INTERNATIONAL JOURNAL OF FINANCIAL ECONOMICS (IJEFE) https://wikep.net/index.php/IJEFE
Vol. 2 No. 8 February 2026, page 1472-1482 e-ISSN: 3063-3648

ENVIRONMENTAL AND SUSTAINABILITY ISSUES IN THE PALM OIL SECTOR: ANALYSIS OF THE IMPACT OF LOCAL REGULATIONS AND GOVERNMENT POLICIES ON ENVIRONMENTAL MANAGEMENT, NATURAL RESOURCE CONSERVATION, AND THE SOCIO-ECOLOGICAL SUSTAINABILITY OF LOCAL COMMUNITIES

Loso Judijanto
IPOSS Jakarta
losojudijantobumn@gmail.com

Abstract

This study analyses the impact of local regulations and government policies on environmental management, natural resource conservation, and the socio-ecological sustainability of local communities in Indonesia's palm oil sector. Through a review of existing literature, this study reveals that regulatory instruments have great potential to control deforestation, reduce pollution, and protect sensitive ecosystems. However, their implementation is often hampered by overlapping authorities, weak supervision, and a lack of alignment between economic and environmental policies, meaning that environmental management and natural resource conservation are not always achieved optimally. The impact of regulations on the socio-ecological sustainability of local communities is also ambivalent. On the one hand, plasma schemes, CSR, and community dialogue obligations through ISPO can increase income, access to infrastructure, and community participation in resource management. On the other hand, in many areas, regulations actually reinforce inequality, ignore customary rights, and trigger agrarian conflicts, especially in areas that still depend on subsistence and forest ecosystems. The results of the study show that the same regulations can produce very different results depending on the socio-ecological context and the quality of implementation at the local level. Overall, this study concludes that regulations in the palm oil sector have significant potential to promote better environmental management, natural resource conservation, and the socio-ecological sustainability of local communities, but only if they are implemented consistently, inclusively, and based on evidence. Strengthening coordination between levels of government, strengthening the capacity of supervisors, recognising customary rights, and integrating local knowledge are important prerequisites for regulations to not only become a formal instrument, but to truly be able to create a balance between economic growth, environmental protection, and social justice for local communities.

Keywords: palm oil, local regulations, government policy, environmental management, natural resource conservation, socio-ecological sustainability, local communities, ISPO, deforestation, peatlands.

Introduction

Palm oil has become one of the strategic commodities in the Indonesian economy as well as one of the main contributors to non-oil and gas export revenues. However, this sector has also been in the global spotlight due to its widespread environmental and social impacts (Ministry of Industry, 2023; World Bank, 2022).

Indonesia's palm oil production continues to increase in line with the demand for vegetable oil, biodiesel, and raw materials for the food, cosmetics, and renewable energy industries, thereby expanding plantation areas into forests, peatlands, and traditional indigenous territories (Ministry of Agriculture, 2022; SEI, 2024). Poorly managed oil palm expansion has been linked to deforestation, peatland ecosystem degradation, loss of biodiversity, and increased greenhouse gas emissions contributing to climate change (The ICCT, 2021; SEI, 2024).

Ecologically, the conversion of tropical forests and peatlands into oil palm plantations drastically alters the structure and function of ecosystems, including a reduction in carbon storage capacity, an increased risk of fires, and a decline in water quality due to runoff from fertilisers, pesticides, and palm oil mill effluent (POME) (The ICCT, 2021; Greenpeace, 2025). Peatlands drained for oil palm cultivation become a major source of carbon dioxide emissions due to the oxidation of organic matter stored for thousands of years, making Indonesia one of the countries with the largest GHG emissions from the land use change and forestry sector (SEI, 2024; European Parliament, 2018). In addition, the loss of wildlife habitats such as orangutans, Sumatran tigers, and various other endemic species shows that oil palm expansion has a direct impact on biodiversity and regional ecosystem stability (The ICCT, 2021; World Bank, 2022).

