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**\*Corresponding author**

Loso Judijanto, IPOSS Jakarta, Indonesia

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# The Land Tenure Dualism Narrative in Indonesia and Its Implications for Oil Palm Sustainability: A Review

Loso Judijanto\*

IPOSS Jakarta, Indonesia

**Abstract**

Indonesia's oil palm sector faces persistent sustainability challenges rooted in structural land tenure dualism. This qualitative literature review examines the narrative of land tenure dualism in Indonesia and explores its implications for oil palm sustainability. Drawing on more than 50 sources from reputable journals, mainly 2020 to 2026 issues, government reports, and international publications, this study identifies a fundamental institutional contradiction between the Basic Agrarian Law (UUPA 1960), which emphasizes agrarian reform and social functions of land, and forestry legislation (Law 41/1999), which prioritizes state forest claims covering two-thirds of Indonesia's terrestrial area. This dualism manifests in legal contradictions, institutional fragmentation, spatial misallocation, and chronic agrarian conflicts. The analysis reveals that tenure insecurity is the primary structural barrier to sustainability certification, particularly for smallholders, who manage 42% of oil palm-planted areas. Land-banking speculation on 8.8 million hectares of cleared yet idle land further undermines sustainability governance. Despite progressive judicial interventions and mandatory Indonesian Sustainable Palm Oil (ISPO) certification, implementation gaps persist due to institutional incoherence. The study proposes policy pathways integrating agrarian justice with sustainability governance, including legal harmonization, institutional restructuring, accelerated smallholder land certification, and genuine participatory spatial planning. This research helps bridge the gap in the literature between the political economy of land tenure and oil palm sustainability, offering evidence-based recommendations for policymakers, industry, and civil society.

**JEL Classification:** Q15 (Land Ownership and Tenure; Land Reform), Q18 (Agricultural Policy; Food Policy), Q23 (Forestry), Q28 (Government Policy), Q56 (Sustainability).

**Introduction****Background: Historical context of land governance in Indonesia**

Indonesia's contemporary land governance system bears the imprint of colonial legacies, post-independence agrarian reform aspirations, and subsequent sectoral policy shifts, creating persistent institutional tensions. The colonial *domeinverklaring* doctrine established the foundation for state appropriation of land, asserting that all land not subject to individual ownership belonged to the state. This legal framework facilitated large-scale resource extraction while marginalizing customary (*adat*) rights and community-based land tenure systems [1].

Following independence, the Basic Agrarian Law (UUPA) of 1960 represented a progressive departure from colonial land relations, emphasizing the social function of

land, equitable distribution, and recognition of customary rights. Article 33(3) of the 1945 Constitution provided the normative foundation, stipulating that land, water, and natural resources are controlled by the state and utilized for the greatest prosperity of the people. However, the enactment of the Forestry Law in 1967 (subsequently revised as Law 41/1999) introduced a parallel governance pathway that effectively revitalized elements of *domeinverklaring* through administrative designation of forest areas (*kawasan hutan*). This created what Peluso termed "adverse formalization"—the use of formal legal mechanisms to legitimate state and corporate control over land while postponing recognition of pre-existing rights [2-4].

### The phenomenon of land tenure dualism

Contemporary Indonesian land governance operates through two parallel and often contradictory pathways. The first pathway, embodied in UUPA 1960, prioritizes agrarian reform, recognizes the social function of land, and affirms customary rights. The second pathway, institutionalized through forestry legislation, enables the Ministry of Environment and Forestry to unilaterally designate forest areas, centralize authority, and postpone recognition of community land rights. This institutional dualism has produced striking spatial consequences: approximately two-thirds of Indonesia's terrestrial area ( $\pm 120$  million hectares) is designated as state forest area, yet the forestry sector contributes less than 1% to national GDP. Meanwhile, the remaining one-third of non-forest land generates over 99% of economic activity, revealing a fundamental structural misallocation. The Constitutional Court has attempted to address this imbalance through landmark decisions. In Decision No. 3/PUU-VIII/2010, the Court established four benchmarks for "the greatest prosperity of the people" mandated by Article 33: tangible benefits for people, equitable distribution of benefits, meaningful participation, and respect for pre-existing rights. Subsequently, Decision No. 35/PUU-X/2012 ruled that customary forests (*hutan adat*) constitute rights-based forests rather than state forests, fundamentally challenging the legal basis for extensive state forest claims. However, implementation of these progressive rulings has been slow and constrained by bureaucratic resistance and institutional path dependencies [5].

### Oil palm in Indonesia's political economy of land

Oil palm occupies a strategically significant position in Indonesia's agrarian political economy. As the world's largest producer, Indonesia manages approximately 16 million hectares of oil palm plantations, contributing 11.3% of total national exports. The sector's land distribution reflects broader patterns of agrarian inequality: 54% controlled by large private companies, 42% by smallholder farmers, and 4% by state-owned enterprises. Projections indicate that by 2030, smallholders will manage 60%

of total oil palm area, underscoring the critical importance of smallholder inclusion in sustainability governance [6].

However, oil palm expansion has been the single largest contributor to agrarian conflicts in Indonesia. In 2020 alone, 101 conflicts related to oil palm plantations were documented, involving 11 deaths, 19 cases of physical violence, and 134 criminalization incidents. By 2018, oil palm conflicts affected 204,135 hectares of land. These conflicts are not incidental but structural, arising from overlapping land claims, inadequate Free, Prior, and Informed Consent (FPIC) mechanisms, and the fundamental tenure dualism described above. As it has been emphasized, land conflicts in Indonesia are systemic outcomes of institutional design rather than implementation anomalies [7].

### Research urgency and knowledge gap

The nexus between land tenure dualism and oil palm sustainability remains underexplored in academic literature. While extensive research examines oil palm deforestation, certification challenges, or agrarian conflicts separately, few studies systematically integrate these dimensions through the lens of political economy and institutional analysis. Three critical gaps warrant attention. First, tenure insecurity constitutes the primary structural barrier to sustainability certification, particularly for smallholders. Approximately 25% of smallholder oil palm land is located within state forest areas without legal documentation. This renders farmers ineligible for Indonesian Sustainable Palm Oil (ISPO) or Roundtable on Sustainable Palm Oil (RSPO) certification, excluding them from premium markets and sustainability programs [8].

