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THE PENDULUM OF AUTHORITY AND THE TRANSMISSION OF ENVIRONMENTAL LAW POLICY IN THE MINING SECTOR IN SOUTH SUMATRA

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Abstract:

This article examines how changes in Indonesian environmental and mining law since 1967 have been transmitted into observable outcomes in South Sumatra, the largest coal-producing province outside Kalimantan. It employs normative juridical research using statutory, historical, conceptual, and case approaches, complemented by indexed literature and descriptive statistics on coal production, poverty, and mine-water quality. The findings show that licensing authority shifted from the national government to districts, then provinces, and back to the national government. At the same time, environmental permits were replaced by environmental approvals, public participation narrowed, and the express formulation of strict liability was weakened. Each shift relocated implementation gaps—from excessive permit issuance during decentralization to increasing supervisory distance under recentralization. In South Sumatra, these gaps are reflected in permit restructuring partly annulled by the courts, untreated acidic mine water, illegal mining, and the provincial government's increasing reliance on road-transport instruments. The article develops a five-link policy-transmission framework and concludes that policy effectiveness depends on sustained accountability across levels of government rather than the formal location of authority alone.

INTRODUCTION

South Sumatra occupies a strategic position in Indonesia's national energy landscape. The South Sumatra Basin contains coal deposits of the Muara Enim Formation, which have been mined by open-pit methods in Tanjung Enim since the colonial era. Production continued to increase, reaching 120.74 million tonnes in 2025 (Pahlevi, 2026). This expansion coincided with rapid legislative changes. Law No. 4 of 2009 on Mineral and Coal Mining has been amended four times, most recently by Law No. 2 of 2025, while the environmental protection regime established under Law No. 32 of 2009 was amended by the Job Creation Law No. 11 of 2020, subsequently enacted through Law No. 6 of 2023. During this period, the Constitutional Court repeatedly reviewed mining provisions, including Decision No. 160/PUU-XXIII/2025, which required objective parameters for the preferential allocation of mining licence areas (Constitutional Court, 2026).

These successive amendments raise a more fundamental question than whether legal norms exist. Suryani et al. (2025a) observed that the number of strategic regulatory variables increased from

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three under Law No. 4 of 2009 to seven under Law No. 3 of 2020. Suryani et al. (2025b) warned that stronger state control may amount to legal formalism unless accompanied by accountability mechanisms and protection of communities' ecological rights. Rijal et al. (2024) and Natsir et al. (2024) argued that the recentralization of mining authority weakened regional oversight. Wibisana (2025) identified a regression in environmental protection after the Job Creation Law across six areas, including environmental impact assessment (EIA), public participation, and strict liability. Similar concerns were expressed by Sembiring et al. (2020) and Widyaningsih and Sembiring (2021), including with respect to energy and mineral resource regulation (Qurbani & Zuhdi, 2020) and the omnibus legislative approach (Dungga & Muhtar, 2022). International literature reveals similar implementation failures: Werner et al. (2024) found that 16% of mining areas in East Kalimantan lay outside licensed boundaries and that Clean and Clear status did not reduce such violations, while Toumbourou et al. (2020) documented approximately 1,735 unrehabilitated mining pits in that province.

Existing studies generally follow two streams. Normative legal studies evaluate national legislative changes, whereas empirical research documents local mining impacts, particularly in East Kalimantan. Research on South Sumatra has largely examined mine-water quality (Gautama et al., 2018; Marhaini et al., 2019; Gobel et al., 2025), coal's contribution to the provincial economy (Syaputra et al., 2023), and revegetation of rehabilitated mining land (Juniarto et al., 2025), without systematically linking successive policy changes to provincial outcomes. Nasir et al. (2023) described multilevel supervision in coal-producing districts as a regulatory vacuum in which licence holders could postpone obligations without clear consequences. Ahmad (2018) identified anomalies in the allocation of authority over public-road use by mining businesses in South Sumatra, but did not connect them to shifting mining-permit authority and the environmental legal regime. The present study addresses the absence of a conceptual framework explaining why changes in national legal norms do not consistently translate into environmental improvements and welfare gains at the provincial level.

Against this background, the article addresses three questions: (1) how have Indonesian environmental and mining laws evolved from 1967 to 2026, particularly regarding the allocation of authority, environmental instruments, and public participation; (2) through what mechanisms are such policy changes transmitted into outcomes at the regional level; and (3) how are their impacts manifested in South Sumatra, and which instruments could close the resulting implementation gaps? The study makes three contributions: a five-period account of shifting authority; a five-link policy-transmission framework integrating Friedman's legal system theory (1975), decentralization accountability, and responsive enforcement; and its application to South Sumatra, a province rarely analyzed from this perspective in environmental legal scholarship.

METHODS

This study adopts a normative juridical approach enriched by secondary empirical evidence, combining statutory, historical, conceptual, and case-based approaches (Marzuki, 2017). Primary legal materials include the 1945 Constitution, mining and environmental legislation since Law No. 11 of 1967, government and ministerial regulations, provincial regulations and instructions issued by the Governor of South Sumatra, Supreme Court Regulation No. 1 of 2023, and Constitutional Court decisions. Secondary materials were obtained from Scopus- and Sinta-indexed articles and environmental law textbooks; only sources traceable through DOIs, legislative identifiers, or official releases were included. Legislation and judicial decisions are cited directly by their identifiers, whereas recent peer-reviewed journal articles were prioritized as secondary literature. Supporting

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data comprise South Sumatra coal production during 2020–2025 from the provincial Energy and Mineral Resources Agency, poverty rates from Statistics Indonesia, and mine-water quality measurements from indexed studies. These data were examined descriptively using linear trends, compound annual growth rates, simple elasticities, and exceedance ratios against environmental standards. Findings were interpreted through Friedman's (1975) legal system framework of legal substance, structure, and culture, and synthesized into a period-specific impact matrix. The analytical process is presented in Figure 1.