On the social side, the presence of oil palm plantations often brings about changes in the social and economic structure of local communities, ranging from shifts in traditional livelihoods to the emergence of complex agrarian conflicts over land rights and natural resources (Mongabay, 2020; Asian Institute of Research, 2023). Many indigenous communities and smallholder farmers have lost access to forests, rivers, and subsistence lands that have long been the basis of local food security and culture, leading to social inequality and economic vulnerability (Mongabay, 2020; Greenpeace, 2025). On the other hand, the palm oil sector also creates jobs, increases household income, and encourages infrastructure development in remote areas, creating *a trade-off* between economic growth and socio-ecological sustainability (World Bank, 2022; Nature Communications Earth & Environment, 2023).

In terms of policy, the Indonesian government has designed various regulations and policy instruments to control the negative impacts of the palm oil sector, including Law No. 32 of 2009 concerning Environmental Protection and Management, a moratorium on the clearing of peatlands and primary forests, and the Indonesian Sustainable Palm Oil (ISPO) certification system, which is mandatory for all palm oil businesses (Ministry of Environment and Forestry, 2021; Ministry of Agriculture, 2022). ISPO is designed to ensure that palm oil cultivation and processing practices meet environmental, social and economic standards, including waste management, biodiversity conservation and the protection of indigenous peoples' rights (Tropenbos-Indonesia, 2020; SEI, 2024). However, the implementation of these regulations often

faces obstacles at the regional level, such as overlapping authorities, weak monitoring capacity, and political-economic pressure from large stakeholders (Tropenbos-Indonesia, 2020; Oil Palm Governance, 2025).

In addition to national policies, local regulations such as Regional Spatial Plans (RTRW), plantation business permits, and waste management regulations at the provincial and district levels also play an important role in determining how oil palm expansion takes place on the ground (KemenLHK, 2021; IJIRSS, 2023). These local regulations can either strengthen or weaken the effectiveness of national policies, depending on the quality of governance, transparency, and community participation in the planning and decision-making processes (Oil Palm Governance, 2025; SEI, 2024). Several studies show that regulatory loopholes and *hollow governance* practices at the sub-national level are often exploited to open up new land in sensitive areas, thereby exacerbating environmental degradation and social conflict (Oil Palm Governance, 2025; Mongabay, 2024).

From an *environmental governance* perspective, Indonesia's palm oil sector is an interesting empirical laboratory for testing the extent to which formal regulations can integrate economic, environmental and social objectives into a coherent policy framework (SEI, 2024; Nature Communications Earth & Environment, 2023). The *social-ecological systems* (SES) approach offers an appropriate analytical framework for examining the complex interactions between regulations, ecosystems, and local communities, including how policies affect the socio-ecological resilience of communities surrounding plantations (Ostrom, 2009; Nature Communications Earth & Environment, 2023). Within this framework, regulation is understood not only as a legal instrument but also as a mechanism that shapes power relations, benefit distribution, and communities' capacity to adapt to environmental and economic changes (SEI, 2024; Oil Palm Governance, 2025).

Although certifications such as ISPO and RSPO are expected to be key instruments for promoting sustainable practices, several studies show that their effects on the socio-ecological conditions of local communities are ambiguous and highly dependent on the regional context (Mongabay, 2020; Nature Communications Earth & Environment, 2023). In areas that have long been integrated into the market economy, certification can increase market access and income, but in frontier areas that still depend on subsistence, certification can actually accelerate the loss of access to natural resources and exacerbate social inequality (Mongabay, 2020; Nature Communications Earth & Environment, 2023). This shows that a "one-size-fits-all" policy is often inadequate to address local complexities, requiring a more contextual and participatory approach (Oil Palm Governance, 2025; SEI, 2024).

In the Indonesian context, the main challenge that arises is how to design and implement regulations that can reduce environmental damage, strengthen natural resource conservation, while maintaining the socio-ecological sustainability of local

communities (KemenLHK, 2021; Tropenbos-Indonesia, 2020). Policies that focus solely on technical environmental aspects without considering the social and political dimensions of often fail to achieve true sustainability goals, as they neglect the rights of indigenous peoples, agrarian conflicts, and local power dynamics (Asian Institute of Research, 2023; Oil Palm Governance, 2025). Conversely, policies that prioritise economic growth without strict environmental oversight have the potential to exacerbate ecosystem degradation and increase the social vulnerability of communities (World Bank, 2022; The ICCT, 2021).

