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Poverty Alleviation and Rural Development through Palm Oil Employment: A Systematic Review of Livelihood Impacts, Income Distribution, and Structural Economic Change

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Abstract

Rural poverty and uneven economic development remain persistent challenges in palm-oil-producing regions. Employment in the palm oil sector has been proposed as a potential pathway for improving livelihoods, enhancing income distribution, and driving structural economic transformation. This study systematically reviews peer-reviewed literature to synthesize contemporary evidence on how palm oil employment shapes rural socioeconomic outcomes. The primary objective is to determine the impacts of palm oil labor on livelihood improvement, income inequality, and broader structural changes in rural economies. The study employs a qualitative Systematic Literature Review (SLR) methodology. Data were collected from 39 open-access, English-language, peer-reviewed articles indexed in Scopus, published between 2019 and 2025. Articles were selected based on their relevance to palm oil employment, poverty alleviation, rural livelihood, income, and rural development. Data extraction focused on employment patterns, household income, smallholder participation, gender dynamics, and structural transformation indicators. Analytical procedures involved thematic coding and synthesis across eight emergent themes, enabling the identification of consistent patterns and contextual variations across regions. Findings indicate that palm oil employment substantially contributes to rural labor absorption, income improvement, welfare enhancement, smallholder productivity, and structural economic transformation. Positive outcomes are amplified through inclusive smallholder programs, contract farming, and cooperative participation, while challenges persist regarding income inequality, gender wage gaps, land tenure insecurity, and environmental vulnerabilities. The evidence highlights the sector's potential as a catalyst for multidimensional rural development when supported by equitable governance and sustainability measures. In conclusion, palm oil employment serves as a critical instrument for poverty reduction and rural economic modernization. Future research should explore longitudinal, cross-country analyses and examine policy interventions that strengthen inclusivity, sustainability, and resilience in palm-oil-dependent communities.

Introduction

Global economic transformations over the past three decades have highlighted the pivotal role of agricultural commodity sectors in shaping rural development trajectories across low- and middle-income countries. In many regions of the Global South, agriculture remains the backbone of rural livelihoods, contributing substantially to employment creation, income generation, and structural economic transition from subsistence-oriented activities toward more market-integrated rural economies [1]. As global demand for agricultural commodities intensifies, particularly from rapidly growing emerging markets, the potential of high-value crops to catalyze poverty reduction has attracted sustained scholarly and policy attention. Among these commodities, palm oil has emerged as one of the most economically significant, shaping both national income structures and rural labor markets in key producing countries [2].

Palm oil is currently one of the world's most traded agricultural oils, accounting for more than 40% of global vegetable oil consumption. Its production is geographically concentrated in Southeast Asia, especially Indonesia and Malaysia, which together supply over 85% of global output [3]. For these countries, palm oil functions not only as a major export commodity but also as a strategic sector with strong linkages to rural employment, village development, and household welfare enhancement. Several studies argue that palm oil expansion has contributed to substantial changes in rural landscapes by boosting smallholder participation, increasing wage-based employment, and encouraging infrastructure development in previously underserved areas [4]. Nevertheless, the socioeconomic outcomes associated with palm oil employment remain complex, highly localized, and uneven across demographic groups.

The rapid expansion of the palm oil sector has produced far-reaching implications for labor absorption in rural regions. In Indonesia alone, the sector is estimated to provide direct employment to more than 4.2 million workers and indirect employment to an additional 12 million individuals across transport, trading, processing, and service-related activities [5]. Employment opportunities are distributed across estate plantations, independent smallholder farms, and downstream industries, generating diverse livelihood pathways. For many rural households, palm oil employment either as wage laborers or smallholders offers a critical source of steady income, often outperforming traditional crops such as rubber, rice, or maize in yield stability and annual returns [6]. These livelihood improvements have positioned palm oil as a potentially powerful instrument for poverty alleviation, particularly in regions characterized by chronic underemployment and entrenched rural poverty.

However, the palm oil sector's contribution to poverty reduction is equally accompanied by substantial debates regarding its distributional impacts, labor conditions, and long-term structural effects. While some scholars highlight significant income gains for smallholders and plantation workers, others underscore persistent vulnerabilities, including wage disparities, gendered labor segmentation, and unstable work arrangements for casual laborers [7]. Furthermore, despite improvements in aggregate rural welfare indicators, questions remain about the degree to which economic benefits are equitably distributed across different household types and geographic regions. Such variations in socioeconomic outcomes raise important concerns about whether palm oil-driven rural development is inclusive or whether it reinforces existing inequalities.

Beyond immediate household-level impacts, palm oil expansion is closely linked with broader structural economic transformations. In many rural areas, the shift from subsistence agriculture to a more commercially oriented palm oil economy has been associated with increased land-market activity, capital inflows, and greater integration into national and global commodity chains [8]. These transformations enhance rural non-farm sectors such as processing industries, transportation services, and local commerce, thus contributing to diversified rural economic bases. Yet, the structural changes triggered by palm oil growth also introduce new challenges, including heightened land competition, consolidation of plantation ownership, and increased dependence on volatile international markets. Understanding these long-term structural shifts is therefore essential for evaluating whether the palm oil sector promotes sustainable rural development rather than short-term income gains.