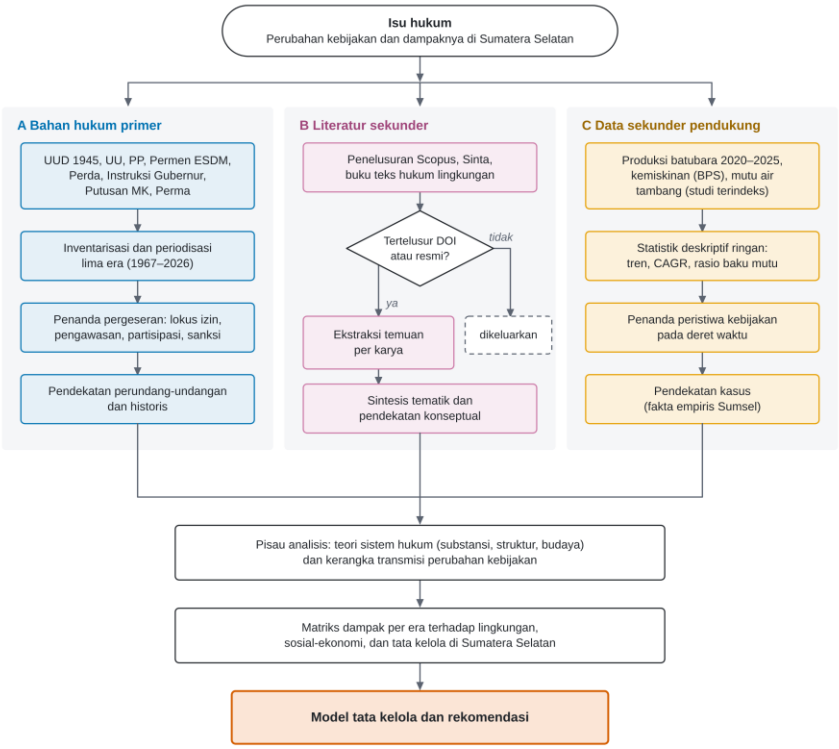


Figure 1. Research workflow

RESULTS AND DISCUSSION

Literature Mapping: Three Streams of Research on Policy Change

The literature review identified three complementary streams, summarized in Table 1. The first comprises normative juridical analyses of legislative amendments. These studies document the movement toward centralization and simplification in the Mineral and Coal Mining Law (Suryani et al., 2025a), the weakening of regional oversight and revenue following recentralization (Rijal et al., 2024; Natsir et al., 2024), and reduced environmental safeguards under the Job Creation Law (Yuniardi et al., 2024; Wibisana, 2025). Their strength lies in close doctrinal analysis, but limited field evidence constrains their ability to establish whether weaker norms translate into greater environmental damage.

The second stream concerns governance and political ecology. Agrawal and Ribot (1999) and Ribot et al. (2006) provide an accountability framework for evaluating decentralization. McCarthy (2004) and Hadiz (2004) explain how decentralization in Indonesia facilitated local rent-seeking networks, while Warburton (2017) shows that resource nationalism in mining is shaped by ownership structures and elite interests. Empirical studies, including Toumbourou et al. (2020),

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Nasir et al. (2023), Werner et al. (2024), and Gintu (2024), provide particularly strong evidence of operations beyond permit boundaries, abandoned mine pits, and supervisory gaps, although most concern East Kalimantan. Listiyani et al. (2023) identify weak national compliance with reclamation guarantee requirements. Indrayanti (2023) examines similar enforcement problems in East Kalimantan, while Widjanarko and Gultom (2024) explore the relationship between Clean and Clear status, coal mining, and deforestation.

The third stream examines environmental and economic impacts in South Sumatra. Engineering studies report acidic mine water and concentrations of metals exceeding regulatory standards in Lahat, Musi Banyuasin, and Tanjung Enim (Marhaini et al., 2019; Gobel et al., 2025). Similar findings on iron, manganese, and open-pit coal wastewater in Kalimantan (Sujiman & Hariyadi, 2022; Sujiman, 2024) indicate that the South Sumatran evidence reflects a wider pattern.

Regional economic studies identify coal as a leading sector in South Sumatra (Syaputra et al., 2023), while a cross-commodity survey found that the environmental, social, and governance (ESG) maturity of South Sumatran coal mining was the lowest among three comparison regions (Syaputra, 2025). These three research streams rarely intersect: normative analyses lack provincial field evidence, governance studies largely overlook South Sumatra, and local impact studies rarely connect findings with regulatory changes. This article bridges these literatures through the policy-transmission framework developed below.

