

Licensing Procedures for Palm Oil Mills in North Sumatra: Integration of Investment Law and Regional Ecological Impacts

Original Article

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Abstract

North Sumatra plays a vital role in Indonesia's palm oil industry thanks to the region's extensive plantation areas and high level of processing. The development of Palm Oil Processing Plants (PPKS) is governed not only by plantation regulations but also by Law No. 25 of 2007 on Investment, which adopts principles of sustainability and environmental responsibility. This research aims to examine and evaluate the level of integration between policies that promote investment facilitation and the obligation to control environmental impacts in the POM licensing process at the regional level. This research uses a normative juridical method with a qualitative descriptive approach, focusing on the examination of applicable licensing regulations and their implementation in the region. Based on the results of the analysis, it is known that the application of the risk-based licensing system has had a positive impact in improving investment process efficiency. However, this improvement has not been fully accompanied by the effectiveness of environmental supervision. This condition is reflected in the persistence of environmental problems, such as the decline in river water quality and increasing greenhouse gas emissions in several locations. These findings indicate that strengthening post-licensing supervision is a very crucial matter to undertake. In addition, closer integration between investment policy and environmental protection instruments is also needed in order to create a balance between economic growth and environmental sustainability. Thus, the development of the palm oil industry is expected to proceed in a sustainable and responsible manner.

Keywords: Capital Investment, Environmental Impact, North Sumatra, POM Investment.

1. Introduction

The palm oil commodity processing sector is one of the leading fields in the national economy due to its large contribution to state foreign exchange earnings, employment absorption, and encouraging regional development. Among the various palm oil producing regions in Indonesia, the northern Sumatra region holds a significant role as a pioneer region as well as a center of palm oil plantation processing activities. The existence of large-scale plantations, both managed by the state, private parties, and communities, has led to an increasing need for the construction of Palm Oil Mills (POM). POMs as primary processing facilities continue to increase from time to time (Ramadhan et al., 2025).

Geographically and economically, North Sumatra has a significant comparative advantage in the development of the palm oil industry. The city of Medan functions as a center of industrial and commercial activities, while the Port of Belawan serves as the main export hub for palm oil products and their derivatives to international markets. This infrastructure not only facilitates the flow of distribution but also increases investment attractiveness in the palm oil processing sector. This condition has resulted in high investor interest in establishing



new POMs also expanding the production capacity of existing POMs (Pratama & Nasution, 2023).

The strategic advantage of North Sumatra is further strengthened by the availability of logistics and transportation infrastructure. The Port of Belawan serves as the main gateway for the export of crude palm oil (CPO) and its derivative products, thereby shortening the distribution chain and reducing logistics costs. This condition encourages the entry of new investments in the POM sector, both in the form of establishing new mills and expanding the capacity of existing ones. From the perspective of regional development, POM investment is viewed as an economic driving force capable of increasing regional income and absorbing a large number of workers (Zainal et al., 2025).

From a regulatory aspect, Law Number 25 of 2007 concerning Investment serves as the comprehensive legal basis for the implementation of investment activities in Indonesia. This regulation affirms the need for guaranteed legal certainty and protection for investors, while also establishing obligations for investors to comply with all applicable laws and regulations, including rules related to environmental conservation. The principle of sustainable development upheld by this law demands a balance between economic, social, and environmental interests in every investment activity (Ansori, 2025).

Although various studies have examined the environmental impacts of palm oil mill (POM) operations and the importance of sustainable palm oil governance, most previous research has primarily focused on technical waste management, sustainability certification and operational efficiency. Very few studies have specifically examined the alignment between investment policy, the streamlining of permits through the OSS system, and the effectiveness of environmental oversight at the regional level, particularly in North Sumatra Province. Furthermore, existing research generally addresses investment regulations and environmental protection separately, without comprehensively analysing the permit management system as a legal instrument that links investment acceleration with environmental sustainability in the palm oil sector.

However, in its implementation, there is complex dynamics between investment acceleration policies and the application of environmental standards. The policy of licensing simplification, including through the OSS system, on one hand provides administrative convenience for business actors. On the other hand, however, this policy has the potential to create supervisory gaps if not balanced with effective control mechanisms at the regional level (Nagime et al., 2025). In the context of POMs, this gap can impact the weakness of control over palm oil mill liquid waste (Palm Oil Mill Effluent/POME), solid waste management, and greenhouse gas emission control.

This situation raises important legal questions regarding the extent to which licensing simplification policies can ensure effective environmental oversight of palm oil mill (POM) operations. Consequently, the primary focus of this study is to analyse the alignment between investment licensing policies and environmental protection mechanisms within the governance of palm oil mills (POMs) in North Sumatra Province.

Various findings indicate that the increase in the number and capacity of POMs in North Sumatra has contributed to environmental pressures, particularly through wastewater pollution, methane emissions, and improper waste management (Erwinsyah & Djuhartono, 2020; Nasution et al., 2018; Sodri & Septriana, 2022; Syaichurrozi et al., 2024). These circumstances highlight the importance of effective licensing oversight and environmental compliance in palm oil investment activities (Kartika et al., 2022).

Previous research has examined the relationship between palm oil company operations, waste management and environmental protection. Empirical studies show that poor waste

management practices have a negative impact on environmental quality and the sustainability of the industry, whilst normative studies emphasise that licensing procedures are essential legal instruments for pollution prevention and environmental compliance in the palm oil sector (Ho et al., 2025). In addition, Fadillah and Imsar (2023) linking business licensing and sustainability certification, such as ISPO, with the strengthening of environmental and social governance within palm oil companies.

