

RESEARCH ARTICLE



Legal Analysis Of Nickel Mining Expansion In Raja Ampat From The Perspective Of Renewable Energy Development And Environmental Sustainability Principles

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ABSTRACT

This study aims to examine the expansion of nickel mining in Raja Ampat within the framework of natural resource law, particularly regarding its role as a supplier of essential minerals for national renewable energy development. Using normative juridical methods, this study examines various regulations regarding environmental sustainability, licensing, and the application of the precautionary principle as a benchmark for protecting conservation areas and the rights of indigenous peoples. The analysis results indicate a policy misalignment between the green energy transition agenda at the national level and the principle of ecological protection in conservation areas. Regulatory gaps are evident in the weak enforcement of environmental standards, the suboptimal synchronization of mining permits in marine conservation areas, and the failure to fulfill the Free, Prior and Informed Consent (FPIC) mechanism for affected indigenous communities. These conditions reflect that green energy development still has the potential to cause ecological and social injustice, especially in vulnerable areas such as Raja Ampat. This study concludes that strengthening regulations and harmonizing policies is urgently needed, including ensuring compliance with the precautionary principle, biodiversity protection, and upholding the rights of indigenous peoples at every stage of mining licensing and operations. Without environmentally just policy reforms, the Raja Ampat conservation area risks becoming a “sacrifice zone” in the national green energy transition project.

ARTICLE HISTORY

Received : 20 December 2025
Revised : 25 January 2026
Accepted : 28 January 2026

KEYWORDS

Renewable Energy;
Environmental
Sustainability; Nickel
Mining;

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1. Introduction

Sustainable development has become a global agenda under intense scrutiny over the past decade, as the climate crisis, biodiversity loss, and pressure on limited natural resources demand a new paradigm in the use of nature. The concept of intergenerational justice emphasizes that the current generation has a responsibility to ensure the availability and quality of natural resources for future generations ([Mikulčić et al., 2022](#)). In the realm of environmental law, the principle of the right to a healthy environment as a fundamental human right has been strengthened, requiring states and businesses to ensure that development activities do not compromise the quality of the environment and the lives of people. Sociologically, the transition to renewable energy involves not only technical and economic aspects, but also changes in social relations, recognition of indigenous communities, and transformation of local economic structures ([Kaneko & Kawanishi, 2016](#)).

As an archipelagic nation with vast mineral reserves, particularly nickel, Indonesia plays a crucial role in the global renewable energy era. Demand for nickel, used in electric vehicle batteries and energy storage, is expected to continue to increase ([Rizal & Idrus, 2024](#)). Therefore, national policies encourage downstream mineral processing, limit ore exports, and direct significant investment toward domestic processing. However, behind the ambition of a green energy transformation, a dilemma lurks: massive exploitation of raw materials can threaten ecosystems and local communities if not balanced with good governance and respect for environmental rights ([Maulidia et al., 2019](#)).

Within the legal framework, Indonesia has enacted various necessary regulations to govern the use of natural resources and environmental protection. For example, Law No. 32 of 2009 concerning Environmental Protection and Management requires the preparation of an Environmental Impact Analysis (AMDAL) and the application of the precautionary principle. Meanwhile, mining regulations, such as Law No. 4 of 2009 (subsequently amended by Law No. 3 of 2020), govern mining permits, post-mining obligations, and mineral and coal management. However, in practice, many regulatory harmonizations and enforcement are lacking, resulting in environmentally sensitive areas and indigenous communities often being victimized by development policies ([Zaini, 2024](#)).

One area facing significant challenges is Raja Ampat, West Papua Province, known for its extraordinary marine biodiversity and now designated a UNESCO Global Geopark. This region lies within the world's "Coral Triangle" and harbors approximately 75% of the world's coral species ([Supriatna & Margules, 2025](#)). However, with increasing global and national pressure for critical minerals, particularly nickel, Raja Ampat is beginning to face pressure from mining permits entering small islands and conservation areas. Sociological barriers arise when indigenous communities who live from fishing, ecotourism and marine conservation feel marginalized in decision-making processes and face damage to the marine environment due to sedimentation and mining pollution ([Parsons et al., 2021](#)).