Table 1. Literature synthesis matrix: policy change and its impacts

Study	Research stream and unit of analysis	Method	Key findings	Transmission link
Suryani et al. (2025a, 2025b)	Normative; national mining law	Normative juridical	Strategic regulatory variables increased from three to seven; risk of legal formalism	1 Normative change
Kusuma (2022); Wibisana (2025)	Normative; Job Creation Law	Normative juridical; non-regression principle	Regression in six areas; burden of proof shifted toward victims	1 Normative change
Yuniardi et al. (2024)	Normative; environmental licensing	Normative juridical	Environmental approval incorporated into business licensing; public participation narrowed	1 and 2
Rijal et al. (2024); Natsir et al. (2024)	Normative; mining recentralization	Normative juridical; case studies	Regional supervision weakened; environmental and corruption risks increased	2 Reallocation of authority
Agrawal & Ribot (1999); Ribot et al. (2006)	Governance; resource decentralization	Comparative framework	Decentralization works when accountability is downward; concealed recentralization	2 Reallocation of authority
McCarthy (2004); Hadiz (2004)	Political ecology; Indonesian regions	Ethnography; political analysis	Regulatory gray areas and local oligarchies after decentralization	2 and 4
Nasir et al. (2023); Gintu (2024)	Governance; East Kalimantan	Qualitative; interviews	Uncertain multilevel oversight benefits licence holders	3 Supervision and sanctions
Werner et al. (2024)	Empirical; East Kalimantan coal concessions	Spatial analysis	16% of mining areas outside permit boundaries; C&C status did not reduce violations	3 and 4

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Study	Research stream and unit of analysis	Method	Key findings	Transmission link
Listiyani et al. (2023)	Normative–empirical; national reclamation	Juridical; secondary data	Reclamation guarantee compliance 52% (2017); reclamation not a C&C requirement	3 and 4
Toumbourou et al. (2020)	Political ecology; Kalimantan mining pits	Qualitative	Approximately 1,735 unclosed pits; citizen advocacy influenced regional regulation	5 Regional outcomes
Marhaini et al. (2019); Gobel et al. (2025)	Impacts; mine water in South Sumatra	Field and laboratory measurements	pH 2.6–5.6; Fe, Mn and TSS exceeded standards before treatment	5 Regional outcomes
Syaputra et al. (2023); Syaputra (2025)	Impacts; South Sumatra economy and ESG	Input–output; survey of 276 respondents	Coal is a leading sector; South Sumatran coal has lowest comparative ESG maturity	4 and 5

Source: Authors' synthesis of the reviewed literature; link numbers refer to the transmission framework in Figure 3.

Five Policy Periods and Shifts in Authority

The review of primary legal materials identifies five policy periods distinguished by the locus of licensing and supervisory authority, as illustrated in Figure 2. The first period (1967–1998) was governed by Law No. 11 of 1967 and the centralized Contract of Work and Coal Contract of Work (PKP2B) regimes. Centralized control restricted the number of operators, but left very limited scope for public participation and primarily upward accountability. In South Sumatra, this period was characterized by state-owned mining operations in Tanjung Enim.

The second period (1999–2008) began with Law No. 22 of 1999 and Government Regulation No. 75 of 2001, which empowered district heads and mayors to issue mining authorizations, followed by Law No. 32 of 2004. Ribot et al. (2006) argued that decentralization improves governance only where authority is transferred to locally downward-accountable institutions. Indonesia frequently experienced the opposite. McCarthy (2004) described overlapping state and customary authority that encouraged informal rent-seeking, while Hadiz (2004) understood decentralization as the reorganization of predatory networks at the local level. Research on coal licensing links geographically proximate but weakly supervised permit authority to environmental degradation (Nasir, 2022), although delegation requires supervisory mechanisms (Tolang & Dibaba, 2022). Werner et al. (2024) document the resulting rapid and poorly controlled expansion of coal permits.

The third period (2009–2014) was marked by Law No. 4 of 2009, which replaced mining authorizations with mining business licences (IUPs), and Law No. 32 of 2009, which strengthened environmental permits, access to information, and strict liability under Article 88. However, district heads still issued IUPs for operations within one district, and the number of permits continued to rise. South Sumatra had approximately 359–363 IUPs before the 2014 review (Gumiwang, 2015). In the fourth period (2014–2020), Law No. 23 of 2014 transferred mining authority from districts to provinces (Gintu, 2024), alongside Clean and Clear evaluation and anti-corruption coordination and supervision of mining permits (Widjanarko & Gultom, 2024). The fifth period (2020–2026) began with Law No. 3 of 2020, which centralized coal-licensing authority (Listiyani et al., 2023), followed by Law No. 6 of 2023, Law No. 2 of 2025, Government Regulation No. 39 of 2025, and Constitutional Court decisions. Presidential Regulation No. 55 of 2022 delegated certain permits to provinces, but only for nonmetallic minerals and rocks; coal authority remained centralized.

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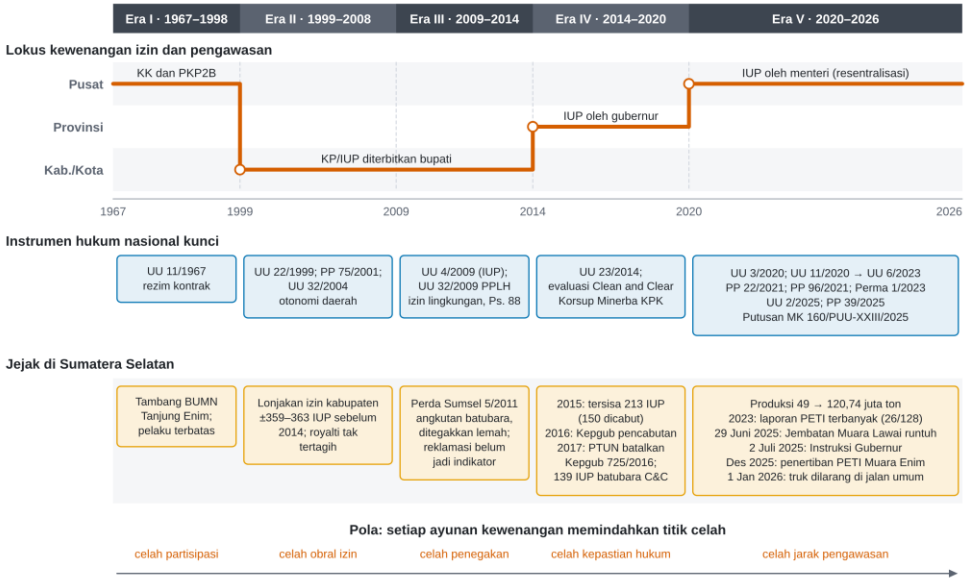