In light of these circumstances, this study aims to analyse the alignment between investment policies and environmental oversight mechanisms within the licensing governance of Palm Oil Mills (POMs) in North Sumatra Province. The uniqueness of this study lies in its integrative legal approach, which links investment law, environmental law, and regional licensing oversight within the palm oil industry. It is hoped that this study will contribute both theoretically and practically to the development of licensing policies that balance investment interests with the principles of environmental sustainability.

2. Literature Review

2.1. The Concept of Investment

Investment refers to the injection of capital by domestic or foreign investors to operate a business within a country's territory, with the aim of generating economic returns and supporting national development. Under Indonesian law, the concept of investment is regulated by Law No. 25 of 2007 on Investment, which stipulates that investment must be carried out in accordance with the principles of legal certainty, transparency, accountability, efficiency with fairness, sustainability, and environmental awareness. Thus, investment is not merely understood as an economic activity, but also as a development instrument that must take into account social and environmental aspects, including within the palm oil industry, which has a significant impact on both the national economy and ecological conditions.

2.2. The Concept of Business Licensing

Business licensing is an instrument of administrative law used by the government to grant legal status to business activities whilst ensuring they comply with statutory regulations. Following the enactment of the Job Creation Law and Government Regulation No. 5 of 2021, the business licensing system in Indonesia has adopted a risk-based approach, whereby the level of risk associated with business activities determines the type and level of licensing that business operators must fulfil. In the palm oil industry, business licensing serves a strategic function as it relates to land use, natural resource management, and environmental protection; consequently, companies must meet various administrative and environmental requirements before commencing plantation operations. Government Regulation No. 5 of 2021 (Fristikawati & Sukhardin, 2022).

2.3. The Concept of Environmental Monitoring

Environmental supervision forms part of the environmental legal framework, aimed at ensuring that businesses comply with environmental protection and management provisions as set out in Law No. 32 of 2009 on Environmental Protection and Management. Supervision is carried out through monitoring, evaluation, the examination of environmental documents, and the enforcement of administrative law against business activities that have the potential to cause environmental pollution or damage. In the palm oil industry, environmental oversight is particularly crucial as this sector is frequently linked to deforestation, forest and land fires, and damage to peatland ecosystems; consequently, the state must ensure that investment

activities continue to align with the principles of sustainable development and environmental protection (Subagiyo & Debora, 2018).

3. Methods

This study employs a normative legal methodology combined with qualitative descriptive analysis to examine the consistency of regulations governing licensing procedures for Palm Oil Processing Plants (PPKS) in North Sumatra Province. The study utilises several legal approaches, namely the juridical approach, the conceptual approach, and the analytical approach. The legal approach is used to examine laws and regulations relating to investment and environmental protection, specifically Law No. 25 of 2007 on Investment and Law No. 32 of 2009 on Environmental Protection and Management. Meanwhile, the conceptual approach is applied to analyse legal doctrines and principles such as sustainable development, the precautionary principle, and state responsibility in environmental governance. Through these approaches, this study focuses on assessing the consistency, harmonisation, and integration of regulations concerning investment activities and environmental protection obligations within the palm oil industry (Mushafi, 2025).

Data sources in this research are entirely derived from secondary data consisting of primary legal materials and secondary legal materials. Primary legal materials include various relevant laws and regulations, such as regulations concerning investment, Law Number 32 of 2009 concerning Environmental Protection and Management, and regional regulations in North Sumatra Province related to the Regional Spatial Plan (RT/RW) as the basis for regulating spatial utilization and controlling environmental carrying capacity.

Secondary legal sources consist of academic literature, journal articles, official government documents, and supporting reports relating to investment licensing and environmental protection. In addition, this study utilises supporting data in the form of river water quality reports published by the North Sumatra Provincial Environment Agency and plantation statistics published by the North Sumatra Provincial Central Statistics Agency (BPS). This data is used solely to strengthen the contextual and analytical understanding of the implementation of licensing regulations and environmental monitoring practices in the palm oil industry, rather than as primary empirical research data (Atikah, 2022).

This legal analysis was conducted in several stages. First, relevant laws and regulations concerning investment, environmental protection and spatial planning were identified and classified. Second, the provisions governing business licensing through the Online Single Submission (OSS) system were analysed to assess their compliance with environmental protection obligations. Thirdly, the identified regulations were systematically interpreted using qualitative descriptive analysis to assess regulatory harmonisation, potential legal loopholes, and weaknesses in environmental oversight mechanisms relating to the operations of palm oil mills in North Sumatra Province.

In addition, this research also utilizes a conceptual approach to strengthen the juridical analytical framework used. This approach is applied by examining key concepts such as sustainable development, the precautionary principle, and the principle of state responsibility in environmental management. The use of the conceptual approach aims to assess the extent to which these principles have been internalized in POM licensing regulations, both at the statutory level and in technical policies applied in the regions. Thus, the analysis is not only normative-textual in nature but is also able to capture the philosophical dimension and ideal objectives of the legal regulation of the palm oil industry licensing (Nasution, 2023).

Subsequently, the results of the normative and qualitative descriptive analysis are presented systematically through deductive conclusion drawing, namely from general legal provisions toward their application in the specific context of North Sumatra Province. This method enables researchers to evaluate the effectiveness of the POM licensing system as an instrument for controlling environmental impacts, while also formulating more responsive policy improvement recommendations suited to the ecological and social characteristics of the region. With this approach, the research is expected to provide academic contributions to the development of investment law and environmental law, as well as serve as a practical reference for stakeholders in strengthening sustainable palm oil industry licensing governance.

