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Nickel Mining in Indonesia

An overview of socioenvironmental governance in the sector

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Nickel Mining in Indonesia: An overview of socioenvironmental governance in the sector

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1.0 Introduction

This case study is part of a broader project focused on strengthening supply chain resilience by analyzing the environmental and associated social impacts of critical minerals extraction and processing through the development of country-commodity case studies focused on nickel, lithium, and copper. As the first in the series and one of two on nickel, this case study describes Indonesia's environmental challenges and associated social issues from nickel mining of laterite ore and processing through high-pressure acid leaching (HPAL) and examines the country's policy measures for managing them. The conclusions and lessons learned from this case study can be used to guide more sustainable nickel laterite mining and processing in Indonesia as well as other jurisdictions.

2.0 Methodology

This case study is based primarily on desk-based research, including documentation from research papers, news articles, technology reviews, and publications from non-governmental organizations focused on social issues and environmental protection. The research was conducted from May to August 2025.

Complementary in-country meetings were held with two Indonesian civil society organizations in August 2025 to provide local perspectives and practical insights, highlighting challenges and opportunities not captured in published sources.

3.0 Context

Detailed contextual information is available from two Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development (IGF) publications: a country factsheet on Indonesia *(IGF QC Factsheet on Indonesia,* to be published) and a commodity profile on nickel (IGF, 2026b). This country-commodity case study draws on these sources and provides a more in-depth view of nickel as a strategic commodity in Indonesia.

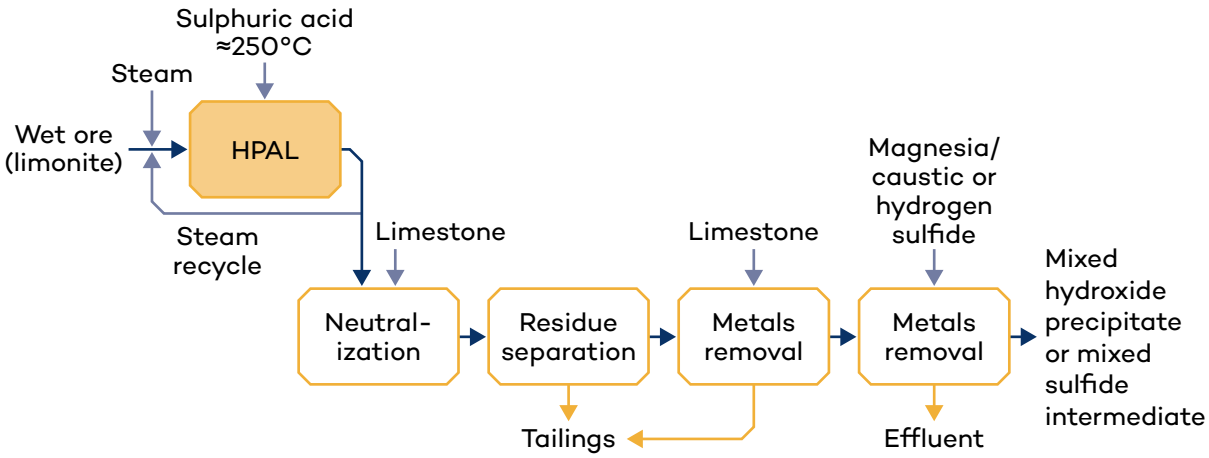
3.1 Geological and Mining Context

Indonesia has the world's largest nickel reserves, with an estimated 55 million tonnes (United States Geological Survey, 2025). It has been the world's leading producer of nickel over the past few years, with a global production share of 16% in 2017 rising to 54% in 2023, when it produced 2.02 million tonnes of nickel (World Mining Data, 2025).

Indonesia's lateritic deposits include both limonite and saprolite ores. Nickel laterite forms close to the surface through weathering of sulfidic materials due to the action of heavy rains, which is why most of these types of deposits are found in tropical regions (Mat, 2023). The ore that can be extracted from these deposits is usually of a lower grade compared to nickel sulfide deposits.

