

Review Article

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From Export Gatekeeping to Sustainability Finance? Palm Oil Trade Governance, Smallholder Compliance, and Indonesia's Economic Diplomacy in the EUDR Era

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ABSTRACT

Indonesia's palm-oil sector is entering a regulatory transition in which export governance, smallholder sustainability, and external market access are becoming increasingly interconnected. This qualitative literature review examines whether centralized palm-oil export governance could evolve beyond trade administration into an institutional platform for sustainability finance and stronger economic-diplomatic credibility. Drawing on more than 50 peer-reviewed journal articles published during 2020–2026, the review integrates scholarship on deforestation-free supply chains, the European Union Deforestation Regulation (EUDR), sustainability certification, independent smallholders, replanting, agricultural finance, traceability, state-influenced commodity marketing, and trade–environment relations. Seven interconnected findings emerge: sustainability obligations are moving upstream; smallholder exclusion reflects structural rather than merely technical constraints; replanting involves a combined productivity and income-transition problem; centralized export governance can create a financing node but not automatically additional finance; financial and institutional support are complementary; verifiable domestic compliance may contribute to external credibility; and concentrated trade governance may introduce liquidity, transaction, competition, data, and accountability risks. The review develops an integrated trade finance compliance diplomacy framework and argues that export-linked sustainability finance is conditional on transparent additionality, smallholder accessibility, land legality, interoperable traceability, institutional separation of commercial and financing functions, and independent monitoring. The article concludes with an agenda for evaluating Indonesia's emerging export architecture empirically after implementation.

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Introduction

Palm oil occupies a distinctive position in Indonesia's political economy because it simultaneously functions as an internationally traded agricultural commodity, a major input for food and oleochemical industries, a source of rural income, and an increasingly important feedstock within domestic energy policy. The sector consequently cannot be understood solely through the conventional analytical lens of commodity exports. Its long-term competitiveness is intertwined with rural development, land governance, environmental performance, industrial upgrading, smallholder productivity, supply-chain organization, and Indonesia's relationships with importing markets. Research published since 2020 has continued to show that historical oil-palm expansion contributed to forest conversion and carbon loss, even though the relationship between palm-oil prices, plantation expansion, and deforestation has changed over time and varies between industrial and smallholder production [1-3].

At the same time, palm oil has generated meaningful economic benefits for rural households. Panel-based evidence from Indonesia

indicates that participation in oil-palm cultivation can improve consumption, reduce some dimensions of household economic vulnerability, and support nutrition, education, asset formation, and broader human-capital outcomes [4-5]. These welfare effects explain why sustainability policy cannot be evaluated only in terms of land-use outcomes. Policies that reduce deforestation while excluding resource-constrained producers can generate distributional effects that are economically and politically significant. Therefore argues that supporting independent smallholders on existing agricultural land is an important pathway for reconciling rural livelihoods and forest protection [6].

The external regulatory environment is now making these domestic production conditions directly relevant to international market access. The European Union Deforestation Regulation has transformed the policy context from one dominated by voluntary corporate commitments toward legally structured due diligence. According to the European Commission's current implementation timetable, the Regulation will apply to large and medium operators from 30 December 2026, while most micro and small operators will follow on 30 June 2027. Operators dealing in covered commodities, including palm oil, are required to demonstrate that relevant products are deforestation-free and produced in accordance with relevant legislation in the country of production [7].

This shift has profound implications because compliance increasingly depends on verifiable information concerning farm location, legality, production history, supplier identity, and deforestation risk. In other words, sustainability is becoming partly an information-governance problem. Supply chains that are environmentally compliant but cannot document origin and legality may encounter market-access difficulties, while actors capable of generating reliable geospatial and legal evidence may acquire a competitive advantage. Scholars have consequently described zero-deforestation governance as a problem involving both environmental effectiveness and equitable access to upgraded markets [8-9].

Independent smallholders are especially exposed to this transition. Certification research in Indonesia demonstrates that such farmers frequently encounter overlapping barriers involving land legality, weak farmer organization, limited agronomic assistance, insufficient finance, dependence on intermediaries, and incomplete documentation. Even where producers are willing to participate in sustainability programs, they may lack the institutional capacity necessary to become visible within formal traceability [10-13].

These issues closely correspond to a 2026 policy discussion framework issued by Indonesia's Ministry of Foreign Affairs. The framework describes sustainability diplomacy as increasingly dependent on production- and supply-chain readiness, particularly among smallholders confronted by aging plantations, incomplete land legality, inadequate traceability, certification constraints, and weak farmer institutions. It further notes that resolving these challenges requires substantial and sustained financing [14].

The Indonesian policy setting is itself undergoing substantial change. Government Regulation No. 24 of 2026, promulgated on 20 May 2026 and effective from 1 June 2026, establishes a governance framework for exports of strategic natural-resource commodities. Its stated scope covers the designation of strategic commodities, export governance, supervision, and related implementation arrangements [15]. Minister of Trade Regulation No. 16 of 2026, also effective from 1 June 2026, specifically governs strategic palm-oil derivative exports and includes export approvals, INATRADE procedures, reporting, obligations applying to the designated export state-owned enterprise, and administrative sanctions [16].

The Ministry of Foreign Affairs policy framework interprets this emerging architecture through an ambitious institutional proposition: centralized export governance might potentially be connected with sustainability financing for smallholder replanting, ISPO certification, traceability, and participation in downstream value chains. It thus links three agendas that are usually analyzed separately: trade governance, sustainability finance, and economic diplomacy. The same document nevertheless recognizes potential tensions between commercial export objectives and financing functions, the existence of non-financial smallholder constraints, and the mismatch between the time necessary to develop farm-level capacity and externally determined compliance deadlines.

The international trade environment is also changing. Negotiations on the EU–Indonesia Comprehensive Economic Partnership Agreement were concluded in September 2025. On 29 June 2026, the European Commission presented proposals concerning CEPA and the Investment Protection Agreement to the Council for signature and conclusion. The published legal texts remain subject to final legal procedures and only become binding after the parties complete their respective internal requirements [17].

Indonesia's palm-oil trade relationship with the EU also continues to be shaped by WTO dispute DS593. In March 2026 the European Union objected to Indonesia's proposed level of suspension of concessions, triggering Article 22.6 arbitration. In June 2026 the arbitration was suspended at the parties' request while possible proceedings under Article 21.5 concerning implementation remain relevant [18]. These procedural developments concern legal questions that differ from EUDR implementation and should not be conflated with it, but they demonstrate the broader importance of trade–environment governance to Indonesia's economic diplomacy.

Indonesia is simultaneously progressing through the OECD accession process. Submission of the country's Initial Memorandum in June 2025 marked the beginning of the comprehensive technical phase during which Indonesian legislation, policies, and practices are examined against OECD instruments and standards [19]. This process does not prescribe any particular palm-oil export structure, but it reinforces the relevance of transparency, regulatory quality, competition, public-sector governance, and measurable institutional performance.

These developments expose an important academic gap. Existing scholarship has analyzed zero-deforestation commitments, certification, replanting, smallholder livelihoods, agricultural finance, trade disputes, and deforestation largely as separate research areas. Very little literature integrates them into a common institutional mechanism linking **trade governance → resource mobilization → sustainability finance → smallholder capability → verifiable compliance → market access and external credibility**.