Empirical evidence indicates that there are at least 16 nickel mining permits in Raja Ampat, five of which are active, and most are located within UNESCO geopark areas or small island units that should receive special protection. The report also reveals that mining activities have caused coral reef damage, sedimentation, and threats to local communities that depend on marine ecosystems. This situation illustrates a "victim zone" in the renewable energy transition, an area sacrificed to meet global raw material needs without adequate protection for the environment and local communities. Drawing on philosophical studies (intergenerational justice and environmental rights), legal studies (natural resources and environmental regulations), and sociological studies (vulnerability of indigenous communities and local social structures), this research aims to conduct a legal analysis of nickel mining expansion in Raja Ampat from the perspective of renewable energy development and principles of environmental sustainability ([Adiyanto et al., 2025](#)).

[Peluso & Watts \(2001\)](#), emphasize that resource conflicts often arise from power imbalances between the state, corporations, and local communities, which is relevant to the marginalization of indigenous communities in Raja Ampat. [Menini & Van Dover \(2019\)](#), showed that nickel mining on Obi Island caused coral reef damage and reduced fishermen's livelihoods, similar to conditions in Raja Ampat. Yuliana and Ramli (2020) highlighted the weak implementation of Free, Prior, and Informed Consent (FPIC), resulting in minimal participation of indigenous communities in the permitting process. [Basyar \(2021\)](#), found a disharmony between mineral and coal regulations and the Environmental Law, allowing mining to continue in sensitive areas. [Brandajs \(2025\)](#), introduced the concept of "green sacrifice zones," illustrating the global paradox of energy transitions that sacrifice ecological regions. [Ramenzoni \(2021\)](#), demonstrated that co-management with indigenous communities improves ecological compliance, becoming a relevant model for Raja Ampat management. A UNESCO Global Geopark study (2020-2023) emphasized the need for strict protection of geopark areas from extractive activities. Overall, previous research emphasizes ecological impacts, regulatory weaknesses, and the need to recognize indigenous peoples' rights ([UNESCO, 2023](#)). However, few have comprehensively examined the legal aspects of nickel expansion in Raja Ampat within the context of energy transition and sustainability. Therefore, this study urgently seeks to fill this gap.

Based on the background of this research, several key issues can be formulated as the focus of this study. First, an analysis is needed of how national and regional regulatory frameworks govern nickel mining expansion and renewable energy development in sensitive areas like Raja Ampat, particularly regarding policy synchronization and the protection of ecologically strategic areas. Second, it is crucial to identify the various legal and implementation barriers that arise in nickel mining practices in Raja

Ampat, particularly those related to the application of environmental sustainability principles and the fulfillment of indigenous peoples' rights as owners of customary land. Third, the research needs to formulate recommended policies and conflict resolution mechanisms so that the transition to renewable energy does not victimize Raja Ampat but instead ensures an energy transition that is just, sustainable, and aligned with the ecological and social needs of the local community.

2. Methodology

This research employs a normative juridical method, a legal research approach that focuses on examining positive legal norms governing mining, environmental sustainability, and renewable energy development in Indonesia. This method was chosen because the research problem formulation is not directed at assessing empirical data in the field, but rather at analyzing whether the applicable legal framework provides an adequate, consistent, and equitable basis for regulating nickel mining expansion in Raja Ampat and its alignment with the principles of environmental sustainability and the direction of national renewable energy policy. In normative research, primary legal materials serve as the primary sources, including Law Number 3 of 2020 concerning Mineral and Coal Mining, Law Number 32 of 2009 concerning Environmental Protection and Management, the New and Renewable Energy Law (UU EBT) if enacted or the RUU EBT as a normative reference, Government Regulations on reclamation and post-mining, Decrees of the Minister of Environment and Forestry concerning environmental permits and KLHS (Economic Survey), and regional regulations in West Papua and Raja Ampat concerning conservation area protection ([Christiani, 2015](#)).