Figure 2. Shifts in the locus of mining licensing and supervision and their legacy in South Sumatra, 1967–2026

Figure 2 shows that authority has not moved in a linear direction, but has oscillated between administrative levels. This pattern accords with Ribot et al.'s (2006) argument that national governments often recentralize authority within ostensibly decentralized systems, by transferring responsibilities without decision-making powers or by selecting local bodies accountable upward. A competing argument emphasizes administrative efficiency and cross-jurisdictional impacts, supporting higher-level regulation of activities affecting multiple jurisdictions (Tinambunan et al., 2025). Together, these arguments generate a testable tension: does recentralization correct district-level rent-seeking, or increase the distance between supervisors and mining sites? It also affects regional legislatures' oversight of local executives (Suastika et al., 2026), because the range of locally supervised activities narrows when licensing moves to the centre. Table 2 summarizes the changing instruments.

Table 2. Changes in mining and environmental legal instruments by policy period

Period	Key instruments	Licensing authority	Environmental instruments	Public participation
I (1967–1998)	Law 11/1967; CoW and PKP2B	Central	Early environmental rules not integrated into mining licences	Very limited
II (1999–2008)	Law 22/1999; GR 75/2001; Law 32/2004	District/city	Law 23/1997; project-level EIA	Geographically closer, vulnerable to capture by local elites
III (2009–2014)	Law 4/2009; Law 32/2009	District (within one district)	Environmental permits; Article 88 strict liability without proof of fault	Expanded through rights to information and objections
IV (2014–2020)	Law 23/2014; Clean and Clear; KPK supervision	Province	Full Law 32/2009 regime; reclamation guarantee not required for C&C	Formally retained, while supervision became more distant

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Period	Key instruments	Licensing authority	Environmental instruments	Public participation
V (2020–2026)	Law 3/2020; Law 6/2023; GR 22/2021; Law 2/2025; GR 39/2025; CC Decision 160/PUU-XXIII/2025	Central (coal)	Environmental approval; Article 88 phrase removed; 100% reclamation and criminal sanctions under Article 161B	EIA participation limited to directly affected communities; Article 162 applies

Each reallocation of authority was accompanied by permit-clearing operations: the Corruption Eradication Commission's mining coordination and supervision initiative in 2014–2016; the revocation of 2,065 IUPs in 2022, including 306 coal permits covering 909,413 hectares (Hukumonline, 2022); and the suspension of 190 permits in January 2026 for failure to provide reclamation guarantees (Kompas, 2026). These initiatives focused primarily on administrative compliance, production, and financial obligations. Studies of coal-permit revocations for noncompliance with domestic market obligations (Priambudi et al., 2024) and proposed criminal liability for abandoned corporate IUPs (Simangunsong et al., 2024) reinforce the administrative and economic orientation. Listiyani et al. (2023) note that reclamation was not a Clean and Clear criterion, and that only 52% of licence holders fulfilled reclamation guarantee requirements in 2017. Permit enforcement therefore represents an administrative and fiscal correction more than an ecological one.

Changes in the Environmental Legal Regime: From Permits to Approvals

As mining authority shifted, the environmental legal regime also changed direction. Law No. 32 of 2009 made environmental permits a prerequisite for business permits and provided for strict liability for activities involving hazardous and toxic substances or posing serious environmental threats, without the need to establish fault under Article 88. The Job Creation Law integrated environmental permits into business licensing as environmental approvals, narrowed participation in environmental impact assessments to directly affected communities, and removed this explicit wording from Article 88. Yuniardi et al. (2024) observed two consequences: withdrawal of environmental approval now also affects business licensing, while public involvement in environmental assessment has contracted. Kusuma (2022) argued that removing the phrase shifts the burden of establishing fault toward victims. Yani (2026) reached a similar conclusion regarding civil liability for hazardous waste management, while Silam et al. (2025) and Widyatama and Irnawati (2024) emphasized that community participation and land rights are integral to environmental protection.

The principle of non-regression provides a normative benchmark. Prieur (2012) argues that attained environmental safeguards should not be weakened because doing so infringes the right to a good and healthy environment. Applying this principle, Wibisana (2025) identified regression in six areas: weaker environmental impact assessments, reduced participation, uncertainty over remedies following the shift from permits to approvals, unclear supervision and sanctions, diluted strict liability, and decriminalization. Putri and Satory (2026) noted that EIA implementation had already been constrained by poor supervision and uneven assessment quality. Purba et al. (2025) also documented difficulties enforcing Article 98 concerning pollution above legal limits, given the need to prove intent and weak corporate criminal accountability.

