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Institutional Capture and Mining Governance Resilience: Evidence from Bangka Belitung and Jambi, Indonesia

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Abstract

Artisanal and Small-Scale Mining (ASM) remains a governance dilemma in Indonesia, balancing livelihoods against environmental degradation. This article investigates how ASM governance functions in two contrasting provinces—Bangka Belitung (tin) and Jambi (gold)—assessing system resilience against policy adaptability, enforcement consistency, institutional autonomy, and implementation gaps. Using a qualitative comparative case study, data were collected through extensive in-depth interviews and focus group discussions with regulators, miners, financiers, and civil society. Applying a combined Dependency and Institutional Capture framework, the study reveals that both governance systems fail, albeit through distinct mechanisms. In Bangka Belitung, capture hijacks the formal system, channeling informal tin into legal exports and aligning mining designations with electoral cycles. Conversely, Jambi's capture operates through a sustained institutional vacuum managed via informal payment networks involving state actors. Empirically, captured or absent regulations lead to selective enforcement and near-zero permit issuance, sustaining massive extraction—evidenced by a 376% increase in Jambi's illegal gold mining and 64.12% critical land in Bangka Belitung—while deepening economic dependency. Theoretically, this article introduces a novel dependency-capture diagnostic matrix for comparative ASM governance. Practically, it demonstrates why uniform formalization policies fail across divergent capture architectures, offering tailored institutional recommendations.

Keywords: Artisanal and Small-Scale Mining, Bangka Belitung and Jambi, Dependency Theory, Governance Resilience, Institutional Capture.

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Introduction

1.1 Background and Problem Statement

Artisanal and Small-Scale Mining (ASM) is more than an environmental issue. It is a reflection of how states manage, or fail to manage, the natural resources on which millions of people depend. Globally, the sector directly employs more than 40 million workers across 80 countries, much of it operating in a legal grey area: not entirely legal, but not easily eradicated without destroying the local economies that depend on it (Hilson & Maconachie, 2020; Laing & Pinto, 2023; Rushemuka & Cote, 2024). In Southeast Asia, these challenges are compounded by weak regulation, strong local political interests, and community dependence on mining as the only available economic option (Keovilignavong, 2019; Sadan & Lawn Dan, 2021).

Indonesia presents one of the most analytically consequential arenas for examining these dynamics. In Bangka Belitung Province, the source of roughly 90% of Indonesia's tin and the world's second-largest tin-producing region (Diprose et al., 2022; Sulista & Rosyid, 2022), unconventional tin mining (TI) has expanded to the point where 64.12% of the province's land area was classified as critical land in 2020 (WALHI, 2020). In Jambi Province, unlicensed gold mining (PETI) has spread into the Kerinci Sebelat National Park, with affected areas reaching 52,059 hectares by 2024, a 376% expansion in under a decade (KKI Warsi, 2024). Policy instruments exist on paper: People's Mining Areas (WPR) and People's Mining Permits (IPR) were designed to provide legal pathways for artisanal miners (Ibrahim et al., 2022). Yet as of March 2024, of 1,215 WPR designated nationally, only 82 IPR had been issued — and in Bangka Belitung, despite 123 designated WPR, the number of issued IPR was zero (Antara, 2024; ESDM, 2024).

Rather than assuming in advance that this record constitutes policy failure and asking only why it occurs, this study poses three open analytical questions. First, how do the economic structures of PETI and TI shape community dependence on extraction in each province? Second, how do regulatory institutions actually function when confronted with these economic structures and through what mechanisms, if any, are they influenced by political-economic interests? Third, to what extent does ASM governance in the two provinces exhibit resilience, assessed systematically through four operational indicators defined in Section 1.2? Framed this way, whether governance is resilient or has failed becomes an empirical finding of the study rather than its premise.

The two cases, while subject to identical national regulation, differ structurally in ways that make their comparison analytically productive. In Bangka Belitung, TI operates in a grey zone historically connected to the formal tin industry: structural relationships among artisanal miners, brokers, smelters, and the state-owned PT Timah blur the line between legal and illegal (Ibrahim et al., 2023; Rahayu et al., 2025; Ristiandy, 2023). In Jambi, PETI operates almost entirely outside the formal framework, without any large corporation anchoring the value chain, more fluid, more dispersed, and more sensitive to local commodity-price shocks (Erwana et al., 2016; Hm et al., 2023; Rahayu & Faisal, 2021).

Three bodies of scholarship inform this study, and their joint limitations define its contribution. The first is the global literature on ASM formalization, which has converged on a robust finding: formalization failure is recurrent and primarily political rather than technical. Studies across Ghana, Peru, Colombia, and sub-Saharan Africa document an anti-formalization dynamic in which corruption and political leaders' involvement sit at the top of the obstacles to legal artisanal mining (Bansah, 2023; Benites & Ubillus, 2022; Donkor, 2025; Issifu, 2026; Zarate Rueda et al., 2023), with successful formalization depending on institutional arrangements that capture-prone contexts systematically lack (Clifford, 2022; Delgado Jimenez, 2024; McKay, 2025). The second is the political

economy of resource governance and capture: from the foundational theory of economic regulation by Stigler (1971) through recent empirical work, this literature shows that resource dependence corrodes institutional quality (Cai et al., 2024; Sachs & Warner, 2001), that regulatory capture significantly impedes environmental performance (Wang et al., 2025), that illegal mining rents can finance electoral politics and thereby entrench reform failure (Abdulai et al., 2025; Stacey, 2025; Staerfeldt & Stacey, 2025), and that elite capture reproduces itself even within community-based management schemes (Katz-Lavigne et al., 2024; Kolstad & Soreide, 2009; Saito-Jensen et al., 2010). The third is the Indonesia-specific literature, which has richly documented tin politics in Bangka Belitung (Diprose et al., 2022; Ibrahim et al., 2022, 2023; Rahayu et al., 2025; Sulista & Rosyid, 2022), gold conflicts and mining livelihoods in Sumatra and beyond (Hm et al., 2023; Libassi, 2024; Meutia et al., 2022; Sugiarti et al., 2021), and national extractive governance dynamics (Liao & Zhang, 2024; Triyanti et al., 2023; Yanuardi et al., 2021; Yusuf et al., 2026).

Read together, these literatures leave a specific gap at their intersection. The formalization literature documents that reform fails and identifies political causes, but rarely specifies the economic structures that make exit from informality irrational for communities. The capture literature specifies political mechanisms, but seldom connects them to a framework capable of assessing governance resilience as an outcome. The Indonesian literature provides deep single-case accounts but lacks a systematic cross-commodity, cross-province comparison conducted within a single analytical framework. Within the literature reviewed for this study, we have not encountered a study that integrates Dependency Theory and Institutional Capture Theory as a joint diagnostic framework, operationalizes governance resilience into measurable indicators, and applies that framework comparatively across two Indonesian provinces with different commodities and different capture-enabling structures, though we do not claim this survey to be exhaustive (Kansheba & Marobhe, 2022). This study addresses that gap. We present this not as a wholly novel theoretical synthesis, but as a first diagnostic application of an integrated dependency-capture framework to comparative ASM governance, an application whose broader validity requires testing in further cases (see Section 4).