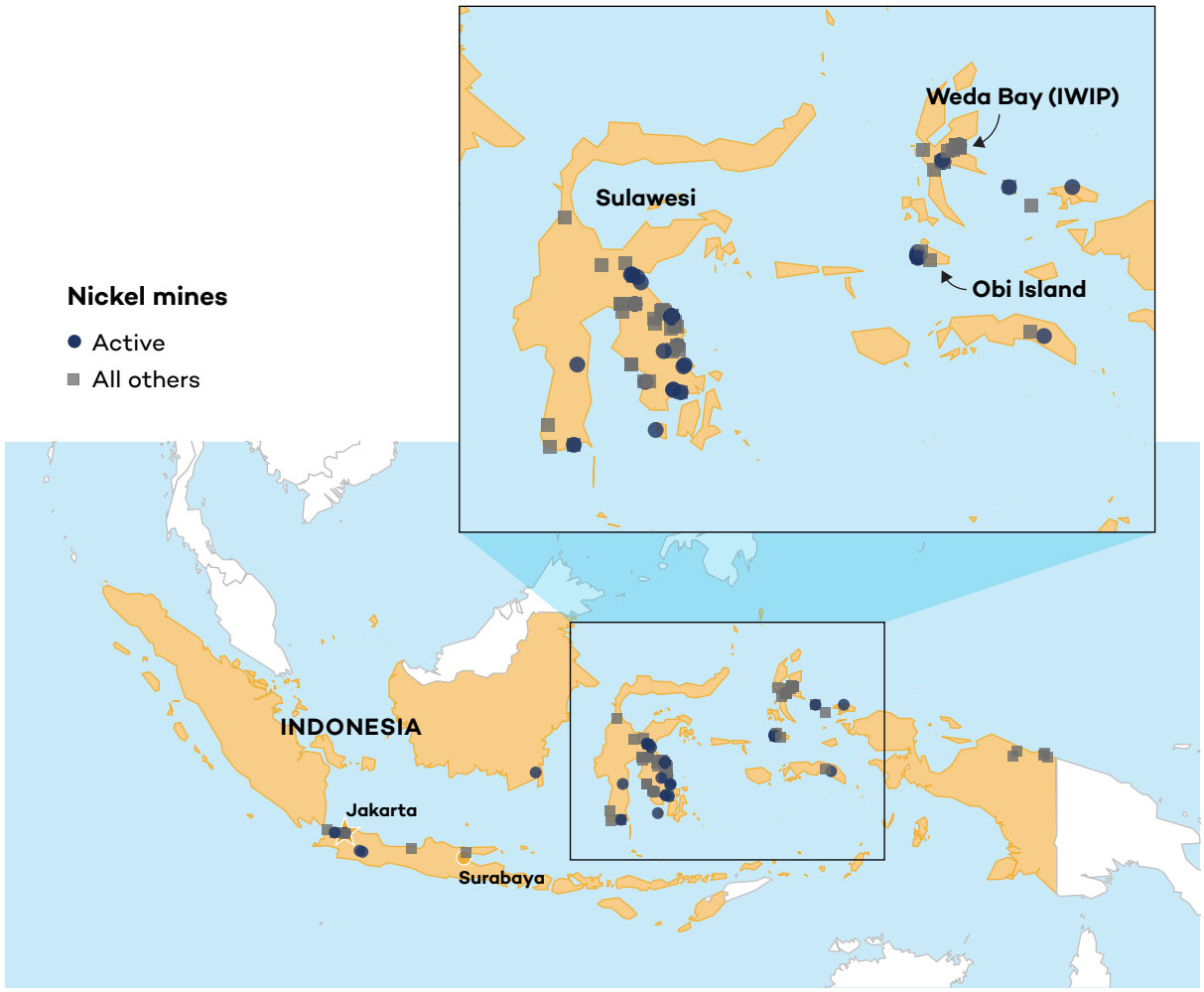
Unlike sulfide ores, nickel laterites are generally difficult to concentrate economically using conventional physical beneficiation methods. As a result, laterite ores are usually processed directly, mainly through pyrometallurgical smelting routes such as rotary kiln electric furnace (RKEF) or through hydrometallurgical processing such as high-pressure acid leaching (HPAL). Figure 1 illustrates the HPAL processing method, from the feeding of the extracted ore into the plant, through its high-pressure treatment with sulphuric acid and the production of highly acidic tailings, and the resulting mixed sulfide precipitate or mixed hydroxide precipitate, which can be further processed into nickel sulphate for electric vehicle batteries.

FIGURE 1. The HPAL process



Source: Nickel Institute, 2025.

FIGURE 2. Map of nickel mines in Indonesia



Source: Author.

Rising demand for nickel in batteries has driven increased use of HPAL to process laterite nickel ore (Li et al., 2025). Currently, there are four operating HPAL facilities in Indonesia, with plans to expand in the coming years (Wong & Ngee, 2024).

Nickel mining and processing occur mainly across the following provinces: Southeast Sulawesi, Central Sulawesi, South Sulawesi, Maluku, Kalimantan, West Papua, and Papua. The expansion of nickel mining has been supported by industrial parks, such as the Indonesia Morowali Industrial Park (IMIP), Weda Bay Industrial Park (IWIP), Pomalaa Black Nickel Industrial Area, and Obi Island. As of December 2025, Indonesia has 365 nickel mining business licences, 79 operating nickel smelters, 74 smelters under construction, and 17 in planning and permitting (Indonesia Miner, 2025).