The Supreme Court attempted to address these gaps through Supreme Court Regulation No. 1 of 2023 on Guidelines for Adjudicating Environmental Cases. However, Satory and Sibuea (2020) warned that Supreme Court regulations rank below statutes and lack a clearly established

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substantive review mechanism; consequently, judicial guidance cannot restore wording removed by the legislature. Conversely, Law No. 3 of 2020 reinforced certain technical mining obligations, including full reclamation and post-mining compliance and criminal penalties for licence holders who fail to comply. The same law contains Article 162 criminalizing obstruction of mining activities; a petition challenging this provision was declared inadmissible in Decision No. 37/PUU-XIX/2021 (Constitutional Court, 2022). Thus, the fifth period strengthened operators' technical obligations while weakening avenues through which communities can demand their enforcement.

A Conceptual Framework for the Transmission of Policy Change

The preceding analysis demonstrates that changes in legal norms do not automatically produce changes in outcomes. To explain the gap, this article proposes the five-link transmission framework in Figure 3. The first link is normative change, whose timing can be understood through Kingdon's (2011) policy windows and whose substance reflects path dependence (Pierson, 2000; Suryani et al., 2025a). The second is the reallocation of authority, which determines who licenses and supervises operations. The third concerns supervisory and sanctioning capacity, informed by Ayres and Braithwaite's (1992) enforcement pyramid and its application to responsive enforcement against illegal mining in Indonesia (Redi, 2023). The pyramid assumes that compliance depends partly on credible upper-level sanctions, including permit withdrawal and criminal penalties. The fourth link is licence-holder behavior, interpreted through Seidman and Seidman's (1994) role-occupant model and Owen and Kemp's (2013) critique of voluntary social licences. The fifth link concerns regional outcomes, which Mehlum et al. (2006) associate with whether institutions favor productive activity or rent-seeking.

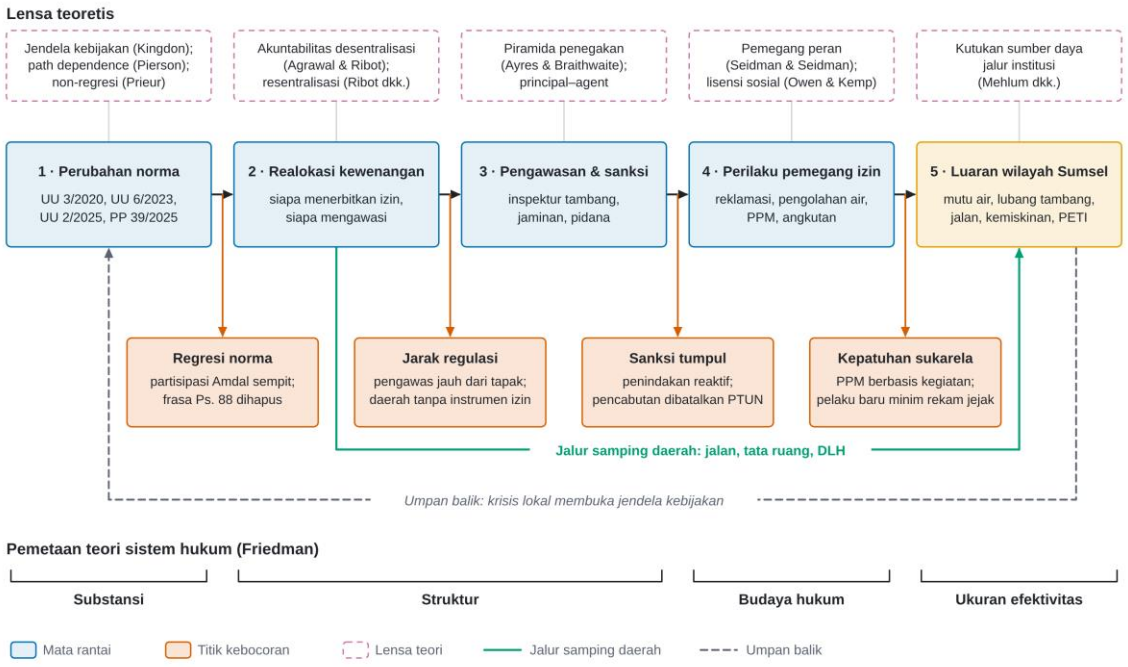


Figure 3. Framework for transmitting environmental mining policy changes and identifying points of leakage

The framework identifies four points of leakage between its links. The first is normative regression, when legislative amendments reduce existing standards of protection. The second is regulatory distance, defined here as geographical, informational, and accountability gaps between

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licensing or supervisory authorities and mining sites, drawing on Ribot et al.'s (2006) accountability framework and Nasir et al.'s (2023) findings on uncertain multilevel supervision. The third is a blunted apex of sanctions, when licence withdrawals are vulnerable to judicial reversal or enforcement remains reactive. The fourth is voluntary compliance, when community-development programs focus on activities without measurable outcomes (Krisdiana & Satory, 2025). Two additional pathways are included: a provincial 'side channel' using road, spatial-planning, and regional environmental powers outside coal licensing, and a feedback loop through which local crises open new policy windows.

Mapping the framework onto Friedman's (1975) legal system theory places the first link within legal substance, the second and third within legal structure, and the fourth within legal culture. The fifth constitutes a measure of overall effectiveness. Figure 4 illustrates the mechanism as a policy-water channel. Changes in legal norms are represented by water released from an upstream dam, namely the legislature, flowing through five stations: norms, authority, supervision and sanctions, licence-holder behavior, and regional outcomes. The narrowing flow indicates the progressive weakening of policy signals, while four gates, K1–K4, and their seepage mark normative regression, regulatory distance, ineffective sanctions, and voluntary compliance. A green channel feeding directly into the final station represents provincial instruments—roads and spatial planning—that remain available without mining-licensing authority. A dotted line shows feedback from local crises to the national policy process. The metaphor demonstrates that ambitious legislation alone cannot ensure corresponding outcomes if policy transmission loses effectiveness at every stage.