Second, land banking and speculation have emerged as significant drivers of deforestation without productive outcomes. Research indicates that 8.8 million hectares of cleared land remain idle, with 54% cleared mechanically rather than by fire—suggesting deliberate land banking strategies. Notably, 73.1% of this idle land is located in topographically suitable areas for oil palm development, and the majority eventually converts to plantations [9].

Third, despite progressive policy commitments—including mandatory ISPO certification since 2020, the palm oil moratorium (2018-present), and National Determined Contribution (NDC) pledges—implementation gaps persist due to institutional incoherence and contradictory incentives. For instance, while maintaining the palm oil moratorium, the government announced plans to open 600,000 hectares of new land for plantations in 2026 [10].



## Research objectives

This study pursues four specific objectives:

- a) to identify the historical roots and contemporary manifestations of land tenure dualism in Indonesia;
- b) to analyze how tenure dualism affects oil palm sustainability governance
- c) to evaluate the implications of land tenure dualism for certification systems, agrarian conflicts, and sustainability practices
- d) to formulate evidence-based policy recommendations for addressing tenure dualism within the framework of oil palm sustainability.

## Literature Review

### Conceptual and theoretical foundations

#### Political economy of land tenure

Political economy approaches to land tenure examine how power relations, institutional arrangements, and distributional struggles shape resource access and control. Article 33(3) of Indonesia's 1945 Constitution establishes the principle of hak menguasai negara (state's right to control), positioning the state as the supreme authority over natural resources for the people's welfare. However, interpretations of this constitutional mandate have varied significantly across policy domains and historical periods [11].

Suparto (2020) argues that the state's right to control should be understood as a trust relationship—the state exercises control on behalf of the people rather than possessing absolute ownership. This interpretation aligns with the Constitutional Court's rulings emphasizing that resource governance must demonstrably serve the greatest prosperity of the people through tangible benefits, equitable distribution, meaningful participation, and respect for pre-existing rights. Yet in practice, sectoral legislation often narrows this constitutional mandate, prioritizing administrative efficiency and state authority over participatory governance and rights recognition [12,13].

#### Dualism in tenure systems

Peluso et al. (2022) introduced the concept of "adverse formalization" to describe governance processes that use formal legal mechanisms to legitimate resource appropriation while postponing or denying recognition of customary and community rights. This framework illuminates Indonesia's dual pathways in land governance. The UUPA 1960 pathway emphasizes agrarian reform, equitable distribution, and the recognition of customary rights. Conversely, the forestry law pathway prioritizes state forest territorialization, enabling ministerial designation of vast forest areas with limited community participation or recognition of rights [12,14-16].

Legal pluralism theory further contextualizes this dualism, recognizing that multiple legal orders—customary law (hukum adat), national agrarian law, and forestry law—coexist and often conflict. Over 4,000 villages are located within designated state forest areas without formal tenure recognition. This spatial overlap generates chronic conflicts as different legal frameworks provide contradictory answers to fundamental questions of land rights and authority [17].

#### Oil palm sustainability: Multi-dimensional governance

Oil palm sustainability encompasses economic viability, social equity, and environmental stewardship—the triple bottom line framework. Certification systems represent key governance mechanisms. RSPO, established in 2004 as a voluntary global standard, has achieved limited smallholder adoption; only 6% of contract smallholder areas are certified. ISPO, introduced in 2011 and made mandatory through Presidential Regulation 44/2020, requires all plantations—including smallholders—to achieve certification by 2025 [18].

Environmental dimensions include deforestation prevention, peat land protection, and greenhouse gas emission reduction aligned with Indonesia's NDC commitments. Indonesia achieved an 82% reduction in oil palm-related deforestation between 2008-2012 and 2018-2020, from 227,000 hectares annually to 45,285 hectares. However, deforestation increased again in 2023, with approximately 30,000 hectares cleared, one-third on peat lands. This volatility reflects the ongoing tension between sustainability commitments and expansion pressures driven by biodiesel mandates and economic growth imperatives [19].

#### Land Tenure Dualism: Structural manifestations

##### Legal and constitutional dualism

The normative contradiction between UUPA 1960 and Forestry Law 41/1999 constitutes the foundation of Indonesia's tenure dualism. UUPA establishes land's social function, prioritizes equitable distribution, and recognizes customary rights as legitimate tenure forms. Article 5 explicitly states that agrarian law is based on customary law, provided it does not contradict national interests and socialism principles. This progressive framework aimed to dismantle colonial land relations and establish indigenous Indonesian land tenure principles [1].

However, the Forestry Law pathway effectively bypassed UUPA's progressive vision. Law 5/1967 and its successor Law 41/1999 granted the Ministry of Forestry extensive authority to designate forest areas through administrative procedures, without requiring equivalent recognition of pre-existing rights or participatory validation. As it has been emphasized, this created a situation

where "UUPA was not cancelled but outmaneuvered" (ditelikung). The Constitutional Court's Decision No. 3/PUU-VIII/2010 attempted to reassert constitutional principles by establishing four benchmarks for legitimate resource governance, yet practical implementation remains limited [20].

### **Institutional fragmentation and sectorial bias**

Institutional dualism mirrors legal contradictions. The National Land Agency (BPN/ATR) oversees agrarian matters and land titling based on UUPA principles. At the same time, the Ministry of Environment and Forestry (KLHK) oversees forest area designation and permits in the forestry sector. The Ministry of Agriculture manages plantation permits, creating a tripartite institutional landscape with overlapping jurisdictions and limited coordination [21].

A particularly critical issue is sectoral bias in the designation of forest areas. As it has been highlighted, "designating forest areas simultaneously designates non-forest areas," yet this determination is made unilaterally by the forestry ministry rather than through cross-sectorial government processes. Government Regulation No. 23/2021, Article 14, further consolidated this sectorial authority, effectively "bypassing" the spirit of Law 41/1999's multi-stakeholder governance. This institutional design creates perverse incentives: the forestry ministry benefits from extensive forest claims regardless of actual forest cover or economic productivity, while other sectors and communities bear the costs of restricted land access.