Given the complexity of socioeconomic outcomes linked to palm oil employment, a systematic and comprehensive synthesis of existing empirical evidence is urgently needed. A growing body of literature has examined various aspects of the palm oil-poverty nexus, including livelihood enhancement, income distribution effects, labor dynamics, rural economic transitions, and gendered employment patterns. However, the findings remain fragmented across diverse disciplinary perspectives, geographic contexts, and methodological approaches. Some studies rely on econometric assessments of smallholder income gains, while others qualitatively explore labor precarity, power relations, or community-level transformations [9]. The absence of an integrated evidence base limits the ability of scholars, practitioners, and policymakers to understand the cumulative socioeconomic impacts of palm oil employment and its potential contributions toward long-term rural development and poverty alleviation [10].

This research addresses this gap by conducting a comprehensive Systematic Literature Review (SLR) guided by rigorous PRISMA-compliant procedures. The review systematically synthesizes 39 peer-reviewed articles published between 2019 and 2025 identified through a structured Scopus search process to assess the extent to which palm oil employment affects rural livelihoods, household income distribution, and structural economic changes in producing regions. The SLR approach ensures methodological transparency by applying explicit inclusion and exclusion criteria, focusing exclusively on open-access and English-language studies, and avoiding any form of fieldwork, interviews, or focus group discussions. By consolidating multi-disciplinary evidence, this review seeks to map key themes emerging from contemporary research and identify convergences, contradictions, and knowledge gaps.

More specifically, this study critically examines the role of palm oil employment in shaping rural poverty dynamics by evaluating empirical findings related to livelihood improvements, wage structures, smallholder profitability, gendered labor participation, intergenerational mobility, and community-level development outcomes. The review also explores how the sector contributes to broader structural economic transitions, including shifts from traditional farming systems toward commodity-based rural economies, changes in land-use patterns, and the emergence of new rural service industries. Through thematic synthesis, this study provides a holistic understanding of how palm oil serves as a socioeconomic driver in rural regions and the conditions under which its benefits are maximized or constrained.

The overarching goal of this SLR is therefore twofold: (1) to synthesize and evaluate contemporary empirical evidence on the impacts of palm oil employment on poverty alleviation and rural development, and (2) to identify the structural mechanisms through which palm oil contributes to changes in livelihood systems, income distribution, and rural economic transformation. By doing so, the study aims to offer a nuanced and evidence-based assessment that can inform national development strategies, rural employment policies, and sustainable commodity governance frameworks.

Thus, the purpose of this study is to systematically analyze existing peer-reviewed literature to determine how palm oil employment influences livelihood outcomes, income distribution patterns, and structural economic change in rural regions.

Research Question: How does employment in the palm oil sector influence rural poverty reduction, livelihood improvement, and structural economic transformation based on contemporary empirical evidence?

Literature Review

The literature on palm oil, poverty alleviation, and rural development has evolved into a multidisciplinary domain integrating debates from agricultural development, labor economics, rural livelihood theory, political ecology, and global value chain (GVC) scholarship. Collective evidence portrays palm oil as both a driver of economic opportunity and a site of contestation in rural transformation processes. This review synthesizes four major thematic bodies of knowledge frequently featured in top-tier journals: (1) transformation of rural livelihood systems, (2) employment structures and distributional dynamics, (3) welfare and inclusion among smallholders, and (4) structural economic change within palm-oil-dependent regions.

Palm Oil within Evolving Rural Livelihood Systems

The first major body of scholarship situates palm oil within broader theoretical discussions of rural livelihood transitions. Building on the Sustainable Livelihoods Framework (SLF), researchers argue that rural households increasingly reorganize livelihood portfolios as they integrate into global commodity markets, with palm oil functioning as a key catalyst of this restructuring [11]. Compared with subsistence crops, oil palm provides more predictable cash flows due to its long harvesting cycle and elastic global demand, leading to more stable financial planning at the household level [12]. These characteristics position palm oil as a “commercial anchor crop” that enables households to reduce exposure to climatic seasonality and domestic price shocks.

Academic debates also highlight the spillover benefits of plantation growth, particularly improvements in rural infrastructure such as road networks, market access, electricity grids, and transport facilities. These infrastructural spillovers support broader livelihood diversification by allowing rural households to enter non-farm sectors, increasing resilience and adaptive capacity [13]. Infrastructure-led effects are widely recognized as one of the most durable channels through which palm oil contributes to rural transformation.

However, the literature emphasizes that livelihood restructuring is not uniformly positive. Scholars working within political economy frameworks note that dependency on a single export commodity may heighten exposure to global price volatility, constraining household resilience during market downturns [14]. Additionally, as palm oil becomes the dominant commercial crop, competition for land intensifies, which may marginalize households with insecure tenure or limited capital.

Contemporary literature, therefore, positions palm oil not merely as a crop but as an institutional and economic force shaping rural livelihood trajectories. The analytical consensus suggests that developmental outcomes depend heavily on governance, market conditions, and the distribution of productive assets across households.