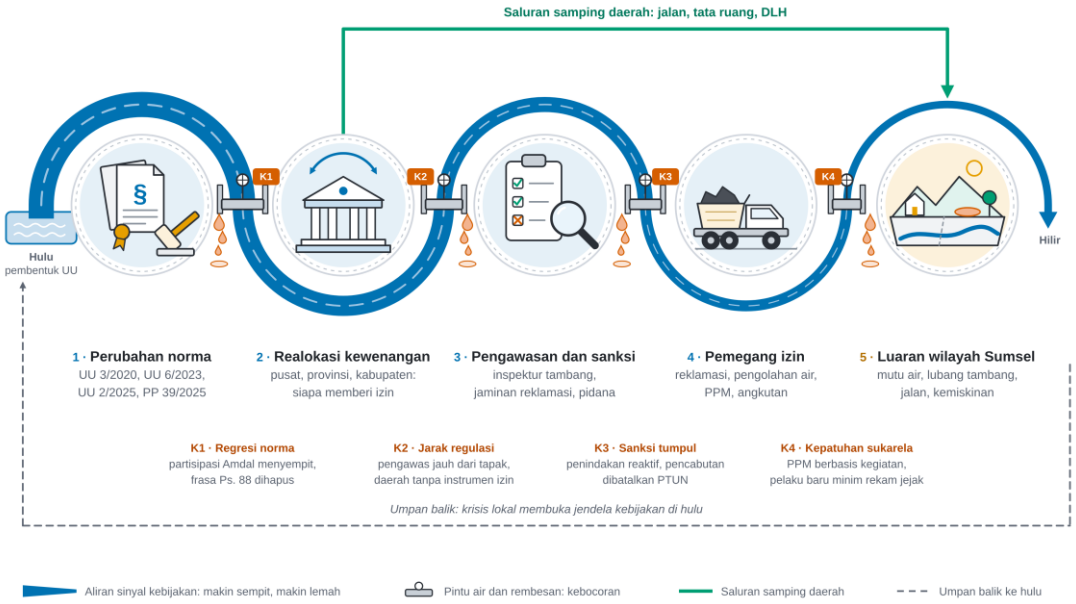


Figure 4. Policy-channel illustration: transmission from national legal changes to regional outcomes

Impacts of Policy Change in South Sumatra

Application of the transmission framework to South Sumatra reveals a distinctive legacy from each period. During decentralization, district governments issued large numbers of permits and many licence holders failed to meet financial obligations. The Corruption Eradication Commission's coordination and supervision initiative assessed only 175 of 359 IUPs in South Sumatra as fit to operate, while just 18 of 241 taxable companies filed tax assessments (Mongabay, 2017). One licence holder whose permit was issued by the Lahat District Head in 2008 reportedly accumulated

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approximately IDR 27 billion in unpaid royalties during 2008–2012. These findings reveal leakage in the second link: authority was located near mining sites without corresponding downward accountability.

Following the transfer of authority to the provincial government, South Sumatra pursued extensive permit restructuring. The number of IUPs fell from 363 to 213 after 150 revocations (Gumiwang, 2015), and by June 2017 only 139 coal IUPs retained Clean and Clear status (Mongabay, 2025). Two limitations remained. First, reclamation and environmental compliance were not central evaluation criteria, leaving abandoned pits largely unaddressed (Mongabay, 2017). Second, on 8 June 2017, the Palembang Administrative Court annulled Governor's Decision No. 725/2016 concerning a mining company on the grounds that revocation fell within central government authority (Mongabay, 2017). The ruling reveals leakage in the third link, because uncertainty over administrative competence weakened the highest available sanction, and foreshadowed full recentralization in 2020.

Coal output in South Sumatra grew especially rapidly during recentralization. Figure 5 shows an increase from 49.00 million tonnes in 2020 to 120.74 million tonnes in 2025. Simple linear regression yields an increase of 14.84 million tonnes annually (standard error 1.65; $R^2 = 0.953$; $p < 0.001$), and a compound annual growth rate of 19.8%. Annual growth slowed from 38.6% in 2022 to 6.6% in 2025; actual 2025 production reached approximately 73.5% of the target (detikSumbagsel, 2026). Over the same period, provincial poverty declined from 12.66% to 10.15% (Apia et al., 2026). Comparing relative changes suggests that a 1% increase in coal production was associated with only an approximately 0.14% relative decrease in poverty, or 0.18% when poverty is lagged by one year. These descriptive associations do not establish causality, but indicate that the production surge was not proportionately transmitted into welfare gains. This pattern is consistent with regional resource-curse findings in Indonesia (Hilmawan & Clark, 2019) and research on mining expansion in South Kalimantan (Yanti & Ferrianta, 2026).