### **Spatial misallocation**

The spatial manifestation of tenure dualism is striking. Approximately 120 million hectares—two-thirds of Indonesia's terrestrial area—is designated as state forest area (kawasan hutan), yet the forestry sector contributes less than 1% to national GDP. Within these forest areas, approximately 15 million hectares consist of shrubland (semak belukar) with no forest cover. Government rehabilitation capacity is only 30,000 hectares annually; at 100% success rates, complete rehabilitation would require 500 years. Empirical evidence shows rehabilitation success rates far below 100%, suggesting these lands will remain ecologically and economically unproductive indefinitely under current policy frameworks. This represents a fundamental structural misallocation. Meanwhile, one-third of the land outside forest areas supports over 99% of national economic activity, creating intense pressure on limited productive land. Recent research by Wibowo et al. (2024) found that 8.8 million hectares of cleared land in Indonesia remains idle, with 44% unused for over five years. Significantly, 73.1% of this idle land is located in topographically suitable areas for oil palm cultivation. This pattern suggests that land banking—clearing land to establish

speculative claims without immediate productive use—has become a strategic practice within the oil palm sector [22].

### **Tenure dualism: Formal vs customary/community rights**

Legal pluralism manifests practically in conflicts between state-recognized formal tenure and customary (adat) or community-based tenure systems. Over 4,000 villages are located within designated state forest areas, their residents lacking formal land rights despite often centuries-long occupation and resource management. The Constitutional Court's landmark Decision No. 35/PUU-X/2012 ruled that customary forests constitute rights-based forests (hutan hak) rather than state forests (hutan negara), potentially affecting up to 40 million hectares [23].

However, operationalizing this decision has proven challenging. As of 2023, only a limited number of hectares of customary forests had received formal recognition through a complex bureaucratic process that requires a ministerial decree. Social Forestry programs (including Community Forestry/Hutan Kemasyarakatan, Village Forests/Hutan Desa, and Community Plantation Forests/Hutan Tanaman Rakyat) granted rights to 4.15 million hectares by 2020, far short of the 12.7 million-hectare target. Moreover, Social Forestry provides partial management rights rather than ownership, leaving fundamental questions of land sovereignty unresolved [24].

### **Oil palm sustainability in Indonesian context**

#### **Production dynamics and expansion patterns**

Indonesia's oil palm sector has experienced remarkable growth, expanding from approximately 100,000 hectares in the 1970s to 16 million hectares by 2025. This expansion concentrated in Sumatra (experiencing 48.8% primary forest loss 1990-2020) and Kalimantan (32.2% primary forest loss). Smallholders have become increasingly significant, managing 42% of total oil palm area as of 2023, with projections indicating 60% smallholder control by 2030. However, smallholder productivity has declined from over 4 tons per hectare in 2020 to 3.8 tons per hectare currently, reflecting aging plantations and limited access to replanting programs [25].

The government announced plans to open an additional 600,000 hectares for oil palm in 2026, despite maintaining the palm oil moratorium nominally in effect since 2018. This apparent contradiction reflects competing policy objectives: meeting biodiesel mandates (B30 program requiring substantial palm oil volumes), supporting economic growth and rural livelihoods, and maintaining sustainability commitments [26].

## Sustainability governance: Certification and policy frameworks

ISPO certification became mandatory for all oil palm plantations through Presidential Regulation 44/2020, with smallholders required to achieve certification by 2025. This represents a fundamental shift from voluntary to regulatory approaches, potentially affecting 2.5 million smallholder families. However, implementation faces substantial challenges. Smallholders encounter high certification costs, complex procedures, inadequate extension services, and—critically—tenure insecurity [27].

It has been found that independent smallholders and contract smallholders participate unequally in sustainability certification, with only 6% of contract smallholder areas RSPO-certified despite theoretically greater support from plasma schemes. Tenure insecurity emerged as a fundamental barrier: approximately 25% of smallholder oil palm land is located within state forest areas without legal documentation, rendering farmers ineligible for certification regardless of their environmental practices [8,28].

The National Action Plan for Sustainable Palm Oil (NAP SPO), launched in 2019, established a multi-stakeholder coordination framework involving government, industry, civil society, and international partners. However, institutional fragmentation continues to undermine implementation effectiveness. A 2024 UNDP evaluation found that coordination mechanisms remain weak, with different ministries pursuing conflicting objectives and limited budget allocation for sustainability programs [29].

## Deforestation dynamics and zero-deforestation commitments

Indonesia achieved significant deforestation reductions in the oil palm sector between 2008-2020, with annual deforestation declining 82% from 227,000 hectares to 45,285 hectares. This resulted from multiple factors: the permanent forest moratorium (2011-present) protecting primary forests and peat lands, the palm oil moratorium (2018-present) freezing new permits, corporate No Deforestation, No Peat, No Exploitation (NDPE) commitments, and enhanced monitoring systems [30].

However, Chain Reaction Research (2024) documented a resurgence of oil palm deforestation in 2023, with approximately 30,000 hectares cleared, one-third of which occurred on peat lands. This increase coincided with rising crude palm oil (CPO) prices and government pressure to expand production for biodiesel mandates. Additionally, the implementation of the EU Deforestation Regulation (EUDR) in December 2024 created new compliance pressures for Indonesian exporters, requiring verified deforestation-free supply chains [31].

The land banking phenomenon represents a particularly concerning dimension. Wibowo et al. (2024) identified 8.8 million hectares of cleared but idle land in Indonesia, with 54% cleared mechanically rather than by fire. Mechanical clearing indicates deliberate human action rather than accidental forest fires, suggesting strategic land claiming. The majority of this idle land eventually converts to oil palm plantations, revealing that deforestation precedes actual plantation establishment by years or decades—a pattern that complicates monitoring and enforcement [9].

## Smallholder dilemmas and inclusion challenges

Smallholders, who manage 42% of Indonesia's oil palm area, face multiple interconnected challenges. First, the productivity decline—from over 4 tons per hectare to 3.8 tons currently—reflects aging plantations that require replanting. However, government replanting programs achieved only 400,000 hectares against a 2.5-million-hectare target, limited by budget constraints and complex procedures [32].

Second, tenure insecurity excludes many smallholders from sustainability certification and premium markets. As noted, 25% of smallholder land is located within forest areas without legal title. Even smallholders with land outside forest areas often lack complete documentation due to complex and costly land certification processes. This creates a perverse outcome: smallholders practicing environmentally sound cultivation may be ineligible for certification due to tenure documentation gaps unrelated to their environmental practices [33].

Third, plasma schemes—supposedly beneficial partnerships between companies and smallholders—often feature asymmetric power relations and benefit distribution. It has been found that plasma arrangements frequently perpetuate dependency rather than enabling smallholder autonomy, with companies controlling input supply, technical assistance, and product marketing. This structural dependency constrains smallholder agency in adopting independent sustainability practices or accessing alternative markets [34].