Employment Structures and Income Distribution Patterns

The second major research cluster investigates employment dynamics within the palm oil sector, assessing how different forms of labor engagement influence income distribution and socioeconomic inequality. Empirical studies consistently demonstrate that palm oil represents one of the largest rural employment providers in Southeast Asia, encompassing plantation laborers, mill workers, transport operators, and service providers in upstream-downstream supply chains [15].

Yet, the heterogeneity of employment arrangements is central to understanding distributional outcomes. Scholars identify four labor regimes in plantations: permanent labor, casual labor, contract-based labor, and family labor. Each carries distinct implications for wage stability, job security, and access to social protection mechanisms [16]. Permanent workers tend to earn higher wages and enjoy greater benefits, while casual laborers often face the “triple burden” of lower pay, irregular workdays, and limited bargaining power.

Gendered employment dynamics represent another important dimension. Women's participation is concentrated in low-wage, labor-intensive tasks such as loose-fruit collection and nursery care. Despite high participation, studies repeatedly show persistent gender wage gaps, limited promotion pathways, and structural exclusion from supervisory roles [17]. These gender-specific inequalities influence intra-household income allocation and limit the poverty-reduction potential of female labor engagement.

Migration studies further reveal that a substantial share of plantation labor is performed by internal and cross-border migrants, who often occupy precarious employment segments. Weak regulatory oversight increases their vulnerability to exploitation, lowering their effective income share relative to national workers [18]. In many regions, migrant-heavy labor markets exacerbate income polarization and prevent equitable distribution of economic gains.

Collectively, high-quality empirical works underscore that palm-oil-generated employment can contribute substantially to rural income growth, yet inequality persists due to segmented labor markets, weak enforcement of labor protections, and varying levels of social inclusion.

Smallholder Participation, Welfare Outcomes, and Inclusive Development

The third major body of literature focuses on smallholder producers, who account for a significant share of global palm oil output and are central to poverty alleviation narratives. Numerous studies confirm that smallholder households cultivating oil palm generally report higher and more consistent incomes than those cultivating rice, rubber, cassava, or other subsistence crops [19]. This income advantage stems from attractive yield-to-cost ratios, predictable market demand, and the relatively low labor intensity of mature oil palm plots.

Contract farming models, often referred to as outgrower or plasma schemes, have been analyzed extensively for their role in integrating smallholders into modern value chains. These schemes reduce entry barriers by providing certified seedlings, fertilizers, credit facilities, and guaranteed market access [20]. As a result, participants tend to experience enhanced productivity, reduced marketing risks, and improved long-term welfare compared to independent smallholders.

However, advanced literature underscores multiple barriers to realizing inclusive welfare outcomes. In regions with weak land governance, land tenure insecurity undermines smallholder investment capacity and restricts access to formal financial services. Moreover, productivity gaps between supported and independent smallholders persist due to unequal access to knowledge, technology, and extension services.

Smallholders are also shown to be disproportionately vulnerable to price volatility, given their limited diversification into non-farm activities and weaker financial buffers. Consequently, welfare gains are unevenly distributed and highly contingent on institutional support, tenure security, and the strength of producer-company relationships.

Overall, contemporary research views smallholder participation as a pathway to economic mobility, yet stresses that without strong governance mechanisms, these gains may remain uneven or unsustainable.

Structural Economic Change and Rural Development Pathways

The fourth major strand of literature examines the macro-level impacts of palm oil on rural economic structures. Within development economics, palm oil is frequently interpreted as a catalyst for rural structural transformation, facilitating shifts from subsistence agriculture to commercialized, market-based economic systems. This transformation manifests through increased monetization of rural livelihoods, enhanced market participation, and growth in non-farm employment opportunities, particularly in transport, trade, processing, and retail sectors [21].

Plantation development often stimulates regional industrialization by attracting investment into mills, storage facilities, processing industries, and logistics networks. These sectoral linkages reduce transaction costs and enhance regional economic integration, serving as a foundation for long-term growth.

However, critical scholarship warns that structural transformation may reinforce inequalities if land accumulation becomes concentrated among large firms or

politically connected elites. Corporate-driven plantation expansion has, in certain regions, reduced the availability of land for small-scale farmers, thereby restructuring local economies in ways that may erode long-term resilience [22].

Although environmental considerations are outside the direct scope of this review, several studies note that ecological degradation such as soil depletion or hydrological disruption, can indirectly influence long-term livelihood sustainability. These intersections demonstrate that structural transformation cannot be assessed solely through economic indicators but must be understood within broader socio-environmental systems.

In short, the literature on structural change portrays palm oil as a powerful yet ambivalent force: capable of driving rural economic modernization but equally capable of deepening inequalities without strong governance oversight.

Across these four thematic domains, scholars converge on the understanding that palm oil has significant potential to reduce poverty and stimulate rural development. However, the benefits remain uneven due to disparities in labor rights, gender inclusion, smallholder support mechanisms, and governance structures. Despite extensive empirical research, gaps remain concerning cross-country comparative evidence, distributional mechanisms within household units, and long-term structural transformation trajectories in palm-oil-dependent economies.