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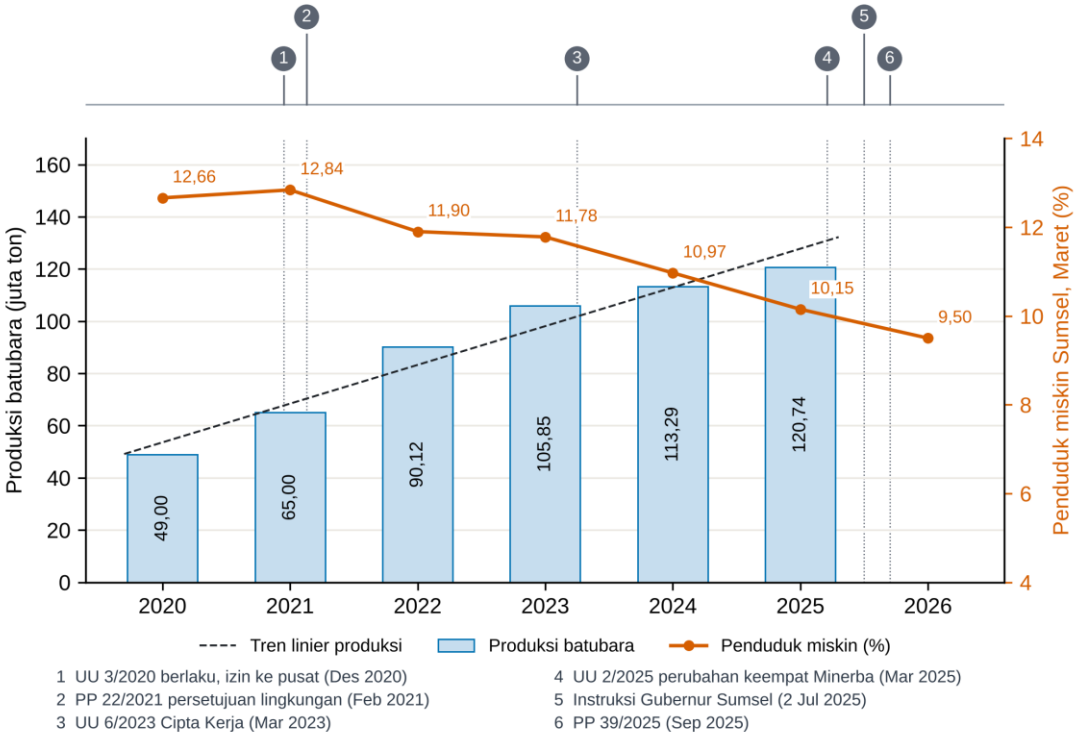


Figure 5. Coal production and poverty rates in South Sumatra, with markers for major policy events, 2020–2026

Environmental studies conducted in three coal-producing districts consistently report acidic mine water before treatment. Table 3 summarizes the findings against the standards established by Minister of Environment Decree No. 113 of 2003. At the most acidic former mine lake, iron concentrations reached 8.6 times the standard, manganese 5.3 times, and total suspended solids at the settling-pond inlet 9.3 times. Gautama et al. (2018) found that lime treatment effectively reduced iron, although manganese remained above discharge limits. Gobel et al. (2025) showed that treatment using NaOH and PAC met the applicable standards at discharge points. The central issue is therefore not the absence of technology but the consistency of environmental obligations throughout operations and after mine closure. Once a pit becomes a post-mining lake, wastewater discharge limits do not automatically apply to the entire waterbody, and environmental risks may shift from licence holders to downstream communities.

Table 3. Mine-water quality in South Sumatra compared with the standards under Minister of Environment Decree No. 113/2003

Location and source	Parameter	Measured value	Regulatory limit	Exceedance ratio
Lahat, Merapi, Sungai Lilin (Marhaini et al., 2019)	pH	3.18–5.6	6–9	$[H^+]$ 2.5–661 × pH 6 threshold
Former Tanjung Enim mine lake (Gautama et al., 2018)	pH	2.6–6.6	6–9	$[H^+]$ up to ±2,500 ×
	Fe (mg/L)	60.2	7	8.6 ×
	Mn (mg/L)	21.3	4	5.3 ×

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Location and source	Parameter	Measured value	Regulatory limit	Exceedance ratio
Tanjung Enim settling-pond inlet (Gobel et al., 2025)	pH	4.9	6–9	$[H^+]$ ±12.6 ×
	TSS (mg/L)	3,716	400	9.3 ×

Source: Authors' calculations. Comparisons involving post-mining lake water are indicative because the discharge standards apply at regulated compliance points.

The most visible consequences of regulatory distance concern illegal mining and coal transportation. In 2023, South Sumatra recorded the largest number of reported illegal-mining cases nationally, accounting for 26 of 128 reports (Bisnis Indonesia, 2026). In December 2025, the Ministry of Energy and Mineral Resources closed three illegal coal stockpiling sites in Muara Enim operating within a state-owned company's concession (Ministry of Energy and Mineral Resources, 2025). Coal transport illustrates a recurring regulatory cycle. South Sumatra Provincial Regulation No. 5 of 2011 had already regulated road use by coal trucks, yet more than a decade later such vehicles still crossed public roads and bridges. The cycle changed after the Muara Lawai Bridge in Lahat collapsed on 29 June 2025 while four coal trucks were crossing (detikSumbagsel, 2025). The Governor subsequently issued Instruction No. 500.11-004-Instruksi/Dishub/2025, prohibiting coal transport on public roads from 1 January 2026 (detikSumbagsel, 2026). This sequence illustrates the feedback pathway in Figure 3: a physical crisis opened a previously closed policy window.