Moreover, Indonesia's 2026 export-governance framework is too recent for credible ex-post academic evaluation. The appropriate research task is therefore not to assume that centralized exports will necessarily improve or damage sustainability performance. Instead, it is to identify the mechanisms, institutional conditions, and failure risks through which different outcomes could emerge.

Accordingly, this article addresses seven questions. First, how are deforestation-free due-diligence requirements redistributing compliance responsibilities and costs across Indonesia's palm-oil supply chain? Second, through what mechanisms could centralized export governance become connected to sustainability finance? Third, what combination of financing instruments could address replanting, certification, legality, traceability, and organizational upgrading? Fourth, which non-financial constraints limit the effectiveness of additional finance? Fifth, under what conditions can domestic sustainability performance contribute to external market-access and diplomatic credibility? Sixth, which economic and governance risks can arise from concentrated trade administration? Seventh, what institutional architecture could connect trade governance and smallholder sustainability while preserving transparency, accessibility, and accountability?

Literature Review

From Voluntary Zero-Deforestation Commitments to Regulatory Due Diligence

The governance of agricultural commodities associated with tropical deforestation has undergone a substantial institutional transformation. Earlier approaches relied heavily on corporate zero-deforestation commitments, certification systems, supplier codes, voluntary standards, and collaborative initiatives. Such mechanisms helped expand monitoring and traceability practices, but evidence of their aggregate environmental effectiveness

remains uneven because voluntary commitments cover only part of commodity markets and implementation varies considerably across companies and landscapes [9].

Demonstrate that companies attempting to implement zero-deforestation commitments often face internal organizational problems, insufficient resources, limited supplier control, inconsistent incentives, and difficulties tracing indirect suppliers. Firms frequently rely on certification schemes, technology providers, and partnerships to compensate for these weaknesses [20]. Their findings are particularly relevant for palm oil because large downstream companies commonly purchase through mills and intermediaries rather than interacting directly with every producer.

Indirect sourcing represents a major traceability blind spot. show that commodity traders in major forest-risk sectors obtain substantial proportions of products through intermediaries whose original suppliers are less visible [22]. Their analysis includes Indonesian palm oil and demonstrates that sustainability systems focusing only on directly contracted suppliers can leave significant portions of the upstream production base outside meaningful monitoring.

This problem creates a tension between environmental stringency and social inclusion. show that zero-deforestation policies may become environmentally more effective while making sustainable-market access harder for vulnerable producers. Their proposed policy-design principles therefore emphasize capacity building, meaningful producer participation, and support systems that allow stringent environmental criteria to coexist with more equitable market access.

Comparable concerns arise in the emerging EUDR literature. warn that deforestation-free regulation may disproportionately affect smallholders, Indigenous peoples, and local communities in producer countries where property rights, administrative documentation, and access to technology remain weak [22-23]. Examining Brazilian commodity sectors, similarly conclude that the ability to comply varies sharply across commodities and producer groups and that technical and financial assistance can become essential where smallholders face high adjustment costs.

Solar, reach similar conclusions from cocoa and coffee supply chains in Peru. They identify geolocation, legality, implementation cost, and due-diligence capacity as central difficulties in translating European regulatory requirements into farm-level practices [24]. Their study is valuable for palm-oil analysis because it shows that EUDR implementation should be understood not simply as border regulation, but as a process that reaches into land administration, producer databases, farm mapping, and local institutional capacity.

Certification can assist with this transition but should not be equated with statutory compliance. compare major voluntary sustainability standards with EUDR requirements and find important gaps concerning legality, traceability, and comprehensive deforestation controls. Certification systems can therefore provide components of a due-diligence architecture without automatically demonstrating full regulatory compliance [25].

The distinction matters particularly for Indonesia, where RSPO and ISPO already provide sustainability-governance infrastructure. Private standards can evolve as external expectations change. for example, show how interactions between cooperation and competition contributed to strengthening RSPO's zero-

deforestation criteria. Yet stronger standards can increase the organizational and financial burden on producers that lack established support systems.

Theoretical and normative assessments of EUDR also differ [26]. emphasizes the economic and supply-chain implications of the regulation, whereas question whether EUDR represents sufficiently transformative environmental governance or instead reproduces important asymmetries between consuming and producing economies. Such differences illustrate why the regulation should not be interpreted through a single analytical frame. It simultaneously functions as an environmental measure, supply-chain due-diligence system, trade condition, and institutional shock for producer-country governance [27].

Evidence from earlier zero-deforestation interventions reinforces the importance of policy complementarity. find that Brazil's Amazon Soy Moratorium contributed materially to reducing deforestation, but its effectiveness depended partly on public property registries and satellite monitoring [28]. Find that leakage can offset part of the environmental gains from geographically limited interventions but does not necessarily eliminate them. argue that market-exclusion mechanisms and payments for environmental services can have different effectiveness, equity, and legitimacy implications, and that combining instruments may sometimes be more appropriate than relying exclusively on one [29].

For Indonesia, jurisdictional approaches may therefore complement farm-level due diligence [30]. show that jurisdictional initiatives can connect provincial and district governance, private sustainability commitments, and external incentives, while [31] demonstrate how participatory jurisdictional strategies can integrate production intensification, certification, ecosystem-service incentives, and local-government coordination in EUDR-related sustainability planning. This is relevant because land legality, farmer registries, spatial planning, extension services, and monitoring frequently depend on subnational government capacity rather than individual exporters.

The literature consequently supports three general propositions. First, traceability becomes increasingly valuable when access to markets depends on demonstrable legality and deforestation-free production. Second, stringent sustainability rules can produce exclusion if the costs of information and compliance are not addressed. Third, effective commodity governance usually depends on combinations of private, public, market, and territorial institutions rather than one instrument operating in isolation [9].

Smallholder Inclusion, Certification, and Supply-Chain Visibility Independent smallholders represent one of the most consequential challenges in Indonesia's sustainability transition because they are economically significant yet institutionally heterogeneous. Their farms differ in size, legal status, planting material, productivity, access to mills, membership in farmer organizations, historical participation in development schemes, and relationships with traders. Uniform compliance strategies therefore risk overlooking large differences in starting conditions.

Find that corporate zero-deforestation commitments in Indonesia remain imperfectly aligned with both remaining deforestation risks and smallholder inclusion. Their analysis identifies weaknesses in traceability, support for higher-risk suppliers, transparency, and engagement with smallholders [32].

More recent household-level evidence reinforces that concern, drawing on surveys involving 1,541 farm households and interviews with supply-chain actors, find that awareness of zero-deforestation commitments remains low, bottom-up traceability is weak, and capacity building and price differentiation are limited, especially among independent smallholders [33]. Similarly find that independent smallholders remain underrepresented within zero-deforestation-compliant supply systems and identify both opportunities and institutional limitations associated with their inclusion.

Access to certified mills is also unequal. demonstrate that independent and contract smallholders participate unevenly in certified palm-oil mill markets, emphasizing that sustainability access depends partly on where farmers are situated within commercial sourcing structures. This means that even technically capable farmers may remain outside upgraded markets when commercial relationships, geography, or mill procurement strategies do not connect them to certified value chains [34].

Certification research helps explain why [10]. find that independent smallholders rely heavily on external support when pursuing non-state palm-oil certification and may have only limited understanding of certification costs and procedures before participation, analyzing a large group of independent farmers in Central Kalimantan, identify structural disadvantages resulting from historical exclusion from extension programs and formal plantation schemes. They conclude that certification at meaningful scale requires systematic support from government, private firms, and civil-society institutions.

