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Analysis of the Environmental Damage in Raja Ampat Caused by Nickel Mining

Yuka Dinda Permata[1], Faisal Santiago[2], Zudan Arif Fakrulloh[3]
[1]Universitas Borobudur, Jakarta, Indonesia, yuka.dinda200787@gmail.com
[2]Universitas Borobudur, Jakarta, Indonesia, faisalsantiago@borobudur.ac.id
[3]Universitas Borobudur, Jakarta, Indonesia, cclsis@yahoo.com

Corresponding Author: yuka.dinda200787@gmail.com[1]

Abstract: Raja Ampat, located at the northwestern tip of Papua, is globally renowned for its unparalleled marine biodiversity and ecotourism potential. However, recent nickel mining activities in small islands such as Gag and Kawe have sparked serious environmental, social, and economic concerns. This study aims to examine the extent of environmental degradation, the socio-cultural disruptions, and the economic trade-offs caused by nickel mining in Raja Ampat, as well as to evaluate potential policy and community-based solutions. The research employs a qualitative approach through literature reviews, policy and legal document analysis, and media reports. The findings reveal severe environmental damage including deforestation, soil erosion, sedimentation, and heavy metal contamination, which directly threaten coral reefs and marine ecosystems. Socially, mining has led to land conflicts, disregard for indigenous rights, and disruption of traditional livelihoods such as fishing, farming, and eco-tourism. Economically, while nickel extraction offers short-term gains, these are disproportionate to the long-term losses in sustainable income from fisheries and tourism. The study concludes that nickel mining in Raja Ampat carries unacceptable ecological and social risks, undermining both local welfare and national conservation commitments. Strong enforcement of environmental and mining laws, recognition of indigenous rights, and prioritization of sustainable alternatives such as community-based tourism and fisheries are essential to safeguard Raja Ampat's future.

Keywords: Raja Ampat, Nickel Mining, Environmental Damage, Indigenous Rights, Sustainable Development

INTRODUCTION

The term "environment" is often used interchangeably with "living environment." Although the two terms are literally distinct, they are generally used to mean the same thing: the environment in a broad sense, encompassing the physical, chemical, and biological environment, including the human environment, animal environment, and plant environment. The environment also has distinct meanings from ecology, ecosystem, and environmental

carrying capacity. However, the latter three cannot be separated from the definition of "environment."

The definition of environmental destruction, as defined in Article 1, point 4, of Law Number 23 of 1997 concerning the Environment, is an action that causes direct or indirect changes to the physical and/or biological characteristics, resulting in the environment no longer functioning to support sustainable development.

The fundamental difference between environmental pollution and the depletion of natural resources is that pollution can occur due to the entry or presence of a substance, energy, or other component into the environment or a particular ecosystem. Thus, energy substances or other components are something foreign or that was originally not present in an environmental area, then present in a certain quantity or quality because it was introduced by human activities. Conversely, the depletion of natural resources located or living in their original context or original area, then by humans is taken continuously and uncontrolled in certain ways and quantities so that it causes changes or declines in the quality of the environment. The negative impacts of declining environmental quality, whether due to pollution or depletion of natural resources, are the emergence of threats or negative impacts on health, decreased aesthetic value, economic losses (economic costs), and disruption of natural systems. Nowadays, people hope to enjoy a good and healthy environment, not only free from environmental pollution that can endanger their health, but also free from other disturbances, which although not too dangerous to health, can damage the aesthetic aspects of their living environment or the environment where they live, so the issue of beauty or aesthetics and cleanliness is also a concern for many people. Many people reject disturbances in the form of odors, noise, or fog that engulfs their homes. Economic losses resulting from environmental problems can reach hundreds of millions, even trillions of rupiah. Generally, the economic losses suffered by pollution victims include the costs of home maintenance or cleaning, medical or doctor fees, loss of livelihoods, damage to coral reefs, and threats from development and mining. Recreational activities such as diving, snorkeling, beach tourism, and cultural tourism are essential for modern society.

Human activities can alter natural systems, for example, logging or deforestation, and mining can alter the global climate, causing extreme droughts or causing storms and flash floods. Similarly, deforestation and unwise large-scale wildlife hunting can alter the global climate and disrupt the balance of existing ecosystems. Development and mining activities that ignore environmental concerns also contribute to accelerating environmental degradation.