## Methodology

### Research design: Qualitative literature review approach

This study employs a qualitative literature review (QLR) methodology to examine the narrative of land tenure dualism and its implications for oil palm sustainability in Indonesia. QLR differs fundamentally from systematic literature review (SLR) in its approach to literature search, selection, and synthesis. While SLR follows strictly defined protocols such as PRISMA with predetermined search strings and explicit inclusion/exclusion

criteria applied uniformly, QLR embraces interpretive flexibility, allowing researchers to pursue emergent themes and adapt search strategies based on preliminary findings [35].

QLR proves particularly appropriate for this research for several reasons. First, the research question addresses complex political-economic narratives and institutional dynamics rather than testing specific causal hypotheses amenable to quantitative meta-analysis. Second, relevant literature spans multiple disciplines—law, political science, geography, development studies, and environmental science—requiring integrative synthesis across diverse epistemological traditions. Third, QLR's narrative synthesis approach enables identification of patterns, contradictions, and causal relationships within policy discourse and institutional practices [36,37].

### Literature search strategy and source selection

Literature identification proceeded through iterative searches across multiple databases and source types. Academic databases included Scopus, Web of Science, and Google Scholar, prioritizing peer-reviewed journal articles indexed in reputable databases. Government sources encompassed legislative documents (UUPA 1960, Forestry Law 41/1999, Presidential Regulation 44/2020), Constitutional Court decisions (No. 3/PUU-VIII/2010; No. 35/PUU-X/2012), ministry reports from KLHK, BPN/ATR, and Ministry of Agriculture, and policy documents including the National Action Plan for Sustainable Palm Oil. International organization publications provided additional perspectives, including World Resources Institute (WRI) Indonesia reports on degraded land and palm oil, CIFOR-ICRAF working papers on forest tenure reform, UNDP evaluations of sustainability initiatives, Chain Reaction Research monitoring reports, and RSPO impact studies. Civil society reports from organizations such as Konsorsium Pembaruan Agraria (KPA), Aliansi Masyarakat Adat Nusantara (AMAN), Forest Watch Indonesia (FWI), and Greenpeace provided critical perspectives on agrarian conflicts and implementation gaps [38].

### Inclusion criteria specified

- a) publication years 2020-2026 for primary empirical research and policy analysis
- b) seminal pre-2020 publications for historical context (e.g., UUPA 1960, foundational Constitutional Court decisions)
- c) geographic focus on Indonesia
- d) thematic relevance to land tenure, political economy, agrarian conflicts, oil palm, sustainability governance, or certification systems
- e) English or Indonesian language

### Exclusion criteria specified

- a) studies from other countries without comparative relevance to Indonesia
- b) non-peer-reviewed sources except official government documents and reputable organization reports
- c) purely technical agronomic studies without governance dimensions.

Search terms included combinations such as: "land tenure dualism Indonesia," "political economy land Indonesia," "agrarian conflict Indonesia," "oil palm sustainability Indonesia," "ISPO certification," "RSPO smallholder," "forest governance Indonesia," "kawasan hutan," "customary rights Indonesia," "deforestation palm oil," "land banking Indonesia," "smallholder certification barriers," and "tenure security oil palm."

### Data analysis process

Analysis proceeded through four iterative phases.

- a) **Phase 1** involved literature collection and initial screening based on title and abstract review, yielding approximately 150 potentially relevant sources.
- b) **Phase 2** entailed close reading of full texts and thematic data extraction using a preliminary coding framework derived from the research questions: land tenure dualism dimensions (legal, institutional, spatial, social), sustainability governance mechanisms, agrarian conflict patterns, and policy initiatives.
- c) **Phase 3** applied systematic coding procedures. Open coding identified initial concepts and patterns within individual sources. Axial coding established relationships between concepts, grouping them into broader thematic categories (e.g., linking tenure insecurity, certification barriers, and smallholder exclusion as interconnected phenomena). Selective coding integrated these categories into overarching analytical narratives addressing the research objectives [39].
- d) **Phase 4** synthesized findings through narrative synthesis, identifying causal pathways, contradictions, and patterns across the literature. This involved mapping the multiple manifestations of tenure dualism, tracing causal chains from institutional design through implementation outcomes, and identifying contradictions between policy rhetoric and empirical realities.

### Analytical Framework and Validity

The analytical framework integrated political economy perspectives on resource governance with institutional analysis examining formal rules, organizational structures, and enforcement mechanisms. This lens proved essential for understanding how power relations, vested interests, and path dependencies shape land governance outcomes despite progressive policy intentions [40].



Validity and trustworthiness were pursued through several strategies. Source triangulation compared findings across academic, government, civil society, and industry sources to identify convergent and divergent perspectives. Cross-validation checked consistency of specific claims (e.g., deforestation statistics, conflict frequency) across multiple independent sources. Reflexivity acknowledges the researcher's interpretive role and potential biases, recognizing that narrative synthesis inevitably involves subjective judgments in weighing contradictory evidence and constructing coherent accounts. Audit trail documentation maintained transparent records of literature search processes, coding decisions, and analytical interpretations, enabling external scrutiny [41].

### Methodological limitations

QLR's inherent flexibility, while appropriate for complex policy research, introduces potential limitations. Unlike SLR's replicable protocols, QLR relies on the researcher's judgment in selecting the literature, which can introduce selection bias. To mitigate this, the study deliberately included diverse source types and perspectives, avoiding over-reliance on any single literature stream. Additionally, QLR depends on the quality and availability of published literature; gaps in empirical research on certain dimensions (e.g., regional variations in the manifestations of tenure dualism across Indonesia's diverse provinces) constrain analytical depth. Finally, the focus on Indonesian-language and English-language sources may exclude relevant insights from other languages, though these constitute the primary academic and policy discourse languages in Indonesia.

### Findings: Thematic analysis

#### Manifestations of land tenure dualism

#### Constitutional and legal contradictions

The Constitutional Court has emerged as a critical institutional actor attempting to reconcile tenure dualism through jurisprudence. Decision No. 3/PUU-VIII/2010 established that Article 33(3)'s mandate for "the greatest prosperity of the people" requires four demonstrable outcomes: tangible benefits reaching communities, equitable distribution of benefits, meaningful public participation in decision-making, and respect for pre-existing rights. The Court emphasized that without the fourth criterion - respect for pre-existing rights - Article 33 devolves into mere political rhetoric rather than an enforceable constitutional principle [12].