Similarly find that successful RSPO certification is strongly conditioned by pre-certification characteristics. Groups with clearer land legality and prior organization are better positioned to succeed, while plantation licenses, environmental requirements, and recurring certification costs remain important barriers. External facilitators continue to play a substantial role.

These findings are particularly important for regulatory systems based on evidence. Farmers with clear land titles, established groups, transaction records, and previous certification experience possess an information advantage. Farmers without these assets may need more support precisely because they are more difficult and expensive to incorporate.

ISPO illustrates a related set of institutional tensions. Identify internal incoherence and changing scales of governance within Indonesian palm-oil certification. further show that smallholder readiness is constrained by agrarian, structural, and cultural conditions rather than one narrowly defined compliance barrier.

Certification also has heterogeneous economic effects [35]. Estimate that certified independent smallholders can achieve favorable financial outcomes relative to comparison groups, although results depend on specific assumptions and conditions, meanwhile, emphasize that the financial attractiveness of RSPO certification depends on the relationship between implementation costs and realized benefits.

The broader sustainability-standard literature reaches a similar conclusion. synthesizing evidence across commodities, finds that certified smallholders often obtain higher prices and incomes on average but that effects vary substantially across contexts. Sustainability standards therefore cannot be assumed to produce equivalent welfare outcomes across regions, commodities, or producer categories [36].

Institutional design can reduce compliance costs show that group-based implementation and changes in the way training, audits, and certification services are delivered can reduce the costs of scaling voluntary sustainability standards among independent smallholders. likewise find that training, risk attitudes, incentives, and cash premiums influence certification uptake and argue for certification designs better adapted to heterogeneous smallholder conditions [37-38].

Farmer organizations can provide a critical bridge [39]. Identify land legality, limited information, poor access to funding, inadequate production inputs, and limited good-agricultural-practice capability as central problems among independent smallholders. Their institutional strengthening model emphasizes cooperatives, farmer groups, mills, finance providers, government agencies, and partnership arrangements.

Land governance remains an especially difficult constraint [40]. demonstrate how insecure and informally documented land rights can become entangled with plantation expansion and conflict in Riau. Such problems cannot be solved merely by geolocating plots: accurate coordinates reveal where a farm is located but do not necessarily establish uncontested legal entitlement to use the land. Finally, the welfare implications of certification are context dependent [41]. Using village-level counterfactual analysis across Indonesia, find that RSPO certification was associated with poverty reduction in some market-oriented village contexts but not where subsistence livelihoods predominated before plantation development. Consequently, inclusion strategies should be sensitive to local livelihood structures rather than assuming certification produces uniform socioeconomic benefits.

Collectively, these studies suggest that EUDR readiness should be understood as a **capability bundle** rather than a certificate. It involves identifiable farms, legal and geospatial documentation, functional farmer organizations, appropriate agronomy, transaction records, market connections, and access to institutions capable of maintaining credible supply-chain information.

Replanting, Productivity, and the Income-Transition Problem
Aging oil-palm plantations represent a second major structural issue. Replanting is often discussed as an agronomic intervention, yet the literature shows that it is simultaneously a financing and livelihood problem. Old palms typically experience declining productivity, but replacing them requires capital expenditure followed by several years during which the new palms generate little or no commercial harvest.

synthesize Indonesian replanting research and identify multiple interconnected barriers, including finance, lack of quality planting material, insufficient technical information, land legality, farmer preferences, and uncertainty during the non-productive period. Rather than reflecting a single financing gap, these barriers show that replanting readiness depends on the interaction of household liquidity, administrative eligibility, land legality, and technical capacity [42].

Provide further empirical evidence that replanting participation is influenced by financial access, land ownership documentation, business registration, and good agricultural practices. Their findings are important because the same capabilities that facilitate replanting formal documentation, organized production, access to institutions also facilitate sustainability certification and traceability.

Subsidy design matters as well [43]. Find that smallholders respond differently to the attributes of replanting subsidy programs and are more willing to participate where financial support is larger and registration mechanisms are appropriately structured [44]. Argue that higher subsidies alone may still be insufficient because farmers face a prolonged income-recovery period and administrative eligibility barriers, including land documentation and organizational conditions.

This income-transition problem has implications for sustainability finance. Financing the physical act of replanting is not enough if the household cannot finance consumption, education, farm maintenance, and debt service before the new trees mature. Consequently, replanting support may require grace periods, alternative-income programs, intercropping, working capital, social protection, or other mechanisms that address household cash flow as well as plantation investment.

Replanting is nevertheless strategically important because productivity gaps can be large [45]. using data from 977 independent smallholder fields, find that average yields represented only about 42% of estimated attainable yields and identify nutrient management, harvesting intervals, weed control, and pruning as important explanatory factors. Improved agronomy can therefore raise production from existing plantation areas and potentially reduce pressure for expansion.

Environmental performance and productivity need not always be opposing objectives. find considerable environmental inefficiency among Indonesian smallholders and identify scope for increasing output while reducing biodiversity-related environmental losses. They also examine payments for ecosystem services as a potential instrument for aligning farm income and biodiversity conservation.

This is significant because palm oil remains an important livelihood asset. find that cultivation increased household living standards and reduced certain dimensions of economic risk among surveyed smallholders, while] find improvements in nutrition, education spending, assets, and electricity consumption.

A sustainability strategy that makes compliance economically incompatible with smallholder livelihoods may therefore generate resistance or exit from formal value chains. Conversely, policies that combine higher productivity, livelihood continuity, and stronger environmental performance create a more plausible route toward durable.

Sustainability Finance, Additionality, and Risk Sharing

Agricultural finance frequently suffers from information asymmetry, production risk, price volatility, dispersed borrowers, weak collateral, and high transaction costs. Sustainability investments can intensify these difficulties because some returns reduced forest loss, better traceability, improved public information, or biodiversity protection accrue partly to society or downstream buyers rather than solely to the farmer making the investment.

Blended finance is one response argue that combining public, concessional, philanthropic, and commercial financing can support sustainable agricultural transitions when different sources of capital address identifiable risks and market failures.

Similarly emphasize that blended-finance effectiveness depends on institutional complementarity, financing modality, and proximity among actors [46]. Their findings caution against treating blended

finance as simply the addition of concessional capital to a commercial project. Governance, incentives, monitoring requirements, and the capacity of implementing organizations influence whether blending actually mobilizes investment.

Supply-chain finance can also reduce conventional collateral dependence. Show how sustainability-oriented agricultural supply-chain information can become part of credit-risk assessment, while argue that agricultural value-chain finance can be strengthened through transaction records, bundled services, and an ecosystem of banks, agribusinesses, development organizations, and other value-chain actors. Although these frameworks are not specific to Indonesian palm oil, the mechanisms are relevant because reliable records of farm production, mill deliveries, certification status, and purchase relationships can potentially reduce information asymmetry between farmers and lenders.

However, resource mobilization does not automatically equal **additionality**. A new sustainability-finance mechanism creates financial additionality only if it expands funding, lowers risk, reaches underserved beneficiaries, lengthens loan maturities, reduces borrowing costs, or finances activities that otherwise would not occur. Merely relabeling an existing budget allocation as sustainability finance does not necessarily change real investment. The literature on environmental incentives also supports instrument combinations. Compare payments for environmental services with market exclusion mechanisms and demonstrate that effectiveness, equity, cost-effectiveness, and legitimacy may point in different directions. An integrated system may therefore need grants for public-good activities, concessional credit for productive investment, guarantees for risk reduction, and performance-based incentives for verified environmental outcomes.