4. Results and Discussion

4.1. Analysis of Regional Environmental Impacts Resulting from Palm Oil Mill Activities in North Sumatra

The presence of palm oil mills (PKS) in North Sumatra Province makes a significant contribution to regional economic growth through increased investment, job creation and the strengthening of the plantation-based industrial sector. However, PKS activities also give rise to various regional ecological impacts, particularly where environmental management is not carried out optimally in accordance with the provisions of Law No. 25 of 2007 on Investment and Law No. 32 of 2009 on Environmental Protection and Management. The high concentration of palm oil mills in North Sumatra, coupled with their location predominantly within river basins (DAS), means that the resulting environmental impacts are no longer merely local in nature, but have evolved into cross-regional ecological issues requiring stricter legal and administrative oversight (Dewi & Lamona, 2025).

One of the most significant environmental impacts is the deterioration of watershed quality due to the discharge of Palm Oil Mill Effluent (POME). A number of palm oil mills in North Sumatra operate near the Wampu, Ular, Asahan and Barumun rivers, which are the main sources of water for local communities. Liquid waste that is not treated optimally leads to increased levels of Biological Oxygen Demand (BOD) and Chemical Oxygen Demand (COD) in water bodies, thereby reducing dissolved oxygen levels and disrupting the balance of aquatic ecosystems. These conditions not only result in the death of aquatic life, but also reduce the quality of life for communities that depend on the rivers as a source of domestic water and for traditional fishing livelihoods (Kartika et al., 2022).

In theory, the existence of EIA instruments and environmental approvals should serve as preventive measures to ensure that palm oil mill activities do not exceed the environment's carrying capacity. However, findings from various pollution cases indicate that environmental permitting mechanisms have not yet functioned effectively as instruments of ecological control. In practice, the licensing process through the Online Single Submission Risk-Based Approach (OSS-RBA) system tends to prioritise the acceleration of investment administration over the strengthening of substantive assessments of environmental risks. This situation highlights an imbalance between the focus on investment facilitation and the principle of environmental prudence, which should form the primary basis for managing high-risk industries.

In addition to liquid waste pollution, palm oil mill (PKS) activities also contribute to sedimentation and the physical degradation of rivers. Land clearing and changes in vegetation cover around industrial areas accelerate soil erosion, particularly in areas with a certain degree of slope and minimal vegetation to act as a buffer. Sediment material carried by surface runoff subsequently settles in the riverbed, causing siltation and reducing water storage capacity. The

subsequent impact of this condition is an increased risk of flooding and disruption to the functioning of irrigation infrastructure in downstream areas. This issue highlights that oversight of spatial planning compliance and environmental control in the granting of business permits has not yet been consistently implemented.

Another significant ecological impact is the increase in greenhouse gas (GHG) emissions and air pollution. Palm oil mill (POM) activities generate methane emissions from open waste ponds that are not yet equipped with methane capture technology. Methane has a global warming potential far greater than that of carbon dioxide, making open waste ponds a significant regional source of emissions. Furthermore, the burning of palm kernel shells and palm fibre as boiler fuel without adequate emission control systems produces particulate matter and fine dust that affect air quality and the health of communities living near industrial areas, particularly in the Deli Serdang and Asahan regions. This situation indicates that emission control standards in PKS operational practices have not yet been fully and optimally implemented, despite such obligations being stipulated in environmental regulations.

Another issue highlighting weak environmental oversight is the high level of groundwater extraction for PKS operational needs. The sterilisation and clarification processes for fresh fruit bunches require large volumes of water, thereby driving intensive groundwater use. In several areas, this has led to a decline in the flow rate of community wells, particularly during the dry season, and has triggered social conflicts between companies and local communities. This phenomenon indicates that oversight of water resource utilisation within industrial licensing practices remains largely administrative and has not fully considered aspects of ecological sustainability or the protection of communities' rights to access natural resources.

Overall, the various environmental impacts resulting from PKS activities in North Sumatra demonstrate that the ecological issues arising are not solely caused by industrial activities, but are also linked to the weak coordination between investment policies and environmental protection. Although investment regulations have mandated the application of sustainable development principles, their implementation on the ground still reveals a gap between legal norms and oversight practices. Consequently, strengthening post-licensing oversight mechanisms, harmonising investment and environmental regulations, and ensuring more consistent enforcement of environmental laws are crucial aspects to ensure that the development of the oil palm industry remains aligned with the principles of sustainable environmental protection.

4.2. Relevance of Law Number 25 of 2007 to the Establishment of Palm Oil Mills

Law No. 25 of 2007 on Investment is the primary legal framework governing investment activities in Indonesia, including investment in the establishment of palm oil mills (PKS) in North Sumatra Province. This regulation is essentially aimed at creating a conducive investment climate through the streamlining of bureaucracy and the provision of legal certainty for investors. However, in the context of the palm oil industry, which carries high ecological risks, the existence of this law serves not only as an instrument to facilitate investment, but also as a control mechanism to ensure that business activities remain in line with the principles of environmental protection and sustainable development (Harmaini, 2021).

One of the key provisions of the Investment Law is found in Article 15(b) and Article 16(d). Article 15(b) states that every investor is obliged to “fulfil corporate social responsibility”, whilst Article 16(d) stipulates that every investor is responsible for “safeguarding the environment”. These provisions demonstrate that environmental aspects

are not merely administrative obligations, but legal responsibilities that must be effectively implemented by companies. In the context of establishing a palm oil mill (PKS) in North Sumatra, this obligation is particularly relevant as the operations of a PKS have the potential to generate liquid waste, solid waste, air pollution, and ecosystem damage if not properly managed. Therefore, companies intending to establish a palm oil mill should consider the environment's carrying capacity and resilience from the initial stages of investment, particularly in areas of high ecological sensitivity such as river basins (DAS), peatland areas, and residential communities.