The Governor's instruction also demonstrates the framework's side channel. Without authority to issue coal-mining licences, the provincial government sought to manage mining impacts through its remaining powers over roads and transport. These instruments can address traffic impacts but not reclamation or water quality within mining concessions. Adjustment costs were considerable: in early 2026, 22 permit holders still lacked dedicated road access, and coal supply to power plants in Bengkulu was temporarily disrupted (Technoz, 2026). These findings support Nazmuddin et al.'s (2025) argument that even comprehensive environmental legislation can be undermined by weak interagency coordination and overlapping mandates.

Impact Matrix and Interpretation through Legal System Theory

Figure 6 synthesizes the findings into an impact matrix assessing the direction of changes across six governance dimensions: control of permit numbers, site-level supervision, public participation, certainty of environmental liability, accountability to local communities, and provincial policy instruments. No period strengthened all six dimensions simultaneously. Decentralization expanded local instruments but weakened permit control and supervision. The third and fourth periods offered the strongest substantive environmental legal safeguards, particularly because environmental permits and strict liability remained intact, yet site supervision and local accountability did not consistently improve. Recentralization strengthened permit control through restructuring, while weakening participation, site-level supervision, and local accountability.

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Figure 6. Impact matrix of policy shifts across six dimensions of mining governance in South Sumatra

From the perspective of legal system theory, the matrix reveals three distinct problems. In terms of substance, mining law already contains many sustainability instruments—reclamation duties, financial guarantees, environmental audits for permit renewal, and community-development programs—yet environmental law has regressed in public participation and strict liability. In terms of structure, repeated changes in authority interrupted continuity in oversight. Institutional capacity was lost before replacement agencies were fully prepared, while the 2017 Administrative Court decision illustrates the legal uncertainty generated by transitional arrangements. In terms of legal culture, economic dependence on mining and weak landholders' bargaining positions have encouraged tolerance of certain violations. Syaputra (2025) reported that South Sumatra's coal sector had lower ESG maturity than nickel and gold mining in two other provinces, and that participation was strongly associated with community trust.

These findings extend the literature in two respects. First, the South Sumatran experience corroborates the pattern reported for East Kalimantan by Stumm and Morgan (2013) and Nasir et al. (2023): administrative correction does not necessarily amount to ecological restoration. Second, the study highlights the provincial government's ability to establish alternative governance channels after losing mining-permit authority. Such side channels show that recentralization does not eliminate provincial roles, but pushes local governments toward instruments not originally designed to regulate the environmental performance of mining operations. The tension identified by Ribot et al. (2006) cannot ultimately be resolved simply by relocating authority; what matters is a continuous chain of accountability linking decision-makers with affected communities.

Policy Implications

The transmission framework enables recommendations to be targeted at each leakage point, as summarized in Table 4. To reverse normative regression, future legislative amendments should restore the explicit strict-liability formulation and broaden participation in environmental impact assessments, while Supreme Court Regulation No. 1 of 2023 should be implemented consistently as an interim safeguard. To reduce regulatory distance, centralized licensing should be complemented by a provincial supervision coordination forum and an open-data dashboard reporting disturbed land, reclaimed areas, financial guarantees, and mine-water quality by district. To strengthen sanctions, the objective criteria for priority mining licence areas required by Constitutional Court Decision No. 160/PUU-XXIII/2025 should include financial capacity to provide reclamation and

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post-mining guarantees, and technical capacity for acid mine drainage treatment, rather than relying solely on applicants' institutional status. To address voluntary compliance, community-development and empowerment programs should be governed by tripartite agreements with measurable targets and periodic audits, consistent with the proposal to transform environmental social responsibility into legally binding instruments (Azzahra & Satory, 2025).

Table 4. Transmission leakage points, corrective instruments, and publicly monitorable indicators

Leakage point	Friedman domain	Corrective instrument	Publicly monitorable indicator
Normative regression	Legal substance	Restore Article 88 wording and EIA participation; consistently apply Supreme Court Regulation 1/2023	Decided strict-liability claims; number of residents involved in EIA consultation
Regulatory distance	Legal structure	Provincial supervision coordination forum; district-level open-data dashboard	Inspection frequency; reclaimed/disturbed land ratio
Weak apex of sanctions	Legal structure	Priority mining licence criteria covering guarantees and technical capacity; coordinated illegal-mining enforcement	Guarantee status by permit; illegal-mining cases pursued through financiers
Voluntary compliance	Legal culture	Tripartite community-development agreements with targets and audits; inlet and outlet water monitoring	District–province poverty gap; compliance with pH, TSS, Fe and Mn limits

CONCLUSION

Since 1967, Indonesia's environmental and mining legal policies have undergone successive shifts in authority from central government to districts, then provinces, and back to central government. Environmental regulation strengthened in 2009 but experienced regression following the Job Creation Law. These reforms affect regional outcomes through five transmission links: changes in legal norms, reallocation of authority, supervisory and sanctioning capacity, licence-holder behavior, and regional outcomes. Four recurring leakages—normative regression, regulatory distance, weakened upper-level sanctions, and voluntary compliance—limit their effectiveness. In South Sumatra, these problems are evident in the rapid expansion of permits during decentralization; permit restructuring that overlooked reclamation and was partly overturned by the courts; acidic untreated mine water; widespread illegal mining; production growth that did not translate proportionately into public welfare; and the province's recourse to road regulation after losing mining-licensing powers. The study concludes that policy effectiveness depends less on the formal location of authority than on sustained accountability connecting public authorities with communities bearing mining impacts. Further research should test this transmission framework empirically, for example by comparing inspection frequency, sanctions, and downstream water quality in Muara Enim and Lahat before and after 2020, and extending comparisons to other coal-producing provinces.

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