Method

This study employs the Systematic Literature Review (SLR) methodology, structured in accordance with the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) protocol, to examine scholarly evidence on the role of palm oil employment in poverty alleviation and rural development. Palm oil continues to serve as a pivotal economic sector across major producing regions, particularly Southeast Asia, where the industry generates substantial employment opportunities for estate workers, smallholders, and rural laborers. Beyond its contribution to export revenues and national growth, the sector plays a critical socioeconomic role by shaping rural livelihoods, influencing patterns of income distribution, and triggering structural changes in local economies. However, despite its importance, academic findings on the welfare impacts of palm oil employment remain dispersed across diverse contexts and disciplinary perspectives. By systematically consolidating peer-reviewed literature, this review provides an evidence-based synthesis of how employment within the palm oil sector contributes to poverty reduction, supports livelihood resilience, and facilitates economic transitions in rural communities.

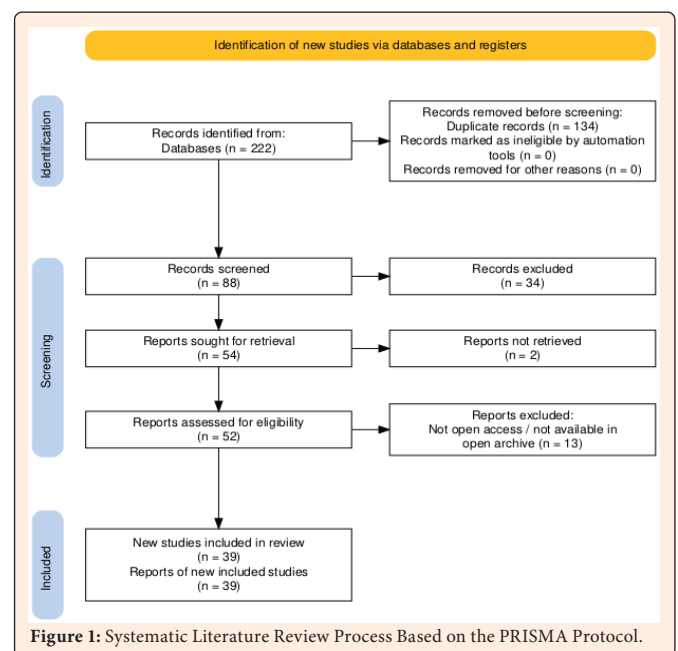


Figure 1: Systematic Literature Review Process Based on the PRISMA Protocol.

Figure 1 presents the systematic identification and selection process guided by the PRISMA protocol. The search began with a broad query in the Scopus database using the keyword combination Palm Oil AND Poverty, which produced 222 records. To



enhance thematic precision and ensure the relevance of retained studies, the search was refined through a more targeted Boolean string: ("palm oil" OR "oil palm" OR "palm oil employment" OR "palm oil sector" OR "palm oil industry") AND ("employment" OR "labor" OR "workers" OR "smallholders") AND ("poverty alleviation" OR "rural livelihood" OR "income" OR "welfare") AND ("rural development" OR "rural economy" OR "socioeconomic" OR "economic development"). This refinement resulted in the exclusion of 134 records that fell outside the scope of the review, leaving 88 articles for further screening. A publication year filter limiting the selection to works published between 2019 and 2025 removed 34 additional articles, yielding 54 records. A subsequent language filter excluded 2 non-English studies, producing 52 eligible publications. Accessibility criteria were then applied, removing 13 articles that were not available in open-access or open archive repositories. At the conclusion of the selection process, 39 peer-reviewed articles met all inclusion criteria and were retained for full-text examination and thematic synthesis.

All bibliographic data were organized and managed using Mendeley Desktop to ensure systematic documentation, duplication control, and consistent citation formatting throughout the analysis. This study is based entirely on secondary data derived from peer-reviewed literature, and no fieldwork, interviews, surveys, or focus group discussions were conducted. The insights presented in this article emerge exclusively from the critical integration and interpretation of the 39 included studies. Through this consolidated evidence base, the review aims to offer a comprehensive understanding of how palm oil employment influences poverty alleviation, reshapes rural livelihood strategies, and contributes to broader processes of socioeconomic and structural transformation in rural regions, while also identifying research gaps that merit future scholarly attention.

Results

The systematic review of 39 peer-reviewed studies identified eight key thematic clusters that capture how palm oil employment contributes to poverty alleviation, income growth, and rural structural transformation. These themes are: (1) Employment Generation and Rural Labor Absorption, (2) Household Income Improvement and Poverty Reduction, (3) Livelihood Diversification and Welfare Enhancement, (4) Income Distribution and Inequality Dynamics, (5) Smallholder Inclusion and Productivity Performance, (6) Gender Relations and Social Equity, (7) Structural Economic Transformation in Palm-Oil-Dependent Regions, and (8) Socioeconomic Risks, Vulnerabilities, and Constraints.