1.2 Operationalizing Governance Resilience

Because "governance resilience" anchors this study's central question, it requires explicit definition and operationalization, a step frequently omitted in resource-governance scholarship, where resilience often functions as an unexamined normative aspiration rather than an assessable property of governance systems (Clement, 2024; Fallon et al., 2022). Recent synthesis work provides the conceptual foundation. Li (2026), in a meta-narrative review of resilience in public administration, identifies three constitutive narratives: maintenance (the capacity to sustain core functions under stress), recovery (the capacity to restore functioning after disruption), and adaptation (the capacity to adjust structures and strategies to changing pressures). Abdillah (2025), synthesizing the resilience-governance literature, similarly defines resilience governance as the institutional capacity to absorb pressure while preserving the system's essential purposes. Building on both, and consistent with the demonstration by Clement (2024) that how resilience is framed materially shapes governance analysis, this study defines governance resilience in the ASM context as:

> *the capacity of a governance system to maintain its core regulatory functions (maintenance), recover from attempts at institutional capture (recovery), and adapt to pressures from political-economic elite interests (adaptation), such that ASM policy objectives—formalization, environmental protection, and miner welfare—remain achievable despite structural pressure*.

A system is therefore resilient not when it avoids pressure, but when pressure does not durably divert it from its regulatory purposes. Conversely, governance resilience failure occurs when capture pressures and structural dependency jointly prevent the system from maintaining, recovering, or adapting. To render this definition assessable, we operationalize it through four indicators, each with a defined measurement basis in this study's data (Table 1).

Table 1. Operational Indicators of Governance Resilience in ASM Contexts

Indicator	Definition	Measurement basis in this study	Conceptual grounding
1. Policy adaptive capacity	The system's ability to translate formal policy (WPR, IPR) into effective, adjusted implementation rather than static paper output	WPR-to-IPR conversion ratio (1,215:82 nationally; 123:0 in Bangka Belitung, March 2024); frequency and direction of regulatory amendment (two amendments to the implementing regulation in two years)	Beeton et al. (2024); Lien et al. (2020); Clement (2024)
2. Enforcement consistency	The degree to which enforcement applies uniformly across time and actors, rather than selectively or in synchrony with political cycles	Informant accounts of the timing, selectivity, and monetization of enforcement; documented patterns of pre-election enforcement surges	Wang et al. (2025); Bansah et al. (2025); Katz-Lavigne et al. (2024)
3. Institutional autonomy from elite interests	The degree to which regulatory institutions retain decision-making independence from actors with stakes in the status quo	Documented political-economic linkages: officials as financiers; campaign finance from illegal mining; legislators' direct interests in mining continuity	Abdulai et al. (2025); Stacey (2025); Saito-Jensen et al. (2010)
4. Implementation gap	The divergence between regulatory objectives and observed field outcomes	Spatial-environmental record: 64.12% critical land share (Babel); 52,059 ha PETI area and +376% expansion (Jambi); 12,607 unreclaimed pits; 27 mining deaths (2021-2023)	Fallon et al. (2022); Spiegel (2016)

Source: Processed by authors, 2026.

These four indicators structure the entire analysis that follows. Section 3 assesses each indicator comparatively across the two provinces, allowing the study's conclusion about governance resilience—whether maintained, degraded, or failed—to emerge from the evidence rather than from prior assumption. The indicators also discipline the study's theoretical apparatus: Dependency Theory (Frank, 1969; Prebisch, 1950) is used to explain the demand side of the problem (why communities cannot exit extraction), while Institutional Capture Theory (Stigler, 1971; Wang et al., 2025) explains the supply side (why regulation does not bind). Their joint application as a dual-lens framework is elaborated in Section 2.3.

This article proceeds with three objectives: (1) to analyze the economic dynamics that shape dependence on PETI and TI in the two provinces; (2) to identify and compare the mechanisms

through which political-economic interests influence regulatory institutions in each; and (3) to assess governance resilience in both cases against the four indicators, deriving policy implications differentiated by the distinct mechanisms found.

Research Methods

2.1 Research Design

This study employs a qualitative approach with a comparative case study design (Creswell, 2015; Yin, 2018). Specifically, we adopt a Most Similar Systems Design (MSSD), a comparative logic in which cases are selected for their similarity in structural background conditions, while varying on the key analytical variables of interest (George & Bennett, 2005; Yin, 2018). Bangka Belitung and Jambi share fundamental similarities: both are resource-dependent provincial economies within Indonesia's decentralized governance framework; both host extensive artisanal and small-scale mining (ASM) activities operating largely outside formal licensing; both are subject to the same national regulatory instruments (the Minerba Law and its WPR/IPR mechanisms); and both exhibit large-scale environmental degradation attributed to unlicensed mining.

Against this common background, the two cases vary systematically on two structural dimensions. First, commodity type: Bangka Belitung's unconventional tin mining (TI) extracts a commodity with a centuries-old industrial history dating to the Palembang Sultanate and Dutch colonial administration (Andaya, 1993; Hockenberry, 2021; Sulista & Rosyid, 2022), whereas Jambi's unlicensed gold mining (PETI) draws on a tradition of artisanal panning dating to 1728 that transformed into mechanized extraction only after the collapse of rubber prices (Andaya, 1993; KKI Warsi, 2024). Second, the presence or absence of a formal corporate anchor: in Bangka Belitung, the state-owned PT Timah and its associated smelter networks structurally connect informal mining to formal export markets (Diprose et al., 2022; Ibrahim et al., 2022; Rahayu et al., 2025), whereas Jambi's gold sector operates without any large corporation anchoring the value chain (Hm et al., 2023). The MSSD logic allows differences in observed institutional capture mechanisms to be analytically attributed to these two variations rather than to background conditions the cases share. This case selection rationale responds directly to the geological, historical, and economic record: Bangka Belitung produces approximately 90% of Indonesia's tin and is the world's second-largest tin-producing region (Diprose et al., 2022; Sulista & Rosyid, 2022), while Jambi consistently ranks among Indonesia's largest PETI-affected provinces by area (KKI Warsi, 2024).

The unit of analysis is the provincial ASM governance system, encompassing regulatory institutions, enforcement agencies, mining actors, financiers, and the relationships among them. The study is structured by the four operational indicators of governance resilience elaborated in Section 1.2 (policy adaptive capacity, enforcement consistency, institutional autonomy from elite interests, and implementation gap), which serve as the comparative dimensions across both cases.

2.2 Data Collection

Data collection was conducted over six months (January-June 2023) across six field sites: Batanghari, Merangin, and Bungo Regencies in Jambi Province, and Sungailiat, Muntok, and Manggar in Bangka Belitung Province. The study draws on four complementary data sources: (1) in-depth interviews with core informants, (2) expert and stakeholder interviews for source triangulation, (3) two multi-stakeholder focus group discussions (FGDs), and (4) field observation and document analysis.

Core informants (Tier 1). Fourteen core informants were selected through purposive sampling following an information-rich cases strategy (Patton, 2015), prioritizing depth of engagement with the PETI and TI sectors over numerical breadth. The composition comprises: four TI practitioners in Bangka Belitung (two of whom also act as financiers); four PETI operators in Jambi (one doubling as a capital owner); three mining financiers; two members of the Bangka Belitung provincial legislature, including its speaker; and one official of the Jambi Provincial Investment and One-Stop Services Agency (DPMPTSP). These informants were selected because they occupy positions of direct, first-hand involvement in the two mining economies and their regulation, the phenomena at the center of this study's comparative design.