3.2 Socio-Economic Profile

Livelihoods

Livelihoods in areas where nickel mining takes place in Indonesia are diversified, ranging from agriculture to forestry, fishing and marine harvesting, small trade and services, livestock, and tourism, with many also working in the nickel mining sector (Adenan & Tunora, 2023; Extractive Industries Transparency Initiative, 2022; Global Forest Watch, n.d.; Taufik et al., 2025). In several nickel-producing areas, communities depend heavily on natural resource-based activities that are particularly vulnerable to the environmental impacts of mining, including:

- **agriculture:** Communities around North Konawe (Southeast Sulawesi) and North Morowali (Central Sulawesi) rely on small-scale agriculture (Adenan & Tunora, 2023; Extractives Industries Transparency Initiative, 2023). North Konawe in Southeast Sulawesi has the largest number of nickel mining business permits in the Southeast Sulawesi Province, covering 2,783 hectares (Adenan & Tunora, 2023; Taufik et al., 2025). As of 2020, 72% of its land area was covered by primary and secondary rainforests (Global Forest Watch, n.d.). Many young people in North Konawe are moving into the mining sector for work (Global Forest Watch, n.d.), with several hundred people in North Morowali also working in the nickel sector (Extractives Industries Transparency Initiative, 2023).
- **fishing:** Coastal fishers depend on fishing in areas near North Konawe Regency (International Union for Conservation of Nature, 2024), Central Halmahera (in North Maluku, where IWIP is located) (Antara News, 2021), Kabaena Island (Southeast Sulawesi) (Jong, 2025a) and Towara in Central Sulawesi (Climate Rights International, 2025).
- **hunting:** communities in Central and Eastern Halmahera, among others living in or near nickel mining areas, have depended on sustaining themselves through hunting for generations (Climate Rights International, 2024).

According to the National Land Agency (Badan Pertanahan Nasional), 24.2% of land in Indonesia is registered under women's ownership, which is above the global average of 20% (United Nations Convention to Combat Desertification, 2024).

Customary Land Tenure and Indigenous Peoples

The total population of Indigenous Peoples in Indonesia is estimated to be between 50 million and 70 million (Siringoringo & Mambor, 2021), representing 18%–19% of the population.

Though Indonesia is a signatory to the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP), the government considers most Indonesians to be Indigenous and thus, the Indonesian Constitution recognizes customary law communities (masyarakat hukum adat). These are people who come from the same lineage, live in a particular geographic area, and have their own institutions and customary laws (Arizona & Cohen, 2024).

As mining expands, areas under customary tenure are often overlaid with mining permits. For instance, the people of the Bajau community are semi-nomadic boat-dwellers spread across multiple coastal and island regions of Indonesia, especially in the Sulawesi region. Mining licences cover approximately 73% of Kabaena Island in Southwest Sulawesi (Satya Bumi, 2024a) which is home to the Indigenous Bajau community (Institute for Development of Rural and Indigenous People, 2019).

For many Indigenous and local communities, forests hold economic, spiritual, and socio-cultural importance, and these groups are among Indonesia's poorest (UN-REDD, 2024). The island of Halmahera in North Maluku province is a major centre of nickel extraction, with the Weda Bay Industrial Park at its centre. The island is also home to the O'Hongana Manyawa Indigenous peoples. Out of a total population of roughly 3,500 people, around 500 want to remain uncontacted, refusing interactions with outsiders (Survival International, n.d.). The O'Hongana Manyawa are entirely dependent on the rainforest and are one of the last nomadic hunter-gatherer tribes left; their way of life depends on the ability to continuously move homes and allow the rainforest in their previous location to regenerate (Survival International, n.d.). The development of mining in O'Hongana Manyawa territories has expanded rapidly since 2020 (Survival International, n.d.), which impacts their ability to continue remaining nomadic and uncontacted.

3.3 Governance and Regulatory Framework

Indonesia's mining sector is governed by laws and regulations overseen by different ministries, including the Ministry of Energy and Mineral Resources (MEMR), the Ministry of Environment (MOE), the Ministry of Forestry, and the Ministry of Labour.

Key mining legislation has been updated to streamline and enhance efficiency, as well as provide clarity and improve activities related to mining; these include Law No.2/2025 which amends Law No.4/2009 on Mineral and Coal Mining, previous amendments to Law No.3/2020, Law No. 11/2020, and Law No.6/2023, as well as Government Regulation No. 25/2024 which amends Government Regulation No. 96 2021 (IGF, forthcoming).

In addition, Law No. 32/2009 on Environmental Protection and Management, under the responsibility of the MOE, requires proponents to undertake an environmental impact analysis (Analisis Mengenai Dampak Lingkungan [AMDAL] in Indonesian). Proponents need to identify, predict, and assess the potential environmental impacts of a proposed project.