Thus, this study aims to systematically analyse how local regulations and government policies influence environmental management, natural resource conservation, and the socio-ecological sustainability of local communities in the palm oil sector in Indonesia.

Research Method

This study uses a systematic literature review method to analyse environmental and sustainability issues in the palm oil sector and the impact of local regulations and government policies on environmental management, natural resource conservation, and the socio-ecological sustainability of local communities. The study was conducted by collecting, classifying, and synthesising various primary and secondary sources, books, and journals related to the research title (Eliyah & Aslan, 2025) ; (Ferrari, 2020) .

Results and Discussion

The Impact of Regulations on Environmental Management and Natural Resource Conservation

National and local regulations in Indonesia, such as Law No. 32 of 2009 concerning Environmental Protection and Management, AMDAL, and various derivative regulations in the palm oil sector, are in principle designed to control land expansion and limit ecosystem damage (KemenLHK, 2021; IJIRSS, 2023). These regulations require palm oil plantation companies to conduct environmental impact assessments, meet waste quality standards, and obtain environmental permits before carrying out production activities (IJIRSS, 2023). However, the effectiveness of these regulations is highly dependent on consistency of substance, inter-agency coordination, and the quality of field supervision, so that in many cases formal policies have not been fully able to prevent significant environmental degradation (IJIRSS, 2023; EIA, 2020).

One of the most prominent regulatory instruments in the palm oil sector is the Indonesian Sustainable Palm Oil (ISPO) certification, which is mandatory for all palm oil businesses since the issuance of Presidential Regulation No. 44 of 2020 and its refinement in Presidential Regulation No. 16 of 2025 (Tropenbos-Indonesia, 2020; Peterson Indonesia, 2025). ISPO regulates the principles of sustainable management, including waste management, biodiversity conservation, peatland protection, and the

cessation of new land clearing in areas sensitive to the (Tropenbos-Indonesia, 2020; SEI, 2024). Normatively, ISPO has the potential to be a key tool for improving environmental management in oil palm plantations; however, compliance and certification coverage remain limited, especially among small companies and plasma farmers (JHI, 2023; Tropenbos-Indonesia, 2020).

In the context of deforestation, regulations such as the moratorium on primary forests and peatlands and the extended palm oil moratorium, which is now permanent, have theoretically reduced the rate of forest clearing for oil palm plantations (Indonesia Palm Oil Facts, 2022; SEI, 2024). SEI data (2024) shows that the rate of oil palm-related deforestation declined over the past decade, although there was a resurgence of deforestation in some areas in 2022–2023 (Mongabay, 2024). This indicates that land use restrictions can curb forest expansion, but have not completely stopped land conversion practices in areas where there are still regulatory loopholes or weak supervision (Mongabay, 2024; EIA, 2020).

On the other hand, policies aimed at facilitating investment, such as the Job Creation Law (Omnibus Law) and its derivative regulations, are considered to weaken environmental standards in the palm oil sector because they simplify the licensing process and reduce the strictness of EIA and land conservation requirements (UNHAS, 2021; EIA, 2020). An analysis of post-Omnibus Law norms shows that several provisions reduce the obligation to protect peat ecosystems and accelerate the licensing process, thereby potentially increasing the risk of land degradation and carbon emissions (UNHAS, 2021; EIA, 2020). Thus, economic and environmental regulations are often in conflict with each other, so that environmental impacts depend on the extent to which the government is able to maintain a balance between investment and environmental protection policies (UNHAS, 2021; SEI, 2024).