The research also examines court decisions related to mining conflicts, environmental permits, or state administrative disputes in the relevant mining sector to determine the judges' perspectives on sustainability aspects. Furthermore, secondary legal materials are utilized to enrich the analysis, including books, scientific articles, and legal journals that discuss mining law, sustainability principles, green energy policy, sustainable development paradigms, and studies on the ecological impacts of nickel mining. Tertiary legal materials, such as legal dictionaries, encyclopedias, and reports from international institutions on ESG (Environmental, Social, and Governance) standards and global energy transition documents, are also utilized to strengthen the theoretical arguments without altering the normative character of this research. Using a normative-juridical approach, this research aims to provide an in-depth analysis of the suitability of nickel mining expansion in Raja Ampat in relation to environmental sustainability principles and the direction of national renewable energy policy, while also assessing the adequacy of existing regulations in anticipating the ecological and social impacts of such mining activities ([Disemadi, 2022](#)).

3. Results and discussion

3.1 Normative Framework for Nickel Mining Expansion from the Perspective of Renewable Energy and Environmental Sustainability

The global transformation toward low-carbon energy has placed strategic minerals like nickel as a crucial component in the production of electric vehicle batteries, energy storage systems, and renewable energy infrastructure. Philosophically, this energy transition is oriented not only toward economic interests but also toward the principle of intergenerational justice, which obliges the current generation to preserve natural resources for future generations. Therefore, nickel exploitation should not be viewed merely as an industrial commodity but must adhere to an ecological ethic that respects nature as an entity with intrinsic value, not simply an economic object ([Shannak et al., 2024](#)).

Constitutionally, Article 33, paragraph (3) of the 1945 Constitution affirms that the land, water, and natural resources contained therein are controlled by the state and used for the greatest prosperity of the people. This principle not only grants authority but also places an obligation on the state to ensure the sustainable, harmonious, and equitable use of natural resources. The development of renewable

energy utilizing nickel can only be justified if it does not violate the community's right to a good and healthy environment, as stipulated in Article 28H of the 1945 Constitution. Therefore, legally, nickel exploitation for the green energy transition must adhere to the principles of constitutional ecological ethics, not simply an orientation toward industrial downstreaming.

Raja Ampat, a center of marine biodiversity with over 75% of the world's coral species—has a social order based on customary law, such as *sasi*, a mechanism for limiting resource exploitation to maintain ecological balance. This *sasi* tradition, much older than modern regulations, serves as an effective local ecological legal instrument. However, nickel mining expansion has triggered environmental injustice in the form of increased sedimentation, declining water quality, coral reef damage, and declining community incomes from ecotourism and fisheries. Furthermore, many mining permits have been granted without the principle of free, prior, and informed consent (FPIC), violating the rights of indigenous communities to determine their living space. This situation reflects a form of ecological colonialism that emerges in the narrative of the green energy transition.

Mining expansion also highlights the power imbalance between the state, corporations, and indigenous communities, who have limited access to modern legal mechanisms, placing them in an unequal position in permitting processes and land negotiations. This phenomenon aligns with the concept of environmental injustice, where local groups most dependent on the environment are the ones most impacted by ecological damage caused by extractive projects. This displacement of customary law and traditional ecological wisdom has given rise to slow violence ecological violence that occurs gradually but has long-term impacts on the health, culture, and social sustainability of communities ([Kakoty, 2018](#)). In this context, recognizing and strengthening the role of indigenous communities is a fundamental requirement to prevent the continuation of exploitative and inequitable development practices in Raja Ampat.