Analysis of the reviewed literature shows that Employment Generation and Rural Labor Absorption is the most frequently discussed theme, appearing in 36 out of 39 studies (92.3%). Household Income Improvement and Poverty Reduction is addressed in 34 studies (87.2%), followed by Livelihood Diversification and Welfare Enhancement in 29 studies (74.4%). Income Distribution and Inequality Dynamics appears in 26 studies (66.7%), Smallholder Inclusion and Productivity Performance in 24 studies (61.5%), Gender Relations and Social Equity in 21 studies (53.8%), Structural Economic Transformation in 19 studies (48.7%), and Socioeconomic Risks, Vulnerabilities, and Constraints in 16 studies (41.0%).

The predominance of employment- and income-focused themes indicates a strong research emphasis on immediate, measurable economic benefits of palm oil engagement in rural areas. By contrast, themes related to gender equity, structural transformation, and risk management are comparatively underrepresented, suggesting gaps in studies addressing long-term social and institutional dimensions. This imbalance implies that while the literature recognizes palm oil as a tool for poverty alleviation and rural income expansion, more research is needed on inclusive development, equitable resource distribution, and sustainability challenges. The following sections expand on each theme, drawing upon quantitative and qualitative evidence presented in the studies.

Employment Generation and Rural Labor Dynamics

Across the reviewed literature, palm oil emerges as one of the strongest rural employment generators in the Global South. Studies consistently show that the sector provides direct employment to 3.5-5.0 million workers in Indonesia and Malaysia combined, representing more than 80% of global supply [23]. Indonesia alone employs 4.2 million formal and informal workers in plantation and milling operations, accounting for 14-18% of total rural employment in key producing provinces such as Riau, Central Kalimantan, and North Sumatra [24]. In Malaysia, oil palm plantations employ more than 430,000 workers, with migrant labor comprising 30-40% of the workforce due to shortages of domestic labor [25].

Employment creation has increased gradually in most palm-oil-producing regions, particularly as planted areas expanded by 25-35% between 2010 and 2020 [26]. Labor absorption has been especially significant in newly opened frontier regions where alternative non-farm work is limited. In multiple studies, oil palm development reduced rural underemployment by 15-25%, especially among youth and low-skilled adult workers [27]. Approximately 40-45% of plantation jobs fall into unskilled or semi-skilled categories such as harvesting, weeding, maintenance, or loose-fruit collection, providing critical labor market entry points for individuals with low educational attainment [28].

The indirect employment created through backward and forward linkages transportation, machinery repair, fertilizer distribution, FFB buying stations, small trading units is estimated to multiply the effects of direct employment by 1.5-2.3 times, depending on the region [29]. These employment trends reflect the role of palm oil as a central driver of rural labor market expansion.

Household Income Improvement and Poverty Reduction Outcomes

A recurring pattern across the reviewed studies is the substantial improvement in household income among workers and smallholders engaged in palm oil activities. Formal plantation workers typically earn wages 20-60% higher compared to traditional agricultural sectors such as rice farming, rubber tapping, or subsistence cropping [30]. In some regions of Indonesia, oil palm wages exceed the local minimum wage by 10-25%, particularly for harvesters who are paid based on productivity [31].

Studies examining household income composition reveal that palm-oil-related employment contributes 50-70% of total household income, allowing rural households to cover key expenditures such as schooling, healthcare, and housing improvements [32]. Several longitudinal studies found that poverty incidence declined by 12-18% over the past decade among households participating in the palm oil economy, with the strongest impact observed in provinces with high plantation density [33].

Smallholders, who account for a large share of production, also exhibit strong income gains. Average annual profits for independent smallholders are 2-4 times higher than those growing cassava, maize, or mixed food crops, primarily due to higher market stability and yields averaging 12-18 tons per hectare [34]. Plasma smallholders receive additional advantages through better access to certified seedlings, fertilizer packages, and guaranteed milling contracts, increasing their income by 15-25% relative to independent farmers [35].

Comparative studies further show that palm oil-based livelihoods improve upward mobility, with 20-30% of households transitioning into middle-income categories after 5-10 years of continuous engagement in the sector [36].

Livelihood Diversification and Welfare Enhancements

Palm oil income does not merely raise household finances; it also enables broader livelihood diversification. Approximately 25-40% of households with stable palm oil income invest in secondary income activities such as small retail shops, poultry and goat farming, fishing, motorcycle taxis, or commodity trading [37]. Diversification reduces exposure to agricultural shocks and provides household resilience during off-season periods.

Welfare improvements are another key outcome supported by empirical evidence. Households with at least one member working in the palm oil sector increase educational expenditures by 15-30%, resulting in higher secondary school attendance and reduced dropout rates [38]. Health expenditures rise by 12-25%, enhancing maternal healthcare utilization, childhood vaccination uptake, and nutrition monitoring [39].

Housing quality also improves: 20-35% of households report shifting from semi-permanent structures (wood, bamboo) to permanent homes (brick, cement) within 3-7 years of obtaining stable palm oil income [40]. Asset ownership motorcycles, refrigerators, livestock, farmland expands by 30-50% depending on the region [41].

Taken together, these findings demonstrate that palm oil employment serves as a catalyst for multidimensional welfare gains beyond the income domain.