Raja Ampat Regency is a regency in the province of Southwest Papua, Indonesia. The regency capital is located in Waisai. The regency comprises 610 islands, including the Raja Ampat archipelago. Four of them, namely Misool Island, Salawati, Batanta and Waigeo, are large islands. Of all the islands, only 35 are inhabited while the other islands are uninhabited and most of them do not yet have names. This regency has a total area of 67,379.60 km² with a land area of 7,559.60 km² and a sea area of 59,820.00 km². Raja Ampat Regency is a regency whose territory mostly consists of a group of islands located at 2°25′ north latitude – 4°25′ south latitude and 130° – 132° 55’ east longitude. This regency has an area of ±6,084.5 km². This regency consists of approximately 600 large and small islands, which include the large islands including Salawati Island; Butanta Island; Misool Island and Waigeo Island are non-volcanic, hilly islands largely covered in dense tropical rainforest. Meanwhile, the smaller islands scattered between the larger islands are coral islands and non-volcanic islands that are abundantly covered with coconut trees and shrubs. The boundaries of Raja Ampat Regency include: North: Pacific Ocean, East: Sorong City & Sorong Regency, South: Seram Sea and West: Seram Sea & Central Halmahera Regency, North Maluku. Raja Ampat Regency as an archipelago, has a relatively small land area and in general the topography of

the area is dominated by hilly areas that are still filled with natural forests. Meanwhile, the coastal areas have diverse characteristics such as sloping beaches with black sand, sloping beaches with white sand with damaged coral reefs to those that are still virgin, deep beaches and mangrove forests. Waigeo Island, Salawati Island, Batanta Island and Misool Island are non-volcanic islands that are hilly and mostly still covered by dense tropical rainforest. On Waigeo Island there is Mount Nokh with an altitude of 715 meters above sea level. Meanwhile, the small islands scattered between the four archipelagos are both coral and non-volcanic. These islands are generally covered with coconut palms, shrubs, and small trees.

The geology of Raja Ampat Regency is dominated by limestone formations formed during the Quaternary period. The soil is composed of Dabas and Neogene rocks, with limestone forming low hills. This limestone is generally dense and contains sand, such as facet limestone, daram limestone, atkari limestone, zaag limestone, openta limestone, sagewin limestone, and bogal limestone. The primary source of limestone is limestone reefs derived from marine life. The differences in the formation locations of these rocks lead to differences in sedimentation processes, resulting in the formation of various types of limestone. Another type of rock in this region is conglomerate sedimentary rock, composed of weathered limestone, a type of conglomerate made up of various materials. Yeffman breccia rocks with larger grains and angular fragments generally consist of decomposed rock fragments within a finer or cemented groundmass.

Raja Ampat Regency was declared a new regency based on Law No. 26 of 2002 concerning the Establishment of Sarmi Regency, Kerom Regency, South Sorong Regency, and Raja Ampat Regency, on May 3, 2002. Raja Ampat Regency was a division of Sorong Regency and is one of 14 new regencies in Papua. The administrative center is located in Waisai, South Waigeo District, approximately 36 miles from Sorong City. The regency's administration took effect on May 9, 2003, with the unveiling of its nameplate by the late Governor of Papua, Drs. Yaap Salosa.

The rapid expansion of nickel extraction—driven by global demand for battery production in the electric vehicle industry—has raised pressing concerns regarding compliance with Indonesian environmental and mining laws. Open-pit mining operations have been linked to deforestation, soil erosion, sedimentation, and heavy metal contamination, threatening coral reef ecosystems and fisheries. From a legal perspective, these activities raise fundamental questions regarding the enforcement of Law No. 32 of 2009 concerning Environmental Protection and Management, particularly regarding the obligation to conduct a comprehensive Environmental Impact Analysis (AMDAL), and Law No. 3 of 2020 concerning Mineral and Coal Mining, which concerns licensing, reclamation, and post-mining obligations. Furthermore, the 2014 Law on Coasts and Small Islands, reinforced by a Constitutional Court ruling, explicitly prohibits mining on small islands, calling into question the legality of existing concessions in Raja Ampat.

Beyond environmental law, nickel mining has implications for constitutional guarantees and legal protection of the rights of indigenous communities. The 1945 Constitution of the Republic of Indonesia, Law No. 39 of 1999 concerning Human Rights, and various Constitutional Court decisions affirm the recognition of customary rights. However, reports from Raja Ampat indicate that mining permits are being granted without adequate consultation or free, prior, and informed consent of local communities, resulting in land disputes, social fragmentation, and threats to cultural heritage. This situation demonstrates a conflict not only between economic development and environmental protection, but also between state-issued mining permits and the fundamental rights of indigenous communities.

Existing scholarly works have addressed the ecological degradation associated with nickel mining on tropical islands; however, research integrating environmental, socio-economic, and legal perspectives in the specific case of Raja Ampat remains limited. Therefore, this study seeks to fill this gap through a comprehensive legal-environmental analysis of the impacts of nickel mining on biodiversity, indigenous communities, and sustainable development in Raja Ampat. The aim is to assess whether mining activities align with Indonesia's environmental and mining legal framework, examine their implications for indigenous peoples' rights, and propose legal and policy alternatives grounded in sustainable development principles. By situating this study within the broader discourse on environmental law, resource governance, and human rights, this study aims to contribute, both theoretically and practically, to the ongoing debate on aligning economic interests with ecological and social justice in Indonesia.