Subsequently, Decision No. 35/PUU-X/2012 fundamentally challenged state forest territorialization by ruling that customary

forests constitute rights-based forests (hutan hak) rather than state forests (hutan negara). This decision potentially affects approximately 40 million hectares and represents the most significant legal victory for indigenous peoples in Indonesia's post-independence history. However, implementation remains constrained. Formal recognition requires village-level spatial planning, documentation of customary law, and a ministerial decree - bureaucratic requirements that few communities can navigate without external support. As of 2023, formal customary forest recognition covered only a small fraction of potentially eligible areas [42].

Arizona (2024) analyzes the Constitutional Court's role as a "corrective mechanism" addressing adverse formalization in forest governance. The Court's decisions reassert constitutional principles against sectoral legislation that narrowed them. However, Arizona notes that judicial victories alone cannot overcome institutional path dependencies and political-economic interests vested in existing arrangements. The gap between de jure constitutional principles and de facto implementation persists [5].

#### Institutional fragmentation

Institutional dualism produces chronic coordination failures. BPN/ATR oversees land titling and agrarian matters based on UUPA principles, KLHK controls forest area designation and forestry permits, and the Ministry of Agriculture manages plantation licenses. Each institution operates according to distinct legal frameworks with different priorities, creating what termed "confusion between cross-sectoral state decisions and sectoral forestry interests" [21].

A critical institutional flaw lies in forest area designation processes. Government Regulation No. 23/2021, Article 14, grants the Environment and Forestry Minister authority to designate forest areas, effectively consolidating what should be a cross-sectorial government decision into single-ministry control. As it has been emphasized, "designating forest areas simultaneously designates non-forest areas," making this a land allocation decision affecting all sectors, not merely forestry management. This sectoral bias creates perverse incentives: it benefits bureaucratically and budgetarily from extensive forest claims regardless of actual forest conditions or economic opportunity costs [43-46].

Recent policy initiatives acknowledge coordination challenges. The National Action Plan for Sustainable Palm Oil (NAP SPO) established multi-stakeholder coordination mechanisms involving government, industry, civil society, and international partners. However, UNDP's 2024 evaluation found that coordination remains weak, with limited high-level political commitment,

insufficient budget allocation, and persistent institutional silos. The One Map Policy initiative, intended to create integrated spatial data resolving overlapping claims, has achieved technical progress but faces political obstacles in reconciling conflicting institutional interests [47].

### Spatial misallocation and idle land

Spatial analysis reveals striking inefficiencies. Two-thirds of Indonesia's terrestrial area is designated as state forest, yet forestry contributes less than 1% to GDP. Within forest areas, 15 million hectares are shrubland with no forest cover; rehabilitation capacity is only 30,000 hectares annually, and empirical evidence shows rehabilitation success rates far below 100%. This suggests these lands will remain ecologically and economically unproductive indefinitely under current frameworks, representing massive foregone economic and social welfare. Meanwhile, it has been identified that 8.8 million hectares of cleared but idle land with 44% unused for over five years. Significantly, 54% was cleared mechanically rather than by fire, indicating deliberate human action establishing land claims. Spatial analysis shows that 73.1% of idle land is located in topographically suitable areas for oil palm, and longitudinal tracking reveals that most eventually convert to oil palm plantations. This pattern indicates that land banking has become a strategic practice: clearing land to establish speculative claims without immediate productive use, holding it idle during price fluctuations or permit processing, and then developing plantations when conditions are optimal [22,48].

This phenomenon represents multiple sustainability failures. First, deforestation occurs years before productive plantation establishment, creating temporal gaps that complicate monitoring and enforcement. Second, idle periods generate no economic benefits, no employment, and no social value while imposing environmental costs. Third, land banking incentivizes continued forest conversion despite existing cleared land availability—a structural driver of unnecessary deforestation [9].

### Formal vs. customary tenure systems

Legal pluralism manifests practically in over 4,000 villages located within designated state forest areas, their residents lacking formal land rights despite often multi-generational occupation. Social Forestry programs represent government's primary response, granting partial management rights through Community Forestry (HKm), Village Forests (HD), and Community Plantation Forests (HTR) schemes. By 2020, 4.15 million hectares were allocated under Social Forestry, falling far short of the 12.7 million-hectare target. However, Social Forestry provides use rights rather than ownership, and permits remain conditional on compliance with often-complex forest management plans

requiring technical capacity many communities lack. Kusuma et al. (2023) identify "emergent institutional issues" in Social Forestry implementation: community capacity limitations, inadequate extension support, insufficient budget allocation for facilitation, and contradictions between community livelihoods needs and forest conservation requirements. Consequently, Social Forestry has not fundamentally resolved tenure insecurity; it has created a new category of conditional, partial rights that leave deeper questions of land sovereignty unaddressed [49].

### Agrarian conflicts: Scale, patterns, and structural causes

#### Conflict prevalence and characteristics

Agrarian conflicts represent a persistent and extensive phenomenon. Between 2013 and 2018, 2,612 agrarian conflict cases were documented, affecting over 7.1 million hectares. Conflicts in the forestry sector, while representing only 5-8% of total cases, accounted for 24% of affected land area—263,269 hectares annually—indicating conflicts in this sector tend to be larger in scale [34].

Oil palm plantations have consistently emerged as the single largest source of agrarian conflicts. In 2020, 101 oil palm-related conflicts were documented, involving 11 deaths, 19 cases of physical violence, and 134 criminalization incidents. By 2018, oil palm conflicts affected 204,135 hectares. Chain Reaction Research characterized oil palm as a "land-hungry" industry with a significant "social footprint," noting that conflicts disproportionately affect indigenous communities and smallholders with weak tenure documentation [7].

It has been analyzed that palm oil conflicts in Sumatra through the lens of autonomy and agrarian law, finding that conflicts arise at the intersection of incomplete land titling, overlapping concession permits, inadequate FPIC implementation, and power asymmetries between corporations and communities. Conflicts are not random or incidental but are systematically structured by institutional arrangements that privilege corporate access while postponing the recognition of community rights [34].

### Structural causes

As it has been emphasized, land conflicts in Indonesia are structural rather than incidental, arising from institutional design rather than implementation failures. Three structural factors are particularly significant. First, legal design postpones recognition of pre-existing rights. Both forestry legislation and plantation licensing procedures prioritize administrative claims and permits over the demonstration of respect for existing community land use and ownership. This inverts the Constitutional Court's fourth benchmark—rather than starting from respect for existing rights,

the system starts from administrative authority and treats existing rights as exceptions requiring proof [5].