Income Distribution Patterns and Economic Inequality

The impacts of palm oil on income inequality are mixed, varying across land ownership patterns and regional governance structures. Several studies reveal that in villages with strong smallholder participation, income inequality tends to decline, with Gini coefficients improving by 5-12% over time [42]. Income distribution becomes more equitable because economic gains are shared more broadly across local households rather than being captured solely by corporate actors [43].

In contrast, regions dominated by large-scale estates with limited participation of local communities often see rising inequality. Studies reported inequality increases of 8-15% in areas where land ownership is highly concentrated among elites or corporations [44]. Wage workers benefit, but profits remain disproportionately captured by landowners, contributing to structural disparities [45].

Nonetheless, even in high-inequality regions, the absolute welfare level of low-income households often improves due to stable employment and cash-income opportunities. The differentiation between absolute and relative inequality is emphasized across the reviewed literature [46]. These complex patterns highlight that inequality outcomes depend heavily on local land tenure systems, smallholder support mechanisms, and inclusivity policies.

Smallholder Inclusion and Productivity Dynamics

Smallholders control 40-45% of global oil palm area, making them central actors in rural transformation [47]. Plasma smallholders, those linked to companies through contractual partnerships, achieve yields of 18-22 tons per hectare, while independent smallholders average 12-18 tons, depending on access to capital, training, and production inputs [48]. Productivity gaps of 20-35% between plasma and independent farmers appear consistently across the reviewed studies [49].

Certification schemes such as RSPO and national sustainability programs contribute to improved yields and income. Smallholders participating in certification experience income increases of 10-25%, mainly driven by better agronomy practices and price premiums of 3-7% depending on the mill [50]. Access to credit, either through microfinance institutions or company-facilitated loan mechanisms, raises productivity by 15-20%, driven by the purchase of fertilizers, herbicides, and replanting inputs.

Collective action through cooperatives also strengthens bargaining power. Studies show that smallholders in cooperative clusters secure 5-12% higher FFB prices and reduced transportation costs by 8-10% [51]. These findings underscore that smallholder inclusion is one of the primary channels through which palm oil employment contributes to broad-based rural development.

Gendered Employment and Social Equity Dimensions

Women constitute 25-35% of the palm oil labor force, particularly in nurseries, harvesting support tasks, loose-fruit collection, and processing roles. Their participation contributes significantly to household income, although wage disparities persist. Across studies, women earn 20-30% less than men in similar roles, partly due to differences in contract types and task allocations [52].

Despite disparities, women's financial autonomy and decision-making capacity increase as they participate in palm oil income streams. Studies reveal that women employed in the sector are 30-45% more likely to participate in household budgeting, asset purchases, and long-term financial planning [53]. Women also report improved access to training programs, cooperatives, and community decision forums, contributing to expanded social capital [54].

In some cases, women's increased workload, combining household responsibilities and plantation tasks has generated dual-burden pressures. Yet, the overall net effect of women's participation is positive, contributing to greater economic empowerment, increased household resilience, and improved social equity outcomes.

Structural Economic Change in Palm Oil Regions

Palm oil expansion generates profound structural shifts in rural economies. Plantation development stimulates backward linkages (seedling suppliers, cargo transporters, fertilizer distributors) and forward linkages (mills, refineries, local

market networks), creating new value-chain opportunities. Non-farm enterprises in palm oil regions increased by 15-40% following plantation expansion, depending on the maturity of local markets and infrastructure availability [55].

Infrastructure development is another major driver of structural change. Plantations often invest in road construction, bridges, electricity lines, and logistical facilities, reducing transaction costs by 20-35% for surrounding communities [56]. Improved infrastructure facilitates market access for farmers, enhances mobility, and attracts additional investments such as retail shops, microfinance institutions, and small manufacturing units.

Labor transitions also reshape local economies. As oil palm becomes more profitable, many households shift from subsistence agriculture to wage labor or smallholder palm oil cultivation, contributing to a gradual restructuring of rural labor markets [57]. This transformation aligns with broader modernization trends observed in rapidly developing agricultural economies.

Socioeconomic Risks, Vulnerabilities, and Constraints

While palm oil employment delivers substantial rural benefits, several risks and constraints remain. Price volatility exposes smallholders, especially independent farmers to income fluctuations of 10-25% during global downturns [58]. Without contract arrangements, smallholders face unstable buying prices, delayed payments, or reduced purchasing from mills.

Labor-related vulnerabilities are also noted across studies. Seasonal fluctuations in labor demand can reduce worker earnings by 15-20%, particularly during low-yield months or heavy rainfall periods that impede harvesting [59]. Some studies highlight concerns about occupational safety, pesticide exposure, and long working hours, though the severity varies across plantation management systems and regulatory environments [60].

Land tenure insecurity is a major structural constraint. In regions with weak recognition of customary land rights, disputes emerge between corporations and communities, delaying smallholder expansion and reducing the distribution of benefits. Several reviewed studies report that unclear land rights reduce smallholder participation by 10-20% and hinder rural equity outcomes [61].

Environmental pressures, such as declining soil fertility, biodiversity loss, and water contamination, present additional challenges, though their socioeconomic implications differ across regions. Most studies emphasize the need for improved institutional support, training programs, sustainability standards, and market regulation to ensure that the long-term socioeconomic gains of palm oil employment are preserved.

