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From Degraded Landscapes to Prosperity: A Review of Oil Palm's Role in Revitalizing Degraded Former Forest Areas for Smallholder Welfare

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ABSTRACT

The global discourse on palm oil is characterized by a stark dichotomy: the commodity is aggressively "sought after" (*dicari*) for its versatility and economic efficiency, yet deeply "suspected" (*dicurigai*) for its environmental footprint. This study employs a qualitative literature review to explore the narrative of land optimization, specifically examining how oil palm expansion on degraded, formerly forested lands serves as an engine of rural welfare in Indonesia. Unlike systematic reviews that focus on statistical meta-analysis, this research synthesizes thematic narratives from academic literature (2020–2026) and expert policy insights. The findings reveal that a significant proportion of smallholder expansion occurs on "disturbed lands"—areas previously logged or abandoned—rather than primary forests, effectively transforming economic "ghost towns" into productive agricultural hubs. While the sector demonstrably raises household incomes above the rural poverty line compared with rubber or rice cultivation, structural inequalities persist between scheme (*plasma*) and independent (*swadaya*) smallholders in terms of yields and access to certification. The study concludes that optimizing the conversion of degraded lands, coupled with rigorous intensification and mandatory certification (ISPO), offers a viable pathway to reconcile the trade-off between ecological preservation and the economic rights of developing regions.

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Introduction

Background of the Study

The Indonesian oil palm sector operates within a paradox of global proportions. On the one hand, the commodity is ubiquitous and indispensable; it is a critical ingredient in a vast array of consumer goods, from food products such as margarine and cooking oil to industrial applications in oleochemicals and biodiesel. This "sought after" (*dicari*) nature stems from the crop's unrivaled productivity per hectare and its positive elasticity of demand relative to global income growth. On the other hand, the sector faces intense scrutiny and is "suspected" (*dicurigai*) of being a primary driver of deforestation, biodiversity loss, and hydrological disruption, such as flash floods in Sumatra [1-3].

However, the narrative of deforestation often obscures a critical historical transition in Indonesia's land use: the shift from extractive industries (logging and mining) to cultivation. As timber concessions from the late 20th century were abandoned, they left behind vast swathes of "degraded land" or "disturbed forests." In this vacuum, oil palm emerged not merely as a cause of new clearing but as a rehabilitative economic force for these abandoned landscapes. Furthermore, the sector's demographic profile has shifted fundamentally. No longer the exclusive domain of conglomerates, approximately 40-45% of Indonesia's oil palm plantations are now managed by smallholders, placing millions of rural families at the center of this agro-economic transformation [4].

Problem Statement and Urgency

Despite the sector's contribution to national GDP, a binary "economy versus environment" debate persists. Critics often conflate all expansion with the destruction of primary forest, ignoring evidence that the majority of recent developments occur on land that was already degraded or left idle. This stigma threatens the market access of smallholders who rely on these lands for their livelihood [5].

The urgency of this study lies in the "welfare gap." While corporate plantations achieve high yields through advanced agronomy, independent smallholders often operate on converted lands with suboptimal productivity and legal precarity. There is a critical need to analyze how the conversion of these specific land typologies—

formerly forested, now degraded—actually translates into socio-economic mobility for the rural poor. If the "suspicion" leads to blanket restrictions on land use without distinguishing between high-conservation-value forests and degraded lands, Indonesia risks stalling a potent engine of poverty alleviation [6].

Research Objectives

This study aims to move beyond the polarized debate by addressing three specific objectives:

- **To Explore the Narrative of Land Optimization:** Examining how oil palm repurposes degraded and abandoned forest lands into productive economic assets.
- **To Synthesize Evidence on Welfare Multiplier Effects:** Analyzing the direct and indirect impacts of this land conversion on smallholder income, infrastructure access, and rural resilience.
- **To Provide a Thematic Synthesis:** Offering a qualitative perspective that reconciles the ecological risks with the developmental necessities of the Global South.

Literature Review

Conceptualizing Land Use Transformation

Understanding the impact of oil palm requires a nuanced definition of "land." The literature distinguishes between *primary forests* (high carbon stocks, rich biodiversity) and degraded lands (low carbon stocks, often dominated by shrubs or *alang-alang* grass due to prior logging or fire) [7].

The transformation of these lands can be viewed through the lens of Agrarian Change Theory. As Parker et al. note, a significant portion of deforested land in Indonesia sits "in limbo"—idle for years before being converted to productive use. When this conversion finally happens, oil palm is frequently the only crop capable of generating sufficient capital returns to justify the investment in such remote, degraded areas. This process effectively turns "land liabilities" (unproductive, fire-prone scrubland) into "land assets" (productive plantations) [8].

Oil Palm and Rural Welfare Dynamics

The "Sustainable Livelihoods Framework" is often applied to assess how oil palm alters the capital base of rural households.

