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Beyond the 30% ISPO Threshold: Building Inclusive Palm Oil Supply Chains through Smallholder Certification, Institutional Readiness, and Replanting Policy Integration in Indonesia

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ABSTRACT

Indonesia's evolving Indonesian Sustainable Palm Oil (ISPO) certification regime links palm oil mill supply-chain accounting to the sustainability readiness of upstream growers. This qualitative literature review critically examines how the minimum 30% ISPO-certified fresh fruit bunch input requirement at initial mass-balance certification could promote, or undermine, independent smallholder inclusion. Drawing on 56 peer-reviewed journal articles published during 2020–2026 and pertinent Indonesian regulatory documents, the review integrates public–private governance, value-chain upgrading, collective-action capacity, agronomic resilience, and policy interoperability. Seven thematic findings identify the importance of legally precise transition arrangements; land and group readiness; mill procurement incentives; benefits beyond price premiums; complementarity between ISPO and the Smallholder Palm Oil Replanting Program (PSR); affordable, credible assurance; and cross-sector coordination. The analysis distinguishes inclusive upgrading from certified supplier substitution and proposes conditional reuse of verified ISPO evidence in PSR applications without replacing program-specific eligibility assessment. An outcome-oriented implementation roadmap connects transparent chain-of-custody accounting with funded independent-farmer support, risk-proportionate surveillance, privacy-aware digital records, and independent evaluation. The principal conclusion is that certified-input compliance creates potential demand for farmer capability-building, but genuine sustainability gains depend on implementation incentives and the number and diversity of smallholders achieving durable improvements in farm management, safety, market participation, and replanting readiness.

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Introduction

Indonesia's sustainability debate in the palm oil sector is entering a phase in which compliance by processing enterprises is expected to shape behavior upstream of the mill gate. Rather than considering certification solely as an attribute of an estate, the Indonesian Sustainable Palm Oil (ISPO) framework increasingly connects buyers, fresh fruit bunch (FFB) suppliers, plantation management, and traceable product flows. This creates a public-policy opportunity: a purchasing obligation could transmit incentives to previously underserved independent smallholders. Yet the same mechanism could produce unequal market access if mills respond by concentrating certified purchases among estates and better-resourced suppliers. This ambiguity reflects longstanding problems of institutional coherence, private–public interaction, and smallholder certification barriers in Indonesia [1-3].

The immediate policy issue concerns the minimum certified-input requirement in Minister of Agriculture Regulation No. 33 of 2025. Article 24(4) requires at least 30% ISPO-certified FFB at initial certification under the mass-balance model, followed by increases in subsequent years; Article 24(3) instead requires fully ISPO-certified FFB for segregation. Article 26 assigns detailed supply-chain calculation guidance to the Director General, while Article 82 provides that the supply-chain assessment provisions must take effect no later than one year after promulgation of the regulation on November 26, 2025. Consequently, the threshold should not be interpreted as a general prohibition on purchasing FFB from uncertified growers. A letter dated October 13, 2026 from the relevant agriculture directorate was subsequently reported as contemplating phased compliance for already-certified enterprises that had not reached the threshold. Because the original signed letter and detailed implementing provisions have not been independently authenticated in this review, the reported transition is interpreted cautiously and not as a formal amendment of the governing regulation.

The economic significance of this distinction is substantial. Independent growers often face documentation gaps, fragmented landholdings, costly verification, weak bargaining power, and uneven access to training. Certification requirements therefore interact with pre-existing inequalities rather than falling onto a uniform population of producers. Studies of Indonesian independent smallholders demonstrate that land legality and organizational

capacity are critical preconditions for participation, while the costs of obtaining certification can remain disproportionate for smaller farms Direct evidence from North Sumatra also indicates that farmers' willingness and ability to pay may cover only part of certification costs, reinforcing the rationale for targeted rather than uniform public assistance Evidence from zero-deforestation initiatives similarly suggests that supplier reach is selective and that participation frequently depends on the resources available to intermediaries and producers Market debates commonly focus on whether a sustainability certificate produces a measurable premium above the ordinary FFB price. This is a legitimate question for producers who must absorb documentation, group membership, farm adjustments, and recurrent assurance costs. However, certification can also alter the trajectory of production by improving harvest safety, fertilizer decisions, planting-material selection, financial records, and long-term reinvestment. The magnitude and timing of such benefits are uncertain, and some are experienced as avoided costs rather than higher daily sale prices. Research on welfare and certification identifies distributional effects and tradeoffs rather than a universal positive premium [4-12].

A further connection is frequently overlooked: sustainable management of an oil palm enterprise requires preparation for the end of its productive planting cycle. Trees age, yields change, harvesting becomes difficult, and a farmer must eventually decide whether and when to replant. Replanting, however, entails the temporary loss of regular harvest income, large establishment costs, and uncertainties about tenure and public assistance. Indonesian studies show that growers' willingness and ability to replant are shaped by subsidy design, collective action, and local socioeconomic constraints ISPO could help producers prepare for these decisions if certification records become useful operational assets rather than one-time audit files [13-16].

This critical qualitative literature review examines the relationship between supply-chain requirements, independent smallholder capability, and the Smallholder Palm Oil Replanting Program (Peremajaan Sawit Rakyat, PSR). Its central argument is conditional: the 30% threshold can support sustainable upgrading only where legally clear transition arrangements are combined with targeted smallholder assistance, inclusive procurement incentives, independent assurance, and carefully governed reuse of verified administrative information. The article synthesizes research published between 2020 and 2026, interprets relevant Indonesian regulatory documents, and develops a mechanism-based policy framework. It intentionally does not claim that changes in certificate counts alone prove improvements in livelihoods, environmental outcomes, or the number of previously excluded farmers participating in certified supply chains.