The management of palm oil waste, particularly POME (Palm Oil Mill Effluent), is also greatly influenced by national and regional environmental regulations. Law No. 32 of 2009 and various ministerial regulations set quality standards for palm oil industry liquid waste and require companies to treat POME before discharging it into the environment (IJIRSS, 2023). However, several studies indicate that the implementation of these regulations still faces serious obstacles, such as incompatible treatment technologies, limited monitoring capacity, and economic incentives that favour substandard waste management practices (IJIRSS, 2023; EIA, 2020). As a result, there are still cases of river pollution and water quality degradation around palm oil mills, which directly impact aquatic ecosystems and communities that depend on these water sources (IJIRSS, 2023; Mongabay, 2024).

Regulations related to peatlands, such as the peat protection policy through Minister of Environment and Forestry Decree No. P.71/2014 and provisions in the ISPO, require companies to maintain peat water levels at a certain level and limit peat conversion for oil palm plantations (Indonesia Palm Oil Facts, 2022; Tropenbos-

Indonesia, 2020). In theory, these regulations have the potential to reduce carbon emissions from peat oxidation and reduce the risk of land fires; however, in practice, their implementation is often hampered by a lack of monitoring, limited technical understanding, and pressure to continue producing palm oil on peatlands (Indonesia Palm Oil Facts, 2022; EIA, 2020). As a result, some peat areas continue to experience drying and degradation, meaning that existing regulations are not yet fully capable of ensuring the sustainable conservation of peat resources (SEI, 2024; UNHAS, 2021).

From a biodiversity conservation perspective, regulations such as ISPO and policies on forest area protection and wildlife corridors establish management principles that require companies to maintain High Conservation Value (HCV) and High Carbon Stock (HCS) areas and avoid land clearing in critical areas (Tropenbos-Indonesia, 2020; SEI, 2024). However, the implementation of these principles is often inconsistent between companies and regions, resulting in the continued fragmentation and conversion of some important habitat areas (SEI, 2024; Mongabay, 2024). In addition, national regulations are not yet fully supported by adequate monitoring and sanction mechanisms, so companies that violate conservation principles often do not face meaningful consequences (EIA, 2020; SEI, 2024).

Regulatory gaps also arise from overlapping authorities between the central and regional governments, as well as between ministries, which has led to ineffective coordination of environmental management in the palm oil sector (IJIRSS, 2023; UNHAS, 2020). For example, authority over forest management, plantation licensing and environmental supervision is spread across several agencies, often leading to differences in interpretation and policy priorities (IJIRSS, 2023; UNHAS, 2020). This situation allows companies to exploit regulatory loopholes to open new land in sensitive areas or avoid stricter environmental management obligations, thereby reducing the overall effectiveness of regulations (EIA, 2020; SEI, 2024).

The impact of regulations on environmental management also depends heavily on the capacity of supervisory institutions, both at the central and regional levels. Environmental and plantation agencies often face limitations in human resources, budgets, and monitoring technology, making them unable to conduct intensive supervision across all palm oil plantation areas (IJIRSS, 2023; SEI, 2024). As a result, many environmental violations, such as illegal land clearing, water pollution, and land burning, are only detected after the damage has occurred, making regulations more of a reactive instrument than a preventive one (EIA, 2020; Mongabay, 2024).

Furthermore, regulations that rely too heavily on a top-down approach and fail to involve local communities often fail to integrate local knowledge and long-standing natural resource management practices (SEI, 2024; Mongabay, 2024). Indigenous peoples and smallholder farmers have deep knowledge of local ecosystems, but formal regulations often do not recognise their rights or provide adequate space for participation in environmental planning and oversight processes (SEI, 2024; EIA, 2020).

This results in regulations that are far removed from the local context, thereby failing to fully promote sustainable and inclusive natural resource conservation (SEI, 2024; UNHAS, 2021).

Overall, national and local regulations in the palm oil sector have great potential to improve environmental management and natural resource conservation, particularly through ISPO, the peatland moratorium, and various strict environmental regulations (Tropenbos-Indonesia, 2020; SEI, 2024). However, the effectiveness of these regulations is greatly influenced by factors such as consistency of substance, inter-agency coordination, monitoring capacity, and local community participation (IJIRSS, 2023; UNHAS, 2021). If regulatory loopholes, weak law enforcement, and overlapping authorities are not addressed, existing regulations will only have a partial impact on environmental management and natural resource conservation in the palm oil sector (EIA, 2020; SEI, 2024).