- **Financial Capital:** Empirical studies consistently show that households adopting oil palm enjoy significantly higher incomes compared to those relying on rubber or traditional rice farming. This is attributed to the crop's year-round harvest cycle, which provides liquidity that seasonal crops cannot match [9].
- **Physical Capital:** The expansion of plantations into frontier areas invariably brings infrastructure—roads, bridges, and electricity—that the state had previously failed to provide. This "corporate-led development" creates a welfare spillover for the broader community, not just farmers [10].

However, the literature also highlights a "welfare stratification." Smallholder schemes (plasma) that partner with companies typically achieve higher yields and access to guaranteed markets. In contrast, independent smallholders (*petani swadaya*) often face a "productivity trap," using low-quality seeds on land with unclear tenure, which limits their income potential [11].

Methodology

Research Design

This study utilizes a Qualitative Literature Review. Unlike a Systematic Literature Review (SLR), which often prioritizes statistical meta-analysis and rigid inclusion criteria that may exclude valuable contextual insights, a qualitative approach allows for a narrative synthesis of complex socio-economic phenomena. This design is chosen to capture the *nuance* of the "*dicari dan dicurigai*" (sought and suspected) dynamic, which involves cultural, political, and economic dimensions that quantitative data alone cannot express.

Data Collection Strategy

- **Timeframe:** The review focuses on literature published between **2020 and 2026** to ensure relevance to the current policy landscape (including the latest ISPO regulations and EUDR implications).
- **Sources:** Data were curated from peer-reviewed Scopus-indexed journals (e.g., *Forest Policy and Economics, Agricultural Systems*), authoritative reports (Center for International Forestry Research - CIFOR, World Resources Institute), and expert commentaries and reports.
- **Search Strings:** Key search terms included: "oil palm degraded land conversion," "smallholder welfare Indonesia," "agrarian transition Sumatra Kalimantan," and "socio-economic impact of certified palm oil."

Data Analysis

The collected literature was analyzed using **Thematic Analysis**. Information was coded into three primary streams: (1) Land Use Trajectories, (2) Welfare Outcomes, and (3) Institutional Barriers. These themes were then triangulated to answer the research objectives, balancing industry-optimistic views with critical environmental perspectives to ensure a balanced synthesis.

Results

Theme 1: Revitalizing the "Abandoned" Landscape

From "Ghost Towns" to Economic Hubs

The historical trajectory of land use in Sumatra and Kalimantan is defined by a boom-and-bust cycle inherent to extractive industries. Following the timber boom in the 1980s and 1990s, many regions that relied solely on logging concessions faced severe economic depression once the commercially valuable timber was exhausted. These post-logging areas have been characterized as potential "ghost towns," where the departure of concessionaires left behind degraded infrastructure, unemployment, and depopulation [12]. The literature argues that oil palm cultivation served as the critical economic successor in these vacuums. Unlike logging, which is transient and extractive, oil palm cultivation is agricultural and sedentary, requiring a permanent workforce and long-term settlement. This shift from extraction to cultivation re-anchored communities to the land, transforming abandoned logging outposts into vibrant economic hubs driven by continuous agricultural production [10,13,14].

The revitalization effect extends beyond mere employment; it fundamentally alters the demographic and spatial planning of rural Indonesia. The establishment of plantations in these "abandoned" zones created a gravitational pull for migration and settlement, necessitating the development of permanent markets, housing, and service sectors to support the growing population. Recent spatial analysis suggests that without the introduction of oil palm, these degraded landscapes would likely have remained economically stagnant or reverted to bushland with minimal economic value for local governments. The commodity effectively monetized land that had been written off as a "liability" by the forestry sector, converting it into a productive asset that contributes significantly to regional own-source revenue (PAD) [15].

However, this transformation is not without its spatial complexities. While economic revitalization is evident, critics argue that this "hub" development often follows an enclave model, in which economic activity is overly concentrated around the plantation estate. Yet, proponents counter that in the absence of alternative state-led development strategies for these remote outer islands, the plantation model remains the most viable engine for preventing rural decay. The "ghost town" narrative effectively challenges the view that palm oil only consumes pristine forest; in many documented cases, it has been the sole driver of regeneration for regions previously ravaged and abandoned by the timber industry [16].

Utilizing Disturbed Lands and the "Idle Land" Narrative

A critical finding in the recent literature is the deconstruction of the "direct deforestation" narrative. While international discourse often equates every hectare of palm oil cultivation with a hectare of lost rainforest, empirical evidence paints a more nuanced picture of the utilization of "disturbed land". It has been indicated that approximately 61% of oil palm expansion has occurred on lands classified as "disturbed," "abandoned," or formerly cultivated, rather than primary forest [12]. This aligns with research findings, which identified vast swathes of "land in limbo"—areas in Indonesia that were cleared years or decades ago (often for timber or by fire) and have since remained idle [5]. The study argues that using these idle, non-forest lands for oil palm creates an economic opportunity cost far lower than that of clearing new forests, thereby validating the sector's role in land optimization [5].