State-Influenced Trade Governance and Market Architecture

Indonesia's emerging export governance also raises questions beyond conventional agricultural finance. conceptualize contemporary state capitalism as an environment in which states increasingly operate not merely as regulators but also as owners, investors, market coordinators, and promoters of capital. Such a perspective is analytically useful because export centralization can involve both regulatory and commercial functions.

A centralized commodity-trading institution can theoretically generate coordination advantages. It can aggregate transaction information, standardize reporting, increase government visibility over trade flows, and potentially create an identifiable point through which export-linked revenue or financing is administered. Yet centralization can simultaneously alter incentives, bargaining structures, transaction times, liquidity requirements, and competition.

Comparative evidence should therefore be used cautiously. Cardwell and Ghazalian examine the Canadian Wheat Board, a historically specific single-desk agricultural marketing institution, and find that deregulation affected productivity incentives. Their research demonstrates that market structure can affect producer behavior, but it does not provide a direct forecast for Indonesian palm oil because commodity characteristics, ownership structures, international markets, and institutional objectives differ.

The relevant question for Indonesia is consequently not whether centralization is intrinsically efficient or inefficient. Rather, it concerns the institutional conditions determining the balance between potential coordination gains and possible concentration costs.

Palm Oil, EU Trade Measures, and Economic Diplomacy

Trade–environment tensions surrounding palm oil predate the EUDR [47]. Analyze EU biofuel sustainability policy under WTO law and identify legal questions surrounding non-discrimination and environmental justification. Examine the status of palm oil under the EU Renewable Energy Directive and frame the debate around contested interpretations of sustainability and protectionism.

Show that Indonesia EU palm-oil disputes have also involved questions of national dignity, sovereignty, fairness, and competing environmental narratives rather than economic calculation alone. More recent analysis by interprets the palm-oil disputes as an important early encounter between WTO jurisprudence and environmental policies connected to the EU Green Deal [48].

Domestic policy responses can themselves be influenced by external sustainability pressure. Wulandari [49]. Analyze Indonesia's palm-oil moratorium in the context of RED II and identify interaction between international regulatory pressure and domestic political-economic conditions.

Economic studies also show that the effects of EU market restrictions should not be generalized without attention to scale and distribution [50]. using a GTAP framework, estimated relatively limited national macroeconomic impacts from restrictions on Indonesian palm-oil exports to the EU under the scenarios they modeled, although effects can differ by sector and region [51] using an environmentally extended multi-regional input–output framework, similarly find relatively limited aggregate national effects but more concentrated subnational impacts in major producing provinces.

These findings reinforce an important point for economic diplomacy: national-level effects and producer-level effects can differ considerably. Market diversification can reduce aggregate exposure while specific smallholder communities, mills, exporters, or provinces remain highly sensitive to regulatory change.

Method

This study **adopts a qualitative literature review**, specifically an integrative and thematic synthesis, rather than a systematic literature review. Its purpose is to connect distinct bodies of scholarship and identify institutional mechanisms, contradictions, conditional relationships, and evidence gaps. It does not claim exhaustive retrieval of every publication and does not use PRISMA flow statistics, meta-analytic pooling, or systematic-review claims of completeness.

The core academic literature consists of **more than 50 peer-reviewed journal articles published between 2020 and 2026**. Literature was organized around seven thematic domains: deforestation-free commodity governance; EUDR and regulatory due diligence; certification and smallholder inclusion; replanting and productivity; sustainability and agricultural finance; state-influenced trade governance; and palm-oil trade–environment diplomacy.

Literature identification was conducted iteratively through Scopus, Web of Science, Google Scholar, and major publisher databases using combinations of terms such as “EUDR,” “deforestation-free supply chains,” “palm oil,” “smallholder,” “traceability,” “certification,” “replanting,” “blended finance,” “value-chain finance,” and “state trading.” Articles were retained when they were peer reviewed, published during 2020–2026, and directly relevant to at least one research question; backward and forward

citation chaining was then used to identify additional high-relevance studies. This purposive search strategy is consistent with the interpretive purpose of a qualitative literature review and is not presented as exhaustive systematic retrieval.

The review places particular weight on Indonesia-specific studies, while comparative research is included where it clarifies institutional mechanisms that cannot yet be evaluated empirically under Indonesia's new 2026 export framework. Comparative evidence is therefore treated as **mechanism evidence**, not as a prediction of Indonesian outcomes. For example, research on Brazilian zero-deforestation supply chains informs understanding of leakage, incentives, and monitoring, whereas research on the Canadian Wheat Board illustrates how changes in commodity-marketing structures may alter incentives without implying that Indonesian palm oil will experience identical effects.

Academic literature was complemented by official policy and legal sources for factual verification of the current institutional setting. These sources include the EUDR implementation timetable, Indonesian PP No. 24/2026, Permendag No. 16/2026, WTO DS593 materials, current CEPA documentation, and OECD accession information. Official sources are not counted toward the minimum 50 journal references.

The Ministry of Foreign Affairs policy discussion framework was treated as a problem-framing source rather than as academic evidence. It links export governance, sustainability financing, smallholder readiness, and economic diplomacy and proposes examination of whether export-related financial flows could support replanting, ISPO certification, traceability, and higher-value participation. Its stated objectives also call for analysis of EUDR readiness, centralized export governance, financing feasibility, smallholder compliance, and diplomatic implications.

The literature was interpreted through combined deductive and inductive thematic coding. Deductive categories trade governance, finance, smallholder readiness, and diplomacy—were derived from the policy problem. Inductive categories emerged from repeated findings in the literature, including land legality, indirect sourcing, income-transition risk, organizational capacity, data interoperability, additionality, liquidity, market concentration, leakage, and exclusion.

The analytical strategy involved four stages. First, studies were interpreted for the specific constraint or mechanism examined. Second, evidence was classified according to the actor bearing the relevant cost or benefit. Third, relationships between themes were mapped, for example between farm legality and certification, or between replanting and household cash flow. Fourth, evidence was synthesized into necessary conditions, enabling conditions, and plausible failure mechanisms for export-linked sustainability finance.

The approach is intentionally cautious about causality. Because Indonesia's current export architecture is new, the review distinguishes among **established empirical evidence, current institutional facts, and forward-looking propositions**. This distinction prevents comparative evidence or policy intentions from being misrepresented as observed Indonesian outcomes.

Results

Theme One: Sustainability Regulation Is Moving Compliance Upstream

The first thematic result is that the economic burden of sustainability governance is increasingly moving toward the upstream parts of

commodity supply chains. Downstream firms may retain formal regulatory responsibility, but compliance requires information that can only be generated by farms, farmer groups, collectors, mills, land authorities, and other upstream institutions.

EUDR makes this especially visible. Geolocation and legality requirements increase the importance of plot-level data, while indirect sourcing makes it difficult to connect final shipments with individual production areas. The traceability gap documented by therefore becomes not merely a corporate sustainability weakness but a potential market-access constraint.

This movement upstream creates a distributional question: who finances the creation of the information required for compliance? Large integrated producers can spread mapping, information systems, legal teams, and auditing costs across larger output volumes. A two-hectare independent smallholder cannot achieve similar economies of scale. If the cost is shifted entirely upstream, the farmer may become commercially unattractive to compliance-sensitive buyers.