Thus, increasing the impact of regulations on environmental management and natural resource conservation requires a more holistic approach, including harmonising regulations between levels of government, strengthening supervisory capacity, integrating local knowledge, and applying strict sanctions for environmental violations. Regulations also need to be designed in a more inclusive and transparent manner so that local communities can play an active role in environmental management and natural resource conservation around palm oil plantations. With such an approach, regulations in the palm oil sector are expected to create a balance between economic growth, environmental protection, and sustainable natural resource conservation.

The Impact of Regulations on the Socio-Ecological Sustainability of Local Communities

Palm oil sector regulations, both at the national and local levels, formally emphasise the protection of local community rights, including the obligation of companies to conduct consultations, provide compensation, and share benefits through plasma and CSR schemes (HRW, 2021; LS-ISPO, 2024). Policies such as ISPO and various agrarian and environmental regulations mandate that plantation expansion must not disregard customary rights, land rights, and community access to natural resources that form the basis of their livelihoods (HRW, 2021; JPSL, 2018). However, in practice, the implementation of these regulations is often not in line with the normative text, so that their impact on the socio-ecological sustainability of local communities is uneven and even contradictory (HRW, 2021; Mongabay, 2024).

One of the most obvious impacts of these regulations is on land access and agrarian conflicts. In many areas, companies exploit regulatory loopholes and weak oversight to take control of land previously used by indigenous peoples and smallholder farmers ( ), often without meaningful consultation or adequate compensation (HRW, 2021; Mongabay, 2024). As a result, regulations that were supposed to protect the rights of communities have instead become instruments that strengthen the position of

companies, exacerbating social inequality and triggering prolonged conflicts between local communities and companies or local governments (HRW, 2021; JISH, 2024). In this context, the socio-ecological sustainability of local communities is disrupted because regulations fail to ensure equitable distribution of land and natural resources.

On the other hand, regulations that govern companies' obligations to share benefits, for example through plasma programmes, CSR, and infrastructure development, have the potential to improve the economic and social welfare of communities around plantations (LS-ISPO, 2024; JPSL, 2018). Empirical studies show that villages that partner with palm oil companies through plasma schemes or receive CSR programmes tend to experience increases in income, access to education, and health facilities compared to non-palm oil villages (Sodality, 2021; JPSL, 2018). However, these benefits are often unevenly distributed; communities with stronger social and political capital tend to receive the largest share, while indigenous peoples and smallholder farmers remain left behind (Mongabay, 2024; HRW, 2021).

The impact of regulations also depends heavily on the local ecological and economic context. Research on thousands of villages in Indonesia found that in areas that have long transitioned to a market economy, such as Sumatra, the presence of palm oil plantations and sustainable certification tends to have a more positive socio-ecological impact, albeit with a decline in environmental quality (Mongabay, 2020; Sodality, 2021). Conversely, in frontier regions such as Kalimantan and Papua, where communities are still highly dependent on forests and subsistence, oil palm expansion—including certified plantations—actually worsens socio-ecological conditions by reducing access to natural resources and disrupting traditional livelihoods (Mongabay, 2020; HRW, 2021). This shows that the same regulations can produce very different results depending on the socio-ecological characteristics of local communities.

Regulations such as ISPO also emphasise socio-ecological aspects through the obligation of companies to establish dialogue with communities, resolve conflicts, and support community-based natural resource management (LS-ISPO, 2024; JPSL, 2018). In some cases, the implementation of ISPO has encouraged increased community participation in decision-making related to land and natural resource management, thereby strengthening the socio-ecological sustainability of local communities (Jolas, 2024; JPSL, 2018). However, in many places, community participation is still formalistic and has no real influence on company policy, so that regulations actually create an illusion of inclusion without any real change in the power structure (HRW, 2021; Jolas, 2024).