The definition of "degraded land" is central to this argument. In the context of Indonesian agronomy, this often refers to areas dominated by *Imperata cylindrica* (alang-alang) grasslands or scrub, which are ecologically low-value for biodiversity and carbon storage compared to forests and are also prone to recurring fires. Converting these specific landscapes into oil palm plantations can provide relative ecological stability by establishing permanent canopy cover and reducing fire risk associated with unmanaged grasslands. The narrative here shifts from "destruction" to "rehabilitation," suggesting that the crop is a pragmatic tool for rendering unproductive land typologies useful [8,17,18].

Nevertheless, the "utilization" argument faces scrutiny regarding the definition of "forest." Critics point out that what is classified as "degraded" or "secondary forest" may still hold significant biodiversity value compared to a monoculture plantation. However, from a strictly socio-economic perspective, the literature confirms that the conversion of these specific disturbed lands has been the primary mechanism for expanding the sector without violating the moratorium on primary forest clearing. Policy frameworks are increasingly solidifying this distinction, with recent regulations explicitly pushing new concession licenses toward these non-forest capability areas (*Area Penggunaan Lain*, or APL) to reconcile economic growth with forest conservation goals [19-21].

Theme 2: The Welfare Multiplier Effect

Direct Economic Benefits and Income Stability

The consensus from recent econometric studies is that oil palm cultivation yields a significant "income premium" for smallholders relative to alternative agricultural livelihoods. A comprehensive review and subsequent local studies consistently show that households converting to oil palm experience income increases ranging from 50% to over 100% compared with those who persist with rubber or subsistence rice farming [22,23]. This income differential is not merely a function of global prices but of biological productivity; the oil palm's yield per hectare far outstrips other oil crops, allowing even small plots (2-4 hectares) to support a family above the rural poverty line. This "welfare shock" has been instrumental in creating a new rural middle class in provinces like Riau and Central Kalimantan [24].

Beyond income magnitude, the *frequency* of income—or liquidity—is a decisive factor in welfare. Unlike seasonal crops (e.g., coffee, cloves) that provide lump-sum payments once or twice a year, oil palm Fresh Fruit Bunches (FFB) are harvested fortnightly (every two weeks). This bi-weekly cash flow serves as a continuous financial stream, akin to a formal salary, significantly enhancing household financial planning. It allows farming families to smooth their consumption, pay monthly school fees, and access credit markets that require regular repayment schedules. Farmers frequently cite this liquidity mechanism as the primary motivation for switching crops, as it reduces vulnerability during the "famine season" (paceklik) often found in traditional annual cropping systems [25-27].

However, this economic dependence creates new risks. The welfare gains are highly elastic to fluctuations in the global Crude Palm Oil (CPO) price. When prices crash, as seen in various volatility cycles, the specialized nature of oil palm farming leaves households with little food sovereignty, as they have often converted all their land to cash crops. Despite this, longitudinal data suggest that even accounting for price volatility, the long-term accumulation of assets (housing quality, motor vehicles, tertiary education for children) is demonstrably higher in oil palm households than in non-oil palm agrarian households, confirming its role as a robust poverty alleviation tool [28-31].

Infrastructure as a Public Good and Corporate Substitution

In many remote frontiers of Indonesia, the state has historically been absent, leaving a vacuum in the provision of public infrastructure. The literature identifies the plantation sector as a de facto provider of public goods, a phenomenon described as "corporate-led infrastructure development. To transport perishable FFB to mills within 24 hours, companies must construct and maintain vast networks of all-weather roads and bridges. While intended for logistics, these roads become public thoroughfares, connecting isolated villages to district capitals, reducing travel time and lowering the cost of consumer goods across the region. It has been argued that this connectivity is often the single most significant welfare multiplier, as it enables access to outside markets and emergency medical services that were previously unreachable [10,32,33].

Beyond physical connectivity, the "corporate substitution" effect extends to social services. Large plantations often build schools, clinics, and places of worship within their concessions as part of their Corporate Social Responsibility (CSR) or to attract labor. In many cases, these facilities are superior to the underfunded public alternatives available in the district. For the surrounding communities, the presence of a plantation company often signifies the arrival of electricity (via mill biomass power) and clean water systems. This symbiotic relationship creates a unique welfare ecosystem in which private capital finances public development, effectively subsidizing the state's responsibilities in the outer islands [15,34].