The literature consequently supports collective investment in compliance infrastructure. Farm registries, geolocation systems, interoperable databases, legal documentation assistance, farmer-group development, and shared verification can lower average compliance costs compared with atomized farm-by-farm implementation. Recent evidence further shows that bottom-up traceability can be strengthened by linking independent smallholder plantations to mill-level sourcing records, while farmer participation in traceability systems is influenced by perceived control, access to credit, education, and institutional support [52-53].

The relationships identified across the literature are best represented as a connected causal pathway rather than independent policy domains. **Figure 1** maps the proposed trade-finance-compliance-diplomacy sequence and explicitly identifies failure points between each stage.

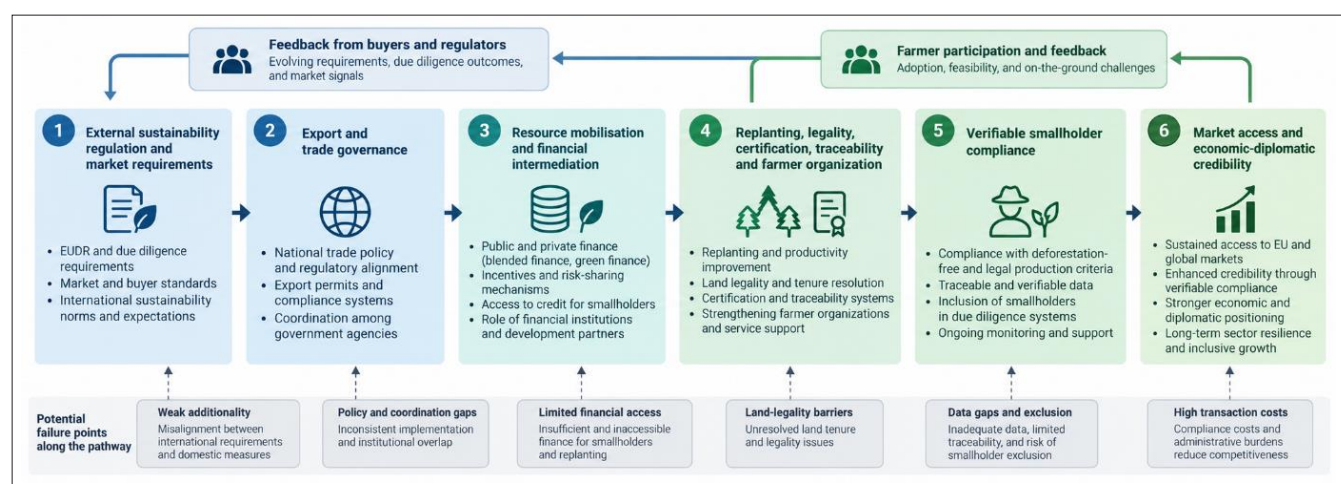


Figure 1: illustrates that the Framework Should Not Be Read As An Automatic Causal Chain

External sustainability requirements can motivate domestic trade and regulatory responses, but export governance generates sustainability outcomes only where resources are mobilized and transmitted into appropriate investments. Financing must then be converted into farm-level legality, replanting, certification, traceability, and institutional capability before it can produce verifiable compliance. Even verified compliance contributes to market access or diplomatic credibility only where importing-market authorities and buyers recognize the evidence generated. Each transition therefore contains a potential institutional failure point.

Theme Two: Smallholder Inclusion Is Structural Rather Than Merely Technical

The second result is that smallholder exclusion cannot be solved exclusively through new technology. Digital platforms, satellite data, blockchain-style traceability, and electronic transaction systems can improve information quality, but they cannot create land rights, resolve boundary disputes, organize farmers, provide agronomic knowledge, or replace missing commercial relationships.

Evidence from certification studies is especially consistent on this point. Farmers with prior organizational support, clearer legality, and established relationships with mills are more likely to meet certification requirements. This produces a selection problem: sustainability programs can disproportionately absorb the producers who were already closest to compliance while the most vulnerable remain outside.

Independent smallholders are therefore likely to require a different compliance pathway from vertically integrated plantation companies. Group-based mapping, cooperative transaction recording, shared auditing, subsidized legal assistance, mobile extension teams, and public-private data integration can potentially reduce per-farmer costs. Empirical work on traceability adoption and Indonesian palm-oil traceability also suggests that producer participation improves when technical systems are combined with organizational support, credit access, and clearer links between farm and mill records.

The structural nature of the problem is also visible in the relationship between certification and land governance. Traceability can establish where production occurs; certification can establish conformity with specific standards; neither process automatically resolves contested land status. Sustainability finance directed exclusively toward auditing may consequently produce limited results if foundational legality problems remain unresolved.

Theme Three: Replanting Is a Sustainability-Finance Problem

The third result concerns temporal mismatch. Many sustainability investments incur costs immediately while generating returns later. Replanting makes this problem especially severe because farmers replace a productive asset with immature trees that require expenditure before producing meaningful harvest.

The literature demonstrates that this is not simply a shortage of investment capital. It is a **multi-year household liquidity problem**, show that even higher subsidy levels may not resolve the lengthy recovery period. similarly identify finance, eligibility, legality, and technical readiness as overlapping constraints.

Consequently, a replanting-finance architecture should distinguish capital expenditure from household income continuity. A grant or loan may cover planting material and field establishment but leave households unable to finance living expenses during immature years. Long grace periods, seasonal working capital, intercropping, alternative livelihood income, and staggered replanting can therefore be as important as headline subsidy values.

This matters for EUDR readiness because replanting and compliance can be mutually reinforcing. Higher-yielding legal plantations reduce incentives for horizontal expansion, while replanting can become an opportunity to formalize farm boundaries, update geolocation records, introduce good agricultural practices, and organize farmers into traceable supply arrangements.

Theme Four: Export Centralization Is Potentially a Financing Node, Not Finance Itself

The fourth result addresses the policy proposition that centralized export governance could create a strategic information and transaction node because export activity becomes more visible and coordinated through formal administrative channels. PP No. 24/2026 establishes the broader strategic-resource export-governance framework, while Permendag No. 16/2026 contains detailed rules applying to palm-oil derivative exports and obligations for the export SOE.

Conceptually, three processes should be distinguished: resource collection, resource allocation, and delivery to sustainability beneficiaries. Keeping these stages analytically separate helps identify where an export-linked financing mechanism may succeed or fail, because strong performance at one stage does not guarantee effective transmission through the next.

Success at one stage does not guarantee success at the next. A centralized arrangement may collect information or revenue efficiently while allocating little toward sustainability. A dedicated fund may allocate resources but reach primarily large companies rather than smallholders. Smallholder allocations may exist on

paper but remain inaccessible because farmers lack required documentation.

The centralization question is therefore better expressed as an institutional transmission problem: what mechanisms translate centralized export activity into additional sustainability investment? Framing the issue in this way shifts attention from the formal existence of a central export node to the governance arrangements that connect trade activity with measurable sustainability outcomes.

This distinction also clarifies the importance of mandate design. A commercial institution seeking fast transactions, buyer retention, export volume, and financial returns follows different operational incentives from a development-finance institution targeting high-cost, high-risk, administratively complex smallholder investments. Combining both functions without explicit governance arrangements can create mandate conflict.

Theme Five: Sustainability Finance Requires an Instrument Portfolio

The fifth result is that no single financial instrument corresponds to all smallholder sustainability constraints. Different problems require different maturity periods, risk allocations, and repayment structures.