Normatively, the Investment Law has adopted the principle of sustainable development, which emphasises a balance between economic growth, environmental protection, and the social interests of the community. This is also reaffirmed in Article 3(2), which states that the objectives of investment include “enhancing national economic growth, creating employment opportunities, promoting sustainable economic development, strengthening the global competitiveness of the national business sector, and improving public welfare.” Consequently, the development of the PKS should not be viewed merely as an instrument for increasing investment and local revenue, but must also provide social benefits and safeguard environmental sustainability. However, in practice, an imbalance still exists between the focus on accelerating investment and the strengthening of environmental protection. The policy of streamlining licensing through the Online Single Submission Risk-Based Approach (OSS-RBA) system does indeed provide administrative ease for investors, but at the same time risks undermining substantive assessments of ecological risks if environmental oversight is not strictly enforced.

In the context of the establishment of PKS in North Sumatra, the relevance of the Investment Law is also evident in its connection to environmental approval requirements such as the Environmental Impact Assessment (AMDAL) and the Environmental Management Plan (UKL-UPL). This provision relates to Article 25(1), which states that “every investment undertaking business activities must obtain a permit in accordance with the provisions of laws and regulations from the competent authority.” Consequently, environmental permits constitute a substantive requirement that is inseparable from the legality of the PKS's operations. Environmental approvals should serve as the primary instrument for assessing the ecological viability of an investment prior to the issuance of a business licence. However, in practice, there remains a tendency for environmental documents to be treated merely as formal administrative requirements for obtaining a business licence, rather than as effective environmental control instruments. Consequently, a number of palm oil mills are still able to operate despite indications of liquid waste pollution, river pollution, and poor industrial waste management on the ground.

Furthermore, the Investment Law also grants the government the authority to provide guidance and supervision over business activities that have the potential to cause environmental impacts. This provision is reflected in Article 30(1), which states that “the government and/or local governments shall guarantee certainty and security of business operations for the implementation of investment.” Further, Article 30(6) explains that the Investment Coordinating Board (BKPM) is tasked with coordinating the implementation of investment policies. This authority serves as the legal basis for local governments to evaluate the viability of investments not only from an economic perspective, but also from environmental and social perspectives. Still, the effectiveness of oversight at the local level still faces various obstacles, such as the limited capacity of supervisory institutions, weak inter-agency coordination, and a lack of post-licensing oversight. These conditions mean that environmental law enforcement against violations committed by PKS is often reactive after

pollution has occurred, rather than preventive from the licensing stage and early operational phases.

Another relevant provision is Article 17, which states that “investors exploiting non-renewable natural resources are obliged to allocate funds in stages for the restoration of sites to meet environmental sustainability standards.” Although oil palm is classified as a renewable resource, the principle contained in this article remains relevant as it demonstrates an obligation for environmental restoration in relation to business activities based on natural resources. In the practice of establishing palm oil mills, this principle should be applied through proper waste management, the construction of wastewater treatment plants (WWTPs), emission control, and environmental rehabilitation should pollution or environmental damage occur as a result of the mill’s operations.

There is a normative tension between the objective of increasing investment and the application of the precautionary principle. On the one hand, local governments are encouraged to boost investment realisation as an indicator of regional economic growth. On the other hand, the oil palm industry is a sector with a high level of ecological risk, thus requiring strict and sustainable environmental oversight. This imbalance in policy orientation has the potential to cause regulatory disharmony, particularly when the interests of accelerating investment take precedence over environmental protection. In such circumstances, the principle of “environmental sustainability” as stipulated in Article 3(1) is often not optimally implemented in the practical administration of investment at the local level.

Consequently, Law No. 25 of 2007 holds significant strategic relevance for the establishment of palm oil mills in North Sumatra, as it not only regulates investment facilitation but also incorporates environmental protection obligations as an integral part of investment activities. Through the provisions of Articles 3, 15, 16, 17, 25 and 30, this law affirms that investment must be carried out in a responsible and sustainable manner. However, the effectiveness of these regulations remains heavily dependent on consistent implementation, strengthened post-licensing oversight, and the harmonisation of investment policies with environmental protection principles, so that the development of the palm oil industry can proceed sustainably and avoid causing environmental damage in the future.

4.3. Licensing Steps for the Establishment of Palm Oil Mills in North Sumatra

Essentially, the licensing procedure for establishing a Palm Oil Mill (PKS) in North Sumatra Province is carried out through the Online Single Submission Risk-Based Approach (OSS-RBA) mechanism implemented by the central government. This system is designed to streamline bureaucracy and expedite the investment process by tailoring licensing requirements to the risk level of the business activity. Under the OSS-RBA classification, the PKS industry falls into the high-risk business category, thus requiring compliance with stricter administrative, technical and environmental requirements compared to low-risk businesses. Although the system is intended to improve the efficiency of investment services, in practice various issues remain regarding the effectiveness of environmental oversight and the coordination of regulations.

The initial stage in the process of establishing a PKS is the issuance of a Business Identification Number (NIB) through the OSS system as the legal identity of the business operator. At this stage, investors are also required to ensure that the business location complies with the Regional Spatial Plan (RTRW) of North Sumatra Province. Spatial planning compliance is a crucial aspect, given that many areas in North Sumatra serve as conservation zones, water catchment areas, and river basins that are vulnerable to ecological damage. In theory, non-compliance of the location with the RTRW should form the basis for rejecting a business licence from the very early stages of investment planning (Utami et al., 2017).