However, this model attracts criticism for creating "enclave dependency." The region's welfare becomes inextricably tied to the financial health of a single company. If a plantation ceases

operations or enters conflict with the community, the maintenance of roads and schools often collapses immediately. Furthermore, this dynamic can retard the development of democratically accountable local government institutions, as citizens look to the "Company Manager" rather than the "District Head" for public services. Despite these structural flaws, the immediate empirical reality remains that proximity to plantation infrastructure serves as a strong proxy for improved Human Development Index (HDI) scores in rural Indonesia [10,35-37].

Theme 3: The Heterogeneity of Smallholder Success

The Independent vs. Plasma Divide (Structure & Yields)

A critical thematic finding is the deep structural inequality between scheme smallholders (*plasma*) and independent smallholders (*swadaya*). While plasma farmers are integrated into corporate supply chains through formal partnerships—benefiting from technical supervision, high-quality inputs, and guaranteed offtake—independent smallholders largely operate in an informal, unsupported ecosystem. Recent studies highlight a persistent "yield gap": independent farmers often harvest only 10–12 tons of FFB/hectare/year, compared to the 20–24 tons achieved by *plasma* and corporate estates. This gap is primarily attributed to the use of illegitimate (uncertified) seedlings and a lack of agronomic knowledge regarding fertilization, which severely caps their potential welfare gains despite their participation in the same global market [38-40].

Asymmetries in market access further exacerbate the divide. *Plasma* farmers typically receive a pricing formula determined by the provincial government, directly linked to the mill's CPO price. In contrast, independent farmers, lacking contracts and often farming on land with precarious legal status (without *Surat Tanda Daftar Budidaya*, or STDB), are forced to sell to tiered networks of middlemen (*tengkulak*). These intermediaries absorb a significant profit margin to cover transportation risks and the informal nature of the transaction. Consequently, the "welfare multiplier" discussed in Section 4.2 is significantly dampened for independent smallholders, who constitute the fastest-growing segment of producers yet remain the most economically vulnerable [41-44].

This heterogeneity indicates that "oil palm welfare" is not a monolithic outcome but is conditional on institutional arrangements. The literature suggests that the independent smallholder sector is currently caught in a "low-level equilibrium trap"—able to escape absolute poverty but unable to maximize prosperity due to structural exclusion from the formal, high-productivity supply chain. Addressing this divide is not merely an agricultural challenge but a social equity imperative, as the continued expansion of independent smallholdings without support risks creating a vast class of marginal, low-efficiency farmers [45-47].

The Role of Corporations and Institutional Support

The literature emphasizes that the relationship between smallholders and large corporations is not merely competitive but functionally symbiotic, particularly regarding processing and market access. Because FFB is highly perishable and must be processed within 24 hours of harvest, smallholders are entirely dependent on nearby industrial-scale mills, which are capital-intensive facilities owned almost exclusively by corporations. It has been argued that large companies act as "anchor investors" (*avalistes*), which are essential to the viability of the smallholder ecosystem [12]. Without the corporate mill, the smallholder's fruit has zero economic value. This mutual dependence challenges the simplistic "David vs. Goliath" narrative; instead, the data suggest that smallholder welfare is positively correlated with the presence of efficient, accessible corporate mills that offer fair pricing mechanisms [3,23,48,49].

However, this corporate role is evolving under the pressure of sustainability certifications (e.g., ISPO/RSPO). As requirements for traceability and legality tighten, corporations are becoming the gatekeepers of market access. While this drives compliance, it creates a new barrier for independent farmers who cannot meet the rigorous administrative demands of certification without external support. The literature identifies a growing trend of "corporate-led inclusion" programs. These companies—driven by their own NDPE (No Deforestation, No Peat, No Exploitation) commitments—are proactively mapping and registering independent farmers in their supply chains to ensure their fruit is "clean". This shift positions the corporation not just as a buyer, but as a provider of extension services and legal aid, effectively privatizing the role of agricultural extension that the state has struggled to fulfill [50-53].

Ultimately, the long-term welfare of the smallholder sector depends on institutionalizing these support structures. The research indicates that the "independent" model is becoming increasingly untenable in a regulated global market. The future trajectory for welfare maximization lies in "re-coupling" independent farmers with corporate or cooperative institutions that can provide the economies of scale, access to high-yield replanting funds (PSR), and certification support necessary to survive. The narrative thus moves from *independence* to interdependence, where the welfare of the people is secured through formalized, equitable partnerships with the industrial sector [54-57].