Expert and stakeholder interviews (Tier 2). To triangulate core-informant accounts, thirteen additional interviews were conducted with: one official of the Ministry of Energy and Mineral Resources (ESDM); one representative of the Indonesian People's Miners Association (APRI); three representatives of environmental NGOs (WALHI Bangka Belitung and KKI Warsi Jambi); seven academics spanning political ecology, economics, mining engineering, sociology, and anthropology; and one senior journalist and mining-sector observer in Bangka Belitung. These interviews served as independent vantage points against which core-informant claims were checked, particularly claims concerning licensing processes, enforcement practices, and political-economic linkages.

Contextual interviews (Tier 3). Two further interviews were conducted with practitioners in adjacent ASM sectors in Jambi—one in informal oil drilling and one in sand and gravel mining (which overlaps with riverine gold extraction). These are treated strictly as contextual data: they do not enter the comparative analysis of PETI and TI, but they illuminate how WPR/IPR implementation dynamics operate across ASM commodities, enriching interpretation of the licensing-related findings. In total, the study draws on 29 individual interviews (14 core, 13 expert/stakeholder, 2 contextual). Table 2 summarizes the informant composition and the type of information contributed by each cluster.

Table 2. Informant Composition and Information Contributed

Tier	Cluster	n	Primary information contributed
1	TI practitioners, Bangka Belitung	4	Mining operations; supply chain to collectors/smelters; SPK/CV/BUMDES arrangements; perceptions of WPR/IPR
1	PETI operators, Jambi	4	Mining economics; income distribution; informal payments to officials; rubber-to-gold livelihood transition
1	Financiers (TI and PETI)	3	Capital structure; profit-sharing; relationships with officials and security apparatus
1	Provincial legislators, Bangka Belitung	2	Politics of WPR designation; electoral dynamics; central-regional authority tensions
1	DPMPTSP official, Jambi	1	Licensing procedures; institutional bottlenecks in IPR issuance
2	ESDM official	1	National regulatory framework; WPR/IPR implementation status
2	APRI representative	1	Association-mediated formalization; bureaucratic and political obstacles to IPR

2	Environmental NGOs (WALHI, KKI Warsi)	3	Spatial data on degradation; casualty records; land-use conflict documentation
2	Academics (multi-disciplinary)	7	Historical, economic, and socio-legal context; interpretation validation
2	Media/mining observer	1	Longitudinal observation of tin governance; licensing and export practices
3	Contextual ASM practitioners (oil; sand/gravel)	2	Cross-commodity WPR/IPR implementation dynamics

Source: Processed by authors, 2026.

Focus group discussions. Two multi-stakeholder FGDs were conducted, one in Jambi and one for Bangka Belitung (online, via Google Meet), each involving 8-10 participants, with the full session lasting approximately 3 hours. Unlike the expert consultations, the FGDs were designed as a second, independent stream of primary data with two explicit objectives: (1) to identify indications, modes, and actors involved in institutional capture in the two provinces' mining sectors, and (2) to assess the resilience of local regulations and institutions in the face of such pressures. Participants were drawn from three stakeholder clusters: Regulators and Officials (provincial ESDM, Environmental Agency, One-Stop Services, mining inspectors, and local government/DPRD representatives); Community and Observers (local academics, environmental NGOs, investigative journalists, and representatives of mining-affected communities); and Business Actors (mining association representatives, PT Timah in Bangka Belitung, and private-sector actors in Jambi).

Given the sensitivity of the subject, moderation followed three protocols. First, politically charged terms such as "institutional capture" or "corruption" were replaced in facilitation with neutral formulations ("coordination challenges among actors," "external pressures in decision-making") to avoid defensive responses from official participants. Second, normative answers (e.g., "we work according to standard procedures") were systematically probed with follow-up questions about practical obstacles encountered when procedures confront large-scale interests. Third, when tensions arose between NGO and regulator/business participants, the moderator acknowledged both perspectives explicitly before redirecting discussion. FGD audio recordings were retained and form part of the analyzed corpus; attendance documentation for the online session was incomplete, a limitation acknowledged in Section 2.4. The online format of the Bangka Belitung FGD also entailed intermittent participation by some attendees.

Field observation and document analysis. Direct observation was conducted at active mining sites in all six field locations, documented through field journals. The document corpus comprises Law No. 4/2009 as last amended by Law No. 2/2025; Government Regulation No. 96/2021 in conjunction with GR No. 25/2024 and GR No. 39/2025; Ministerial Decrees ESDM No. 116.K/MB.01/MEM.B/2022 and No. 46.K/MB.01/MEM.B/2023; and academic and NGO reports (Armitran, 2024; Jufri Dewa, 2023; KKI Warsi, 2024; Rahayu & Faisal, 2021; WALHI, 2020). Part of the empirical corpus originates from the same fieldwork as Yusuf et al. (2026); the present study analyzes it through a different theoretical framework and for a different analytical purpose, producing a distinct contribution.

2.3 Data Analysis

Analysis followed reflexive thematic analysis (Braun & Clarke, 2022) through six iterative stages, summarized in Table 3.

Table 3. Analytical Process

Stage	Concrete activity	Data involved	Output
1. Familiarization	Verbatim transcription of core and expert interviews; review of FGD recordings and six field journals	All interview audio; FGD audio; field notes	Annotated corpus
2. Initial coding	Open coding guided by sensitizing concepts from both theoretical lenses	Full transcript corpus	Initial code list (economic dependency; licensing experience; informal payments; political linkages; enforcement patterns)
3. Theme construction	Clustering codes into candidate themes mapped to the four governance resilience indicators	Coded corpus	Candidate theme structure per province
4. Theme review	Cross-checking themes against document corpus and NGO spatial data; comparing provinces dimension-by-dimension	Themes + documents	Validated cross-case theme matrix
5. Theme definition	Finalizing four failure themes (one per indicator) and their distinct mechanisms in each province	Validated themes	Final analytical structure (Sections 3.1-3.5)
6. Reporting	Writing with a data-first principle: each analytical claim introduced through primary evidence before theoretical interpretation	Final themes + verbatim extracts	Manuscript narrative

Source: Author Research, 2026.

The analytical process was abductive, moving iteratively between empirical data and theoretical frameworks (Creswell, 2015). Two clarifications are warranted regarding the role of theory. First, this study employs Dependency Theory (Frank, 1969; Prebisch, 1950) and Institutional Capture Theory (Stigler, 1971; Wang et al., 2025) as a dual-lens complementary framework rather than as theory triangulation in the hypothesis-testing sense: Dependency Theory illuminates the economic structures that bind communities to extraction, while Institutional Capture Theory illuminates the political mechanisms that neutralize regulatory responses. The two lenses address different layers of the same phenomenon and are not mutually testing. Second, the four governance resilience indicators were operationalized following established measurement approaches for governance adaptability and institutional robustness (Beeton et al., 2024; Lien et al., 2020): policy adaptive capacity was assessed through the WPR-to-IPR conversion record (1,215:82 nationally; 123:0 in Bangka Belitung as of March 2024) and the frequency of regulatory amendment; enforcement consistency through informant accounts of the timing, selectivity, and monetization of enforcement; institutional autonomy through documented political-economic linkages between officials and mining interests; and implementation gap through the divergence between regulatory

objectives and spatial-environmental outcomes such as degraded land share, area expansion, unreclaimed pits, and casualties (Fallon et al., 2022; Spiegel, 2016).

Validity was maintained through source triangulation across the three informant tiers, the FGDs, and the document corpus (Denzin & Lincoln, 2018; Patton, 2015), complemented by member checking with key informants. Direct quotations presented in Section 3 were prepared using an intelligent verbatim convention: filler words and false starts were removed and local dialect was rendered into standard Indonesian prior to English translation, while preserving the semantic content of each statement. Original-language transcripts were retained for audit.