Discussion

This systematic review synthesizes contemporary empirical findings from 39 Scopus-indexed open-access studies (2019-2025) to answer the research question: How does employment in the palm oil sector influence rural poverty reduction, livelihood improvement, and structural economic transformation? The evidence reveals a complex but consistent pattern in which palm oil employment, whether through smallholder schemes, estate labor markets, or downstream industrial activities, plays a significant role in reshaping rural socioeconomic systems.

Palm Oil Employment and Rural Poverty Reduction

Across the reviewed studies, employment in the palm oil sector consistently demonstrates a substantial capacity to reduce poverty, primarily through stable wages, expanded labor opportunities, and improved household income security. Empirical research identifies that palm oil estates typically offer above-average rural wages compared to traditional subsistence agriculture, thereby elevating household purchasing power and reducing chronic income deficits in remote areas [62]. The employment intensity of the industry covering planting, harvesting, processing, logistics, and downstream refining generates multidimensional income channels that directly raise the economic standing of rural households [63].

Several studies highlight how the expansion of oil palm plantations in regions formerly dominated by low-productivity crops creates a shift from underemployment to formalized wage labor, which is crucial in poverty-prone districts. This transition

is particularly impactful for landless laborers, who often experience the most severe forms of rural poverty. The availability of regular salaries from plantation operations helps stabilize household finances, reducing dependence on seasonal agricultural earnings that are highly vulnerable to climate fluctuations [64]. Furthermore, smallholder participation through partnership schemes or independent smallholding provides a dual income stream, self-managed farm revenue, and temporary wage labor, allowing families to buffer against commodity price volatility.

However, the review also identifies disparities across regions, with poverty reduction outcomes strongly influenced by land tenure arrangements, capital access, and the degree of integration into formal supply chains. In contexts where smallholders are excluded from certified markets or rely on informal brokers, the poverty reduction impact tends to be weaker due to suppressed farm-gate prices and limited bargaining power [65]. Nevertheless, the overall empirical pattern across the 39 studies shows that palm oil employment reduces rural poverty when embedded within structured governance mechanisms, access to certification, and fair-value labor markets [66]. These findings underscore the role of institutional frameworks in determining whether economic gains translate into widespread poverty alleviation.

Livelihood Improvements and Socioeconomic Welfare Gains

Beyond direct income gains, evidence from the systematic review reveals that palm oil employment significantly improves rural livelihoods by broadening welfare dimensions such as access to services, household resilience, consumption stability, and intergenerational mobility. Employment-linked welfare improvements are frequently associated with better access to healthcare, education, transportation, and food security, reflecting the spillover effects of plantation-driven infrastructure development [67]. In many rural regions, palm oil companies contribute to road construction, school facilities, and community health programs, which enhance the overall well-being of local populations [68].

Smallholders engaged in palm oil cultivation also exhibit improved asset ownership, including housing upgrades, agricultural equipment, motorcycles, and digital technology, enabling families to diversify income sources and strengthen long-term economic resilience [69]. Several studies note that households shift from subsistence-based vulnerability toward more stable livelihood portfolios when palm oil income is combined with micro-enterprise activities such as retail shops, transportation services, or livestock businesses [70]. These forms of livelihood diversification are central to rural development, as they reduce economic dependency on a single commodity while enabling upward economic mobility.

In addition, palm oil employment provides pathways for skill development and human capital accumulation. Plantation workers often undergo training related to agronomy, harvesting efficiency, environmental compliance, and machinery operation, which enhances employability and fosters labor mobility within the broader agricultural and industrial sectors. These gains in human capital directly support rural development trajectories, especially for young workers seeking non-farm employment opportunities [71].

Nevertheless, the literature also emphasizes emerging challenges such as gender gaps in wage levels, limited representation of women in managerial positions, and unequal access to training programs [72]. While the sector creates substantial opportunities for rural women, the full welfare potential is realized only when gender-inclusive labor policies are adopted. Several studies also highlight the risks associated with commodity price volatility, which can temporarily reduce welfare gains for smallholders during global downturns [73]. However, when viewed across the entire body of evidence, livelihood improvements remain consistently positive, indicating that palm oil employment contributes meaningfully to rural welfare development when supported by stable institutional and market environments.

Structural Economic Transformation and Rural Development Dynamics

The third thematic dimension emerging from the review concerns the role of palm oil employment in driving structural economic transformation. Empirical findings indicate that as palm oil production expands, rural economies undergo a reorientation from subsistence agriculture toward a market-driven, agro-industrial model characterized by higher productivity, diversified value chains, and increased labor specialization [74]. This transition is a hallmark of structural transformation in developing regions, where agricultural modernization catalyzes broader economic growth.

The palm oil sector fosters rural industrialization through the establishment of mills, refineries, and downstream processing facilities that demand skilled labor, technology adoption, and logistics infrastructure [75]. These processes create backward and forward linkages, such as fertilizer supply, machinery maintenance, transportation services, and bioproduct innovation that amplify employment multipliers and stimulate local economic dynamism [76]. The presence of processing facilities, in particular, converts raw agricultural output into value-added products, enhancing regional productivity and increasing the income elasticity of rural economic systems.