Literature Review and Conceptual Foundations

Public–Private Sustainability Governance and Certification

Sustainability certification simultaneously functions as a regulatory signal, a product-assurance mechanism, a management discipline, and a potential condition of market participation. ISPO differs institutionally from voluntary Roundtable on Sustainable Palm Oil (RSPO) arrangements, particularly in its state-centered legal foundation and mandatory orientation for relevant producer categories. The existence of a standard does not, by itself, resolve competing demands involving trade, domestic development, land legality, and public accountability. Scholarship on Indonesian certification describes political contestation and institutional fragmentation, while broader work on public–private governance emphasizes the conditions under which standards reinforce or displace one another [17].

These debates suggest that the effectiveness of certification should be evaluated along three dimensions. Regulatory effectiveness concerns clearly defined obligations, feasible enforcement, and reliable assurance. Distributive effectiveness asks who bears compliance costs, who captures economic returns, and who is excluded. Substantive effectiveness addresses changes in practices and outcomes in fields, workplaces, and landscapes. A historical-institutionalist perspective also indicates that new sustainability requirements are implemented through inherited institutions whose incentives may not match current objectives. Indonesian studies of changing policy pathways and local resistance illustrate why formal rules should be assessed against their operational interpretation A broad review of smallholder palm oil sustainability likewise finds that certification has delivered uneven improvements, emphasizing the gap between standard-setting and measurable outcomes [18-21].

Mass Balance, Supply-Chain Traceability, and Value-Chain Upgrading

Mass balance is a chain-of-custody accounting arrangement that allows certified and noncertified inputs to be handled within controlled systems while accounting for eligible certified volumes under the applicable rules. Segregation, by contrast, requires certified material to remain separated according to the relevant certification scheme's conditions. Neither model should be described loosely as proof that every physical unit in a mass-balance product originated on a certified farm. Certified-volume reconciliation, supplier identity, incoming weights, and transaction integrity are therefore essential to the credibility of any claim. Technologies for recording FFB sales, spatial provenance, and digital agreements may support traceability, but their effectiveness depends on governance and data quality A global value-chain perspective identifies the mill as both a purchasing gatekeeper and a possible organizer of supplier upgrading. A buyer can help farmers improve practices by sharing field services, information, record systems, or group certification costs. Alternatively, a buyer facing a deadline can satisfy its input quota from already-certified large estates, leaving hard-to-reach independent farmers unchanged. Evidence on zero-deforestation sourcing shows that corporate commitments do not necessarily extend to the most vulnerable or least organized producers, especially where supply chains contain multiple intermediaries Thus, a higher certified input share and broader inclusion are separate outcomes requiring separate indicators [22-24].

Collective Action and Heterogeneous Smallholder Readiness

Individual smallholders face a high ratio of fixed certification costs to marketed output. Group formation and internal control systems can spread administrative expenses and provide a basis for training, monitoring, grievance handling, and documented corrective action. Yet organizational form should not be equated automatically with organizational quality. Effective groups need trustworthy leadership, member records, transparent fee allocation, and practical capacity to support members whose documentary and agronomic starting points differ substantially. Comparative smallholder certification studies identify these organizational and learning barriers, including outside Indonesia, where they illuminate general mechanisms without establishing direct ISPO effects Evidence from Sabah provides a relevant regional comparator: jurisdictional certification can reproduce unequal access to support when smallholder groups differ in land security, finance, and technical capacity.

A capability approach extends this assessment beyond whether farmers can produce documents for an auditor. It asks whether producers can obtain affordable inputs, understand safety requirements, plan future expenditures, negotiate with purchasers, and recover from income interruptions. Resilience also depends on farm and off-farm income diversification, access to formal and informal credit, and exposure to commodity-price volatility. Indonesian evidence shows that the welfare implications of smallholder oil palm cultivation are heterogeneous, and that farmers' responses to industry pressures reflect different resource an inclusive supply-chain program must therefore differentiate its intervention rather than treating all uncertified suppliers as one category [25-29].

Sustainable Agronomy, Occupational Safety, and Ecological Limits

Productivity and sustainability are linked but not synonymous. Better planting material, timely harvesting, balanced fertilizer applications, and soil and water management can improve performance on poorly managed farms; however, impacts depend on rainfall, local soils, previous management, available capital, and growers' ability to follow recommendations. Research identifies large yield gaps but also documents heterogeneous and sometimes statistically inconclusive results from specific better-management interventions Accordingly, the review treats agronomic gains as plausible, context-dependent mechanisms rather than guaranteed outcomes of certification. The social and environmental components of farm performance are equally material. Harvesting exposes workers to falls, heavy loads, cutting tools, terrain, and hazards near infrastructure. Training, equipment, hazard assessment, and social protection should be valued even when they do not appear directly in FFB prices. Indonesian occupational studies offer evidence of ergonomic risks and potential gains from safety education, although neither establishes a causal benefit attributable specifically to ISPO Ecological performance must also include biodiversity, nutrient leakage, and land-use responses, rather than only the number of hectares managed under a standard [30-36].

Replanting as a Dynamic Component of Sustainability

An oil palm enterprise is a multidecade investment whose productivity profile cannot be maintained indefinitely without renewal. Replanting is not simply the mechanical replacement of old palms: it requires credible tenure, appropriate seedlings, operational planning, site assessment, income arrangements for the immature phase, and safeguards for biological diversity. Research on replanting challenges indicates that the decision involves household finance and perceived vulnerability as much as technical tree age. Replanting can also create temporal ecological disruption, so improved agronomy and habitat management remain necessary This perspective motivates an institutional link between certification and PSR. Group certification may produce verified identity, georeferenced plots, management records, and observations about farm condition that are also useful in assessing replanting applications. Nevertheless, shared documentary needs do not create automatic eligibility. A PSR administrator must still check program-specific requirements, current tenure validity, agronomic suitability, funding conditions, and risks of double counting. Studies on land insecurity and replanting participation underscore that legitimate documentary verification cannot be replaced by a simple certificate-status flag [37-40].