Certification fees and farm mapping may justify grant-like assistance where the social return exceeds the private return. Replanting requires long-term finance and grace periods. Working-capital constraints may require short-term credit. Banks reluctant to lend to poorly collateralized farmers may respond to guarantees or portfolio-risk sharing. Buyers may co-finance compliance when traceability secures their future supply. Environmental outcomes may justify results-based incentives or payments for ecosystem services.

The implication is that export-linked sustainability finance should be designed as a financial architecture, not a single fund [54]. show that blended finance is most useful where concessional resources address specific constraints preventing commercially oriented finance from participating.

A financing architecture nevertheless introduces new governance risks. **Figure 2** therefore maps major risks associated with centralized export governance against possible institutional safeguards. These safeguards are presented as analytical controls to be tested rather than as predetermined policy prescriptions.

Core principle: coordination gains require safeguards against concentration costs.			
Key Risk		Governance Safeguard	
1	 Exporter liquidity risk		Service-level standards and working-capital facilities.
2	 Transaction and approval delays		Digital processing and time-bound approvals.
3	 Market concentration risk		Competition monitoring and periodic market review.
4	 Price-discovery weakness		Transparent benchmark pricing and market information disclosure.
5	 Sustainability-fund diversion or weak additionality		Ring-fenced finance, independent audit and public reporting.
6	 Data-quality and traceability failure		Interoperable databases, verification and correction protocols.
7	 Smallholder exclusion risk		Farmer-centered eligibility, grievance mechanisms and targeted support.
8	 Legal and trade-policy risk		Legal review, transparency and periodic compatibility assessment.

Source: Author synthesis from 2020–2026 literature.

Figure 2: Illustrates the Dual Nature of Centralization.

The same institutional concentration that can strengthen coordination may also increase exposure to operational failure. Liquidity risk requires attention to working-capital arrangements; transaction delays require measurable service standards; concentration requires competition monitoring; price-discovery concerns require transparent market information; sustainability financing requires ring-fencing and audit; and smallholder inclusion requires accessible eligibility rules and grievance mechanisms. The relevant policy question is therefore the strength of safeguards relative to the risks created by the institutional design.

Theme Six: Finance Is Necessary but Not Sufficient

The sixth result is one of the most robust across the literature. A farmer can receive money and still fail sustainability requirements because the primary constraint may be legality, knowledge, organization, or data.

For example, a loan cannot resolve a boundary dispute. Certification financing does not guarantee that a farmer has adequate documentation. A mapping application cannot independently validate legal rights. Subsidized seedlings do not guarantee good agricultural practice. A digital traceability system cannot produce trustworthy output when the underlying supplier identity or farm record is inaccurate.

Consequently, finance has to be bundled with **institutional capability**. The relevant package may include land-registration assistance, agronomic extension, cooperative development, farm mapping, business registration, certification preparation, financial literacy, and buyer linkage.

This explains why previous certification programs often depend strongly on facilitators. External support performs functions that markets and farmers cannot easily organize individually. Scaling sustainability therefore involves institutionalizing these facilitation functions rather than assuming they disappear after finance becomes.

Theme Seven: Verifiable Domestic Capability Can Matter for External Credibility

The final thematic result concerns economic diplomacy. Sustainability diplomacy is stronger when domestic policy claims can be supported by verifiable implementation evidence. This does not mean that stronger domestic compliance determines the legal outcome of trade disputes or obliges importing jurisdictions to recognize particular producer-country systems. Rather, it means that evidence changes the factual environment within which market-access discussions occur.

A traceability system capable of demonstrating legal, geolocated, deforestation-free production can provide exporters and public authorities with more concrete evidence than broad statements about national sustainability performance. Similarly, inclusive compliance systems can help demonstrate that environmental upgrading does not require excluding smallholders.

The Ministry of Foreign Affairs policy framework directly links financed farmer readiness with Indonesia's credibility in external trade and cooperation settings. The literature on EU–Indonesia palm-oil disputes suggests why this matters: the relationship has been shaped not only by trade flows but also by competing narratives concerning environmental performance, discrimination, fairness, and regulatory legitimacy [55].

Domestic capability should nevertheless not be confused with automatic diplomatic “leverage.” International recognition depends on legal requirements, verification credibility, interoperability, and the policy choices of trading partners. The relevant concept is therefore evidence-based credibility, not guaranteed bargaining power.

Discussion and Analysis

Answering RQ1: Who Bears the Cost of Deforestation-Free Compliance?

The review indicates that the formal legal location of due-diligence responsibility and the economic incidence of compliance costs need not coincide. Downstream operators can require upstream suppliers to produce increasingly detailed data, and the cost may ultimately be transmitted through contractual requirements, procurement decisions, reduced supplier numbers, or lower willingness to source from difficult-to-document producers.

Independent smallholders are particularly exposed because fixed costs per farm are high relative to production. Mapping, documentation, auditing, and farmer identification are far cheaper per tonne for a large estate than for a dispersed network of very small farms.

The policy implication is not that importing-market regulation necessarily excludes smallholders, but that exclusion becomes more plausible where supply-chain actors are given strong compliance incentives without parallel mechanisms for producer upgrading. Collectively show that equity outcomes depend strongly on implementation arrangements.

A practical analytical distinction can therefore be made between **compliance enforcement** and **compliance enablement**. Enforcement determines the requirements for market participation; enablement determines whether vulnerable producers possess realistic pathways to meet them.

Answering RQ2: Can Export Governance Become Sustainability-Finance Infrastructure?

The literature supports a conditional answer. Export centralization can potentially become part of sustainability-finance infrastructure where it improves transaction visibility, coordinates data, creates predictable revenue channels, or helps structure financial contributions. However, none of these functions arises automatically from centralized trading authority.

A credible financing link requires four institutional conversions. Export-related financial flows must first generate measurable additional resources, after which those resources need to be ring-fenced or governed transparently enough to preserve their sustainability purpose. The funds must then be transformed into instruments appropriate to different investment problems, and delivery systems must finally reach the intended beneficiaries rather than only already-formalized firms or producers.

The failure of any conversion breaks the chain. Export centralization without additionality becomes administrative concentration. Additional finance without good allocation becomes inefficient spending. Good allocation without accessible delivery excludes vulnerable farmers. Successful delivery without monitoring makes impact difficult to establish.

The central research contribution of this article is therefore to conceptualize export centralization not as a binary policy choice but as an institutional transmission mechanism whose performance

depends on governance between stages. This perspective provides a testable framework for future empirical research once implementation data on export transactions, financing, and smallholder outcomes become available.

Answering RQ3: What Financing Portfolio Is Needed?

A financing portfolio aligned with the literature would distinguish five broad investment categories. Replanting capital addresses high upfront costs and delayed returns, whereas income-transition finance protects household cash flow during immature years. Compliance-enabling finance covers mapping, documentation, certification preparation, and digital onboarding; institutional-development finance supports cooperatives, farmer groups, extension, and shared services; and environmental-performance finance can reward biodiversity conservation, avoided deforestation, or other verified ecosystem outcomes.

Different capital providers are suited to different functions. Public or concessional resources may be appropriate where benefits are highly social or risks are too high for banks, while commercial lenders can finance investments with more predictable repayment. Buyers can co-finance traceability where they benefit from compliant supply, and guarantees can lower the risk faced by financial institutions. This portfolio logic is consistent with the agricultural value-chain finance literature, which emphasizes transaction records, bundled services, and coordinated participation by financial and non-financial actors.