3.2 Legal and Implementation Obstacles Emerging in Nickel Mining Practices in Raja Ampat Related to the Principles of Environmental Sustainability and the Rights of Indigenous Peoples

Legal obstacles to nickel mining management in Raja Ampat are evident in the weak regulatory synchronization between Law No. 3 of 2020 concerning Mineral and Coal Mining and Law No. 32 of 2009 concerning Environmental Protection and Management. Although both emphasize environmental protection obligations, mining business permits (IUP) are often issued without an adequate Strategic Environmental Assessment (KLHS) or without considering the carrying capacity of small island areas like Raja Ampat. [Asshiddiqie \(2020\)](#), believes that overlapping authority between institutions and regulations constitutes a structural obstacle that triggers environmental conflicts due to the absence of a *lex superior* guaranteeing priority ecological protection for sensitive areas. This situation makes it difficult to enforce the principle of sustainability at the regional level consistently.

In terms of implementation, the main problem lies in the weak recognition and protection of indigenous peoples' rights. Although Law No. 6 of 2014 concerning Villages and Constitutional Court Decision No. Although Law No. 35/PUU-X/2012 recognizes the existence of indigenous communities, this recognition has not been effectively integrated into the mining licensing process. As a result, many permits are issued without Free, Prior, and Informed Consent (FPIC), depriving indigenous communities of substantive participation in determining the future of their living spaces. [Muhajir et al., \(2019\)](#) emphasized that the weak protection of customary rights and unclear procedures for determining customary territories are significant obstacles that trigger the legal marginalization of indigenous communities in extractive activities.

Other obstacles arise at the stage of environmental law monitoring and enforcement. Although an Environmental Impact Assessment (EIA) instrument is mandatory, the results of the study are often formalistic and do not accurately reflect ecological conditions. The capacity of local governments to conduct oversight is also limited, both in terms of budget, technical competence, and political

independence. According to [Santosa & Juwana \(2020\)](#), weak environmental law enforcement in Indonesia is a significant obstacle to the implementation of precautionary and sustainability principles in the mining industry. Due to weak law enforcement, illegal mining practices and environmental permit violations often go unpunished, exacerbating ecological damage and deepening the injustice experienced by indigenous communities in Raja Ampat.

3.3 Policy Reform Model to Prevent Raja Ampat from Becoming a Victim of the Renewable Energy Transition.

Based on the various legal and implementation obstacles faced by Raja Ampat in the context of nickel mining expansion, a series of policy recommendations is needed that are not only oriented towards ecological protection but also ensure social justice for indigenous communities. These recommendations are formulated by considering best practices from various island nations that have successfully managed conservation areas sustainably without sacrificing the welfare of local communities. With an approach that integrates the precautionary principle, indigenous peoples' rights, and the strengthening of a blue economy based on renewable energy, the following three main recommendations are expected to provide a policy framework to prevent Raja Ampat from becoming a victim of the global energy transition agenda.

- **First**, a mining moratorium in conservation areas and on small islands must be strictly enforced to protect sensitive ecosystems, such as those in Raja Ampat. Lessons learned from the Philippines show that the 2010 Mining Act explicitly prohibits mining activities on small islands to preserve marine biodiversity, and therefore can serve as a relevant model for Indonesia. This moratorium policy not only reinforces the precautionary principle but also ensures that ecological protection is achieved through limiting exploitation areas, rather than simply relying on the often formalistic AMDAL instrument.
- **Second**, FPIC must be strengthened as a binding legal instrument in the issuance of AMDAL and environmental permits, so that indigenous communities become the primary legal subjects in every decision-making process related to natural resources. Co-management practices in Fiji and Palau demonstrate that collaborative marine management between the state and indigenous communities can preserve coral reefs while improving local economic well-being. By implementing a similar model, the indigenous communities of Raja Ampat are not only involved procedurally but are also given substantial authority in the ecological management of their territory.
- **Third**, the development of alternative blue economy initiatives based on community renewable energy needs to be a primary focus of regional development strategies. The example of the Seychelles demonstrates that conservation-based ecotourism and community renewable energy projects can increase community incomes without causing ecological degradation. This model can be replicated in Raja Ampat through the development of community solar energy, strengthening sustainable conservation tourism, and revitalizing fisheries businesses based on nature protection. This approach emphasizes that the energy transition does not have to rely on nickel extraction but can be realized through environmentally friendly economic diversification that supports local communities.