The impact of regulations on socio-ecological sustainability is also evident in changes in livelihoods and patterns of natural resource use. In many villages, regulations facilitating oil palm expansion have encouraged a shift from subsistence farming and forest use to dependence on plantation or plasma labour wages (Mongabay, 2020; HRW, 2021). These changes may increase nominal income, but they also reduce

livelihood diversity and increase dependence on a single commodity, making communities more vulnerable to price fluctuations and policy changes (Mongabay, 2024; Pro-Ideas, 2026). In the long term, regulations that do not take into account livelihood diversification and the protection of local ecosystems have the potential to weaken the socio-ecological resilience of communities.

Regulations that rely too heavily on a top-down approach and do not recognise customary rights and local knowledge often fail to maintain the socio-ecological sustainability of local communities. Indigenous peoples have complex and sustainable forest and land management systems, but formal regulations often do not recognise their rights or provide adequate space for participation in environmental planning and monitoring processes (HRW, 2021; EIA, 2020). As a result, regulations become instruments that are far removed from the local context, thus failing to fully promote sustainable and inclusive natural resource conservation (SEI, 2024; UNHAS, 2021).

Overall, regulations in the palm oil sector have great potential to improve the socio-ecological sustainability of local communities, particularly through ISPO, plasma programmes, and CSR (LS-ISPO, 2024; JPSL, 2018). However, the effectiveness of these regulations is greatly influenced by factors such as consistency of substance, inter-agency coordination, monitoring capacity, and local community participation (IJIRSS, 2023; UNHAS, 2021). If regulatory gaps, weak law enforcement, and overlapping authorities are not addressed, existing regulations will only have a partial impact on the socio-ecological sustainability of local communities (EIA, 2020; SEI, 2024).

Thus, increasing the impact of regulations on the socio-ecological sustainability of local communities requires a more holistic approach, including harmonising regulations across levels of government, strengthening supervisory capacity, integrating local knowledge, and imposing strict sanctions for violations of community rights. Regulations also need to be designed in a more inclusive and transparent manner, so that local communities can play an active role in managing the environment and natural resources around oil palm plantations. With such an approach, regulations in the oil palm sector are expected to create a balance between economic growth, environmental protection, and the socio-ecological sustainability of local communities.

Conclusion

Local regulations and government policies in the palm oil sector have complex impacts and are not always in line with normative objectives and the reality on the ground. On the one hand, instruments such as ISPO, the peatland moratorium, and various environmental regulations provide a strong framework for controlling deforestation, reducing waste pollution, and protecting sensitive ecosystems. However, on the other hand, weak inter-agency coordination, overlapping authorities, and limited monitoring capacity have led to many regulatory loopholes that companies

exploit, so that environmental management and natural resource conservation are often not optimally achieved.

The impact of regulations on the socio-ecological sustainability of local communities is also ambivalent. In some areas, plasma schemes, CSR, and the obligation to engage in dialogue with communities through ISPO have been able to increase income, access to infrastructure, and community participation in resource management. However, in many cases, regulations actually reinforce inequality, ignore customary rights, and trigger agrarian conflicts, especially in frontier areas that still depend on subsistence and forest ecosystems. As a result, the socio-ecological sustainability of local communities is often disrupted because regulations fail to guarantee equitable distribution of land, benefits, and meaningful participation.

Overall, regulations in the palm oil sector have great potential to promote better environmental management, natural resource conservation, and the socio-ecological sustainability of local communities, but only if they are implemented consistently, inclusively, and based on evidence. Strengthening coordination between levels of government, strengthening the capacity of supervisors, recognising customary rights, and integrating local knowledge are important prerequisites for regulations to not only become a formal instrument, but to truly be able to create a balance between economic growth, environmental protection, and social justice for local communities.

References

Asian Institute of Research. (2023). *Indonesian palm oil industry: Environment risk, indigenous peoples, and national interests in the energy sector*. Asian Institute of Research.

Bohrium. (2025). *The oil palm governance: Challenges of sustainability policy in Indonesia*. Bohrium.