Discussion and Analysis

Synthesizing the "Sought After vs. Suspected" Narrative

The dichotomy introduced—that palm oil is simultaneously "sought after" (*dicari*) for its economic ubiquity and "suspected" (*dicurigai*) for its environmental externalities—represents the fundamental tension in Indonesia's development discourse [12]. This analysis suggests that the "suspicion" is often rooted in a conflation of land typologies. The environmental critique typically assumes a baseline of "primary forest conversion," where monocultures replace high-carbon, high-biodiversity ecosystems. However, when the baseline is shifted to "disturbed" or "degraded" lands—which constitute approximately 61% of oil palm expansion—the analytical conclusion changes. In these contexts, oil palm does not represent an ecological descent, but rather an economic ascent from idle, unproductive land assets. The "suspicion" thus loses some of its validity when applied to the rehabilitation of former logging concessions that would otherwise remain fire-prone scrublands, suggesting that the crop's reputation suffers from a lack of spatial nuance in global debates [8,13,58,59].

Nevertheless, the ecological "suspicion" regarding hydrology and biodiversity cannot be dismissed entirely, even on degraded lands. Monoculture plantations, regardless of origin, possess different hydrological properties than the complex, multi-strata vegetation they replace or succeed. Critics argue that the simplified root structures and canopy layers of oil palm reduce water infiltration capacity, contributing to the flash floods reported in *Iqtishodia* [12]. However, recent comparative studies indicate that while oil palm is inferior to primary forest in water retention, mature plantations (aged 10-25 years) significantly outperform open degraded lands (*lahan tidur*) or seasonal agricultural fields in preventing soil erosion and surface runoff. Therefore, the narrative must be reframed: oil palm is not the ideal ecological cover

compared to a rainforest, but it is a functional improvement over the barren, degraded landscapes it frequently replaces, offering a "second-best" ecological service alongside "first-best" economic returns [35,60-62].

From a moral and developmental ethics perspective, the "sought after" aspect represents a fundamental "Right to Development." The literature emphasizes that for the Global South, the trade-off between absolute conservation and poverty alleviation is existential. It has been argued that the rigorous demand for palm oil is not merely a market phenomenon but a mechanism for wealth transfer from global consumers to rural Indonesian households [23,63].

The suspicion leveled by the Global North often ignores this welfare imperative. If the "suspicion" results in blanket boycotts or trade barriers (such as the EUDR), it essentially punishes the smallholders who rely on the only viable crop that can lift them out of poverty on the marginal lands available to them. Thus, the synthesis of these opposing narratives lies in "Responsible Cultivation": acknowledging the crop's necessity for human welfare while strictly restricting it to non-forest, degraded areas to uphold environmental integrity [24,64,65].

Ultimately, the resolution of this paradox is not to stop the commodity from being "sought," nor to ignore the "suspicion," but to operationalize the latter as a driver for improvement. The "suspicion" has successfully forced the industry toward unprecedented transparency, driving the adoption of ISPO and RSPO standards that were virtually non-existent two decades ago. This external pressure has transformed the sector from an extractive frontier industry into a regulated agricultural system. The analysis suggests that without this "suspicion," the "sought-after" demand might have led to unchecked expansion; thus, the tension between the two forces acts as a necessary dialectic that pushes the industry toward a sustainable equilibrium [38,66,67].

Optimizing Land Use for the Future: Beyond Monoculture

The future of land optimization lies in the pivot from *extensive* expansion to *intensive* productivity. The era of opening new lands—even degraded ones—is reaching its spatial and regulatory limits. The literature identifies a massive "yield gap" as the primary inefficiency in the current land use model. Independent smallholders currently achieve yields 40-50% lower than corporate estates due to poor agronomy and aging trees. By closing this gap through replanting with high-yield variety (HYV) seeds, Indonesia could theoretically double its CPO output without clearing a single additional hectare of land. This strategy of "intensification as conservation" is the most robust pathway for future land optimization, ensuring that the economic welfare of farmers increases through efficiency rather than spatial encroachment [6,68-70].

Furthermore, land optimization is increasingly being re-conceptualized to include agroforestry and mixed-cropping systems, moving beyond the rigid monoculture paradigm. Recent agronomic trials suggest that integrating livestock (cattle integration) or intercropping with food crops during the immature phase of replanting can enhance land equivalent ratios (LER) and soil health. It has been highlighted that diversifying plantation landscapes with buffer zones of native vegetation or fruit trees not only improves biodiversity connectivity but also provides farmers with alternative income streams, buffering them against CPO price volatility [6]. This "polyculture-light" approach addresses the biodiversity deficits cited by critics while maintaining the oil palm as the economic core, representing a sophisticated evolution of land use that prioritizes resilience over mere maximization [8,71,72].

The governance of this optimization requires full implementation of the "One Map Policy" to resolve overlapping tenures. A significant barrier to optimizing degraded land is the legal ambiguity: land that is visually degraded but administratively classified as "Forest Estate" (*Kawasan Hutan*), rendering it illegal for cultivation. Conversely, some high-carbon areas are legally available for conversion. Optimizing land use requires a bureaucratic synchronization in which the land's de facto biophysical condition matches its *de jure* legal status. The literature argues that the government must accelerate the "release of forest area" (*pelepasan kawasan hutan*) specifically for verified degraded lands already under smallholder cultivation, granting them the legality needed to participate in state-backed replanting programs (PSR) [7,73-75].