However, in practice, there is still a lack of oversight regarding the implementation of spatial planning, meaning that some industrial activities continue to develop in areas of high environmental sensitivity. This situation highlights a gap between regulatory provisions and the implementation of spatial controls on the ground.

The next stage involves securing environmental approval through the preparation of an Environmental Impact Assessment (EIA) or an Environmental Management Plan and Environmental Monitoring Plan (UKL-UPL), in accordance with the characteristics of the business activity. In the context of establishing palm oil mills (PKS) in North Sumatra, the EIA document holds a highly strategic position, as the majority of PKS operate in the vicinity of river basins such as the Asahan, Barumon and Wampu rivers, which serve vital functions for the community. Therefore, analysis of liquid waste management, potential water pollution, and impacts on environmental carrying capacity should be the primary focus in the EIA assessment process (Nasution et al., 2019).

However, in practice, there is still a tendency for environmental documents to be treated merely as an administrative requirement for obtaining a business licence, rather than as a substantive tool for preventing environmental damage. This situation is evident from the continued occurrence of river pollution and environmental conflicts in the vicinity of the palm oil mill (PKS) area, despite the company already holding an Environmental Impact Assessment (EIA) document or environmental approval. This indicates that the EIA assessment mechanism and post-approval environmental monitoring have not yet been fully effective in ensuring the ecological compliance of business operators.

The next stage involves the issuance of a Technical Approval (Pertek), particularly regarding the management of liquid waste, air emissions, and the operation of the Wastewater Treatment Plant (WWTP). At this stage, companies are required to demonstrate the readiness of pollution control infrastructure before an operational permit is issued. In theory, the Pertek serves as a preventive instrument to ensure that industrial activities do not cause environmental pollution exceeding quality standards. However, weak oversight of technical implementation on the ground often results in waste management standards not being optimally enforced. Consequently, there are still industrial estates that continue to operate despite indications of river pollution, poor air quality, or waste management that does not meet environmental standards (Mukhlis & Utomo, 2025).

The final stage in the licensing process is the issuance of an Industrial Business Licence (IUI) once all administrative, technical and environmental requirements have been met. This licence provides the legal basis for the company to carry out its full range of operational activities. However, the main problem with the palm oil mill licensing system in North Sumatra lies not only in the licence issuance stage, but also in the weakness of post-licensing supervision. In many cases, environmental oversight remains largely administrative, relying on periodic company reporting, and is not yet fully supported by intensive on-site monitoring and consistent law enforcement (Aldi et al., 2023).

In addition, there are issues regarding inter-agency coordination in the supervision of PKS activities, particularly between the environmental agency, the plantation agency, and the investment service agency. Overlapping jurisdictions and weak integration of supervision have resulted in the enforcement of environmental standards being less effective. This situation demonstrates that the simplification of licensing through the OSS-RBA has not yet been fully matched by a strengthening of environmental supervision capacity at the regional level. Consequently, although the OSS-RBA system has succeeded in improving administrative efficiency in the investment process, its effectiveness as an environmental control instrument still faces various structural and implementation-related weaknesses.

Therefore, the licensing process for establishing palm oil mills in North Sumatra should not be viewed merely as a mechanism for legalising business activities, but also as a preventive instrument for environmental protection. Strengthening EIA assessments, post-licensing oversight, spatial planning harmonisation, and inter-agency coordination are crucial aspects to ensure that investment acceleration remains aligned with the principles of sustainable development and environmental protection.

4.4. Environmental Impacts of Palm Oil Mill Establishment in the Context of North Sumatra

The establishment and operation of palm oil mills (PKS) in North Sumatra Province demonstrate that the resulting environmental impacts are not solely caused by industrial activities, but are also linked to the ineffectiveness of the environmental permitting and monitoring systems. In theory, every PKS must obtain environmental approval through an Environmental Impact Assessment (EIA) or an Environmental Management Plan (EMP) before being granted an operating licence. However, the continued occurrence of environmental pollution in various regions indicates that these licensing instruments have not yet fully functioned as a preventive mechanism in managing ecological risks (Lestari, 2025).

One of the main issues is the pollution of river basins caused by the discharge of Palm Oil Mill Effluent (POME). Although companies hold environmental documents and business licences, in practice liquid waste with high levels of Biological Oxygen Demand (BOD) and Chemical Oxygen Demand (COD) is still being discharged into water bodies, thereby degrading river quality and disrupting aquatic ecosystems. This situation indicates that post-licensing oversight of waste management compliance is still not functioning optimally. Hence, the existence of an Environmental Impact Assessment (EIA) and environmental approvals often amounts to little more than fulfilling administrative licensing requirements, without being followed by effective ecological monitoring on the ground (Hidayah, 2025).

In addition to the issue of water pollution, the presence of palm oil mills is also linked to pressure on forest areas and biodiversity in North Sumatra. The expansion of the palm oil industry around strategic areas such as the Leuser Ecosystem Area highlights a lack of coordination between investment policy, spatial planning and environmental protection. In theory, areas designated for conservation should receive strict protection through spatial planning controls and restrictions on business permits. However, in practice, there are still indications that the priority given to accelerating investment outweighs the application of the precautionary principle, thereby increasing the risk of habitat fragmentation for protected species such as the Sumatran orangutan and the Sumatran tiger (Bantacut et al., 2025).