Methods: An Interpretive Qualitative Literature Review

The research applies an interpretive qualitative literature review that combines critical narrative synthesis with thematic comparison. It is not a systematic literature review, does not use PRISMA, and does not claim comprehensive enumeration of all eligible publications. Its purpose is to clarify mechanisms, evaluate rival explanations, identify policy complementarities, and construct a defensible implementation framework. The unit of analysis is a substantive proposition—such as the relationship between group organization and audit costs—rather than a pooled effect size. The review integrates empirical articles with theoretical governance scholarship while keeping formal regulatory texts in a separate primary-policy evidence category.

The review gives priority to peer-reviewed journal literature published from 2020 through 2026. Core search concepts include ISPO, RSPO, smallholder certification, palm oil traceability, FFB purchasing, organizational readiness, land tenure, oil palm yields, safety, replanting, sustainability performance, and Indonesia. Complementary research from Thailand, Malaysia, and Ghana is considered where it illuminates a mechanism or provides a useful contrast; it is not treated as if it measured Indonesian ISPO outcomes. The literature set is purposive, multidisciplinary, and updated iteratively as tensions or underexamined relationships arise in the analysis Texts are interpreted within seven thematic domains: legal transition; barriers to smallholder readiness; buyer behavior and inclusion; agronomic and social value; certification–replanting complementarity; finance, assurance, and digital infrastructure; and interagency governance. For each domain, the synthesis distinguishes the problem documented, mechanism proposed, supporting observations, counterevidence, and practical policy implications. This deliberate separation of evidence from inference is particularly important when scholarship on voluntary RSPO certification is used to anticipate the implications of a mandatory public standard. The review also asks who bears a cost or captures a benefit rather than simply whether aggregate outcomes improve.

Methodological credibility is evaluated qualitatively through the transparency of study design, the relevance of study locations, measurement of outcomes, specificity of interventions, recognition of selection bias, and interpretive scope. Strong claims of causality are avoided for cross-sectional or observational associations. The value of a published finding is considered together with its limitations: a district-level certification association need not imply an effect on a specific independent farm; favorable outcomes in a highly organized cooperative may not transfer to isolated growers; and compliance data cannot substitute for independent welfare or landscape measures. Contradictory results are preserved as informative rather than averaged away.

The analysis of law and policy relies on the text of Presidential Regulation No. 16 of 2025, Minister of Agriculture Regulation No. 33 of 2025, and Minister of Agriculture Regulation No. 13 of 2024. Article 24 of the 2025 ministerial regulation is central to distinguishing the mass-balance 30% condition from the segregation pathway; Article 80 provides a basis for prioritizing certified smallholders in specified funding facilitation. The 2024 FFB pricing framework applies to partnered growers within its legal scope and should not be generalized automatically to every informal sale by an independent farmer. A media report about the October 2026 directorate letter is contextual rather than equivalent to an authenticated legal text. Because rules, administrative procedures, and publication records change, this manuscript is a time-bounded interpretation as of early November 2026. It does not report field interviews, audit records, mill procurement

registers, or administrative data on certification and PSR applicants. Accordingly, statements about the likely operation of an integrated system are reasoned policy proposals rather than observed program effects. The article proposes prospective evaluation designs so that implementation can be tested empirically. This reflexive boundary is especially important where politically salient concerns about farm-gate prices coexist with the legitimate objective of strengthening domestic sustainability standards.

Results: Thematic Findings

Theme 1: A Threshold Whose Meaning Depends on Implementation

The first finding is that the significance of the certified-input requirement depends on the correct distinction between a chain-of-custody condition and a blanket farm-level marketing restriction. Under Article 24 of Regulation No. 33/2025, mass balance permits a controlled mixture of certified and noncertified inputs but requires accounting that demonstrates the minimum certified share at the designated certification stage. By contrast, a segregation model is designed around certified material streams. The reported October 2026 correspondence suggests administrative awareness of transition difficulties, but does not itself establish a new statutory exemption or revise the regulation's underlying percentages. Technical guidance issued under Article 26 must clarify measurement periods, admissible evidence, transaction reconciliation, responsible authorities, and the legal basis for any transitional discretion. Article 82 adds a distinct commencement issue: supply-chain assessment must take effect no later than one year after the November 26, 2025 promulgation, although the article does not prescribe an identical company-level milestone for every mill. The second finding is a substantial risk of communication failure. An independent grower may hear that mills are required to purchase certified FFB and infer that all uncertified material is about to become unsaleable, while a mill may anticipate enforcement before local supplier certification is realistically achievable. These reactions do not have to be factually correct to affect investment or commercial behavior. The wider governance literature shows that unclear authority and disputed certification legitimacy can produce implementation resistance or selective compliance A clear public implementation note should therefore specify what the threshold does and does not regulate.

Figure 1 sets out the review's conceptual theory of change and makes visible the central implementation risk. Rather than assuming that certified procurement automatically benefits independent farmers, it treats mill decisions as a branching mechanism that can direct the same legal requirement toward either supplier development or supplier replacement.

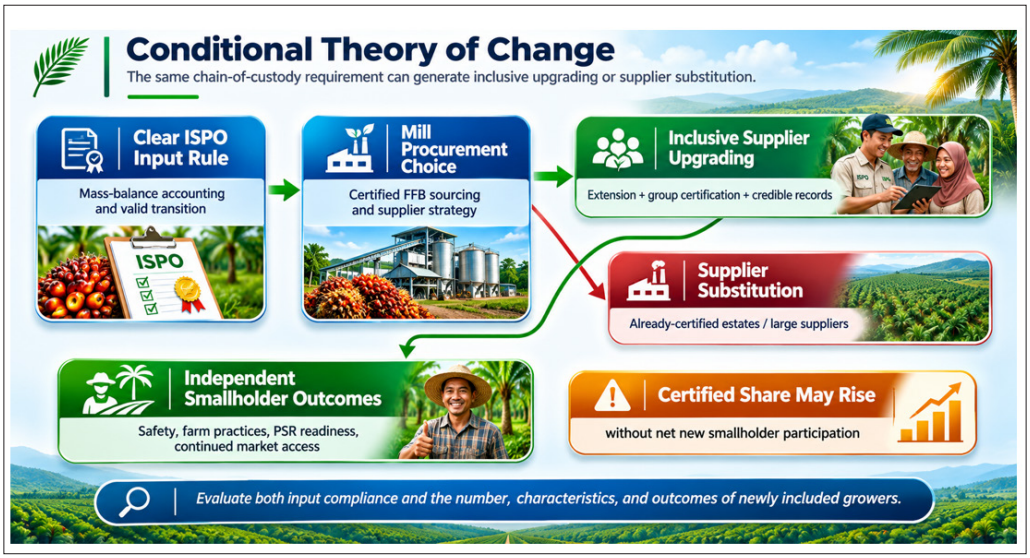


Figure 1: Conditional Theory of Change from ISPO Certified-Input Accounting to Inclusive Upgrading or Supplier Substitution (Original Conceptual Synthesis).