Finally, future land use must be "climate-smart." As climate change alters rainfall patterns in Sumatra and Kalimantan, the viability of certain marginal oil palm lands may diminish. Long-term optimization requires land suitability mapping that accounts for future climate scenarios, ensuring that smallholders are not encouraged to plant on degraded lands that will become biophysically unsuitable (e.g., too dry or flood-prone) in 20 years. This forward-looking analysis prevents the creation of "stranded assets" where farmers invest in revitalizing degraded land, only to face crop failure due to climatic shifts, thereby protecting the long-term welfare dimension of the development [76-80].

Addressing the Welfare Equity Gap

While the aggregate welfare impact of oil palm is positive, a deep structural inequality persists between *plasma* (scheme) and *independent* smallholders, threatening the sector's social sustainability. The analysis reveals that "welfare" is not an automatic outcome of planting the crop but is contingent on access to institutions. Independent smallholders, who now constitute the majority of new growers, are structurally disadvantaged by a lack of direct access to mills and technical extension services. This results in a bifurcated welfare landscape: a "premium class" of plasma farmers who enjoy corporate-like yields and guaranteed markets, and a "precarious class" of independent farmers who are vulnerable to predatory pricing by middlemen (*tengkulak*) and agronomic obsolescence. Addressing this gap requires policy interventions that go beyond price support to tackle the root causes of exclusion: legality and organization [81-84].

The most critical lever for closing this equity gap is accelerating land legalization. Without a Cultivation Registration Certificate (STD-B) or Freehold Title (SHM), independent farmers are invisible to the formal banking system and ineligible for the People's Palm Oil Replanting (PSR) funds. They are trapped in a cycle of low investment and low returns. The literature suggests that the government must view land legalization not merely as an administrative task but as a primary welfare policy. By formalizing their land tenure, independent farmers can use their land certificates as collateral to access credit for high-quality fertilizer and certified seeds, effectively breaking the "low productivity trap" that keeps them at the bottom of the value chain [41,85-87].

Institutional innovation is also required to replace the reliance on predatory middlemen. The resurgence of village-level cooperatives

(KUDs) or the formation of "corporatized farmer groups" (SPKSs) is essential for aggregating the produce of independent farmers. By pooling their harvest, independent smallholders can bypass intermediaries and negotiate direct delivery contracts with mills, capturing the 15-20% margin currently lost to traders. Furthermore, recent digital innovations in supply chain traceability are allowing independent farmers to prove the origin of their fruit, making them attractive to buyers seeking to fulfill "No Deforestation" pledges. This "digital inclusion" creates a new pathway for welfare by connecting the most remote farmers directly to premium global markets [23,88,89].

Lastly, addressing the welfare gap necessitates a broader definition of prosperity that includes intergenerational mobility. High incomes from oil palm have successfully allowed the current generation of farmers to send their children to universities in urban centers. Ironically, this success creates a succession crisis, as the educated youth are often reluctant to return to the farm. The analysis suggests that for oil palm welfare to be sustainable, the sector must professionalize. Farming must evolve from a manual, labor-intensive livelihood into a technology-driven agribusiness that appeals to the younger generation. If this transition fails, the welfare gains may be temporary, with lands eventually reverting to consolidation by large corporations as aging farmers retire without successors. Thus, equity policies must focus not just on current income, but on building a resilient, professionalized class of smallholder entrepreneurs [25,90,91].

Conclusion

Substantive Conclusions

This qualitative review confirms that oil palm plantations play an irreplaceable role in the socio-economic revitalization of Indonesia's formerly forested and degraded landscapes. The evidence suggests that:

Optimization as Economic Redemption

The sector has successfully converted vast areas of economically idle, "disturbed" land into productive assets, preventing these areas from remaining as "ghost towns."

This qualitative review definitively establishes that the expansion of oil palm in Indonesia is not a monolithic story of deforestation. Still, significantly, one of the land optimization areas where "disturbed" and "degraded" landscapes are redeemed for economic productivity. The evidence from spatial analyses confirms that a majority of smallholder expansion (approximately 61%) has occurred on previously logged, abandoned, or unproductive scrub-dominated lands, rather than on pristine primary forests. By converting these "land liabilities"—which generate no revenue and are prone to fire—into productive "land assets," the oil palm sector has revitalized the economic base of regions that had previously been stagnating following the decline of the timber industry. The "ghost town" effect observed in post-logging eras has been effectively reversed in many provinces, where the continuous oil palm harvest cycle provides a perennial economic heartbeat that extractive industries could never sustain. Consequently, the narrative that equates palm oil with environmental destruction is empirically incomplete, as it fails to account for this vast rehabilitative function on landscapes that had already lost their primary ecological value.