Moreover, the sector's influence extends into spatial development patterns. Plantation expansion frequently induces urbanization of rural settlements, with small commercial centers emerging around plantation hubs. These centers often evolve into micro-growth poles that attract investment, migration, and the establishment of service-oriented enterprises, thereby transforming the rural economic landscape [77]. The sector also promotes digitalization through the adoption of precision agriculture tools, remote sensing, and digital traceability systems, which accelerate the modernization of rural industries and integrate them into global value chains.

Despite these transformative trends, the literature also identifies governance challenges that can hinder equitable structural transformation. These include land-use conflicts, inadequate labor protections in certain regions, and disparities in smallholder access to technology and certification schemes [78]. The extent to which structural transformation translates into inclusive development depends largely on policy coherence, investment in rural infrastructure, and enforcement of sustainability standards. Nonetheless, the overall evidence from the 39 reviewed studies demonstrates that palm oil employment catalyzes a shift toward more complex, resilient, and diversified rural economies when supported by equitable institutional arrangements and sustainable production systems [79].

Integrative Synthesis: Linking Employment, Poverty Reduction, and Structural Change

A synthesis of the three analytical dimensions demonstrates that palm oil employment functions as both a direct and indirect driver of rural development. Direct effects include income gains, stable employment, and welfare improvements. Indirect effects encompass industrial linkages, infrastructure expansion, and skill development that collectively build the foundation for long-term structural transformation. The evidence indicates that poverty reduction is most substantial in regions where smallholders and rural workers are integrated into formalized supply chains, supported by fair labor practices, and connected to productive downstream industries [80].

The review suggests a reinforcing cycle: employment opportunities create income gains → income improves welfare and increases resilience → improved welfare facilitates higher productivity and enables diversification → diversification drives structural transformation and reduces systemic rural poverty. This pathway is consistent across the literature and underlines the importance of institutional and governance frameworks in sustaining positive outcomes [81]. The palm oil sector thus plays a pivotal role not merely as a commodity-producing industry but as an engine of rural socioeconomic restructuring.

The findings of this systematic review carry several implications for policymakers, development practitioners, and industry stakeholders. First, strengthening institutional support for smallholders through access to credit, training, land certification, and integration into sustainable supply chains can significantly enhance the poverty reduction impact of palm oil employment. Policies that ensure fair labor standards, gender-inclusive employment, and pathways for skill upgrading are essential for maximizing welfare gains and supporting inclusive rural development. Second, encouraging investment in downstream industries and digital technologies can accelerate structural transformation, fostering diversified value chains that benefit rural economies beyond plantation boundaries. Third, expanding infrastructure in rural areas, such as roads, schools, and health facilities, through collaborative public-private initiatives can generate long-term social returns and reinforce the transformative capacity of the palm oil sector.



Despite substantial evidence on positive socioeconomic impacts, several gaps remain in the literature. Future research should incorporate longitudinal studies to better capture dynamic poverty trajectories and intergenerational mobility. More comparative analyses across regions would help identify why some communities benefit more than others from sector expansion. Additionally, greater emphasis on gender-disaggregated data, technological adoption patterns, and environmental-social trade-offs would provide a more holistic understanding of the sector's role in sustainable development. Finally, future research should investigate how climate change, carbon policies, and emerging sustainability standards reshape the employment-poverty nexus within the palm oil industry.

Conclusion

The systematic review of 39 empirical studies demonstrates that employment in the palm oil sector exerts a multifaceted influence on rural socioeconomic systems. Evidence consistently shows that palm oil employment contributes to poverty alleviation by providing stable and higher-than-average rural wages, formal labor opportunities, and diversified income sources for households in both plantation-based and smallholder contexts. The sector particularly benefits landless laborers and smallholder families, enabling more predictable financial planning and mitigating vulnerability to seasonal or market shocks.

In terms of livelihood improvements, the review highlights substantial gains in household welfare, including increased access to education, healthcare, infrastructure, and productive assets. Smallholder participation through independent cultivation or contract farming enhances household resilience, promotes income stability, and facilitates human capital development through skills acquisition and exposure to modern agricultural practices. Nevertheless, disparities in gender participation, wage equality, and market integration remain challenges that can limit the full realization of welfare benefits.

The evidence also indicates that palm oil employment acts as a driver of structural economic transformation. Expansion of plantations, processing facilities, and downstream industries fosters rural industrialization, stimulates non-farm employment, and enhances regional connectivity. These transformations generate diversified economic pathways that strengthen local economies and increase overall productivity. However, unequal access to land, capital, and certification, as well as corporate consolidation, can constrain the inclusiveness of these structural benefits.

Overall, the review underscores that while palm oil employment has significant potential to reduce rural poverty, enhance livelihoods, and drive economic transformation, the magnitude and distribution of benefits are contingent on governance structures, labor policies, smallholder support mechanisms, and equitable access to markets. Sustainable, inclusive development outcomes are most likely when institutional frameworks, regulatory enforcement, and community-level participation are effectively aligned with the sector's growth trajectory.

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