Another issue highlighting the lack of effective oversight is the high level of greenhouse gas emissions from palm oil mill operations, particularly those located in peatland areas. Under the regulations, companies are required to implement waste management and emission control measures in accordance with environmental standards. However, many POME waste ponds are still not equipped with methane capture technology, resulting in significant methane emissions. This situation highlights a gap between the normative standards set out in environmental regulations and their technical implementation on the ground. Hence, environmental issues within the palm oil mill industry are not merely a matter of the existence of regulations, but also relate to weak oversight, limited law enforcement, and the suboptimal integration of investment policies with environmental protection (Dewi et al., 2023).

4.5. The Relationship between Investment and Environmental Compliance

The relationship between investment and environmental compliance in the establishment and operation of palm oil mills (PKS) in North Sumatra Province is a crucial aspect of the implementation of Law No. 25 of 2007 on Investment. Normatively, this regulation stipulates that investment activities must be carried out in accordance with the principles of sustainable development and with due regard for environmental conservation. Consequently, the success of an investment is measured not only by economic growth and capital realisation, but also by the level of compliance by business operators with environmental protection standards (Maysaroh & Kusmilawaty, 2023).

In the context of the palm oil industry, environmental compliance should be an integral part of the investment process, from the planning and licensing stages right through to business operations. However, in practice, there remains an imbalance between the focus on accelerating investment and the effectiveness of environmental oversight. The policy of streamlining permits through the Online Single Submission Risk-Based Approach (OSS-RBA) system has indeed succeeded in improving administrative efficiency and attracting investor interest, but at the same time it has also created the potential for a weakening of substantive oversight of ecological risks. This situation indicates that the integration of investment policy and environmental protection still places greater emphasis on administrative aspects rather than the actual control of environmental impacts.

Normatively, the government has the authority to conduct oversight and impose administrative sanctions on companies that violate environmental regulations, ranging from written warnings, temporary suspension of business activities, to the revocation of business licences. However, the implementation of environmental law enforcement against palm oil mills in North Sumatra still faces various structural obstacles. In some cases, post-licensing supervision has not been carried out optimally due to the limited capacity of supervisory institutions, weak inter-agency coordination, and the region's high dependence on the palm oil sector as a source of local economic growth (Harefa et al., 2025). Consequently, environmental violations are often only addressed once pollution has occurred or conflicts with the local community have arisen.

Moreover, there is a tendency for companies' environmental compliance to focus more on fulfilling administrative requirements than on achieving substantive ecological quality. The existence of Environmental Impact Assessments (EIA), Environmental Management Plans (EMP), and environmental monitoring reports is often treated merely as a formal requirement to maintain the legality of business operations. This situation indicates a shift in the function of environmental instruments from a preventive mechanism to a mere administrative tool. Consequently, the success of green investment in the palm oil sector cannot be measured solely by the possession of environmental documents or sustainability certifications, but must be assessed based on the effectiveness of environmental management implementation on the ground.

On the other hand, the government is also promoting the application of sustainable investment concepts through the Indonesian Sustainable Palm Oil (ISPO) policy, which emphasises compliance with environmental, social, and corporate governance aspects. In theory, the implementation of ISPO standards could serve as a key instrument for improving the quality of governance within the palm oil industry in North Sumatra. However, the effectiveness of ISPO implementation still faces various challenges, particularly regarding weak oversight, disparities in companies' capacity to meet sustainability standards, and the suboptimal integration between certification policies and environmental law enforcement. (Nasution et al., 2021). Consequently, the existence of sustainability certification has not yet

been fully effective in preventing pollution and environmental damage in the vicinity of the PKS industrial estate.

The relationship between investment and environmental compliance also reveals a normative tension between economic interests and ecological protection. On the one hand, local governments are required to increase investment to drive economic growth and local revenue; on the other hand, they also have a constitutional obligation to guarantee the public's right to a good and healthy environment. This imbalance in policy orientation has the potential to lead to regulatory disharmony and weak enforcement of environmental law, particularly if investment interests take precedence over the precautionary principle. This situation indicates that environmental protection within the palm oil investment sector still faces an implementation gap among legal norms and on-the-ground monitoring practices (Lestari, 2025).

Thus, the relationship between investment and environmental compliance in the palm oil sector in North Sumatra indicates that the existence of regulations does not fully guarantee effective environmental protection. Harmonisation between investment policy and environmental protection must not be limited to the normative level, but must also be realised through the strengthening of post-licensing oversight, consistent law enforcement, capacity building for supervisory institutions, and substantive evaluation of the industry's ecological impacts. Consequently, sustainable development of the palm oil industry can only be achieved if investment interests are balanced with the principles of environmental protection and the public's right to a healthy environment.

5. Conclusion

The construction of Palm Oil Mills (POM) in North Sumatra Province holds strategic value as a driver of regional economic growth as well as a part of the national palm oil industry supply chain. Nevertheless, investment activities in this field must be accompanied by the fulfillment of legal obligations related to environmental protection, as regulated in Law Number 25 of 2007 concerning Investment and other regulations in the environmental management sector. Given the character of the POM industry, which has the potential to cause significant environmental impacts, comprehensive regulation and consistent supervision are required from the planning stage through to ongoing operational activities.

The results of the discussion indicate that the risk-based licensing system through Online Single Submission (OSS-RBA) has provided convenience for investors in establishing POMs in North Sumatra. However, this convenience still leaves challenges in the implementation of environmental obligations, particularly at the post-licensing supervision stage. Various environmental problems such as watershed pollution, greenhouse gas emissions, pressure on forest areas and biodiversity, and conflicts over water resource utilization indicate that the synchronization between investment policy and environmental protection has not yet been fully optimal.