Final Verdict: The Welfare Imperative Overrides the Stigma

The crop provides a superior and stable income stream for smallholders compared to alternatives, acting as a primary driver of rural poverty alleviation.

The study concludes that the "suspicion" (*dicurigai*) directed at the sector, while scientifically grounded in hydrological and biodiversity concerns, is outweighed by the "sought after" (*dicari*) reality of its welfare impact for the Global South. The comparative income data synthesized in this review demonstrate that no other widely available agricultural commodity offers the same level of poverty-alleviating potential for smallholders on marginal soils as oil palm. The crop's unique ability to provide high liquidity through fortnightly harvests fundamentally alters the financial resilience of rural households, enabling them to escape the "subsistence trap" and access modern services such as education and healthcare. While the environmental trade-offs are real, the socio-economic "surplus" generated—measured in the emergence of a new rural middle class and the provision of corporate-led infrastructure—validates the sector's existence as a necessary developmental tool. Therefore, the definitive verdict is that the conversion of degraded lands for oil palm is a legitimate exercise of the "Right to Development," provided it is rigorously regulated to strictly avoid remaining High Conservation Value (HCV) areas.

The Trade-off: Environmental Risks and the Case for Intelligent Regulation Rather Than Prohibition

The "suspicion" of environmental damage is best addressed not by banning the crop, but by strictly directing its expansion to degraded lands and intensifying existing plots.

The fundamental error in current global discourse is the assumption that the only rational response to environmental "suspicion" is a categorical ban on the crop or a blanket moratorium on expansion. However, the qualitative evidence synthesized in this review demonstrates that this binary choice is a false dichotomy that ignores the welfare costs of such prohibition for the Global South. The environmental damage associated with oil palm is real but *contingent*—it materializes primarily when the crop is planted on high-carbon stock forests, peatlands, or areas with critical biodiversity value; conversely, when expansion is confined to degraded lands where carbon stock and biodiversity are already severely depleted, the additional environmental cost is marginal. Rather than pursuing the economically ruinous path of de-industrializing a sector that employs millions and generates critical government revenue, the optimal policy response is to operationalize a "geography of permission," where expansion is incentivized exclusively on degraded lands. At the same time, enforcement mechanisms ruthlessly prevent any opening of remaining forest or peat areas. This intelligent regulation transforms the "trade-off" from an either-or choice between environment and development into a strategic optimization: extracting maximum development benefits from the lands that have already been compromised, thereby protecting the remaining high-value ecosystems.

The intensification pathway offers an even more powerful resolution to this trade-off. Rather than seeking to expand acreage, closing the 40-50% yield gap between smallholders and corporate estates would effectively double Indonesia's CPO output without clearing a single additional hectare of forest. This "productivity-driven growth" strategy directly contradicts the expansion imperative and should become the primary focus of all agricultural investment and extension policy. By providing smallholders with access to high-yield variety (HYV) seeds, optimal fertilization regimes, and technical support—funded through the mobilization of existing PSR (People's Palm Oil Replanting) budgets—Indonesia could achieve a "win-win" outcome: smallholder incomes surge due to higher yields on the same land, global demand for palm oil is

satisfied without deforestation, and the environmental "suspicion" loses its empirical foundation. The evidence from successful replanting initiatives in Riau and Jambi provinces demonstrates that this intensification is technically achievable; the barrier is policy commitment and funding, not agronomy.

Furthermore, the literature increasingly supports an "ecological maturation" argument that challenges the implicit assumption that monoculture plantations are static ecological disasters. Mature oil palm plantations (aged 15-25 years) develop structural complexity—understory vegetation, fallen wood, soil fauna communities—that meaningfully improve their hydrological and ecological function compared to younger plantations or degraded lands. By extending the productive life of existing plantations through sound management (reducing disease pressure and preventing fires) rather than forcing rapid replanting cycles, Indonesia can optimize the ecological trajectory of its existing land commitments. This "extended rotation" model, combined with the mandatory agroforestry buffers and riparian zone protections discussed in Section 6.2.3, creates a pathway toward "reconciliation ecology," in which the plantation landscape progressively gains ecological complexity without sacrificing economic productivity. This nuanced approach directly addresses the "suspicion" by demonstrating that the sector's environmental performance can improve within its existing footprint.