Second, institutional arrangements create sectoral bias in favor of state and corporate claims. KLHK's authority to unilaterally designate forest areas, combined with inadequate inter-ministerial coordination, enables extensive state forest claims that overlap with community lands. Similarly, plantation permit processes often lack robust spatial verification to identify existing settlements, farms, or customary territories. Companies acquire permits through administrative channels, then confront communities claiming the same land based on multi-generational use, setting up inevitable conflicts [40].

Third, enforcement asymmetries favor corporations over communities. When conflicts arise, communities resisting corporate encroachment frequently face criminalization through trespassing or theft charges, while corporate documentation violations rarely result in permit revocation. In 2020, 134 community members were criminalized in oil palm conflicts, while a few companies faced equivalent legal consequences. This enforcement asymmetry reflects and reproduces power inequalities embedded in tenure dualism [7].

### Implications for oil palm sustainability

#### Tenure insecurity as certification barrier

Tenure insecurity constitutes the primary structural impediment to sustainability certification for smallholders. ISPO and RSPO standards both require documented legal land rights as a baseline criterion. Farmers lacking formal land certificates are ineligible regardless of their environmental practices. It has been found that approximately 25% of smallholder oil palm land is located within state forest areas without legal documentation. Even outside forest areas, many smallholders lack complete land certificates due to complex and costly titling processes [8].

This creates perverse outcomes. Environmentally responsible farmers practicing zero-burning land clearing, maintaining riparian buffers, or protecting biodiversity may be excluded from certification and premium markets solely due to gaps in tenure documentation unrelated to their sustainability practices. Meanwhile, large companies with complete permits but questionable environmental practices can more easily achieve certification. The certification system thus inadvertently reinforces existing inequalities rather than rewarding actual sustainability performance [50-52].

Acceleration of smallholder ISPO certification faces substantial obstacles. With over 2.5 million smallholder families required to achieve certification by 2025, and many lacking prerequisite land documentation, extension services, and financial resources, mass certification within this timeframe appears unrealistic. In a research on certification acceleration in Riau Province, it has been found that certification procedures remain prohibitively complex for independent smallholders, requiring documentation and technical knowledge that necessitate external facilitation [50,53]. Without substantial government investment in support services and tenure regularization, mandatory ISPO requirements risk excluding smallholders from formal supply chains rather than promoting sustainability adoption [54].

#### Land banking and deforestation without productivity

The land banking phenomenon reveals a troubling dimension of oil palm expansion. Wibowo et al.'s (2024) finding that 8.8 million hectares of cleared land remains idle, with 54% cleared mechanically indicates deliberate speculative land claiming. This practice undermines sustainability governance in multiple ways [22].

First, it decouples deforestation from immediate productive use, creating temporal gaps that obscure responsibility. Companies or speculators clear the forest, let the land sit idle during permit processing or market conditions, then develop plantations years later—potentially after ownership transfers. Monitoring systems focused on forest clearing may overlook that cleared land remains unproductive for extended periods, while systems focused on plantation establishment may overlook that deforestation occurred years earlier [9].

Second, land banking incentivizes continued forest clearing despite the substantial availability of cleared land. If 8.8 million hectares of already-cleared land exist, why does new deforestation continue? The answer lies in institutional incentives: clearing forest establishes land claims in Indonesia's context of weak tenure security, regardless of whether the land is immediately productive. This transforms deforestation from an agricultural necessity into a strategic means of claiming territory [22].

Third, idle land generates no economic or social benefits—no production, employment, or community welfare—while imposing environmental costs of forest loss. This represents pure welfare loss: environmental degradation without offsetting benefits. Economically rational policy would prioritize the use of existing cleared land before permitting new clearing, yet institutional arrangements fail to enforce this rationality [9].

### Policy incoherence: commitments vs. implementation

Substantial gaps separate sustainability commitments from implementation realities. ISPO became mandatory in 2020, yet enforcement mechanisms remain weak. The palm oil moratorium has been extended multiple times since 2018, yet the government announced plans to open 600,000 hectares of new plantation land in 2026. Indonesia's NDC commits to significant emissions reductions with forestry sector contributions, yet deforestation increased in 2023 after previous declines [55].

These contradictions reflect competing policy objectives. The B30 biodiesel mandate requires massive volumes of palm oil, creating pressure for expansion. Economic growth imperatives, especially post-COVID recovery, prioritize production and exports. Rural development and smallholder livelihoods depend substantially on oil palm income. Environmental sustainability and climate commitments demand reduced deforestation and enhanced forest protection. Balancing these objectives within coherent policy frameworks remains elusive [56].

Political economy factors further complicate coherence. Local governments derive significant revenues from plantation permits and taxes, creating fiscal incentives for expansion regardless of national moratoriums. Companies have invested substantially in oil palm infrastructure and supply chains, creating powerful vested interests resisting restrictions. Smallholder livelihoods depend on oil palm income, complicating efforts to limit expansion. These political-economic forces exert persistent pressure against stringent sustainability enforcement, resulting in implementation gaps between policy rhetoric and practice [6].

### Smallholder exclusion and productivity challenges

Smallholders managing 42% of oil palm areas face interconnected challenges that threaten both their livelihoods and the sector's sustainability. Productivity has declined from over 4 tons per hectare in 2020 to 3.8 tons per hectare currently, primarily due to aging plantations requiring replanting. However, government replanting programs achieved only 400,000 hectares against a 2.5 million-hectare target, limited by budget constraints, complex application procedures, and limited outreach [25].

Tenure insecurity compounds productivity challenges. Farmers uncertain about long-term land security are less likely to invest in productivity improvements, quality inputs, or sustainable practices that require upfront costs and delayed returns. Exclusion from certification and premium markets reduces income, limiting resources available for replanting or productivity investments.

This creates a poverty trap: tenure insecurity → low investment → low productivity → low income → continued tenure insecurity [57]

Plasma schemes, theoretically offering smallholder support, frequently feature asymmetric power relations. It has been found that plasma arrangements often perpetuate dependency rather than enabling autonomy, with companies controlling input supply, technical assistance, credit, and product marketing [34]. Farmers effectively become contracted laborers on land formally "their" own, with limited agency over management decisions or market access. This dependency constrains independent adoption of sustainability practices or pursuit of certification [58].