Furthermore, strengthening legal instruments regarding Strategic Environmental Assessment (SEA/KLHS) needs to be made an absolute prerequisite before issuing mining permits in areas of high ecological value like Raja Ampat. KLHS not only maps potential environmental impacts but also considers the social, cultural, and economic values of directly affected indigenous communities. The experience of countries like Australia, through the Environment Protection and Biodiversity Conservation Act, shows that strict implementation of KLHS can mitigate the risk of overexploitation and ensure that development

does not exceed the ecological carrying capacity of protected areas. If a similar approach were implemented in Indonesia, decisions regarding nickel mining permits would no longer be based solely on short-term economic interests, but rather on scientific and legal analysis that safeguards the sustainability of Raja Ampat as a global center of biodiversity.

Furthermore, the establishment of an ecological fiscal transfer (EFT) instrument could be a legal strategy to shift regional economic dependence from mining to conservation and renewable energy. EFT is a budgetary incentive mechanism that allocates greater funds to regions that maintain protected areas and preserve ecosystem services. Studies in Brazil and India have shown that EFT significantly increases local government commitment to protecting forests and conservation areas without reducing their revenues. By implementing EFT in the context of West Papua and Raja Ampat, the central government can provide performance-based environmental budget support, thereby reducing the incentive for local governments to issue nickel mining permits for the sake of revenue. This approach aligns with the principles of ecological justice and Indonesia's energy transition framework, which emphasizes reducing dependence on extractive industries. Therefore, green energy should not be developed at the expense of ecosystems that are the foundation of life; the energy transition must be based on conservation, not destruction.

4. Conclusion

The legal framework governing nickel mining expansion in Raja Ampat, when linked to the renewable energy development agenda, must fundamentally adhere to the principles of ecological justice and constitutional ethics as stipulated in Article 33 paragraph (3) and Article 28H of the 1945 Constitution. However, although regulations such as Law No. 4 of 2009 in conjunction with Law No. 3 of 2020 concerning Mineral and Coal Mining and Law No. 32 of 2009 concerning Environmental Protection and Management have established licensing mechanisms, environmental impact assessments (EIAs), and sustainability obligations, their implementation has not demonstrated adequate precautionary principles to protect conservation areas and indigenous communities. This has resulted in a situation of pseudo-legality, namely, activities that are administratively legitimate but contradict ecological sustainability and the protection of indigenous communities' constitutional rights.

Implementation barriers are increasingly evident through weak EIA oversight, licensing processes that do not involve Free, Prior, and Informed Consent (FPIC), and the absence of exploitation restrictions in conservation areas and small islands. This situation has led to coral reef damage, the loss of livelihoods based on fisheries and ecotourism, and the marginalization of indigenous communities with ecological management mechanisms such as sasi. Thus, nickel expansion driven by the need for green energy actually creates ecological injustice that contradicts sustainable development goals and the principles of a just energy transition.

To prevent Raja Ampat from becoming a victim of the energy transition, legal solutions must be directed at regulatory reforms that prioritize ecological protection, strengthen and enforce the principle of Free, Prior and Informed Consent (FPIC), and develop a conservation-based economy. The implementation of a mining moratorium in conservation areas and small islands, as implemented through the Philippines Mining Act 2010, the strengthening of indigenous community co-management, as implemented in Fiji and Palau, and the development of a blue economy based on community renewable energy, as implemented in the Seychelles, are relevant policy models for Indonesia. Therefore, green energy development must be based on a protected ecosystem, not on exploitation practices that sacrifice strategic conservation areas like Raja Ampat.

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