The upper pathway in Figure 1 links legally specified input accounting, funded producer development, stronger group systems, verifiable farm improvements, and potentially greater readiness for replanting. The lower pathway represents preferential buying from already-certified estates or intermediaries, in which the mill's certified share may rise without measurable improvement among previously uncertified independent suppliers. These pathways coexist with the possibility of mixed strategies. Therefore, credible monitoring needs both chain-of-custody ratios and indicators for new independent-farmer participation, corrective action, and post-certification performance.

Theme 2: Readiness is Organizational and Distributive

The reviewed literature repeatedly identifies farmer documentation, tenure clarity, group capacity, transaction records, and practical agronomic support as readiness bottlenecks. Indonesia's land governance conditions can make nominal ownership and accepted documentation diverge, while geographical distance raises the costs of repeated verification. These barriers may be most pronounced for growers who lack long-term relationships with a mill or organized collective. Studies of certification preconditions and ISPO adoption underscore the importance of land rights, awareness, institutional support, and local implementation capacity A 2026 case-based study across three districts of Riau similarly highlights the mismatch between certification targets and the time and resources required to resolve prerequisite barriers [41].

The existence of farmer organizations does not eliminate this disadvantage. Groups need operational recordkeeping, defensible internal inspections, transparent member lists, decision rights, and mechanisms for handling noncompliance. A group formed solely to satisfy a grant or certification application may be unable to maintain ongoing surveillance obligations. Evidence from organized Indonesian smallholder systems shows that long-term collective action can support resilience, but experience and local context matter greatly the resulting policy implication is not simply to increase the number of associations but to invest in verifiable institutional functions that persist between audit visits [53].

Certification costs are also unevenly distributed. Training, geographic mapping, internal controls, external audits, and monitoring can include fixed expenditures that individual growers cannot recover quickly through improved sales. The logic of group-level economies of scale is supported by work examining cost reduction for sustainability standards, yet successful aggregation requires accountable leadership and realistic participation costs Studies of farmer incentives and comparative certification adoption suggest that official mandates alone cannot replace perceived usefulness, credible support, and appropriate communication.

Theme 3: Demand Pull can Create Upgrading or Displacement
A certified sourcing threshold can make formerly optional supplier development economically relevant to mills. Where mills depend on independent FFB and cannot meet evolving certified-volume targets from their existing sources, they may have incentives to support mapping, training, internal control systems, and independent group certification. Such support can spread the cost of compliance across a buyer network and establish more stable commercial relationships. Evidence from smallholder adoption research suggests that access to guidance, reduced information barriers, and well-designed incentives can strengthen participation, although effect sizes cannot be generalized to all regions an equally plausible response is certified supplier substitution. A processor may increase certified-input ratios by reallocating purchases toward large estates, already-verified groups, or distant suppliers. Such strategies could be rational under tight deadlines, uncertain enforcement, or inadequate local extension budgets, even though they do little to upgrade the existing independent grower base. Research on corporate deforestation commitments indicates limited reach into complex smallholder networks, while farm-level participation is shaped by institutional accessibility A governance design that measures only certified tonnage will therefore reward both the inclusive and exclusionary pathways equally.

Figure 2 distinguishes the logic of mass-balance accounting from segregation and illustrates how a processor might interpret the certified-input threshold. The graphic is conceptual, not evidence of an observed certified volume at any particular Indonesian mill; actual accounting requires compliance with applicable technical provisions and independently verified transactions.



Figure 2: Conceptual Comparison of Initial Mass-Balance Input Accounting and Segregation Under the ISPO Supply-Chain Framework (Illustration, not Actual Mill Data).

In the mass-balance illustration in Figure 2, certified and noncertified FFB can enter a controlled accounting boundary, while the certified proportion must satisfy the applicable minimum at initial certification. The illustration does not imply that individual mixed physical outputs can truthfully be described as containing a fixed percentage of certified oil. Segregation instead illustrates a separate certified input stream. The distinction is fundamental for consumer claims, transaction monitoring, and fraud prevention. Digital records may help, but credible source documents and independent sampling remain important [43].

Theme 4: Value Extends Beyond a Certificate Premium
The evidence on certification's farm-level benefits is mixed. Some studies identify favorable associations with economic or social outcomes, whereas others show that certification effects depend on farmer selection, context, or the specific practice assessed. Indonesian evidence on village welfare and poverty does not establish a uniformly positive impact, while a study of smallholder RSPO certification raises questions about economic gains alongside increased agrochemical use. Work directly comparing certified and noncertified farm productivity also requires careful treatment of causal identification and management variation Findings from certified farms in Ghana offer a comparator rather than proof of outcomes under Indonesian ISPO [50-55].

Agronomic improvement constitutes a more specific potential route to value. Planting material of reliable quality, field-specific nutrient management, drainage and soil stewardship, harvest intervals, and reliable crop records are relevant to yield, input expenditure, and future replanting. Empirical agronomy research identifies substantial yield gaps on smallholder land and demonstrates that

management opportunities can exist even without horizontal expansion Nevertheless, field trials of better practices do not always detect statistically reliable yield improvements within their study periods, and responses to fertilization and Nature-Based management remain heterogeneous [51-54].