### Discussion

#### Synthesis: Dualism as structural sustainability barrier

The evidence reveals a clear causal chain linking land tenure dualism to sustainability challenges. Legal and institutional dualism creates systemic tenure insecurity through contradictory frameworks, fragmented authority, and postponed rights recognition. Tenure insecurity generates chronic agrarian conflicts as multiple parties claim the same land based on different legal frameworks. Conflicts and insecurity prevent sustainability certification, particularly for smallholders, as documented legal rights constitute prerequisite criteria. Simultaneously, weak tenure governance enables land banking speculation, driving deforestation without productive outcomes [59].

This represents a structural rather than incidental problem. Sustainability initiatives such as ISPO certification, moratoriums, and corporate NDPE commitments address symptoms—deforestation, poor environmental practices, social conflicts—without resolving the underlying institutional cause: fundamental contradictions in land governance frameworks. As long as legal dualism persists, generating tenure insecurity, sustainability governance will face ongoing implementation challenges regardless of policy rhetoric or the proliferation of certifications [1].

There is a metaphor that captures this precisely: "If Article 33 is a compass, Indonesia's land policy has not lost its way—the compass is kept in the minister's office". The constitutional and legal principles for equitable, sustainable land governance exist; they are simply not operationalized in institutional practice. Sectoral interests, bureaucratic path dependencies and political-economic pressures override constitutional mandates [60].

### Contradictions: Rhetoric vs. reality

The gap between sustainability rhetoric and implementation reality reveals deeper governance challenges. Indonesia has constructed an impressive architecture of sustainability commitments: mandatory ISPO, extended moratoriums, NDC pledges, Social Forestry targets, and Constitutional Court recognition of customary rights. Yet implementation consistently falls short: deforestation resurges despite moratoriums, Social Forestry meets only one-third of targets, recognition of customary forests covers minimal areas despite Constitutional Court rulings, and smallholders face exclusion from certification despite mandatory requirements [17].

These gaps are not merely technical implementation challenges but reflect fundamental political-economic contradictions. Agrarian justice—equitable land distribution, respect for existing rights, meaningful participation—conflicts with accumulation imperatives driving corporate plantation expansion. Environmental sustainability—forest protection, emissions reductions, biodiversity conservation—conflicts with economic growth and rural development objectives that prioritize production expansion. Legal formalization through certification and permits conflicts with recognition of informal, customary tenure systems [61].

Resolving these contradictions requires confronting uncomfortable questions about development models and distributional justice. Can Indonesia achieve oil palm sustainability without fundamentally redistributing land rights and corporate power? Can environmental goals be met without constraining economic growth and accepting transition costs? Can formal legal systems accommodate customary tenure diversity without subordinating it to bureaucratic categories? Current policy frameworks attempt to avoid these questions through technocratic solutions—certification standards, monitoring systems, efficiency improvements—that leave underlying power relations and institutional structures intact [6].

### Political economy: Power, interests, and path dependencies

Political economy analysis illuminates why progressive policies face persistent implementation obstacles. Multiple actors have vested interests in existing arrangements. KLHK benefits bureaucratically from extensive forest claims, regardless of actual forest conditions, as larger nominal territory justifies larger budgets and organizational scope. Large plantation companies have invested substantially in existing supply chains, land banks, and political relationships, creating powerful interests resisting restrictions or redistribution. Local governments derive revenues from plantation permits and taxes, incentivizing expansion over

conservation. These interests generate political resistance to reforms that would redistribute land, enhance community rights, or impose stringent environmental limits [56].

Path dependencies reinforce status quo arrangements. Indonesia's land governance institutions developed over decades, creating established procedures, organizational cultures, and stakeholder expectations resistant to change. Forestry sector dominance in forest area governance reflects historical institutional development rather than current functional rationality, yet organizational inertia makes fundamental restructuring politically difficult. Similarly, corporate plantation models and plasma schemes have become normalized approaches to oil palm development, making alternative smallholder-centered models appear risky or impractical despite potentially superior sustainability outcomes [2].

International political economy also shapes domestic policy space. EU regulations such as EUDR create compliance pressures on Indonesian exporters, potentially incentivizing sustainability improvements. However, they also generate nationalist resistance, with Indonesian officials characterizing such regulations as protectionist trade barriers rather than legitimate environmental standards. Balancing international market access requirements with domestic political legitimacy constrains policy options [31].

### Pathways forward: Integrating justice and sustainability

Resolving land tenure dualism requires multi-level reforms addressing legal frameworks, institutional structures, implementation mechanisms, and political-economic incentives. Legal harmonization constitutes a foundational priority. Revising or harmonizing UUPA 1960 and Forestry Law 41/1999 to eliminate normative contradictions would establish clearer legal foundations. Critically, revoking Article 14 of Government Regulation No. 23/2021 would restore cross-sectoral government authority over forest area designation, preventing unilateral ministerial determination. Accelerating the implementation of Constitutional Court Decision No. 35/PUU-X/2012 through simplified customary forest recognition procedures would operationalize indigenous rights [23].

Institutional restructuring must address fragmented authority. Establishing a high-level coordinating body for spatial planning and land allocation—positioned within the President's office to transcend sectoral interests—could overcome inter-ministerial fragmentation. Genuine One-Map Policy implementation, with transparent, publicly accessible spatial data, would reduce overlapping claims and improve accountability. Fiscal decentralization reform, creating positive incentives for conservation through payment for ecosystem services schemes,

transferring resources to local governments, and maintaining forest cover, would align local and national interests [29].

Accelerated smallholder tenure regularization represents a critical implementation priority. Fast-tracking land certification for smallholders in non-forest areas would make them eligible for certification. For the 25% of smallholder oil palm within forest areas, a systematic review and reclassification of productive agricultural land as non-forest (Area Penggunaan Lain/APL), or the granting of definitive tenure rights through accelerated Social Forestry procedures, would resolve status ambiguities. Full subsidies and simplified procedures for smallholder ISPO certification, with robust extension support, would enable rather than exclude smallholder participation [62].

Most fundamentally, integrating agrarian justice with sustainability governance requires reconceptualizing sustainability beyond purely technical environmental criteria to encompass distributional equity and the recognition of rights. Participatory spatial planning with meaningful community engagement and FPIC mechanisms would ensure land use decisions respect existing rights and community priorities. Redistributive land policies, through the genuine implementation of Tanah Objek Reforma Agraria (TORA) programs, would address historical inequalities. Accountability mechanisms, including transparency in concession allocation, community-based monitoring, and accessible judicial review, would enhance enforcement [12].