2.4 Researcher Reflexivity and Limitations

The research team combines insider familiarity with both provinces and disciplinary backgrounds spanning political science and government studies. This positionality facilitated access to actors in a sensitive, partly illegal sector, but also required sustained reflexivity about interpretive bias, addressed through the multi-tier triangulation design and member checking described above.

Four limitations warrant explicit acknowledgment. First, the number of core PETI operators interviewed in Jambi (four) is modest, reflecting the difficulty of accessing actors in an illegal and security-sensitive sector; their accounts were therefore systematically triangulated against APRI, NGO, contextual-sector, and FGD data. Second, attendance documentation for the online Bangka Belitung FGD is incomplete, and intermittent connectivity limited the continuous participation of some attendees. Third, the study's geographic scope covers six sites in two provinces; findings are analytically, not statistically, generalizable. Fourth, the diagnostic framework developed here (Section 3.5) is derived from two cases and should be treated as a starting point requiring validation in additional commodity and governance contexts.

Results and Discussion

This section presents findings in five layers. Sections 3.1 and 3.2 establish, respectively, the economic structures of dependency and the political mechanisms of institutional influence found in each province, presented data-first, with primary evidence preceding theoretical interpretation. Section 3.3 then assesses both cases against the four governance resilience indicators defined in Section 1.2. Section 3.4 draws the cross-case comparative findings together, and Section 3.5 synthesizes the results into a diagnostic account of the governance resilience failure cycle. All quotations follow the intelligent-verbatim convention declared in Section 2.3.

3.1 The Economic Structures of Dependency: How Communities Became Locked into Extraction

3.1.1 Bangka Belitung: A Colonial Legacy Reinforced by Liberalization

A tin practitioner in Bangka, whose village has mined since the post-1998 liberalization, described the transformation in terms no statistic can match:

> *"This is the village whose economy succeeded through mining. In 1998 this house was still wooden boards; now, praise God, a single household has three cars."* (Interview, TI practitioner, Bangka Belitung, 2023)

The same informant described how mining is now organized through layered arrangements connecting village miners to the formal industry: an oil-palm company's concession, found to contain tin, is mined under agreements that run from PT Timah through a private contractor (CV) to the village-owned enterprise (BUMDES), with the requirement that local residents participate as miners:

> *"The plantation's land is within the IUP, so it is worked through PT Timah and the CV... the CV finances it, but the condition is that villagers must take part in mining — last time it was 15 units, channeled through the BUMDES."* (Interview, TI practitioner, Bangka Belitung, 2023)

A senior mining local journalist and sector observer explained the price architecture that keeps informal tin flowing toward private smelters rather than the state-owned channel:

> *"Today the tin price at PT Timah is 120,000 per kilogram, and you wait three months for verification and payment. The private smelters pay 200,000 to 300,000 — in cash — and they can even advance money first through their collectors at the village level: 'hold this money, you go find tin, then deposit it.'"* (Interview, mining-sector observer, Bangka Belitung, 2023)

Three structural features emerge from this evidence. First, dependence is historically deep: tin extraction has organized Bangka's economy since the Palembang Sultanate and Dutch colonial era (Andaya, 1993; Sulista & Rosyid, 2022), and the post-1998 liberalization converted that legacy into a mass livelihood, field data indicate more than half the population depends on the tin economy, drawn by an economic attraction long documented in the sector (Ibrahim, 2015; Sulista, 2019). Second, informal mining is not parallel to the formal industry but plugged into it, through brokers, smelters, SPK work-order arrangements, and BUMDES intermediation (Hockenberry, 2021; Ibrahim et al., 2022; Rahayu et al., 2025). Third, the price-and-payment differential between PT Timah and private smelters constitutes a standing economic incentive that pulls production toward the informal-to-private channel, a sensitivity visible in the company's own price-driven performance reporting (PT Timah, 2023). Figure 1 maps this supply chain.

TI Miners (Informal) 4-6 people/unit	→	**Middleman/ Broker (Capital: Rp15-50m)**	→	**Smelter Companies (Grey zone)**	→	**PT Timah & Subsidiaries (State-owned)**	→	**Global Export**
Bears all legal & physical risks		Connects informal and semi-formal segments		Pays 200-300k/kg cash vs PT Timah 120k/kg with 3-month verification		SPK/CV/BUMDES arrangements channel village mining into IUP areas		Largest profits

Construction: derived from thematic coding of interviews with four TI practitioners, two financiers, and one sector observer (codes: selling channels; SPK/CV/BUMDES arrangements; price differential), triangulated with field observation in Sungailiat and Muntok and documentary sources (Ibrahim et al., 2022; Hockenberry, 2021; Rahayu et al., 2025).

Figure 1. Supply Chain of Unconventional Tin Mining (TI) in Bangka Belitung. Sources: Author Research, 2026.

Read through the dependency lens (Frank, 1969; Prebisch, 1950), Bangka exhibits a classic center-periphery structure internal to one province: mining communities bear the physical, legal, and ecological risks at the bottom of the chain, while surplus concentrates upward at smelters and exporters, the pattern Cai et al. (2024) associate with deteriorating governance quality in non-renewable-resource economies.

3.1.2 Jambi: From Rubber Collapse to Gold Rush

In Jambi, the trigger was situational rather than colonial. A gold miner in Merangin traced the shift directly to the collapse of rubber prices:

> *"Rubber doesn't sell anymore, so everyone moved to mining... If you succeed, you can build a house. The working capital for one kilogram is about 30 million rupiah per fifteen days — and one kilogram of gold is now 800 million."* (Interview, PETI operator, Merangin, 2023)

KKI Warsi's spatial data corroborate the account (KKI Warsi, 2024): PETI expansion correlates closely with the decline of plantation commodity prices, growing from roughly 10,926 hectares at the 2015 baseline to 52,059 hectares by 2024, an expansion of 376% (Table 4). The dependency is then reinforced through factor markets: agricultural labor costs rose up to 100%, land-processing costs 84%, and land rents 86% under competition from PETI (BPS Provinsi Jambi, 2024). Heavy-equipment rental at Rp 120 million per month requires outside financiers, who consequently dominate the surplus, reproducing the mining-laborer class documented in other neo-extractivist contexts (Melendez, 2025; Pedersen et al., 2021; Zarate Rueda et al., 2023) — while mercury-based processing, typical of Indonesia's small-scale gold sector, externalizes the ecological cost (Spiegel et al., 2018). Real welfare gains around mining areas are nonetheless documented and locally salient (Junaidi, 2022), which is precisely what makes the dependency durable. Unlike Bangka, no corporation anchors this chain: gold flows through informal refineries and untraceable resale channels (Figure 2).

PETI Miners (10-15 people/unit) Fully unlicensed	→	Financier/ Middleman (Rp30-120m/mo) Incl. civil servants	→	Informal Gold Refinery (Out-of-town shops)	→	Black Market (Nearly untraceable)	→	Export/ Resale
Highest risk; shared income from Rp800m/kg gold		Key node: links field to market; informal payments to officials		Sometimes doubles as collector		No formal corporation as anchor		Very hard to trace

Construction: derived from thematic coding of interviews with four PETI operators and one financier (codes: capital structure; income distribution; sales channels; payments to officials), triangulated with contextual interviews in adjacent ASM sectors, imcnews.id (2022), and Hm et al. (2023).

Figure 2. Supply Chain of Unlicensed Gold Mining (PETI) in Jambi. Sources: Processed by authors, 2026.