Workplace protection is an additional, often underpriced benefit. Oil palm harvesting entails biomechanical strain, cut injuries, falling fronds, work near transport routes, and potential proximity to electrical conductors. Safety training, hazard identification, protective equipment, equipment maintenance, and suitable health and social protection can reduce exposure even when the benefit appears as the absence of an incident. Studies of ergonomic hazards and occupational health education among Indonesian plantation workers motivate such practices, but direct ISPO-specific accident-reduction effects remain insufficiently established Certification audits should thus verify working safeguards rather than equating the presence of written procedures with actual safety. Ecological safeguards require similarly nuanced evaluation. Reduced conversion pressure, soil integrity, riparian protections, and better management of biodiversity can contribute to sustainability, but greater yields can also alter economic incentives to expand planted areas. Research on the relationship between farm management and ecological functions shows that economic and ecological performance need not always move together, while modeling of market responses warns that intensification can create land-use rebound effects A credible ISPO outcome framework should therefore track spatial land-use change and environmental practices alongside production and earnings, without assuming that high productivity is automatically equivalent to landscape sustainability.

Figure 3 translates the varied conditions documented across studies into an actionable smallholder capability matrix. The domains are deliberately interdependent; a grower with good agronomic practice but unresolved tenure or no viable group record system may still face substantial barriers to certification and public support.

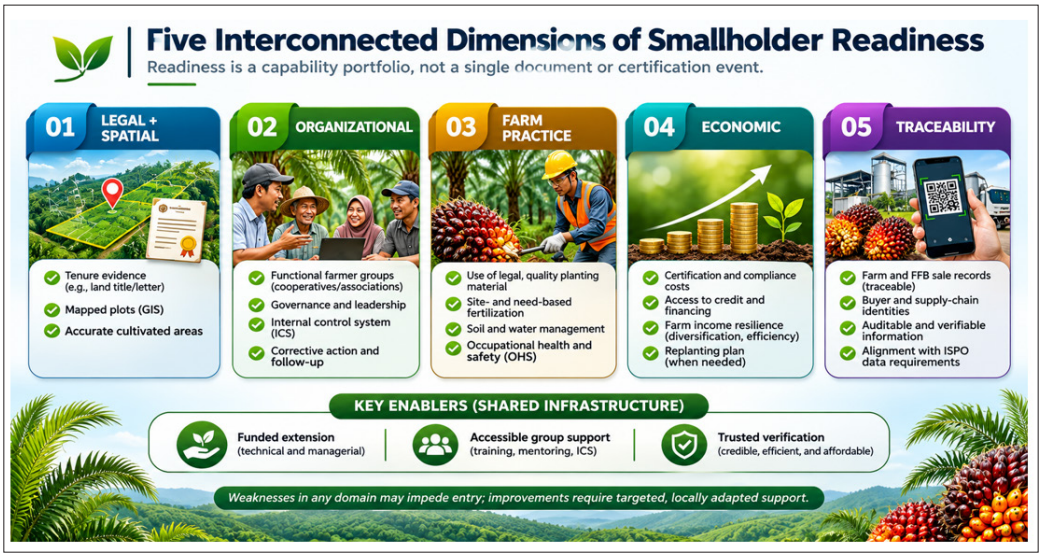


Figure 3: Five Interdependent Capability Domains of Independent Oil Palm Smallholder Readiness (Original Thematic Synthesis).

The five domains in Figure 3 are legal and geospatial readiness, organization and internal controls, agronomy and workplace safety, economic resilience and replanting planning, and traceability with auditable transaction records. Each domain needs baseline assessment, an assigned service provider, time-bound corrective actions, and verification of completion. This integrated approach is consistent with empirical accounts of institutional barriers, land insecurity, and farm performance, while avoiding the assumption that any single training session can address systemic disadvantages [56].

Theme 5: ISPO and PSR Share a Readiness Infrastructure

ISPO can help establish the information and organizational discipline necessary to assess replanting readiness. A farmer group may already hold member identities, plot coordinates, cultivated area, land documentation, management records, and observations about crop condition. These materials may be relevant for PSR applications, where land eligibility, productivity, age, planting material, work planning, and financing must be evaluated. Research on farmers' replanting decisions suggests that access to credible technical advice and administrative assistance could reduce uncertainty and avoid preventable delays [45].

However, administrative overlap should not be confused with the identity of legal tests. Regulation No. 33/2025 provides for prioritization of ISPO-certified smallholders in specified funding facilitation, including replanting-related support, but a certificate does not authorize immediate replacement of every certified holding. Nor does certification guarantee an approved PSR proposal. Decisions remain dependent on plantation-specific facts, current eligibility criteria, technical feasibility, documentation, and program budgets. Research into subsidy preferences and the sufficiency of replanting support suggests that finance and income constraints can remain severe even when a public scheme exists the practical opportunity is a disciplined once-only approach to evidence collection: verify a data element once, record its provenance, maintain its currency, and allow authorized officers to reuse it when the second program requires an equivalent standard. This would not eliminate necessary reinspection where a plot boundary has changed, a legal document has expired, or PSR requires additional proof. Instead, it could shift scarce field resources from repetitive collection toward unresolved discrepancies and targeted technical assessment. Studies of spatial databases, digital transaction monitoring,

and certification traceability support the feasibility of more interoperable information, although governance arrangements remain decisive [42].

Figure 4 proposes a possible architecture for verified-information reuse between group ISPO and PSR. It is a policy design rather than a description of a currently integrated government platform, and its safeguards are as important as its proposed efficiency gains.