### **Toward sustainable and equitable oil palm development**

Oil palm need not be environmentally or socially destructive; properly governed, it can provide sustainable livelihoods while minimizing environmental impacts. Indonesia has demonstrated capacity for significant deforestation reduction—achieving 82% decline between 2008-2012 and 2018-2020. Certification systems, when accessible and rigorously enforced, can promote improved practices. Smallholder-centered development models can enhance livelihoods while reducing social conflicts [19].

However, realizing this potential requires addressing structural governance failures embodied in land tenure dualism. Technical sustainability interventions—certification standards, monitoring systems, agronomic improvements—remain necessary but insufficient without resolving the underlying tenure contradictions that generate insecurity, conflict, and speculation. Policy coherence demands reconciling competing objectives—economic growth, rural livelihoods, environmental protection, agrarian justice—through explicit priority-setting and resource allocation rather than rhetorical commitments lacking implementation mechanisms [26].

The 8.8 million hectares of already-cleared, idle land present both a challenge and an opportunity. This vast area could accommodate substantial production expansion without additional deforestation, if governance systems prioritized utilizing existing cleared land over permitting new forest conversion. Achieving this requires confronting land-banking speculation through tenure regularization, production requirements for idle permitted land, and land redistribution to productive smallholders. The existence of this idle land renders arguments for continued deforestation economically and environmentally indefensible; governance reform must translate this reality into policy [22].

## **Conclusion**

### **Key findings**

This qualitative literature review demonstrates that land tenure dualism constitutes a structural feature of Indonesian land governance, not an implementation anomaly. The parallel operation of the UUPA 1960's agrarian reform framework and Forestry Law 41/1999's state forest territorialization creates fundamental contradictions in legal norms, institutional authority, spatial allocation, and rights recognition. This dualism generates chronic tenure insecurity, facilitates agrarian conflicts, prevents sustainability certification, particularly for smallholders, and enables speculative land banking, driving deforestation without productive outcomes.

The implications for oil palm sustainability are profound. Despite impressive sustainability architecture—mandatory ISPO certification, extended moratoriums, Constitutional Court recognition of indigenous rights, National Action Plans—implementation gaps persist because underlying tenure contradictions remain unresolved. Smallholders managing 42% of oil palm areas face systematic exclusion from certification due to tenure documentation gaps unrelated to their environmental practices. Meanwhile, 8.8 million hectares of cleared but idle land reveal that deforestation continues despite the availability of massive unutilized land, driven by speculative land-claiming incentives within weak tenure governance systems. Policy incoherence reflects deeper political-economic contradictions between agrarian justice and accumulation imperatives, environmental sustainability and growth objectives, formal legal frameworks, and customary tenure diversity. Technical sustainability interventions cannot overcome these structural contradictions; institutional reform addressing legal dualism, fragmented authority, and distributional inequities is essential.

## Policy recommendations

**Legal reform (1-2 years):** Revoke Article 14 of Government Regulation No. 23/2021 to restore cross-sectoral authority over forest designation. Initiate legislative harmonization of UUPA 1960 and Forestry Law 41/1999, eliminating normative contradictions. Accelerate Constitutional Court Decision No. 35/PUU-X/2012 implementation through simplified customary forest recognition procedures and adequate budget allocation.

**Institutional restructuring (3-5 years):** Establish a Presidential-level coordination body for spatial planning and land allocation, transcending sectoral interests. Implement a transparent, publicly accessible One-Map Policy resolving overlapping claims. Introduce fiscal decentralization, creating positive incentives for conservation by paying local governments for ecosystem services.

**Smallholder tenure security (3-5 years):** Fast-track land certification for smallholders in non-forest areas. Systematically review and reclassify productive agricultural land within forest areas, particularly the 25% of smallholder oil palm lacking documentation. Provide full subsidies and simplified procedures for smallholder ISPO certification with robust extension support. Mandate FPIC in all forest designation, spatial planning, and concession allocation processes with independent monitoring.

**Justice-sustainability integration (5-10 years):** Adopt an agrarian justice framework as a core principle in all oil palm sustainability policies, ensuring rights recognition, equitable benefit distribution, meaningful participation, and accountability. Implement a permanent moratorium on oil palm expansion in primary forests and peat lands, redirecting expansion to 15 million hectares of shrubland within existing forest areas. Strengthen supply chain transparency and traceability through mandatory disclosure integrated with ISPO certification. Address land banking by requiring production on idle permitted land and redistributing it to productive smallholders.

## Research contributions

This study makes three primary contributions. First, it integrates political economy of land tenure literature with oil palm sustainability literature—domains typically treated separately—revealing how institutional contradictions in land governance structurally constrain sustainability outcomes. Second, it conceptualizes "land tenure dualism" as an analytical framework for understanding agrarian conflicts and sustainability barriers, applicable beyond Indonesia to other contexts featuring parallel governance pathways with contradictory logics. Third, it provides evidence-based policy pathways connecting constitutional principles, institutional reforms, and implementation mechanisms,

offering actionable guidance for government, industry, civil society, and international actors.

## Future research agenda

Several research gaps warrant attention. Quantitative analysis of tenure dualism's economic impacts on productivity, poverty, and welfare outcomes would complement this qualitative synthesis. Comparative regional case studies examining how dualism manifests differently across Sumatra, Kalimantan, Sulawesi, and Papua would illuminate contextual variations. Longitudinal tracking of Constitutional Court decision implementation and customary forest recognition from 2012-2030 would assess institutional change trajectories. Political economy ethnography examining how tenure dualism is produced and reproduced in daily bureaucratic practices would deepen understanding of implementation obstacles. Finally, scenario modeling exploring alternative land allocation frameworks and their implications for sustainability and equity would inform strategic planning.

Indonesia's oil palm sector can achieve genuine sustainability, but only through governance reforms addressing foundational institutional contradictions. Technical interventions—certification, monitoring, efficiency—remain necessary but insufficient. Resolving land tenure dualism through legal harmonization, institutional coordination, rights recognition, and agrarian justice integration constitutes the structural prerequisite for translating sustainability commitments into implementation realities. The evidence is clear; the policy pathways are identifiable; political will for fundamental reform remains the critical variable determining whether Indonesia's oil palm sector becomes a model of sustainable development or continues reproducing conflicts, inequities, and environmental degradation.

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