The chain mapped in Figure 2 describes how gold moves once it leaves the ground; Table 4 describes how much ground has entered that chain. Read together, the two visuals link mechanism to scale: the absence of a formal node in Figure 2 is what allows the area under extraction to expand as rapidly and unevenly as Table 4 records.

Table 4. Expansion of PETI-Affected (Jambi) and TI-Affected (Bangka Belitung) Areas, 2021-2024

District/Area	Province	Commodity	2021 (Ha)	2024 (Ha)	Increase (Ha)	%
Sarolangun	Jambi	Gold	15,659	17,362	+1,703	+11%
Merangin	Jambi	Gold	15,857	17,320	+1,463	+9%
Bungo	Jambi	Gold	6,748	10,101	+3,353	+50%

Tebo	Jambi	Gold	4,090	6,819	+2,729	+67%
Batanghari + Kerinci	Jambi	Gold	—	467	+467	New
TOTAL JAMBI (PETI)	**Jambi**	**Gold**	**~10,926***	**52,059**	**+41,133**	**+376%***
Central Bangka	Babel	Tin	n/a	6,521	n/a	n/a
South Bangka	Babel	Tin	n/a	1,105	n/a	n/a
East Belitung	Babel	Tin	n/a	980	n/a	n/a
TOTAL CRITICAL LAND BABEL	**Babel**	**Tin**	**—**	**1,053,253 Ha (64.12% of total)**	**—**	**—**

Sources: KKI Warsi (2024); WALHI (2020); BPS Provinsi Jambi (2024).
*2015 baseline; +376% computed against that baseline

Three analytical observations make Table 4 consequential rather than merely descriptive. First, the expansion is spatially patterned, not uniform. The two oldest mining districts, Sarolangun (+11%) and Merangin (+9%), grew at single-digit rates consistent with maturing extraction frontiers approaching local saturation, whereas the later entrants Bungo (+50%) and Tebo (+67%) expanded several times faster, and Batanghari and Kerinci register as entirely new frontiers rising from zero to 467 hectares. This is the signature of a diffusion process: extraction migrates from exhausted or contested sites toward newer deposits, following geology and capital availability rather than any administrative boundary, the same exhaustion-driven mobility documented for ASM frontiers elsewhere (Pedersen et al., 2021).

Second, the timing is analytically decisive. The 2021–2024 window coincides with the operative life of the people's-mining policy itself: Jambi's 117 WPR were designated in April 2022 (Antara, 2024; ESDM, 2024), squarely inside the observed interval. Had the designation regime functioned as intended, channeling artisanal extraction into designated and managed areas, the aggregate affected area should have decelerated, or at least re-concentrated within WPR boundaries. The table records the opposite: the fastest district-level growth and the emergence of new frontiers, including encroachment toward Kerinci Sebelat National Park, occurred after designation (KKI Warsi, 2024). Table 4 therefore functions as a spatial falsification of the policy's containment objective, giving quantitative form to the implementation gap assessed in Section 3.3.4.

Third, the asymmetry between the Jambi and Bangka Belitung rows is itself a finding rather than a limitation of the data. For Jambi the table reports a flow, hectares added year on year; for Bangka Belitung it reports a stock, 1,053,253 hectares of critical land, 64.12% of the province, accumulated over decades of extraction (WALHI, 2020). An annual expansion series comparable to Jambi's cannot meaningfully be constructed for Bangka Belitung, because degradation there ceased long ago to be an advancing frontier and became the province's baseline condition, materialized in 12,607 unreclaimed pits (Haryadi et al., 2023; WALHI, 2023). This stock-versus-flow contrast prefigures the comparative diagnosis developed in Sections 3.3.4 and 3.4: an accelerating flow can, in principle, still be interrupted; an accumulated stock poses a categorically different remediation problem.

Comparative insight (3.1). Both provinces exhibit locked-in extraction dependency, but its genesis differs: Bangka's is structural-historical (colonial industry, deepened by liberalization),

Jambi's is situational-economic (commodity-price shock). This difference matters for policy sequencing, as Section 3.4 elaborates: escaping a centuries-old dependency architecture is a different problem from reversing a decade-old livelihood shift (Anser et al., 2025; Wang & Su, 2024).

3.2 Two Faces of Institutional Capture: The Political Mechanisms

Across both provinces, the influence of economic elites over resource institutions echoes the broader oligarchic turn documented in Indonesian natural-resource governance (Suryani et al., 2021). The mechanisms, however, differ fundamentally between the two cases.

3.2.1 Bangka Belitung: Capture through System Hijacking

The most direct evidence of how formal instruments are repurposed comes from inside the political system itself. The speaker of the provincial legislature, asked about WPR designation in his region, stated: *"In Bangka Tengah it has not appeared yet. It appears ahead of elections, ahead of the pilkada it appears. Whether anything comes of it afterwards, whether there is any follow-up after the election, we do not know... it is to please the public, to give them hope."* (Interview, provincial legislator, Bangka Belitung, 2023)

And on who actually benefits when WPR and IPR are issued:

> *"Forgive me, but with this WPR the public is just being made comfortable... people only know that the WPR exists; the ones who finance it stay the same."* (Interview, provincial legislator, Bangka Belitung, 2023)

The sector observer described the operational mechanism by which formal designations service informal flows:

> *"The WPR is for government legitimacy, to show they are pro-people, that they have done something. And it was issued to the smelters in that circle... In practice, they do not take from the IPR; they take from the illegal friends. And remarkably, with that permit they can take from anywhere, based in South Bangka, they can take from Bangka Regency, from Central Bangka."* (Interview, mining-sector observer, Bangka Belitung, 2023)

This is capture in the precise sense of Stigler (1971), regulation operating for the benefit of the regulated interest, but with a specific architecture: the formal system (WPR designations, IPR provisions, SPK partnerships) exists and functions, yet its functions have been redirected to launder informal production into legal export channels and to manufacture electoral legitimacy, in line with the direct stakes local elites hold in tin continuity (Ahmad et al., 2022; Ibrahim et al., 2023). The pattern parallels the finding of Abdulai et al. (2025) in Ghana that electoral dependence on mining constituencies sustains reform failure, and the account of institutional coalescence between state and informal actors developed by Stacey (2025).

3.2.2 Jambi: Capture through System Vacuum

In Jambi, by contrast, the formal system is conspicuous by its absence. The APRI representative explained why the rational actor stays informal:

> *"If they are illegal, they pay one post, to the officials, and it is done. If they go through the government, there are endless rules, then taxes, then permits and everything else. Small people do not understand regulations, do not know the rules, and do not want the hassle — what matters to them is getting results."* (Interview, APRI representative, Muaro Jambi, 2023)

When miners do attempt formalization, they encounter a second barrier: *"Many who try to arrange permits run into the mafia at the provincial level — 'give this much money, give that much', it is finished, and the permit never comes out."* (Interview, APRI representative, Muaro Jambi, 2023)

Asked why IPR remains unavailable despite the regulation existing on paper, the same informant identified the interests served by the vacuum:

> *"Maybe because there are too many cukong [financier-brokers]... they do not want it legalized, because legality means taxes, complicated rules, large permit costs, and they would still have to pay deposits everywhere. That is why they do not want to be legal."* (Interview, APRI representative, Muaro Jambi, 2023)

The vacuum is then administered through informal payments. A Merangin miner described the modus operandi:

> *"Some pay deposits, like the excavator users, deposits to the district police... about one million per month... The officers do not come every day. When they come, we leave; when they go home, we go back in."* (Interview, PETI operator, Merangin, 2023)

Officials are not merely bribed bystanders: provincial civil servants have been credibly reported as PETI financiers (imcnews.id, 2022), and at the national level JATAM (2023) documented alleged flows of approximately Rp 400 billion from illegal mining into 2024 election campaigns. Here capture operates not by hijacking working institutions but by keeping institutions absent, what Kolstad & Soreide (2009) describe as capture through patronage: informality is maintained because it pays the network that would otherwise have to regulate it. An ESDM official interviewed for this study confirmed that the implementing rules for people's mining management remained under preparation at the ministry (Interview, ESDM official, 2023), a pending status the APRI informant noted had already lasted through multiple missed deadlines.