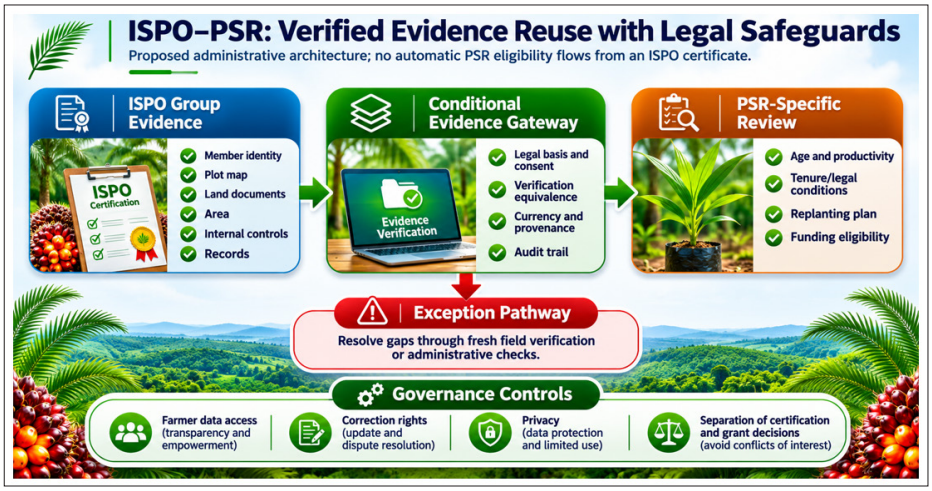


Figure 4: Proposed ispo–per Verification-Evidence Reuse Architecture with Additional Psr Eligibility Assessment and Safeguards (policy proposal).

In Figure 4, ISPO assessment supplies documentary evidence only if the data element is legally shareable, current, sufficiently precise, and produced under a verification protocol acceptable to the PSR authority. A shared verification registry could retain source, date, consent or legal basis, and audit trail, while PSR officers perform any additional checks for replanting eligibility, technical plans, and financing. Failure to meet equivalence rules triggers fresh verification rather than automatic approval. This distinction responds to land-status risk and farmer heterogeneity identified in recent studies

Theme 6: Funding and Assurance Must Lower Real Compliance Costs

The availability of a funding window does not mean an independent farmer can access it effectively. Government support authorized through ISPO-related policy may cover assistance in documentation, group strengthening, certification and surveillance, but operational delivery depends on application procedures, eligibility, administrative capacity, and local service provision. The literature on ISPO adoption and certification-cost structures indicates that poorly organized groups and large fixed expenditures can still suppress participation public implementation should therefore report not only appropriations or nominal beneficiaries, but also application completion rates, median processing time, farmer-paid costs, and the distribution of funding across smallholder categories.

Surveillance arrangements also pose an enduring cost problem. Physical farm inspection is important for checking matters that cannot be verified remotely, including occupational conditions, site-level environmental issues, boundaries, and management practices. Repeated travel to remote plots can nevertheless be expensive, and an overly mechanical audit cycle risks diverting resources from real corrective action. A risk-proportionate model could combine mandatory site visits with geospatial checks, digital transaction reconciliations, exception reporting, and targeted unannounced verification where permitted by accredited procedures. Digital or remote examination should supplement, not replace, independent judgment or on-the-ground evidence for high-risk findings.

Digital systems also introduce threats. Incomplete seller identities, nonunique plot identifiers, recycled documentation, erroneous geospatial mapping, and manipulated incoming weights can compromise traceability even when records appear technically sophisticated. Blockchain systems do not independently guarantee that data entered at the first point of sale are true. Experience from traceability proposals and palm oil transaction platforms therefore supports treating data governance, field validation, human review, and interoperability as foundational infrastructure rather than optional enhancements (Afrianto et al., 2022; El Hathat et al., 2023; Kannan et al., 2023). A practical system must also offer low-connectivity access and grievance mechanisms for farmers wrongly flagged as ineligible.

Theme 7: Coordination Across Sectors Determines System Coherence

Expansion of the ISPO framework across plantation activities, downstream industry, and bioenergy increases the importance of synchronized interpretation among the Ministry of Agriculture, Ministry of Industry, the energy ministry, BPDP, accreditation institutions, certification bodies, and local governments. Each sector has legitimate assurance needs, but repeated verification of identical facts can impose unnecessary cost. The institutional record of palm oil certification in Indonesia emphasizes the risk of fragmented governance and inconsistent application, suggesting that agreement on shared definitions, data elements, and permissible reliance between auditors is essential the external trade environment adds further complexity. Voluntary and domestic standards may help establish organizational capabilities, but they do not automatically satisfy separate destination-market requirements, including rules concerning deforestation-free trade and geolocation. Studies evaluating the implications of the European Union Deforestation Regulation indicate both trade pressures and implementation challenges for exporting countries, especially where smallholder records are incomplete Alignment across schemes could reduce duplication where technical equivalence exists, but policymakers must avoid misleading claims that holding an ISPO certificate substitute for any other legally required due diligence [47- 52].

Discussion and Policy Analysis

Compliance and Inclusion are Contingent, not Mutually Exclusive

The synthesis supports a conditional rather than categorical response to concerns about the 30% rule. There is no necessary logical connection between an initial mass-balance sourcing threshold and an immediate ban on uncertified FFB. Equally, the existence of a technically permissible transition does not guarantee that all mills will continue purchasing from vulnerable suppliers. Commercial decisions depend on certified sourcing options, logistical costs, uncertainty, demand from downstream buyers, and local government oversight. This interpretation reconciles the concern that compliance may shift markets against the possibility that the same rule can finance supplier upgrading. The key policy question is which behavioral pathway implementation makes most attractive the temporal mismatch between buyer obligations and farmer readiness deserves explicit recognition. Mills can revise purchasing mixes quickly, whereas group certification may require extended work on title documents, institutional capacity, agronomy, and audits. A phased mechanism is therefore justifiable when it is anchored in valid legal authority, published milestones, and verifiable progress, with any discretion interpreted consistently with Articles 26 and 81–82 of Regulation No. 33/2025. It becomes counterproductive if firms can repeatedly seek extensions without building independent supplier capacity. An inclusive transition should pair progressive purchasing goals with independently assessed milestones for mapping, application readiness, farmer training, first-time certification, and the continuing share of purchases sourced from pre-existing smallholder suppliers. The associated price question requires a legally precise response. Minister of Agriculture Regulation No. 13/2024 establishes a regulatory framework for purchasing FFB from partnered smallholders within its defined arrangements; its legal protections should not be expanded rhetorically to every transaction involving nonpartner independent growers. At the same time, certification status should not be treated as an arbitrary justification for unlawful discounts or discriminatory procurement. Officials should clarify price-setting obligations by marketing channel, promote transparent receipts for FFB transactions, and provide accessible complaint pathways. Without channel-specific safeguards, broad assurances that farmers are protected could mask important gaps in practice.