Monitoring of environmental and social impacts is conducted by MEMR and MOE. Mining inspectors under the MEMR oversee the compliance of mining operations with the implementation of technical and safety regulations, including tailings management, worker safety, and post-mining reclamation plans. Environmental oversight, particularly enforcement of environmental permits and mitigation measures, is primarily the responsibility of the MOE and its regional offices.

4.0 Environmental and Associated Social Impacts

The environmental impacts of nickel mining in Indonesia are broad and widespread. They range from greenhouse gas emissions to water pollution, deforestation, and land transformation. These impacts are closely related to social issues, such as the consumption of contaminated water, the loss of arable land, and worsened air quality. The following sections describe the key environmental impacts and their associated social impacts in more detail.

4.1 Energy

Extracting metal from laterite ore requires more energy than extracting it from sulfide ore due to its low grade (IGF, 2024; WINS Global Consult, 2022) and because the whole ore is being processed, as opposed to sulfide ore processing where the ore goes first through a concentration stage. Processing of laterite ore using HPAL is less energy intensive than RKEF (Wood Mackenzie, 2023), which requires a very large continuous power supply, with some facilities needing up to 40MWh/t Ni produced (Nickel Institute, 2024). Meanwhile, HPAL requires approximately 10–20 MWh/t Ni produced. Some HPAL plants are strategically built on hilly terrain to reduce energy use for slurry transfer, taking advantage of gravity to facilitate the natural flow of slurry (ChuanYu et al., 2025).

4.2 Greenhouse Gas Emissions

Since laterite nickel is found closer to the surface than sulfide nickel, in most cases, it does not require deep pits or tunnels to mine (Climate Rights International, 2024). However, processing low-grade laterite ore into battery-grade nickel emits considerable amounts of greenhouse gases (GHGs), principally in the form of carbon dioxide (CO_2) due to high energy needs, which are two to six times more than sulfide nickel production (as shown in Table 2), especially when coal is used to power mining and processing (International Energy Agency [IEA], 2021; WINS Global Consult, 2022).

The Indonesian nickel industry's reliance on coal (IGF, 2024) makes its production one of the most carbon-intensive globally. Industrial parks for nickel processing account for 15% of Indonesia's coal power output, potentially rising to 24% with future capacity growth of their

local coal power plants (WINS Global Consult, 2022).[1] Additional GHG emissions come from coal generation and dust from drilling and transport (WINS Global Consult, 2022). Coal-fired power plants also release pollutants, including particulate matter, sulphur dioxide, nitrogen oxides, and heavy metals (Climate Rights International, 2024).

TABLE 1. CO_2 emissions for nickel processing methods

Ore type	Process	Product	Tonnes of CO_2 per tonne of Ni equivalent
Sulfides	Electric/flash smelting	Refined Ni/Matte	6
Laterite	HPAL	Refined Ni/mixed sulfide precipitate/mixed hydroxide precipitate	13.7
Laterite	Blast furnace/RKEF	Nickel pig iron/matte	45.1

Source: Visual Capitalist, 2023.

Communities in Central Sulawesi have also noted a steady increase in respiratory illnesses from air pollution since nickel mining operations began in the area and believe there may also be a link to rising rates of stunting and malnutrition in children (Climate Rights International, 2025), which impacts children and increases women's care burden.

Continuous Improvement

In an effort to reduce its GHG emissions, renewable energy sources such as hydropower and liquefied natural gas could be used to power smelters. However, the supply of liquefied natural gas and hydropower development in Indonesia is currently limited, and the volatility of nickel prices raises operational costs. In instances where coal continues to be used, improvements such as coal filtering, limestone substitutes, and conveyor belt transport are suggested (ChuanYu et al., 2025).

Industrial parks have begun adopting electric vehicle use, including electric trucks for logistics and internal transport, which can reduce on-site emissions (Petromindo, 2025). The government has also removed tax exemptions for new investments in RKEF pyrometallurgical smelters. This may encourage the proliferation of HPAL plants, which emit significantly less CO_2 (ChuanYu et al., 2025).

[1] While new grid-connected coal plants are restricted, exceptions exist for nickel processing since these are considered strategic projects.

BOX 1. DECARBONIZATION THROUGH ELECTRIFICATION AT IWIP

As part of efforts to decarbonize and align with Indonesia's target of net-zero by 2060, IWIP has started electrifying parts of its transport operations. This has been done through the operation of electric vehicles, including heavy equipment and trucks. Electric vehicle use is expected to lower carbon emissions from transportation activities within the park (IWIP, 2025).