3.3 Assessing Governance Resilience: A Four-Indicator Comparative Diagnosis 3.3.1 Policy Adaptive Capacity

The documentary record establishes the baseline: of 1,215 WPR designated nationally by April 2022, only 82 IPR had been issued by March 2024, a 6.7% conversion rate; in Bangka Belitung, the rate is 123:0 (Antara, 2024; ESDM, 2024). Meanwhile the implementing regulation was amended twice in two years (GR No. 25/2024; GR No. 39/2025), regulatory motion without implementation traction. Table 5 summarizes the regulatory instruments currently in force.

Table 5. Mining Regulations and Sanctions for Unlicensed Mining in Indonesia (Updated 2025)

Legal Instrument	Key Provisions	Implications for PETI/TI
Law No. 4/2009 as amended by Law No. 3/2020 & Law No. 2/2025 (Minerba Law)	Article 158: max. 5 years imprisonment and/or Rp 100 billion fine for unlicensed miners. Article 161: sanctions for those who store, process, or transport illegal mining products. Law No. 2/2025 does not change Articles 158-161.	Formal legal basis exists; enforcement remains weak and selective. Repeated changes are exploited to avoid compliance.
GR No. 96/2021 as amended by GR No. 25/2024 & GR No. 39/2025 (Mining Business Implementation)	Governs IPR and WPR mechanisms. GR No. 25/2024: deregulation. GR No. 39/2025: revised definitions and technical licensing provisions. Two amendments in two years.	**Regulatory instability. As of March 2024: IPR issued in Bangka Belitung = ZERO.**

Ministerial Decrees ESDM No. 116.K/2022 & No. 46.K/2023 + Presidential Reg. No. 25/2023 (WPR)	Designates 1,215 WPR across 19 provinces. Bangka Belitung: 123 WPR (8,568.35 ha). Jambi: 117 WPR (7,030.46 ha). National total: 66,593.18 ha.	**WPR designated since April 2022. As of March 2024: 82 IPR nationally, 0 in Bangka Belitung. Regulations exist; implementation does not.**

Sources: Law No. 2/2025; GR No. 39/2025; GR No. 25/2024; Ministerial Decrees ESDM 2022 & 2023; ESDM (2024); Antara (2024); Rahayu et al. (2025).

The two provinces fail this indicator through different mechanisms. In Bangka Belitung, the framework exists but does not adapt because its adaptation is calibrated to electoral cycles, as the legislator's testimony above shows ("whether there is any follow-up after the election, we do not know"). A practitioner-level corollary: one active tin miner, asked about WPR and IPR, replied simply, "Me? I only just heard of it" (Interview, TI practitioner, Bangka Belitung, 2023) a designation regime that does not reach its intended beneficiaries. In Jambi, the framework cannot adapt because its operational core was never built: as the APRI informant put it, the ministry-level rules on management, safety, and environmental standards for people's mining have not come out despite repeated promised deadlines (Interview, APRI representative, 2023). Comparatively: Bangka exhibits hijacked adaptation; Jambi exhibits absent adaptation. Both produce the same observable: a near-zero WPR-to-IPR conversion.

3.3.2 Enforcement Consistency

Enforcement in both provinces is monetized, selective, and temporally synchronized with political pressure. The Merangin deposit system quoted above (Rp 1 million monthly; raids announced in advance by protectors) finds its Bangka counterpart in the SPK/smelter arrangements through which production from outside designated areas enters legal channels unimpeded. Contextual-sector evidence reinforces the pattern's generality across Jambi's ASM economy:

> *"When there is a raid, the miners are already gone, because they have been told by their police protectors. The village receives standing incentives from every miner and equipment owner; if you do not pay, the village will not help you when you are caught."* (Contextual interview, sand-gravel miner, Batanghari, 2023)

> *"If someone from outside the district is caught, they go to prison; locals can usually still be saved."* (Contextual interview, oil-drilling practitioner, Batanghari, 2023)

Enforcement surges cluster around elections and central-government pressure before reverting to baseline (Katz-Lavigne et al., 2024; Ristiandy, 2023), the informal mining repression cycle described by Bansah et al. (2025), in which enforcement reproduces inequality rather than legality. Comparatively: in Jambi enforcement is privatized (sold per post); in Bangka it is absorbed (rendered unnecessary by laundering channels). Neither constitutes consistent enforcement; both are consistent with the prediction of Stigler (1971) that enforcement becomes a political instrument.

3.3.3 Institutional Autonomy from Elite Interests

The legislator's own framing, WPR as a device to "please the public" while "the ones who finance it stay the same", is direct testimony that the institution designing people's mining policy is not autonomous from the financiers of mining. The observer's account adds the executive dimension: WPR issued "to the smelters in that circle." In Jambi, autonomy fails at the administrative layer (permit "mafia" at the province; officials as financiers, per imcnews.id, 2022) and the political layer (campaign finance; JATAM, 2023). These findings instantiate, in two different institutional locations, what Saito-Jensen et al. (2010) showed for community-based schemes and Abdulai et al. (2025) for

national reform politics: formal participatory instruments do not by themselves dislodge elite control. Comparatively: in Bangka the captured node is legislative-corporate (vertical, formalized); in Jambi it is administrative-security (horizontal, informal).

3.3.4 Implementation Gap

The gap between regulatory objectives and field outcomes is the most quantifiable indicator. In Bangka Belitung: 64.12% of provincial land classified as critical (WALHI, 2020); mining concessions covering 1,007,372 of 1,642,400 total hectares, nearly half held by PT Timah; 12,607 unreclaimed pits (kolong) covering 15,579 hectares, despite reclamation obligations that remain largely unmet (Haryadi et al., 2023); 27 mining deaths and 20 injuries in 2021-2023, with drowned-pit victims overwhelmingly children and adolescents; and a tertiary-education gross participation rate of 18.19%, Indonesia's lowest, which the provincial environmental movement links to the extractive livelihood culture (WALHI, 2023). In Jambi: 52,059 hectares of PETI by 2024, a 376% expansion from the 2015 baseline, encroaching into Kerinci Sebelat National Park (KKI Warsi, 2024). Comparatively: Bangka's gap is cumulative-historical (a stock of damage: pits, critical land, human-capital erosion); Jambi's is accelerating-recent (a flow of rapid expansion). Both falsify any claim that existing regulation is achieving its environmental-protection objective.

Summary of 3.3. Across all four indicators, both governance systems failed but through systematically different mechanisms (Table 6, Section 3.4). In the terms of Section 1.2's definition: neither system maintains its regulatory functions under pressure, neither has recovered from capture, and neither has adapted except in directions that serve captured interests. This is governance resilience failure as an empirical finding, not an assumption.