A Credible Pathway from Certification to Farm Performance

For farmers, the most compelling argument for ISPO is not simply that it serves export-market preferences. It is that certification can supply a structured diagnosis of how an enterprise is managed and what needs improvement. For example, inadequate seedling provenance, unsafe harvesting procedures, weak nutrient records, and unplanned replanting may not cause an immediate certification failure alone, but each can expose the household to future costs. Making audit findings actionable requires guidance, affordable corrective measures, clear responsibilities, and repeated follow-up. Evidence on yield gaps and farm resilience makes it plausible that these interventions can create benefits, while mixed results from agronomic trials warn against universal productivity claims The benefits should be measured through a balanced scorecard that distinguishes outputs, intermediate changes, and outcomes. Outputs include certificates, documented farms, extension sessions, and verified chain-of-custody transactions. Intermediate measures include correct fertilizer practices, recorded plot histories, functioning group controls, documented hazard mitigation, and credible replanting plans. Outcomes include FFB yields adjusted for palm age, net margin after input costs, injury rates, lost workdays, biodiversity safeguards, tenure disputes resolved, and stable market participation. Such a scorecard acknowledges the possibility of tradeoffs, including chemical intensification and land-expansion responses, that would be obscured by a certificate-only performance metric.

ISPO–PSR Integration Should Target Administrative Friction, not Legal Shortcuts

An ISPO–PSR bridge could become an important policy innovation if it operates as a verified-document reuse service instead of a blanket eligibility waiver. The economic argument is compelling: repeated land mapping, identity confirmation, and group documentation impose real time and cost burdens on applicants and field officers. Reusing trustworthy, current evidence under suitable authority could reduce paperwork while improving data consistency. It would also allow PSR caseworkers to focus on the truly distinctive elements of replanting eligibility and financial planning. Yet the quality of the original certification record, local land disputes, and the farmer's ability to maintain an income bridge remain critical constraints This integration should be designed through an explicit data dictionary and a verification-equivalence matrix. The matrix would identify each administrative field, its legal purpose, source institution, original inspection method, validity period, consent or statutory basis for sharing, and any required PSR-specific follow-up. Farmers must be able to correct records and appeal an erroneous mismatch, and data security controls should limit access to legitimate purposes. No certification body should become the automatic arbiter of eligibility for public finance. Likewise, PSR funding must not become conditional on unnecessary data extraction or on preferential supplier contracts imposed by mills. Public finance requires particular care during the immature phase of a replanted field. Research on farmers' preferred subsidy attributes and recent modeling of replanting support indicates that the adequacy, timing, and design of assistance can determine uptake. A nominal replanting grant may be insufficient where households cannot bridge several years without harvest revenue or where tenure problems remain unresolved ISPO records could help identify these vulnerabilities in advance, but meaningful replanting readiness requires financial counseling and, where appropriate, complementary livelihood or credit arrangements.

A Phase-Gated Roadmap for Implementation

The first phase should establish legal and operational certainty. Authorities should publish the enforceable scope of each chain-of-custody pathway, the calculation base for the mass-balance threshold, procedures for transitions authorized by regulation, and requirements for reporting certified inputs. Mills should map existing independent supplier networks before altering procurement contracts, while government and producer associations identify groups with acute legal or administrative constraints. Baseline reporting should record both certified supply volumes and the identity and number of smallholders who currently sell to a mill. This preserves the information needed to distinguish future supplier development from mere source replacement. The second phase should prioritize intensive support where the risk of exclusion is greatest. Rather than funding only the easiest farmers to certify, buyer contributions, BPDP-supported services, and local extension programs should make documentary assistance, geospatial registration, group internal controls, safety training, and agronomic planning accessible to distant and low-capacity growers. Producer associations can mediate collective applications and communicate realistic benefits, while mills can offer verifiable service commitments without making farmers dependent on unfair exclusive agreements. Evidence on the determinants of ISPO implementation and smallholder participation underscores the need to combine resources with credible local institutions [44].

In the third phase, regulators should expand reliance on reliable digital systems and evaluate outcomes independently. Surveillance resources may be allocated according to defensible risks, supplemented by random checks to detect gaming and preserve auditor independence. Results should be disaggregated by farm size, independent or partnered status, location, land-tenure category, and gender where ethical and lawful collection is appropriate. Mill-level improvement should not be credited as an inclusive success unless it is accompanied by evidence of improved access, practices, and welfare among previously uncertified independent suppliers. Periodic evaluation should then inform any subsequent adjustment of required certified sourcing proportions.

Figure 5 presents a phase-gated roadmap that links near-term legal certainty, medium-term supplier upgrading, and longer-term outcome verification. Its phases are illustrative implementation sequences, not announced government deadlines or legally prescribed percentage trajectories.