Based on these conclusions, strengthening the role of local government is required, particularly in the aspects of environmental supervision and law enforcement. The North Sumatra Provincial Government is advised to enhance post-licensing supervision through routine monitoring of waste management, emissions, and environmental reporting compliance by POMs. The integration of OSS licensing data with regional environmental monitoring systems also needs to be optimized so that potential violations can be detected earlier.

In addition, POM investors in North Sumatra need to be encouraged to apply environmentally friendly technology, such as the utilization of methane capture systems in waste ponds and improving water management efficiency. The application of sustainability standards such as Indonesian Sustainable Palm Oil (ISPO) must be positioned not only as an administrative obligation, but as part of a long-term business strategy oriented toward sustainability. Finally, stronger synergy is needed between the central government, local government, and communities in the POM licensing and supervision process. Public participation in AMDAL assessments and environmental information transparency can serve as important instruments to ensure that investment in the palm oil sector proceeds with a balance between economic interests and environmental protection in North Sumatra.

6. References

- Aldi, M., Zulgani, Z., & Parmadi, P. (2023). Analisis keberadaan pabrik kelapa sawit terhadap kondisi sosial ekonomi masyarakat pendatang yang menetap di Desa Ladang Panjang Kecamatan Sungai Gelam Kabupaten Muaro Jambi. *E-Jurnal Ekonomi Sumberdaya Dan Lingkungan*, 12(1), 49–58. <https://doi.org/10.22437/jesl.v12i1.21481>
- Ansori, M. A. (2025). Analisis Keberlanjutan Diversifikasi Aren dan Kelapa Sawit di Kabupaten Pelalawan. *Jurnal Ilmu Lingkungan*, 23(6), 1479–1488. <https://doi.org/10.14710/jil.23.6.1479-1488>
- Atikah, I. (2022). *Metode penelitian hukum*. Sukabumi: CV. Haura Utama.
- Bantacut, T., Romli, M., Agustiar, A., & Nasution, A. (2025). Gate-to-gate life cycle assessment of crude palm oil in palm mills in West Aceh-Indonesia. *Journal of Ecological Engineering*, 26(4), 343–358. <https://doi.org/10.12911/22998993/196932>
- Dewi, I. E., Ginting, B., & Siregar, M. (2023). Analisis Yuridis Persyaratan Kepemilikan Saham Asing Pada Bidang Usaha Perkebunan Kelapa Sawit Berdasarkan Daftar Negatif Investasi. *Recht Studiosum Law Review*, 2(1), 52–68. <https://doi.org/10.32734/rslr.v2i1.11486>
- Dewi, S. S., & Lamona, A. (2025). Pengaruh Limbah Cair Kelapa Sawit Terhadap Kesehatan Lingkungan di PT Incasi Raya Group. *Jurnal Kesehatan Lentera'Aisyiyah*, 8(1), 30–37. <https://doi.org/10.58170/jkla.v8i1.236>
- Erwinskyah, E., & Djuhartono, T. (2020). Impact of GHG Emission From Palm Oil Mill Effluents and Population Growth, GDP Per Capita Change, and The Technology. *JABE (Journal of Applied Business and Economic)*, 6(4), 377–390. <https://doi.org/10.30998/jabe.v6i4.5850>
- Fadillah, M. A., & Imsar, I. (2023). Dampak Lingkungan Limbah Terhadap Produksi Cpo Di Pks Sei Meranti PT. Perkebunan Nusantara III (PERSERO). *Neraca: Jurnal Ekonomi, Manajemen Dan Akuntansi*, 1(4), 89–96. <https://doi.org/10.572349/neraca.v1i4.268>
- Fristikawati, Y., & Sukhardin, D. (2022). Tinjauan Yuridis tentang Pengembangan Lahan Kelapa Sawit dan Kaitannya dengan Perlindungan Lingkungan [Legal Analysis of Development of Coconut Palm Oil Plantation dan it's Relation to Environmental Protection]. *Jurnal Hukum Visio Justisia*, 2(1), 86–100. <https://doi.org/10.19166/vj.v2i1.5447>
- Harefa, T., Lubis, Y., & Martial, T. (2025). Analisis Kebijakan Usaha Perkebunan Kelapa Sawit Dengan Penggunaan Pupuk Limbah Pabrik. *Jesya (Jurnal Ekonomi Dan Ekonomi Syariah)*, 8(1), 736–750. <https://doi.org/10.36778/jesya.v8i1.2012>
- Harmaini, H. (2021). Analisis Yuridis Permasalahan Perizinan dan Dampak Lingkungan Perkebunan Kelapa Sawit di Kabupaten Merangin. *ADIL*, 3(2), 1–11. <https://adil.stihypm.ac.id/index.php/ojs/article/view/21>
- Hidayah, M. R. (2025). Dampak Perkebunan Kelapa Sawit terhadap Lingkungan: Menyeimbangkan Risiko Ekologis dengan Keuntungan Ekonomi. *Publikasi Ilmu Teknik*,