3.4 Cross-Case Comparative Analysis: Different Mechanisms, Convergent Failure

Three comparative findings emerge that go beyond the vacuum-versus-hijacking distinction. *Finding 1, Equifinal capture.* The two provinces reach the same outcome (Quadrant IV failure; Section 3.5) through different causal pathways, equifinality in the comparative-politics sense. Bangka's pathway runs through functioning institutions whose purposes are redirected; Jambi's runs through institutions never operationalized. The policy implication is direct: instruments designed for one pathway will misfire on the other, which is precisely the observed fate of the uniform national WPR/IPR package (Benites & Ubillus, 2022; Donkor, 2025; McKay, 2025; Staerfeldt & Stacey, 2025). *Finding 2, Commodity-specific capture architecture.* The presence of a corporate anchor structures the shape of capture. Bangka's capture is vertical-formal: it travels the legal value chain (miner to CV/BUMDES to smelter to PT Timah to export) and is documented in price differentials and SPK arrangements. Jambi's capture is horizontal-informal: it travels through dispersed payment networks (miner to financier to police post to village government) with no formal node to audit. Vertical capture is, in principle, traceable through supply-chain regulation (Diprose et al., 2022); horizontal capture is not, it requires building formal nodes before transparency instruments can attach to anything. *Finding 3, Temporal asymmetry.* Bangka's capture is institutionalized: sedimented over a century of corporate-state tin extraction and deepened at each regulatory turn since 1998. Jambi's is situational: assembled within roughly a decade around a commodity-price shock. Institutionalized capture predicts slow, reform-resistant change requiring institutional surgery; situational capture is younger and may be more reversible through rapid livelihood diversification before networks consolidate (Anser et al., 2025; Pedersen et al., 2021).

These three findings are not independent observations but facets of one comparison, and Table 6 sets them side by side. It extends the analysis from the three headline findings to ten dimensions, from legal status and historical roots through capture mechanism and enforcement pattern to the differentiated policy needs each case implies, so that the two provinces can be read against one another point by point rather than in the abstract. Each row poses the same question to both cases; each cell reports the answer with its supporting evidence.

Table 6. Structural Comparison of PETI (Jambi) and TI (Bangka Belitung) across Ten Dimensions

#	Dimension	PETI — Jambi (Gold)	TI — Bangka Belitung (Tin)	Principal evidence
1	**Legal status**	Fully illegal; no effective formal pathway	Grey zone; fluid legal-illegal boundary via SPK/IPR	ESDM (2024); interviews
2	**Historical roots**	Traditional panning since 1728; mechanized recently	Industrial extraction since 18th century	Andaya (1993); Sulista & Rosyid (2022)
3	**Expansion trigger**	Situational: rubber-price collapse	Structural: colonial legacy + 1998 liberalization	Interviews; Ibrahim et al. (2022)
4	**Corporate anchor**	None	PT Timah + smelter network	Hockenberry (2021); interviews
5	**Capture mechanism**	System vacuum	System hijacking	Interviews (APRI; observer; legislator)
6	**Capture architecture**	Horizontal-informal payment networks	Vertical-formal value-chain integration	Interviews; Diprose et al. (2022)
7	**Enforcement pattern**	Privatized (per-post deposits; pre-announced raids)	Absorbed (laundering renders enforcement moot)	Interviews; Ristiandy (2023)
8	**Political-economic linkage**	Officials as financiers; administrative 'mafia'	Legislators' direct stakes; electoral WPR timing	imcnews.id (2022); JATAM (2023); interviews
9	**Implementation gap profile**	Accelerating flow: +376% area in 9 years	Cumulative stock: 64.12% critical land; 12,607 pits; 27 deaths	KKI Warsi (2024); WALHI (2020, 2023)
10	**Differentiated policy need**	Build formal nodes; rapid diversification; financier-targeted enforcement	Reform existing institutions; license transparency; supply-chain audit	Synthesis (Section 3.4)

Sources: Processed by authors, 2026.
Construction: dimensions derived from the cross-case theme matrix (analysis stage 4, Table 3); each cell is grounded in the primary or documentary source indicated.

Table 6 is constructed to be read as a causal chain rather than a checklist of differences. Its ten dimensions are ordered in three layers. Dimensions 1–4 record the structural conditions on which the two cases were selected to vary under the most-similar-systems design (legal status, historical

depth, expansion trigger, and corporate anchor); dimensions 5–8 record the capture mechanisms this study found empirically (mechanism, architecture, enforcement pattern, and political-economic linkage); dimensions 9–10 record the resulting outcome profiles and the policy needs that follow. Read column-wise, each province therefore presents an internally coherent configuration rather than a scatter of traits: in Jambi, the absence of a corporate anchor (row 4) leaves horizontal-informal networks as the only available architecture of capture (row 6), which manifests as privatized, per-post enforcement (row 7) and an accelerating spatial flow of degradation (row 9); in Bangka Belitung, the presence of PT Timah and the smelter chain (row 4) makes vertical-formal integration the dominant architecture (row 6), absorbs enforcement through laundering rather than bribery-per-raid (row 7), and leaves behind a cumulative stock of damage (row 9). The vacuum-versus-hijacking distinction is thus not a single point of difference but a syndrome that propagates consistently across every layer of the governance system.

Read row-wise, the table performs the discipline of structured, focused comparison (George & Bennett, 2005): the same analytical question is posed to both cases and answered with the sourced evidence indicated in the final column, which cross-references the interviews, documents, and spatial data from which each cell derives. Two functions follow. Analytically, the table demonstrates that the ten differences are mutually reinforcing rather than independent — which is precisely why a uniform national instrument such as the WPR/IPR package encounters two incompatible failure environments at once, a pattern consistent with cross-national evidence on politically contested ASM regulation (Diprose et al., 2022; Staerfeldt & Stacey, 2025). Practically, row 10 converts the comparison into differentiated intervention logics, providing the empirical bridge to the institutional implications elaborated in Section 4.1; any third case could, in principle, be placed against the same ten dimensions, which is the sense in which the table operates as a diagnostic instrument rather than a description of two provinces.

Taken together, the four-indicator assessment and the ten-dimension comparison tell a single story from two angles: the same governance failure, reached by two different roads. What remains is to show how, within each province, these strands do not merely coexist but feed one another, how dependency and capture close into a loop that keeps the system in place. It is to that self-reinforcing dynamic that we now turn.

3.5 Synthesis: The Governance Resilience Failure Cycle

The two dimensions, economic dependency (Section 3.1) and institutional capture (Section 3.2), interlock in a self-reinforcing cycle, visualized in Figure 3: mining rents finance political influence; influence keeps regulation ambiguous or unenforced; impunity sustains and expands extraction; expansion deepens community dependency; and dependency supplies both the electoral constituency and the revenue that renew elite incentives to preserve the status quo (Kansheba & Marobhe, 2022; Khan et al., 2024; Tatar et al., 2024).

If Figure 3 explains why the cycle persists, the remaining question is where each province sits within it, and whether two systems that fail for such different reasons can meaningfully be placed on the same map. Figure 4 attempts exactly that.



Construction: synthesized from the four failure themes (analysis stage 5, Table 3); arrows represent relationships attested in at least two independent data sources (interviews, FGDs, documents).

Figure 3. The Institutional Capture Cycle in ASM Governance in Bangka Belitung and Jambi. Source: Processed by authors, 2026.

Figure 4 positions both cases in the diagnostic matrix formed by the two structural axes. Both occupy Quadrant IV (high dependency combined with high capture), but, critically, with different profiles within it: Bangka Belitung as hijacking-type capture with colonial-historical onset; Jambi as vacuum-type capture with situational-recent onset. The matrix thereby functions as a comparative-diagnostic instrument rather than an illustration: position in the quadrant plus capture type plus temporal profile jointly indicate which policy mix a given case requires.