4.3 Water

In laterite mining, environmental conditions and rainfall can increase concentrations of nickel and other metals like chromium, manganese, magnesium, and iron in mine water. Open-pit mining exposes chromium, which may oxidize to toxic hexavalent chromium (Cr(VI)) and leach into water (Nasrullah et al., 2017).

In terms of nickel processing, the amount of water used for producing nickel depends on the processing method, type of ore processed, technologies used, and water recycling. On average, the mining and processing of 1 kilogram (kg) of nickel requires 0.053 cubic metres (53 litres) of water (IEA, 2021). HPAL consumes more water compared to RKEF due to the large amounts needed to produce sulphuric acid, which is necessary for dissolving nickel and cobalt from the ore. On average, approximately 300 cubic metres of water are required to produce 1 kg of nickel processed by HPAL (ChuanYu et al., 2025).

Currently, Indonesia does not make water quality monitoring data publicly available. On Obi Island (also in North Maluku Province), there are reports that companies did not communicate the amounts of highly toxic chemicals and carcinogenic compounds in rivers near their nickel mining operations (for a detailed overview, see reports by the Organized Crime and Corruption Reporting Project [2025] and Vardar & Dörrer, 2025). Local populations were not made aware of the contamination and had no choice but to use the contaminated water (Climate Rights International, 2025; Organized Crime and Corruption Reporting Project, 2025). Now, many local residents are compelled to either buy clean drinking water if they can afford it or else rely on unsafe sources (Climate Rights International, 2024; Vardar & Dörrer, 2025).

Pollution and wastewater runoff from industrial parks have degraded water quality and reduced fish stocks, resulting in fishers having to travel further out to sea to sustain their livelihoods (Ginting & Moore, 2021) and a disruption to Indigenous ways of life (Satya Bumi, 2024a). Environmental impacts, including water pollution and damage to arable land caused by flooding linked to deforestation for industrial parks, have also negatively affected the livelihoods of farmers in nearby communities (Ginting & Moore, 2021).

On Kabaena Island, located off the Southwest coast of Sulawesi, where approximately 73% of the land is under mining concessions, water samples reveal unsafe levels of lead, mercury, and cadmium, in comparison to the national water standards, as well as those of the World Health Organization, and the U.S. Environmental Protection Agency (Satya Bumi, 2024b).

Water pollution directly impacts the livelihoods and cultural heritage of local communities, including Indigenous communities like the Bajau, who rely on fishing for subsistence (Satya Bumi, 2024b). Fishers in Tapunggaya in North Konawe and Kabaena Island have reported

having to travel further to find their catch and spend more money on petrol because of pollution from nickel mining (International Union for Conservation of Nature, 2024). In Tani Indah, near a nickel smelter, water pollution is said to have killed the plankton that feed fish, leading to the collapse of aquaculture and the reliance on high-priced goods from local markets, which now need to be purchased (Climate Rights International, 2024).

Raja Ampat, located in Southwest Papua, one of the world's most biodiverse marine regions and home to 75% of the world's known coral species, hosts five companies with approved nickel mines controlling at least 25,424 hectares of land and sea concessions—nearly half the size of Jakarta. In June 2025, following findings that at least three companies violated environmental laws, including a prohibition on mining on small islands, not having the requisite permits, and causing ecological damage such as sedimentation and forest encroachment (Jong, 2025b), the government suspended nickel mining in Raja Ampat. The government retained the permit for PT Gag Nickel, partly government-owned, as it lies outside the UNESCO geopark (Jong, 2025c).

It is unknown how much small-scale mining contributes to Indonesia's nickel production; however, its impacts are highly localized. For example, while industrial mines have water treatment systems, small traditional mines, such as those in North Konawe Regency and Kolaka in Southeast Sulawesi Province, lack comparable treatment infrastructure. As a result, these operations have poor runoff management, leading to the pollution of river and coastal areas and murky water (ChuanYu et al., 2025).

4.4 Land Transformation

Land disturbance from laterite mining is generally greater than from sulfide mining: the land transformation factor for laterite mining ranges from 7 m^2/t to 229 m^2/t nickel, with a median of 50 m^2/t nickel, larger than the median of 30 m^2/t nickel for sulfide mining, which has a land transformation factor range of 4 m^2 to 398 m^2/t nickel (Mervine et al., 2025). Thus, vast areas of land must be cleared for laterite extraction as well as for mine infrastructure and waste storage.

The Indonesian government controls and owns most forests, as per Law No. 41/1999 (World Resources Institute, 2024). Nickel concessions require Forest Area Approval from the MoE to clear forests, with permits often mandating companies to replant natural forests twice the area cleared, inside or outside their concession (Mighty Earth, 2024).