This portfolio logic is synthesized in Figure 3, which maps trade flows, a dedicated sustainability-finance window, complementary sources of capital, delivery institutions, smallholder beneficiaries, and a monitoring layer. The structure intentionally separates the commercial export function from sustainability-finance governance so that commercial and developmental performance can be evaluated independently.

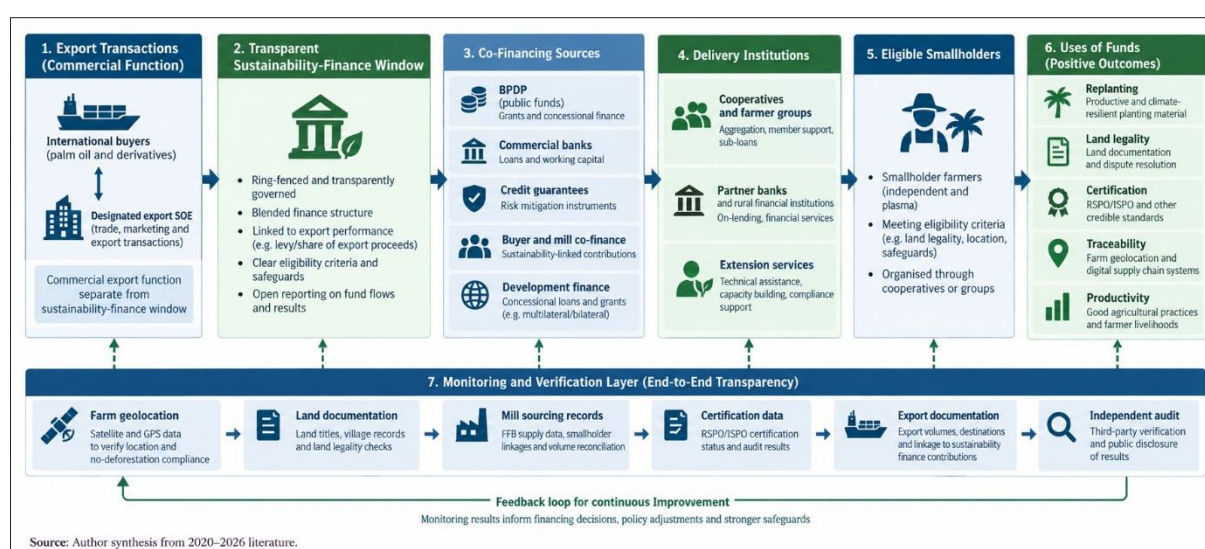


Figure 3: Illustrates That The Export Institution Need Not Itself Perform Every Financial Function.

A transparent sustainability-finance window could instead coordinate with existing public funds, banks, guarantees, development finance, buyers, mills, cooperatives, and extension institutions. A common monitoring layer connects geolocation, land documentation, mill-sourcing records, certification information, export documentation, and independent audit. Such an arrangement would allow commercial export performance and sustainability outcomes to be evaluated separately while still maintaining institutional linkage.

Answering RQ4: Why Finance Alone Cannot Deliver EUDR Readiness

The literature shows that smallholder barriers frequently arise from institutional history rather than current cash shortages. Demonstrate that historical exclusion from extension and plantation-support schemes creates persistent disadvantages. find that pre-existing land legality and farmer-group organization strongly influence certification prospects [56]. emphasize agrarian, structural, and cultural constraints. Identify access to finance as only one problem among legality, information, inputs, and organizational weakness.

This means that increasing the amount of credit available may not proportionately increase compliance. A farmer who lacks a recognized land document may remain ineligible for finance. A farmer who receives finance may still be unable to produce

auditable traceability data. A farmer group may acquire a digital platform yet lack internal governance to maintain accurate records.

The most appropriate unit of intervention may consequently be neither the individual farmer nor the national export institution but the local compliance ecosystem: farmers, cooperatives, collectors, mills, banks, local government, land agencies, extension services, certification organizations, and data providers. Interventions designed at this ecosystem level can address the institutional dependencies that determine whether finance is converted into usable legality, traceability, and market-access capabilities.

Answering RQ5: From Domestic Capability to Economic-Diplomatic Credibility

Economic diplomacy is sometimes described primarily in terms of negotiation positions. The evidence examined here suggests a complementary dimension: **implementation credibility**.

If Indonesia can demonstrate that smallholders are increasingly geolocated, legal, traceable, sustainably managed, and included in formal value chains, then external engagement is supported by observable domestic capacity. This does not preclude disagreement over the design, proportionality, legality, or fairness of importing-market regulations. It changes the evidence available within such discussions.

This issue is particularly relevant as EUDR implementation approaches. The current EU timetable establishes December 2026 and June 2027 as the principal application dates for different operator categories. It is also relevant to the evolving institutional framework of EU–Indonesia relations following conclusion of CEPA negotiations.

The WTO context should be treated separately. DS593 concerns legal issues surrounding EU measures affecting palm oil and oil-palm crop-based biofuels, and the ongoing compliance-related procedural developments do not determine EUDR legality. Nevertheless, both issues illustrate the wider trade–environment interface examined.

Similarly, OECD accession is not an endorsement or rejection of any particular palm-oil policy. It does, however, create a broader setting in which transparency, competition, state-owned enterprise governance, environmental standards, and public-sector accountability are subject to heightened technical scrutiny during the accession process.

Answering RQ6: What Risks Accompany Centralized Trade Governance?

The potential benefits of coordination must be analyzed alongside several categories of risk. Exporter liquidity is one concern because export businesses operate through working-capital cycles involving procurement, inventories, processing, shipping, and payment settlement; additional administrative or intermediation stages can lengthen these cycles and increase financing costs. Transaction speed is closely related, since commodity markets respond to prices, freight conditions, buyer schedules, and currency movements, making predictable and time-bound processing commercially important.

Market concentration creates a second group of risks. A strongly centralized node can facilitate national coordination but can also become a single operational dependency if alternative transaction channels disappear. Price discovery therefore becomes especially important where fewer actors participate directly in international transactions, increasing the value of transparent benchmarks, disclosure, and independent market information.

Mandate conflict represents a third risk category because a state-influenced exporter may simultaneously be expected to maximize trade value, preserve domestic availability, support downstream industry, collect revenue, finance sustainability, and pursue broader national strategic goals. These objectives do not necessarily point in the same direction. Governance and rent-allocation risks consequently require clear eligibility rules, independent audit, and transparent reporting where an institution influences both trade flows and the allocation of sustainability finance.

Data risk and smallholder exclusion form a fourth cluster of concerns. Centralization can create valuable integrated databases, but inaccurate centralized data can also magnify error, making correction procedures for farm boundaries, supplier identities, duplicated records, and disputed legal information essential. In addition, if compliance or finance eligibility is designed around documentation already held by formal producers, the smallholders facing the greatest institutional constraints may become least able to access support; these concerns mirror the liquidity, transaction, inclusion, and mandate tensions identified in Indonesia's policy discussion framework.

Answering RQ7: Institutional Conditions for an Integrated Architecture

The synthesis identifies seven conditions worth testing empirically as Indonesia's new export framework develops. The first is mandate clarity: commercial export responsibilities and sustainability-finance responsibilities should be sufficiently distinguishable for their performance to be measured independently. The second is additionality, meaning that export-linked resources should demonstrably expand investment capacity or improve financing terms, while the third is accessibility, which requires eligibility systems to account for the weaker documentation and collateral positions of many independent smallholders.