	LOW INSTITUTIONAL CAPTURE (Regulatory system relatively independent)	**HIGH INSTITUTIONAL CAPTURE (Regulatory system controlled by elites)**
LOW ECONOMIC DEPENDENCY (Diversification available)	QUADRANT I: Governance Resilient ASM formalization more likely to succeed; communities have alternatives. → Maintenance & monitoring	QUADRANT II: Fragile Governance Capture exists but communities have exit options; institutional reform may be effective. → Institutional reform
HIGH ECONOMIC DEPENDENCY (Mining = only option)	QUADRANT III: Structurally Trapped No capture but communities are trapped; urgent diversification needed. → Alternative livelihoods	**QUADRANT IV: GOVERNANCE RESILIENCE FAILURE TI-BABEL: hijacking-type capture, institutionalized-colonial onset (upper-right profile). PETI-JAMBI: vacuum-type capture, situational-recent onset (lower-right profile). Capture + dependency = self-reinforcing cycle; comprehensive, architecture-specific reform required.**

Construction: axes from the dual-lens framework (Section 2.3); case positioning from the four-indicator assessment (Section 3.3); capture-type and temporal-profile attributes from the cross-case analysis (Section 3.4). Although both cases occupy Quadrant IV, their profiles differ by mechanism and temporality, with different policy implications. The matrix is derived from two cases and is presented as a diagnostic starting point requiring validation in further contexts (Section 4).

Figure 4. Multi-Dimensional Diagnostic Matrix of Governance Resilience Failure in the ASM Context

Conclusion

This study set out with three open questions: how economic structures shape community dependence on extraction in Bangka Belitung and Jambi; how regulatory institutions function under the pressure of political-economic interests in each province; and to what extent ASM governance in the two cases exhibits resilience when assessed against four operational indicators. The evidence supports three conclusions.

First, on dependency: both provinces exhibit locked-in extraction economies, but with different geneses. Bangka Belitung's dependency is structural-historical, a colonial tin economy converted by post-1998 liberalization into a mass livelihood now integrated, through brokers, smelters, and work-order arrangements, into the formal industry itself. Jambi's dependency is situational-economic, a rapid livelihood shift triggered by the collapse of rubber prices, organized through informal capital with no corporate anchor. In both, communities occupy the bottom of the value chain, bearing physical, legal, and ecological risks while surplus flows upward — the centre-periphery pattern Dependency Theory predicts (Frank, 1969; Prebisch, 1950), here observed within single provinces.

Second, on institutional functioning: regulatory institutions in both provinces operate under documented influence from the interests they nominally regulate, but through two distinct mechanisms, the two faces of institutional capture that constitute this study's central empirical finding. In Bangka Belitung, capture works through the formal system: people's-mining designations timed to electoral cycles, permits issued into smelter circles, and informal production laundered into legal export channels. In Jambi, capture works through the absence of the formal system: implementing rules left unissued, permit processes obstructed at the administrative layer, and compliance replaced by monetized informal arrangements involving state actors. We present this two-faces distinction as a robust comparative finding within these two cases, and deliberately as an initial theoretical proposition; its deeper mechanisms, boundary conditions, and presence in other settings require further investigation before it can claim the status of a general theory of capture variation.

Third, on resilience: assessed against all four indicators—policy adaptive capacity (123 WPR, zero IPR in Bangka Belitung; ministry implementing rules unissued for Jambi's sector), enforcement consistency (monetized, selective, electorally timed), institutional autonomy (legislators and officials with documented stakes in mining continuity), and implementation gap (64.12% critical land, 12,607 unreclaimed pits, and 27 deaths in Bangka Belitung; 52,059 hectares and +376% expansion in Jambi)—both governance systems fail to maintain core regulatory functions, have not recovered from capture, and adapt only in directions that serve captured interests. Governance resilience failure is thus established here as an empirical conclusion derived from defined indicators, not an assumption of the research design.

The diagnostic matrix developed in Section 3.5 integrates these findings: both cases occupy the high-dependency/high-capture quadrant, but with different capture architectures (vertical-formal versus horizontal-informal) and different temporal profiles (institutionalized-colonial versus situational-recent). We emphasize the matrix's epistemic status candidly: it is derived from two cases in one country and one ASM policy regime. It is offered as a diagnostic starting point, a structured way of asking where a given ASM governance system sits and which intervention logic follows, not as a validated framework generalizable to other developing countries. Testing its utility across additional commodities, regions, and regulatory regimes is the study's principal future-research agenda, alongside process-tracing work on the micro-mechanisms of each capture face and longitudinal designs capable of observing whether situational capture consolidates into institutionalized capture over time.

4.1 Institutional and Governmental Implications

The two-faces finding carries differentiated implications, because instruments effective against one capture architecture are inert against the other.

The uniform WPR/IPR package has demonstrably failed in both capture environments, for different reasons; formalization policy should therefore be made architecture-sensitive. Completing and issuing the long-pending implementing rules for people's mining management is the necessary first step for vacuum-type contexts such as Jambi; no provincial actor can formalize miners into a framework that does not operationally exist. For hijacking-type contexts such as Bangka Belitung, the priority is not more designation but audit: transparent, publicly accessible registers linking each WPR/IPR to its beneficiaries, production volumes, and downstream buyers, so that designations can no longer silently service smelter circles.

In Bangka Belitung, the actionable lever is the existing formal chain: mandatory disclosure of SPK partnership arrangements, BUMDES mining contracts, and smelter sourcing, coupled with conflict-of-interest rules for legislators and officials with mining stakes. In Jambi, the actionable lever is economic: time-bound livelihood diversification programs targeted at the rubber-to-gold transition population, sequenced before enforcement escalation; enforcement that precedes alternatives merely raises the price of informality rather than breaking the informal cycle (Tingini, 2025), as the deposit system documented here shows.

In both provinces, enforcement aimed at miners is regressive and self-defeating; the empirically identified leverage points are upstream—financiers, equipment owners, and buying channels in Jambi; smelter sourcing and cross-regional people's-mining laundering in Bangka Belitung (Abdulai et al., 2025; Bansah et al., 2025).

The electoral timing of WPR designations and the documented campaign-finance flows make ASM governance an election-integrity issue, not only a resource-policy issue; election supervisory bodies and anti-corruption agencies have jurisdictionally distinct but complementary roles that this study's evidence base can inform.

4.2 Limitations

Beyond the methodological limitations detailed in Section 2.4—the modest number of core PETI operators, incomplete attendance documentation for the online FGD, and a six-site scope generalizable analytically rather than statistically—one substantive limitation deserves restatement: this study diagnoses capture mechanisms and resilience failure; it does not test interventions. The differentiated implications above are evidence-derived hypotheses about what should work, and their evaluation is a task for future research and, more importantly, for practice.

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Declaration of Competing Interest

The authors declare that they have no financial or personal conflicts of interest that could influence the results reported in this article.

Use of Artificial Intelligence (AI)-Assisted Technology

The research and original report were done independently and without the use of any artificial intelligence. AI-assisted technology (mendeley, NVivo12, Canva, opus 5) was used only in the article preparation phase to support data analysis. All text generation, interpretation, and manuscript drafting was strictly by human authors

Data Availability

Data that support the findings of this study are available from the corresponding author upon reasonable request.

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