A moratorium on new mining licences for clearing primary forests and peatlands was introduced in 2011, covering 66 million hectares (WINS Global Consult, 2022). Despite this, deforestation is increasing, and forest clearance in 2023 was double that of 2020 (Mighty Earth, 2024). Environmentally sensitive peatlands, which constitute carbon sinks, are threatened by mining in regions such as Sumatra, Kalimantan, Sulawesi, and Papua (WINS Global Consult, 2022).

Of Indonesia's 920,000 hectares of nickel mining concessions, about 66% remain forested (Fournier, 2024). According to the Indonesian Forum for the Environment, monitoring in 2022 has shown ongoing rainforest destruction in South Sulawesi linked to nickel mining (Asiatoday, 2022). Based on a report by Mighty Earth (2024), seven of the 25 highest-deforestation nickel concessions—the concessions in areas that may cause significant forest loss due to exploration or mining activity—are in key biodiversity areas as per the International Union

for Conservation of Nature. Deforestation results in significant environmental and social consequences. By weakening soil stability, it increases the risk of tailings accidents, runoff, erosion, and landslides (Tan et al., 2025), while also destroying habitats for wildlife and people who rely on forests for food, water, and other essentials (United Nations Environment Programme, 2024). On Halmahera Island in North Maluku Province, geospatial analysis shows that IWIP's operations have cleared 5,331 ha of tropical forests, releasing about 2.04 million metric tons of stored GHGs (Climate Rights International, 2024). This loss directly threatens the livelihoods, culture, and subsistence of communities dependent on fishing, farming, and hunting (Climate Rights International, 2024).

Customary Land

Indigenous communities near mines report inadequate consultation and transparency regarding land acquisition and use for nickel mining operations, as well as insufficient compensation (Business and Human Rights Resource Centre [BHRRC], 2024). Land rights legislation, such as Law No. 32/2009 on Environmental Protection and Management, grants broad discretion to central and local governments in determining "public interest," which may risk overriding customary land rights (United Nations Development Programme, 2021). In some cases, communities believe the government is only granting temporary use rights, since customary land cannot be sold (BHRRC, 2024). However, companies have often disregarded these customary land rights (BHRRC, 2024; Climate Rights International, 2025). Those who resist land transfers frequently face retaliation, restricted access, legal threats, and even imprisonment (Climate Rights International, 2024).

Expansion of Industrial Parks and Demographic Pressure

Indonesia's industrial parks, particularly nickel-focused zones, concentrate heavy processing facilities where raw minerals are processed into higher-value products. The rapid expansion of these industrial parks has driven worker immigration, both for formal employment within the parks and for informal-sector work in surrounding areas, placing pressure on local resources such as water, land, and public services (Ginting & Moore, 2021). In addition, some industrial parks have been designated as National Strategic Projects, increasing police and military presence in surrounding areas (Ginting & Moore, 2021).

4.5 Mine Waste

Extracting metal from low-grade ore increases mining waste such as waste rock and tailings (IEA, 2021), with HPAL processing producing around 1.4 to 1.6 tonnes of waste per tonne of nickel ore processed, or around 160 tonnes of waste per tonne of nickel metal produced, far exceeding smelting (RKEF) waste (Wood Mackenzie, 2023). Much of this waste is corrosive chemical tailings laden with sulphuric acid that are difficult to neutralize, store, and contain (Tan et al., 2025). Eliminating impacts from HPAL residues could be achieved through a circular approach that converts them into other materials, such as iron ore or aggregate, but the complex chemistry involved makes this very challenging (Nickel Institute, 2025).

HPAL tailings are typically stored behind dams, but Indonesia's HPAL plants face dam space constraints due to dense vegetation, challenging topography, high rainfall, and seismic risks, especially in areas such as Sulawesi (Institute for Energy Economics and Financial Analysis, 2024; Wood Mackenzie, 2023). A landslide at IMIP on March 22, 2025, buried four workers under

nickel mine waste, highlighting the importance of implementing robust HPAL tailings safety measures. This landslide was triggered by heavy rainfall, compounded by potentially inadequate tailings management and unaddressed structural vulnerabilities (Jong, 2025d). Tools such as filtered tailings, which remove some water before storage, can help prevent tailings leaks and are generally safer; however, heavy rains still pose breach risk (Earthworks, 2025).

4.6 Gendered Exposure to Environmental Impacts

Despite equal rights under the Agrarian Reform Law, prevailing customary land ownership, language barriers, and limited legal literacy can hinder women's access to fair compensation and remedies for land loss. Many women report that compensation and resettlement processes often fail to restore their livelihoods or provide in-kind compensation (United Nations Development Programme, 2021).