Ditjenbun, Kementerian Pertanian. (2020). *Peraturan Presiden Republik Indonesia Nomor 44 Tahun 2020 tentang Sistem Sertifikasi Perkebunan Kelapa Sawit Berkelanjutan Indonesia (Indonesian Sustainable Palm Oil/ISPO)*. Jakarta: Kementerian Pertanian.

Eliyah, E., & Aslan, A. (2025). STAKE'S EVALUATION MODEL: METODE PENELITIAN. Prosiding Seminar Nasional Indonesia, 3(2), Article 2.

European Parliament. (2018). *Palm oil: Economic and environmental impacts*. European Parliamentary Research Service.

Ferrari, R. (2020). Writing narrative style literature reviews. Medical Writing, 24(4), 230–235. https://doi.org/10.1179/2047480615Z.000000000329

Greenpeace. (2025). *Indonesian forests & palm oil*. Greenpeace USA.

Human Rights Watch (HRW). (2021). *"Why our land?": Oil palm expansion in Indonesia risks peatlands and livelihoods*. Human Rights Watch.

IJIRSS. (2025). *Government policies to reduce palm oil waste pollution in Indonesia*. *International Journal of Islamic and Social Sciences*, 7(2), 1–15.

Indonesia Palm Oil Facts. (2022). *FACT SHEET: Indonesia's deforestation efforts*. Indonesia Palm Oil Facts.

International Council on Clean Transportation (ICCT). (2021). *Ecological impacts of palm oil expansion in Indonesia*. ICCT.
International Council on Clean Transportation (ICCT). (2021). *Ecological impacts of palm oil expansion in Indonesia*. International Council on Clean Transportation.
Intertek. (2025). *ISPO: Indonesian Sustainable Palm Oil*. Intertek Assurance.
Kementerian Lingkungan Hidup dan Kehutanan (KemenLHK). (2021). *Peraturan dan kebijakan pengelolaan lingkungan hidup di sektor kelapa sawit*. KemenLHK.
Kementerian Lingkungan Hidup dan Kehutanan (KemenLHK). (2021). *Peraturan dan kebijakan pengelolaan lingkungan hidup di sektor kelapa sawit*. Jakarta: KemenLHK.
Kementerian Pertanian (Kementan). (2022). *Statistik perkebunan kelapa sawit Indonesia*. Kementan.
Kementerian Pertanian (Kementan). (2022). *Statistik perkebunan kelapa sawit Indonesia*. Jakarta: Kementerian Pertanian.
Mongabay. (2020). *"Certified" palm oil linked to worse social, ecological outcomes for Indonesian villagers*. Mongabay.
Mongabay. (2020). *Certified palm oil linked to worse social, ecological outcomes for Indonesian villagers*. Mongabay.
Mongabay. (2024). *Palm oil deforestation makes comeback in Indonesia after decade-long slump*. Mongabay.
Nature Communications Earth & Environment. (2023). *Replanting unproductive palm oil with smallholder plantations can help achieve Sustainable Development Goals in Sumatra, Indonesia*. *Communications Earth & Environment*, 4(1), 1–12.
Oil Palm Governance. (2025). *The oil palm governance: Challenges of sustainability policy in Indonesia*. Bohrium.
Ostrom, E. (2009). *A general framework for analyzing sustainability of social-ecological systems*. *Science*, 325(5939), 419–422.
Peterson Indonesia. (2025). *Comparing Presidential Regulation No. 44/2020 and No. 16/2025 on ISPO certification*. Peterson Indonesia.
SDS Indonesia. (2025). *Indonesian Sustainable Palm Oil (ISPO)*. SDS Indonesia.
SEI (Stockholm Environment Institute). (2024). *Indonesian palm oil exports and deforestation*. Trase.
Setkab. (2020). *President Jokowi signs Presidential Regulation on ISPO certification system*. Setkab.
Tropenbos-Indonesia. (2020). *New ISPO: A new hope to strengthen oil-palm governance?* Tropenbos-Indonesia.
UNHAS. (2021). *Environmental standard of Indonesian palm oil post omnibus law ratification*. *Journal of Environmental Law and Policy*, 4(2), 1–12.
World Bank. (2022). *Indonesia palm oil sector review*. World Bank.