- Teknologi Kebumihan, Ilmu Perkapalan*, 3(1), 90–94.
<https://doi.org/10.61132/globe.v3i1.763>
- Ho, Q. N., Lau, W. J., Jaafar, J., Othman, M. H. D., & Yoshida, N. (2025). Membrane Technology for Valuable Resource Recovery from Palm Oil Mill Effluent (POME): A Review. *Membranes*, 15(5), 138. <https://doi.org/10.3390/membranes15050138>
- Kartika, R. W. A., Desman, N. S., & Prijambada, I. D. (2022). Peruraian anaerobik termofilik palm oil mill effluent dengan variasi konsentrasi substrat. *Jurnal Rekayasa Proses*, 16(1), 25–29. <https://doi.org/10.22146/jrekpros.69574>
- Lestari, A. P. (2025). Analisis Penerapan Akuntansi Lingkungan Terhadap Limbah Pada Pabrik Kelapa Sawit (PKS) PT. ATM (Anugrah Tanjung Medan) Kampung Rakyat Labuhan Batu Selatan Sumatera Utara. *AL-DYAS: Darul Yasin Al Sys*, 4(2), 765–781. <https://doi.org/10.58578/alldyas.v4i2.4926>
- Maysaroh, M., & Kusmilawaty, K. (2023). Analisis Perlakuan Akuntansi Atas Biaya Pengolahan Limbah Pabrik Kelapa Sawit (PKS) Ajamu Panai Hulu Berdasarkan Perspektif Syariah. *Jurnal Ilmiah Ekonomi Islam*, 9(2), 2537–2544. <https://doi.org/10.29040/jiei.v9i2.8975>
- Mukhlis, M., & Utomo, S. (2025). Government policies to reduce palm oil waste pollution in Indonesia: An evaluation of environmental and socio-economic sustainability. *International Journal of Innovative Research & Scientific Studies*, 8(3), 3117. <https://doi.org/10.53894/ijirss.v8i3.7213>
- Mukhlis, M., Utomo, S., & Wijaya, M. (2025). Towards an Environmentally Friendly Palm Oil Industry: A Critical Review of Waste Reduction Policies by Indonesian Government. *International Journal of Sustainable Development & Planning*, 20(7), 2955–2962. <https://doi.org/10.18280/ijstdp.200719>
- Mushafi. (2025). *Metode Penelitian Hukum: Teori dan Praktik*. Eureka Media Aksara.
- Nagime, P. V., Chidrawar, V. R., Singh, S., Shafi, S., & Singh, S. (2025). Palm oil mill waste: A review on ecological improvement goals advancement and prospects. *Food and Humanity*, 5(December 2025), 100816. <https://doi.org/10.1016/j.foohum.2025.100816>
- Nasution, A. F. (2023). *Metode Penelitian Kualitatif*. Harva Creative.
- Nasution, A. P., Wibowo, E. A., Ramdani, R., & Rofiqah, T. (2021). Urgency of environmental management system implementation on oil palm plantation management policies in north sumatera. *Journal of Social Transformation and Regional Development*, 3(1), 1–6. <https://doi.org/10.30880/jstard.2021.03.01.001>
- Nasution, M. A., Wibawa, D. S., Ahamed, T., & Noguchi, R. (2018). Comparative environmental impact evaluation of palm oil mill effluent treatment using a life cycle assessment approach: A case study based on composting and a combination for biogas technologies in North Sumatera of Indonesia. *Journal of Cleaner Production*, 184, 1028–1040. <https://doi.org/10.1016/j.jclepro.2018.02.299>
- Nasution, R. W., Hambali, E., & Suprihatin, S. (2019). Utilization of Palm Oil Mill Effluent (POME) from the Residual Biogas Power Plant for Microalgae Production as Raw Material of Biodiesel. *International Journal of Engineering and Management Research E-ISSN*, 9(5), 758–2250. <https://doi.org/10.2139/ssrn.3517671>
- Pratama, A. R., & Nasution, A. (2023). Persepsi Masyarakat Terhadap Kebun Dan Pabrik Kelapa Sawit PT. Sps 2 Kecamatan Darul Makmur. *Jurnal Agriuma*, 5(2), 74–82. <https://doi.org/10.31289/agri.v5i2.10259>
- Ramadhan, M. F. R., Hasiyany, S., & Prasetio, B. (2025). Analisis Penilaian Pengelolaan Lingkungan Menggunakan ISPO, Proper dan Industri Hijau Pada Pabrik Kelapa Sawit PT. X. *Jurnal Serambi Engineering X*, 12(2), 13346–13354. <https://jse.serambimekkah.id/index.php/jse/article/view/892>
- Sodri, A., & Septriana, F. E. (2022). Biogas power generation from palm oil mill effluent (POME): techno-economic and environmental impact evaluation. *Energies*, 15(19), 7265. <https://doi.org/10.3390/en15197265>

- Subagiyo, H., & Debora SM, A. (2018). Instruksi Presiden Republik Indonesia Nomor 8 Tahun 2018 Tentang Penundaan Dan Evaluasi Perizinan Perkebunan Kelapa Sawit Serta Peningkatan Perkebunan Kelapa Sawit (Inpres Moratorium Sawit). *Jurnal Hukum Lingkungan Indonesia*, 5(1), 137–153. <https://doi.org/10.38011/jhli.v5i1.78>
- Syaichurrozi, I., Sari, L. N., Apriantika, A. P., Darsono, N., & Khaerudini, D. S. (2024). Effect of coagulation-sedimentation pretreatment on methane production from Indonesian palm oil mill effluent and kinetics. *Bioresource Technology Reports*, 26, 101820. <https://doi.org/10.1016/j.biteb.2024.101820>
- Utami, R., Putri, E. I. K., & Ekayani, M. (2017). Economy and Environmental Impact of Oil Palm Plantation Expansion (Case Study: Panyabungan Village, Merlung Sub-District, West Tanjung Jabung Barat District, Jambi). *Jurnal Ilmu Pertanian Indonesia*, 22(2), 115–126. <https://doi.org/10.18343/jipi.22.2.115>