With elevated levels of pollution and deterioration of health, food insecurity and care work increase (Hill et al., 2017). Globally, women and girls are often responsible for household resources like food and water, so if these become scarce or are polluted, they may need to travel further, and work longer and harder to secure food and water for their families (Oxfam, 2017). Sometimes, using polluted water is the only option, increasing the risk to women and girls. For instance, on Obi Island in North Maluku, nickel mining is reported to have contaminated local water sources with hexavalent chromium (Cr6), a carcinogenic chemical that can also cause liver damage, reproductive problems, and developmental harm when ingested or inhaled.

5.0 Strengths and Gaps

5.1 Strengths

Indonesia has made recent updates to its regulatory framework for the mining sector. The AMDAL requires mining companies to assess environmental impacts and develop mitigation measures as well as management and monitoring plans to address the key risks and impacts before a mining permit is granted. Project proponents must also prepare and submit monitoring reports. These requirements are generally based on good international practice, with centralization helping by setting broad policies for environmental and social protection and allowing for harmonization across the country.

In terms of the review process, a Technical Advisory Committee is established to involve independent experts in reviewing the AMDAL and presenting the findings/results to the Appraisal Commission, which in turn provides its advice to the Competent Authority (NCEA, 2023).

In addition, the Government of Indonesia is engaging with international organizations, including the IGF and the Initiative for Responsible Mining Assurance (IRMA), to strengthen the alignment of its regulatory framework and mining practices with international standards. In this context, IRMA is supporting work on benchmarking legal frameworks and exploring complementarities between its audit system and national regulations (Diemel et al., 2024).

5.2 Gaps

Legal Framework

While Indonesia's AMDAL legal framework formally includes social impacts, it lacks a requirement for grievance mechanisms or legal remedies for affected communities. While the law mandates consultation, it could be strengthened to include provisions for community empowerment or mechanisms to ensure meaningful participation.

Monitoring and Enforcement

Regulatory oversight and enforcement could be strengthened in terms of resources and capacity of the environmental agencies at the national and regional levels to ensure that when violations occur, companies (or individuals) are held accountable. Furthermore, penalties for non-compliance can be perceived as purely administrative and ineffective due to weak enforcement, overlapping mandates, and legal loopholes (Zahroh & Najicha, 2022). Additionally, under existing laws (including the Omnibus Law on Job Creation), only national, not provincial, authorities can halt company operations for non-compliance (Climate Rights International, 2023).

Water Management

Water quality monitoring data is not currently publicly available. Given the impact of water pollution from nickel mining activities on surrounding water bodies, public availability of monitoring data would improve transparency and support environmental oversight. Access to monitoring data may also inform pollution mitigation measures to manage potential water pollution risks. Consistent enforcement of existing environmental permitting and requirements may ensure effective water management that aligns with water management standards.

Public Participation and Social Impacts

Public participation in the AMDAL processes is frequently hampered by limited information and ineffective engagement methods (Jong, 2025e). Where AMDAL processes are carried out, emphasis is placed on environmental factors, while social risks are often overlooked. Enhancing the public participation process within the AMDAL framework has the potential to provide a win–win for the mining company, enabling it to seek public support and maintain good working relationships with communities where these projects operate.

Free, Prior, and Informed Consent

Indonesia's 2009 Mining Law and its 2020 amendment do not mandate free, prior, and informed consent (FPIC) of Indigenous Peoples, despite having voted in favour of the UNDRIP. Unless legally required, companies often avoid adopting FPIC policies (Institute for Human Rights and Business, 2022). In instances where Indigenous Peoples are potentially affected by mining projects, seeking FPIC is crucial to respecting the use of land through customary law.

6.0 Conclusions

Indonesia has invested significant resources into leveraging its large nickel endowments for economic development. The use of HPAL to process the country's low-grade laterite ore for a variety of products, notably electric vehicle batteries, continues to grow in scale. Such intense development is associated with significant environmental and social impacts.

On multiple indicators, nickel laterite mining and processing have a larger environmental footprint and increase the quantity of waste generated per ton of metal produced than nickel sulfide mining. In addition, the processing of laterite ore is energy intensive, with much of Indonesia's energy for this process coming from coal, which in turn results in larger GHG emissions.

As a result, there is a growing global expectation, including from civil society, to significantly reduce environmental and social harms and tighten the sustainability standards of mining operations. This means ensuring stringent legislative frameworks are in place to address key issues such as tailings and water management, which have the potential for significant impacts on the environment and society. It also requires adequate resourcing and capacity building of relevant government ministries to be able to assess and monitor mining and processing operations and keep pace with international best practices and expectations.

