not yet fully functioned as a mechanism for strengthening trust, power sharing, and collaborative accountability across actors.

The implications are significant. When transparency is limited to the communication

of final decisions, rather than opening deliberative processes to broader understanding and engagement, actors outside the dominant government structure have less opportunity to shape priorities or monitor consistency between plans and implementation. This reproduces hierarchical relations in disaster governance and weakens ownership of mitigation programs among non-central actors. In this context, limited transparency does not merely reduce access to information; it also constrains trust formation, limits meaningful participation, and inhibits the development of substantive collaborative accountability.

This study therefore characterizes transparency in Sawahlunto as being at the level of administrative transparency rather than substantive transparency. As long as transparency remains administrative, collaborative governance will struggle to evolve from consultation toward genuine co-governance, because actors do not yet share equal access to the reasoning, process, and consequences of institutional decisions.

Synthesis of Institutional Design Variables

A synthesis of the four institutional design variables reveals that collaborative governance in Sawahlunto is formally established but functionally constrained.

Table 8. Synthesis of Institutional Design in Collaborative Governance

Dimension	Strength	Limitation
Inclusive Participation	Multi-actor involvement	Unequal decision-making power
Exclusive Forums	Formal existence	Irregular and weak authority
Ground Rules	Basic regulations available	Weak enforcement
Transparency Processes	Information partially accessible	Limited accountability

Source: Researcher's processing, 2026

These findings align with previous studies that identify institutional weakness as a primary barrier to effective collaborative governance in disaster mitigation. However, this study extends existing literature by demonstrating how institutional design deficiencies systematically constrain collaboration outcomes.

Taken together, the four dimensions reveal a consistent institutional pattern in Sawahlunto. Collaborative governance has developed factually and includes multiple actors, formal forums, planning documents, and information mechanisms. However, these elements have not yet been consolidated into a coherent and fully institutionalized collaborative design. Participation remains unequal, forums remain insufficiently routine and preventive, rules remain insufficiently operational and binding, and transparency remains predominantly administrative. These weaknesses do not stand alone; they reinforce one another. Unequal participation limits deliberative balance, weak forums fail to stabilize coordination, weak rules reduce enforceability, and partial transparency weakens trust and accountability. This cumulative interaction explains why mitigation continues to be implemented in a fragmented, sectoral, and reactive manner even though collaborative elements are already present.

Therefore, the suboptimal outcome of mitigation in Sawahlunto is not produced by a single institutional deficiency, but by the cumulative effect of incomplete collaborative institutionalization. The findings indicate that the core problem is not the absence of actors, regulations, or technical capacity per se, but the weakness of the institutional design that

should organize interaction, coordination, accountability, and learning across those actors. Moreover, this incomplete institutionalization is reinforced by path dependency, in which older response-oriented practices continue to shape current governance behavior even as policy discourse has shifted toward preventive disaster risk reduction.

The results confirm that collaborative governance alone is insufficient without a coherent institutional design. In line with Ansell and Gash's framework, effective collaboration requires not only actor participation but also well-defined rules, stable forums, and transparent processes. Compared to previous studies that emphasize collaboration dynamics, this study highlights institutional design as the central mechanism shaping collaboration effectiveness.

To make this contribution more applicable, the study proposes an operational institutional design model for local landslide mitigation governance in Sawahlunto and similar high-risk regions. The model contains four institutional pillars: (1) the integration of inclusive participation across governmental and non-governmental actors in a more balanced decision-making structure; (2) the strengthening of formal forums that are routine, preventive, and organized around risk agendas rather than only post-event coordination; (3) the establishment of clear and binding inter-agency ground rules for pre-disaster collaboration; and (4) the development of transparent collaborative monitoring and evaluation mechanisms that move beyond administrative disclosure toward substantive accountability and learning.

This model is transferable because it does not rest on a unique institutional form specific only to Sawahlunto, but on a set of minimum collaborative conditions that can be adapted by other local governments facing similar landslide risks and similar bureaucratic constraints.

For practical application, improvement in institutional design may be traced through several indicators, including the regularity of cross-sectoral forums, the degree of actor involvement in decision-making, the existence of explicit and binding inter-agency procedures, the openness of budgeting and mitigation information, and the availability of collaborative monitoring and evaluation records across institutions.

Because this study is qualitative and focused on a single case, the proposed model should be understood as an empirically grounded and context-sensitive framework rather than a rigid universal template. Its broader application requires adaptation to local administrative arrangements, hazard profiles, and institutional histories.

Conclusion

This study examined the institutional design of collaborative governance in landslide disaster mitigation in Sawahlunto City, a highly disaster-prone mining city in West Sumatra, Indonesia. The findings demonstrate that while collaborative governance has been formally adopted in disaster mitigation practices, its effectiveness remains constrained by weaknesses in institutional design. Although multiple governmental agencies, community-based organizations, and local actors are involved, collaboration is not yet fully institutionalized in a manner that ensures consistent coordination, shared responsibility, and long-term mitigation effectiveness.

The analysis reveals that inclusive participation exists in principle but remains uneven in practice, with decision-making authority concentrated among a limited number of

governmental institutions. Coordination forums are present but function irregularly and lack sufficient strategic authority to guide integrated mitigation efforts. Ground rules, including regulations and standard operating procedures, provide a basic framework for collaboration; however, weak enforcement and limited accountability mechanisms reduce their effectiveness. Transparency processes related to disaster information, budgeting, and decision-making are partially implemented but remain insufficient to foster trust, public oversight, and meaningful stakeholder engagement.

The main analytical contribution of this study is to show that institutional design functions as the explanatory bridge between the formal presence of collaboration and the uneven performance of mitigation governance. In Sawahlunto, collaborative practice already exists, but it remains partial, reactive, and insufficiently institutionalized. The study demonstrates that this condition is shaped not only by current coordination weaknesses, but also by institutional legacies and path dependency that continue to privilege emergency-response-oriented governance over preventive and risk-based collaboration.

This study contributes to the literature on disaster governance by demonstrating that the success of collaborative governance depends not merely on the presence of multiple actors but on the coherence and strength of institutional design. By focusing on institutional design as the central analytical lens, this research extends previous studies that primarily emphasize collaboration dynamics or stakeholder interaction. The findings highlight the importance of strengthening formal coordination forums, clarifying roles and responsibilities, institutionalizing rules of collaboration, and enhancing transparency mechanisms as prerequisites for effective disaster mitigation.

From a policy perspective, landslide disaster mitigation in Sawahlunto requires a shift from fragmented, response-driven, and project-based coordination toward a more preventive, deliberative, and sustainable governance architecture. This shift requires the routine functioning of formal collaborative forums, clearer and more binding cross-sectoral rules, more equal inclusion of actors in decision-making, and transparency mechanisms that support not only administrative disclosure but also shared monitoring and collaborative accountability. Only through such institutional restructuring can mitigation move beyond episodic coordination and develop into a durable disaster risk reduction system at the local level.

The proposed institutional design framework may serve as a practical reference for local governments facing similar landslide risks, particularly in regions where complex physical vulnerabilities intersect with institutional and governance challenges.

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