METHOD

This study uses a normative juridical approach combined with qualitative analysis to examine the environmental, legal, and social implications of nickel mining in Raja Ampat, as well as the rights of indigenous peoples. This method allows for a systematic analysis of the compliance of mining activities in Raja Ampat with the Indonesian legal framework, including constitutional principles, legal obligations, and relevant Constitutional Court decisions. In addition to legal analysis, the study adopts a literature-based method, collecting and synthesizing secondary data from academic journals, policy reports, and environmental impact studies. These sources provide insights into ecological degradation, socio-economic impacts, and governance issues associated with nickel mining on small islands. Media reports and NGO investigations are also reviewed to capture recent developments, including permit revocations, community protests, and government responses. The study further integrates a comparative perspective, examining how international legal norms on environmental protection and the rights of indigenous peoples influence and contrast with Indonesia's domestic legal framework. This approach highlights consistency. The term environment is often used interchangeably with the term environment. Although the two terms are literally distinct, they are generally used to mean the same thing: the environment in a broad sense, encompassing the physical, chemical, and biological environment, or the human, animal, and plant environments. The environment also has distinct meanings from ecology, ecosystem, and environmental carrying capacity. However, the last three factors mentioned cannot be separated from the concept of environment or the living environment.

RESULT AND DISCUSSION

1. What are the main factors causing damage to marine and terrestrial ecosystems in Raja Ampat?

The main factors causing damage to marine and terrestrial ecosystems in Raja Ampat are nickel mining activities, illegal fishing, and sustainable tourism development. Damage caused by nickel mining, especially on small islands such as Gag, Kawe, and Manuran, has had a negative impact on both marine and terrestrial ecosystems. Threats to the ecosystem in Raja Ampat, which is the heart and lungs of the city within a diverse marine biodiversity reserve and a conservation area, mining activities have the potential to damage and threaten fragile marine and terrestrial ecosystems. Terrestrial ecosystems, such as animals, are confused about where they live or their habitats are being destroyed, causing many of them to leave or seek refuge in residential areas.

2. How does tourism impact the preservation of coral reefs and marine biodiversity in Raja Ampat?

The impact of unsustainable tourism, including illegal nickel mining, can disrupt the region's income. Raja Ampat is a tourist destination that attracts many international tourists to enjoy the entertainment and marine beauty created by God Almighty. However, due to human greed and human actions, this once-beautiful place has become damaged and polluted, leading to the extinction of marine life and biota.

3. What efforts have the local government and related institutions made to address environmental damage in Raja Ampat, and how effective have they been?

a. Revocation of Mining Permits

The Indonesian government has revoked several mining business permits (IUP) in the Raja Ampat region, including those belonging to PT. GAG Nikel, after being found to have violated environmental regulations and the area's geopark status. This decision is fully supported by Indonesian conservation and is considered a concrete commitment to protecting this invaluable natural reserve.

b. Supervision and Law Enforcement

The Ministry of Environment (KLH) and the Environmental Management Agency (BPLH) have inspected the mine site to investigate indications of environmental pollution. The National Police Criminal Investigation Agency (Bareskrim) has also been involved in investigating alleged criminal acts in nickel mining activities.

c. Involvement of Indigenous Communities

The government is committed to resolving mining issues through customary law and educating affected customary landowners. Local communities continue to voice their opposition to nickel mining activities.

CONCLUSION

The case of nickel mining in Raja Ampat demonstrates the profound tension between economic extraction and the imperatives of environmental protection and human rights. The research findings confirm that mining activities have caused severe ecological damage, including deforestation, sedimentation, and heavy metal contamination, which threaten the marine biodiversity that constitutes Raja Ampat's global ecological value. At the same time, the granting of mining concessions without proper Environmental Impact Assessments and without Free, Prior, and Informed Consent of indigenous communities reveals fundamental weaknesses in governance and compliance with Indonesia's legal framework.

From a legal perspective, the persistence of mining operations on small islands directly contravenes statutory prohibitions under the 2014 Coastal and Small Islands Act and undermines the principles of Law No. 32 of 2009 on Environmental Protection and Management. Furthermore, the disregard of indigenous rights protected under the Constitution and Law No. 39 of 1999 on Human Rights underscores a broader conflict between state development policies and fundamental rights guarantees. The selective enforcement of mining laws, as illustrated by the partial revocation of permits in 2025, raises questions about legal certainty, equal application of the law, and the accountability of state institutions.

This study contributes to the academic discourse by integrating environmental, social, and legal perspectives, highlighting the need for stronger enforcement mechanisms, transparent governance, and community-centered decision-making. It underscores the importance of prioritizing sustainable alternatives—such as eco-tourism, fisheries, and

conservation economies-that align with the principles of sustainable development and provide equitable benefits for local communities.

In conclusion, the Raja Ampat case serves as a critical reminder that the pursuit of short-term economic gains through extractive industries cannot justify the long-term risks posed to ecosystems, indigenous rights, and sustainable livelihoods. The protection of Raja Ampat requires not only legal enforcement but also a normative shift toward recognizing environmental conservation and indigenous participation as central to Indonesia's national development strategy.

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