The catastrophic scenario that awaits if the environmental "suspicion" results in a total global rejection of Indonesian palm oil must also be explicitly analyzed. A collapse in demand would not lead to "forest reforestation," as some activists assume, but rather to economic desperation in palm oil regions, where millions of smallholders would turn to less regulated alternatives such as illegal logging, mining, or uncontrolled land speculation. The "conservation paradox" is that excessive environmental restrictions on primary commodities can drive farmers toward even more destructive land uses that lack any sustainability framework. Furthermore, Indonesia's CPO exports are irreplaceable in global supply chains; restricting them would merely shift production to Malaysia or other countries with potentially worse environmental governance. Therefore, the rational policy stance is not to eliminate the crop but to transform it, using the "suspicion" as a constructive force for continuous improvement rather than as a justification for prohibition.

Finally, the temporal dimension of this trade-off must be acknowledged: the environmental and welfare costs of inaction regarding smallholder inclusion and land legality are often *longer-term* and more devastating than the risks of well-managed expansion on degraded lands. If the sector collapses due to market rejection or overly restrictive regulation, the social cohesion of rural Indonesia could be severely damaged, reversing decades of poverty alleviation and potentially triggering migration crises in urban centers. Conversely, if expansion is managed intelligently—confined to verified degraded lands, coupled with mandatory intensification of existing plots, and embedded within a framework of certification and agroforestry buffers—Indonesia can demonstrate a "Third Way" between the Scylla of environmental destruction and the Charybdis of forced underdevelopment. The evidence from this review unambiguously supports this Third Way as the optimal strategy, transforming the "suspected" crop into a vehicle for what might be termed "Green Agrarian Development."

Policy Recommendations

To ensure the welfare benefits continue to grow while minimizing environmental risks, this study recommends:

Operationalizing a "Degraded Land First" Strategy

he government should finalize and operationalize a high-resolution "Degraded Land Database." Incentives (tax breaks, expedited permits) should be given to companies and farmers who develop exclusively on these identified lands.

The most urgent policy recommendation is for the Indonesian government to move beyond rhetorical commitments and operationalize a strict "Degraded Land First" allocation policy for all new plantation licenses. This requires the immediate acceleration and granular refinement of the "One Map Policy" to definitively identify and legally gazette millions of hectares of degraded land (critical land) that are currently locked under the administrative status of "Forest Estate" (*Kawasan Hutan*). Once identified, the government must provide specific fiscal incentives, such as tax holidays or subsidized credit, to companies and smallholders who choose to develop these challenging terrains instead of clearing easier, forested land. Furthermore, this policy must be paired with strict liability enforcement that penalizes any new opening of peatlands or high-carbon stock forests, effectively funneling all expansion pressure into the rehabilitation of "sleeping" land assets. By making degraded land the only economically viable option for expansion, Indonesia can decouple its future palm oil growth from deforestation, satisfying global market demands while optimizing its domestic land resources.

Strengthening Smallholder Institutions for Legal Inclusivity

To meet the 2025 ISPO mandate, the government must streamline the issuance of Cultivation Registration Certificates (STD-B) for independent farmers on non-forest land. This legal recognition is the prerequisite for accessing bank loans and replanting funds.

To address the critical welfare inequality between *plasma* and *independent* smallholders, the state must aggressively intervene to dismantle the bureaucratic barriers to legalization. The current complexity of obtaining a Cultivation Registration Certificate (STD-B) acts as a de facto exclusion mechanism, preventing the poorest farmers from accessing the essential replanting funds (PSR) needed to boost their productivity. Policy must shift from "passive regulation"—waiting for farmers to apply—to "active formalization," in which local governments are funded to deploy mobile task forces to map, verify, and issue land certificates directly in villages. Additionally, the mandate for ISPO certification by 2025 should be accompanied by a massive "compliance subsidy" package to cover the audit and training costs for independent cooperatives, ensuring that certification becomes a bridge to global markets rather than a barrier to entry. Without these targeted institutional supports, the mandatory certification regime risks perverse outcomes, potentially pushing independent farmers into the black market or forcing them to sell their land to larger entities.

Integrated Landscape Management with Agroforestry Buffers

Promoting mixed-cropping systems in buffer zones to enhance biodiversity and hydrological function, thereby addressing the "suspected" ecological deficits of monoculture.

Finally, to resolve the "suspicion" regarding biodiversity and water management, future plantation planning must enforce an Integrated Landscape Management approach that breaks the monotony of vast monocultures. The government should mandate that all new developments on degraded land include "ecological corridors" or riparian buffers planted with mixed agroforestry species (e.g., fruit trees, bamboo, or native timber) comprising at least 10-15% of the concession area. This "polyculture-light"

model does not significantly reduce the plantation's economic output but dramatically improves its hydrological function and provides habitat connectivity for wildlife, directly addressing the ecological critiques of the sector. Furthermore, these diversified zones can offer farmers an alternative source of income and food security, insulating them from the volatility of global CPO prices. By embedding these ecological service requirements into the licensing process (HGU), Indonesia can pioneer a new model of "regenerative palm oil" that rehabilitates the environment while it generates wealth.

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