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Appendix A. Relevant Indonesian Environmental Laws and Regulations

TABLE A1. Indonesian laws and regulations relevant to environmental and associated social impacts

Type of legal instrument	Title/description of legal instrument	High-level summary of objectives	Section in case study law refers to
Constitution	1945 Constitution	Provides that natural resources, including nickel, are controlled by the state and used for the greatest prosperity of the people. Also provides that every person has the right to enjoy a good and healthy environment.	
Law	Amendment to Law No. 4/2009 via Law No. 3/2020	Amends, clarifies, and adds provisions regarding mining business activities, licensing, transfers of mining licences and shares in mining companies, among other matters.	3.1.1, 3.2.3, 3.3.2
Law	Amendment to Law No. 4/2009 via Law No. 2/2025	Amendment to Law No. 4/2009 on Mineral and Coal Mining. Primarily seeks to improve business transparency by encouraging beneficial ownership disclosure, broadening access to mining rights and improving access to mineral resources for small companies, religious groups, and others that may not have participated in the mining sector to enhance community participation.	3.1.1
Law	Law No. 1/2014 on the Management of Coastal Areas and Small Islands (amending Law No. 27/2007)	Deals with the management of coastal areas and small islands. Aims to ensure the long-term well-being of coastal and island communities and ecosystems through sustainable resource utilization.	3.2.3

Type of legal instrument	Title/description of legal instrument	High-level summary of objectives	Section in case study law refers to
Law	Law No. 32/2009 on Environmental Protection and Management	Regulates environmental protection and management, aiming for sustainable development, environmental conservation, and restoration.	3.1.2, 3.2.3, 3.3.2
Law	Law No 6/2023 on Job Creation	Consolidates various overlapping regulations into a single instrument. Aims to create jobs by attracting investment through incentives and streamlining regulatory requirements, including business licensing.	1.1
Law	Law No. 13/2003 (Manpower Law)	Governs labour and employment in Indonesia and addresses various aspects of the employment relationship, including working conditions, employment contracts, wages, working hours, and termination procedures.	3.5
Law	Law No. 41/1999 (Forestry Law)	Outlines the framework for the management and utilization of forests, emphasizing sustainability and the balancing of environmental, social, and economic benefits.	3.3.1
Law	Law No. 32/2024 concerning Amendments to No. 5/1990	Relates to the Conservation of Biological Natural Resources and their Ecosystems. Among other things, it requires the protection, preservation, and sustainable use of biological natural resources.	3.2.3, 3.3.3
Government regulation	GR No. 22/2021	A part of the implementation of the Job Creation Law that contains detailed provisions relating to environmental protection and management, such as the legal basis for environmental impact analysis, environmental management efforts and environmental monitoring efforts, waste management, water quality management, air quality management, and so on.	3.1.2, 3.1.3, 3.2.3, 3.3.3, 3.3.4

Type of legal instrument	Title/description of legal instrument	High-level summary of objectives	Section in case study law refers to
Ministerial decree	Minister of Environment Decree No. 112/2003	Deals with domestic wastewater quality standards and sets out protocols for monitoring domestic and industrial zone wastewater treatment and standards at national and local levels.	3.2.3
Ministerial decree	Minister of Energy and Natural Resources Decree No. 1827/2018	Sets out guidelines for the implementation of good mining practices in Indonesia, including by providing safety protocols for tailings and waste facilities.	3.4
Ministerial regulation	Minister of Environment and Forestry Regulation No. 106/2018	Deals with the protection of plants and animals in Indonesia.	3.2.3
Ministerial regulation	Minister of Energy and Natural Resources Regulation No. 7/2006	Deals with the processing and refining of minerals and coal, with specific provisions regarding the handling of excavated materials, including soil. Outlines procedures for assessing land damage by measuring key physical, chemical, and biological soil properties.	3.3.4
Ministerial regulation	Minister of Manpower Regulation No. 5/1996	Deals with the establishment of occupational safety and health management systems. Provides, among other things, that companies working in hazardous industries and those with at least 100 employees are required to establish occupation health and safety management systems.	3.5
Law	Law No. 2/2012	Allows the state to acquire private land for public interest projects, with compensation covering tangible assets (land, plants, buildings and other losses that can be quantified), often missing non-quantifiable losses, which may disproportionately impact women due to the gendered use and ownership of natural resources.	3.3.2

Type of legal instrument	Title/description of legal instrument	High-level summary of objectives	Section in case study law refers to
Government regulation	GR No. 27/2012	Requires community involvement in the preparation of an environmental impact assessment per application process.	3.3.2
Ministerial regulation	Minister of Environment No. 17/2012	Calls for transparent and complete information, and equal standing for all parties during environmental impact assessment and permitting processes.	3.3.2
Ministerial decree	Minister of Environment No. 12/2024	Sets out the national contributions to address climate change and emphasizes the importance of mitigating climate change through various strategies, including high-pressure acid leaching tailings management.	3.4

Source: Author.

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