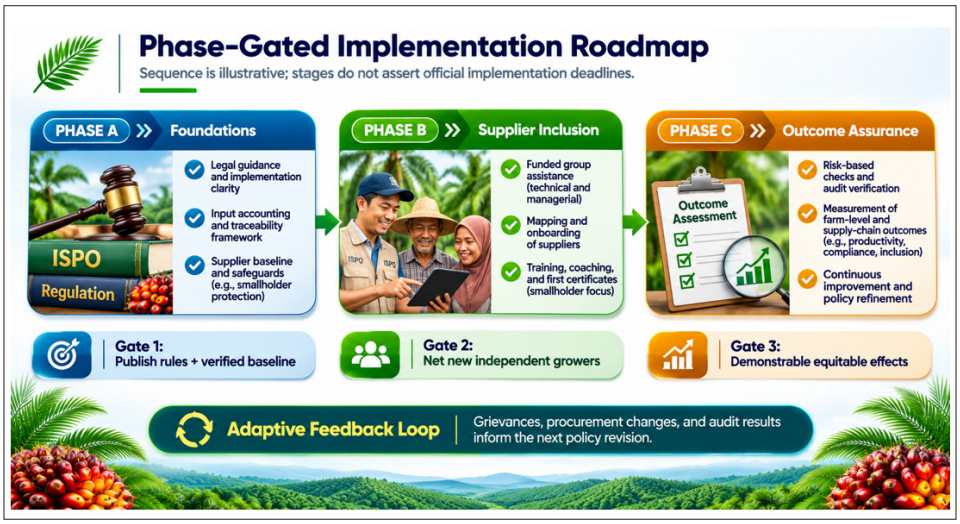


Figure 5: Illustrative Phase-Gated Ispo Implementation Pathway with Inclusion and Outcome Verification (Not an Official Timeline).

The gates in Figure 5 require different evidence before implementation advances: documented legal guidance and supplier baselines; demonstrable expansion of smallholder capacity and first-time certification; and independently verified environmental, social, production, and inclusion outcomes. The framework also includes a corrective feedback loop, allowing implementation guidance, financing arrangements, and auditing strategy to be revised when costs or exclusions exceed expectations. This approach is consistent with the view that sustainability systems must learn from implementation heterogeneity rather than simply reward visible compliance [46].

Rival Interpretations, Unintended Effects, and Evaluation

Two rival interpretations deserve serious consideration. The optimistic interpretation is that supply-chain requirements provide a market-linked reason for mills to invest in independent farmer readiness, supporting certification and better replanting plans. The pessimistic interpretation is that the reform mainly redistributes purchases toward suppliers who are already certified, with certification expenses and procurement uncertainty passed to the least prepared growers. Both are consistent with the current conceptual framework and elements of the observed literature. Therefore, analysis should be designed to falsify either account rather than presuming one from the number of certificates issued There are also risks beyond supplier replacement. Fraudulent attribution of certified volume, poorly checked group memberships, conflicts of interest in audit contracting, land disputes, inflated service fees, and inappropriate use of farmer location data can undermine trust. The policy mix may further incentivize short-term agronomic intensification without safeguards for pollution, habitats, or land conversion. Scientific evidence on environmental tradeoffs and local governance demonstrates that performance must be assessed at both farm and landscape levels A more coherent audit architecture must therefore protect assurance credibility while directing limited verification budgets toward material risks. Prospective empirical research could test the proposed mechanisms through panel surveys, buyer transaction data, geospatial analysis, and institutional process tracing. Comparative evaluation of mills with different supplier-development commitments could examine whether previously uncertified independent farmers gain stable market access while controlling for farm size, age structure, location, and pre-existing group membership. A separate administrative study could measure whether ISPO-validated records reduce PSR processing time without increasing error or wrongful denial. Work on district-level production associations and replanting participation suggests potentially useful hypotheses, but also highlights the need to avoid treating associations as proof of causation [48].

Finally, ISPO should be situated within a broader development strategy rather than treated as a universal remedy. Farm improvements depend on credit, labor, climate, agronomic knowledge, and household obligations; exports depend on trade rules beyond domestic certification; and long-term welfare depends on how risks are distributed across the value chain. The literature on palm oil welfare, national trade competitiveness, and smallholder farming systems offers no basis for reducing these interacting problems to a single certification metric The strongest defensible conclusion is that the regulation provides a potential coordination device whose ultimate value must be demonstrated through farmers' realized capabilities and independently measured outcomes [49].

Conclusions and Policy Recommendations

The minimum certified-input requirement for the ISPO mass-balance supply-chain pathway is best understood as a potential

catalyst for institutional and agronomic upgrading, not as an automatic prohibition on marketing uncertified fresh fruit bunches. Its outcomes are nevertheless contingent. When purchasing incentives favor supplier development, mills can help expand smallholder certification and better plantation management. When incentives instead reward only the certified-volume ratio, the same requirement can encourage substitution toward already-certified sellers and leave the least prepared farmers further behind. The review identifies smallholder readiness as a multidimensional condition involving defensible land information, functioning organizations, useful farm records, access to technical support, occupational safeguards, finance, and credible traceability. The benefits of certification must consequently be assessed beyond a direct FFB price premium. Avoided injuries, more disciplined input management, improved replanting preparedness, and stronger ability to participate in formal supply chains are meaningful potential outcomes, although none is automatic or equally attainable across households. The relationship between ISPO and the Smallholder Palm Oil Replanting Program represents an especially promising but conditional policy complementarity. Certification may generate verified information that can lawfully and efficiently support a later application, while PSR retains its own land, financial, and technical eligibility requirements. A shared evidence-reuse protocol, founded on data quality, appropriate authority, privacy, appeal rights, and verification equivalence, could reduce repeated paperwork without weakening public accountability. Practical implementation requires an enforceable technical roadmap for certified-volume accounting and any authorized transitions, explicit safeguards against unjustified procurement discrimination, funded institutional assistance for the least prepared groups, independent and risk-proportionate auditing, and coordination across agriculture, industry, energy, certification bodies, BPDP, and local authorities. Producer organizations should act as partners in identifying barriers and supporting members rather than treating transition policy as a question of acceptance or rejection alone. Ultimately, success should be demonstrated by the number and diversity of previously excluded smallholders who acquire durable capabilities; by improvements in farm management, worker safety, environmental stewardship, economic resilience, and verified readiness for appropriate replanting; and by the integrity of the supply chain from plot to downstream product. The 30% threshold may open this pathway, but only deliberate institutional design can convert a certification requirement into inclusive and lasting improvements in Indonesia's smallholder palm oil economy.

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