The fourth condition is financial-institutional complementarity: funding should be integrated with land legality, extension, farmer organization, agronomy, certification, and data support. The fifth is interoperability, meaning that farm identity, geolocation, land documentation, mill transactions, sustainability certification, and export records should be capable of communicating across systems while avoiding unnecessary duplication.

The sixth condition is independent accountability, supported by audit, complaints, data-correction, and disclosure mechanisms where the institution managing export-linked resources possesses substantial market influence. The seventh is adaptive evaluation, under which the architecture is assessed against actual outcomes rather than institutional intent. Together, these conditions convert broad policy objectives into criteria that can be examined empirically after implementation.

A useful evaluation dashboard would therefore track not only export value but also transaction times, working-capital effects, export prices relative to benchmarks, numbers of participating smallholders, hectares mapped, land-documentation progress, certification coverage, replanting uptake, loan repayment, traceability completeness, and evidence of market acceptance. Monitoring both commercial and sustainability indicators would make it possible to identify whether coordination gains are accompanied by measurable inclusion and compliance outcomes.

Broader Analytical Implications Sustainability as Competitiveness Infrastructure

The conventional framing of sustainability often assumes a trade-off between environmental regulation and competitiveness. The literature reviewed here suggests that the relationship is more complex. Traceability, legality, higher productivity, stronger farmer organizations, and reliable data can impose substantial short-term costs while simultaneously becoming long-term market infrastructure.

Where buyers increasingly demand verifiable origin, a country with fragmented and unverifiable supply networks can incur higher transaction costs regardless of whether production is environmentally responsible in practice. Information capability therefore becomes part of trade capability.

This perspective changes the interpretation of sustainability finance. It is no longer only environmental expenditure. Financing farm identification, mapping, productivity, and legality can also be regarded as investment in **export-quality infrastructure**.

From Certification to Interoperable Evidence

Another implication is that sustainability architecture should evolve from a certificate-centered approach toward an evidence-centered approach. Certifications remain useful because they

provide standards, audits, organizational routines, and market signals. Yet Cosimo et al. (2024) demonstrate that certification alone does not reproduce every element of EUDR due diligence. The more scalable strategy is therefore to identify interoperable evidence already produced through certification and domestic regulatory systems and reduce duplication where possible. Farm polygons, farmer identity, legality documents, historical land-use information, mill-sourcing records, and audit results can potentially be reused across multiple sustainability requirements if data governance permits. This approach may lower compliance costs without assuming equivalence among different regulatory standards, because evidence can be reused while each regulatory system retains its own substantive requirements.

Farmer Organization as Compliance Infrastructure

Cooperatives and farmer groups are often discussed primarily as economic organizations. The literature suggests a second function: they can become **compliance infrastructure**.

A functional organization can aggregate mapping, record-keeping, credit applications, certification, training, input procurement, auditing, and buyer relationships. This can reduce transaction costs for both farmers and institutions seeking to support them, while also making the data required for traceability easier to consolidate. Evidence on farmer engagement and Indonesian smallholder traceability further indicates that social organization, training, credit access, and structured farm-to-mill records are important complements to digital traceability technologies.

However, simply registering a farmer group does not create institutional capability. Governance quality, transparency, leadership, member participation, accounting, dispute resolution, and links with mills remain important. Consequently, financing farmer organizations should include organizational development, not only administrative formation.

Additionality as the Central Financing Test

One of the most important analytical principles emerging from this review is additionality. Export-linked sustainability finance should be assessed relative to a counterfactual: **what sustainability investment would have occurred without the new financing mechanism?**

If the same farmers receive the same amount from the same public budget under a different institutional label, additionality is weak. If the system allows previously excluded farmers to receive long-maturity credit, reduces risk sufficiently to attract banks, finances geolocation that otherwise would not occur, or bridges multi-year income losses during replanting, additionality is stronger.

Additionality also has an environmental dimension. Financing should ideally produce observable outcomes beyond ordinary commercial investment for example, verified deforestation-free sourcing, strengthened land legality, biodiversity protection, or increased productivity on existing land.

The Need for Temporal Alignment

A final cross-cutting issue is timing. Sustainability standards have regulatory deadlines; replanting produces benefits only after years; land legalization can be administratively slow; cooperative development requires institution-building; and traceability systems need time to reach broad coverage.

This creates the danger of a sequencing mismatch. Markets may begin demanding data before farmers receive support. Replanting programs may improve long-term productivity but do little for near-term traceability. Certification may be completed

while unresolved land issues later create compliance problems. A coherent transition therefore requires deliberate sequencing: near-term mapping and data readiness, medium-term institutional and legal upgrading, and longer-term replanting and productivity transformation [57-68].

Conclusion

This qualitative literature review examined whether Indonesia's emerging centralized palm-oil export governance could become more than an administrative mechanism and contribute to sustainability financing, smallholder readiness, and external economic credibility. The evidence does not support a predetermined conclusion that centralization will necessarily produce either beneficial or adverse outcomes. Instead, it demonstrates that outcomes depend on a series of institutional transmission mechanisms.

The first substantive conclusion is that deforestation-free supply-chain governance increasingly converts farm-level information into a condition of market access. Legality, geolocation, traceability, supplier identity, and verifiable land-use history are therefore becoming components of international competitiveness, not merely environmental reporting.

The second conclusion is that independent-smallholder inclusion is primarily a structural capability problem. Certification, traceability, and EUDR readiness depend on land legality, farmer organization, agronomic practices, commercial relationships, finance, and institutional support. Technology can improve information, but it cannot replace these underlying conditions.

Third, replanting demonstrates why sustainability finance requires a multi-dimensional perspective. Upfront investment costs are only part of the challenge; income interruption, documentation, eligibility, agronomic support, and household liquidity matter equally. Long-term sustainable intensification therefore requires financial products aligned with biological production cycles.

Fourth, export centralization can potentially create a useful coordination node because it may improve visibility over trade and transaction flows. However, a coordination node becomes sustainability-finance infrastructure only when resources are additional, transparently governed, accessible to smallholders, and connected with effective delivery institutions.

Fifth, financial resources and institutional capability are complements. A credible architecture should therefore combine finance with legality support, farmer-group strengthening, extension, geolocation, traceability, certification preparation, and market integration.

Sixth, verifiable domestic compliance can contribute to Indonesia's evidence base in economic diplomacy, but it should not be treated as an automatic source of bargaining power or as determining the outcome of WTO, EUDR, CEPA, or other regulatory processes. External recognition remains governed by the relevant legal and institutional frameworks.

Finally, centralized export governance introduces risks that must be evaluated empirically, including exporter liquidity, transaction speed, market concentration, price discovery, mandate conflicts, data integrity, smallholder exclusion, and sustainability-fund governance. The appropriate academic approach is therefore neither advocacy for nor opposition to centralization, but systematic evaluation of these competing mechanisms.

Future research should exploit implementation data as the new architecture matures. Priority indicators include export-processing time, working-capital requirements, realized export prices, transaction costs, participation of independent smallholders, distribution of sustainability finance, replanting uptake, legal-documentation progress, traceability coverage, certification outcomes, environmental performance, and continued access to major export markets.

Indonesia's central strategic challenge is consequently broader than compliance with any single foreign regulation. It is whether domestic trade institutions, financial systems, farmer organizations, and sustainability governance can be connected strongly enough that environmental compliance, rural inclusion, and trade competitiveness become mutually reinforcing rather than competing objectives.

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