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Potential Distortion of Sustainable Development in the Conflict of Interest of Nickel Mining and Indigenous Communities in Halmahera, North Maluku

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ABSTRACT. Indonesia is rich in nickel resources. Indeed, it is good for the country economics and meeting the needs of modern society. There is a dilemma between economy and environmental sustainability. The difference of interests often leads to the neglect of the owned rights of the community of the indigenous and will lead to social inequality, eventually results in endless conflict. Halmahera Island has been used as a mining site for years. The Halmahera indigenous people have undergone serious impact, both in ecological and economic aspect. The purpose is to learn what can be done to alleviate the dispute, as well as to comprehend community impacts and roles in environmental conservation. The data analysis approach used is descriptive qualitative, with a scoring matrix assessment of the temporal impact forecasts and the application of 6+ strategic environmental assessment/SEA elements with scoring range of 1 (weak) to 5 (strong). Mining exploitation and the neglect of the rights of indigenous people is clearly contradictive with the essence of Sustainable Development Goals. The results of the analysis show the fact that mining activities, with a score of 4,123, emit severe impact in Halmahera Island; degradation of ecology, the life, and economic condition of the indigenous people. Post mining activities, however, yielded to a greater disruption with a score of 4,75. Mining can be made sustainable by implementing a comprehensive plan, which in the assessment analysis can reduce the risk level to a value of 3,25. The indigenous people of the island of Halmahera suffer ecological, cultural, and economical losses in order to meet the needs of modern society; ironically, the demand for nickel continues to grow. Therefore, friction between the community and mining actors will continue to occur before environmental management and mitigation proves to be effective. Sustainable development is a key in conflict resolution that should be acted upon by mining actors. Utilization of natural resources must be carried out comprehensively, in accordance with the principles of inclusive sustainable development.

Keywords: *Environmental controversy, Halmahera Island, indigenous people, nickel mining, Sustainable Development Goals*

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1. Introduction

The economy and the use of natural resources grow simultaneously and are interrelated. International trade chains have the power to affect environmental burden. The use of green technology does not deny the use of metals and minerals that continues to increase (Nakajima *et al.*, 2017).

Anthropogenic activities require metals that majorly used in modern technologies. Among types of metals, nickel is broadly used for infrastructure and buildings, transportation, industrial machinery, appliances and metal products. Nickel's corrosion resistance, strength, and high temperature stability are highly valued in these applications, which often take the form of stainless steels or superalloys (Elshkaki, Reck and Graedel, 2017). The nickel market has grown in value over the last two decades, reaching US\$35 billion in 2019, with total output exceeding 2.4 million tons of nickel. This expansion has been fuelled mostly by an increase in stainless steel demand. A burgeoning Chinese economy based on construction spending has increased demand for stainless steel and encouraged large-scale investment, while simultaneously increasing the amount of nickel required. Nickel demand from stainless steel has more than doubled in the last ten years, reaching 1.6 million tonnes

in 2019. While the stainless-steel industry still consumes over 70% of total nickel, growth has been driven by Class II (nickel pig iron and FeNi) nickel product usage, with Class I (metals and chemicals) nickel product use increasing albeit at a slower rate. The primary driver of future nickel demand growth. The European Commission (EC), in collaboration with the European Battery Alliance, is aggressively encouraging the use and manufacture of electric vehicles (EVs) in Europe, as well as local battery manufacturing capabilities. In the case of nickel, the study's focal point, this will certainly lead to increasing demand for Class I items for use as feedstock in sulphate production, which may be subject to supply chain bottlenecks. The EC's entire sourcing strategy and consequent supply security require knowledge of such constraints (Fraser, 2021). Understanding the extent of future demand for EV battery raw material is crucial for guiding strategic policy and industry decisions, as well as evaluating possible supply risks including social and environmental consequences.

There are plentiful nickel economic resources known throughout the world, especially in Australia, Canada, New Caledonia, the Philippines, Indonesia and Russia, among others. Nickel can be found in sulphide ores or laterite ores. Sulphide ores usually obtained from volcanic or hydrothermal

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processes, while laterite ores usually made up near ultramafic rocks surface with large scale of corrosion (Mudd, 2010).

The nickel resource in Indonesia was assessed at 6,233.65 million tons in 2016, with a reserve of 3,155.67 million tons (Suherman and Saleh, 2018). Indonesia has a wide area of ultramafic bedrock, more over in Sulawesi Island with an area as large as 15,400 km² and Halmahera Island with roughly about 8000 km² of ultramafic outcrops. The East Celebes Tertiary subduction zone shows that thin layers of pelagic sediments fed to the trench were highly deformed and demonstrate extensive mantle involvement. The same may be said of Halmahera and the surrounding tiny islands, which, along with Celebes, hold Indonesia's greatest lateritic nickel and iron-ore reserves (Katlli, 1975). Nickel is extracted from opencast mines. Opencast mining has crucial impact on tropical rainforest because it has an effect on indigenous plantation and fertility of the soil surrounding the mines. Soil degradation not solely affecting biodiversity, but it also affects the socioeconomics (Prematuri *et al.*, 2020).

Mining licence holders are responsible for increasing the additional value of minerals in their mines by taking economic values into account. According to Article 102 paragraph (3) of the Mineral and Coal Mining Law in the Republic of Indonesia's 1945 Constitution, growing economic benefits can be accomplished by improving value-added of minerals extracted domestically and contributing ideally to the country's economic benefits. By taking into account the comparative quality of mineral resources and the long-term viability of mining operations, this will serve to enhance the mineral supply chain as part of industrial development and provision in local production (Krustiyati *et al.*, 2022).

Rich in nickel resources, both Sumatera and Halmahera Islands become main nickel mining prey (van der Ent *et al.*, 2013). However, the eastern territory of Indonesia such as Maluku and East Nusa Tenggara are actually two of the poorest regions despite its function as mining sites. The central government is troubled about the wider geographical interval in the economic growth gains (Asteria *et al.*, 2021).

Indonesia is consisting of global biodiversity hotspots. It is a megadiverse country that has the most varies coral reefs worldwide (von Rintelen, Arida and Häuser, 2017). Wallacea, in central Indonesia, is a biodiversity hotspot. It is about halfway between Borneo and New Guinea. After Sulawesi, Halmahera is Wallacea's second-largest island. Over millions of years, Halmahera's distinct biota evolved in isolation from neighbouring landmasses.

Meanwhile, the Halmahera's fauna is only moderately varied, but it is notable for its high amount of species-level endemism (Setiadi *et al.*, 2010). Moluccan Scrubfowl (*Eulipoa wallacei*) and Dusky Scrubfowl (*Megapodius freycinet*) are two megapodes that live on Halmahera. However, the first megapode, a fragile indigenous species to the Moluccas, was not discovered during this research. In Halmahera, Dusky Scrubfowl are plentiful, and they prefer flat area at low elevation to undulating terrain. Furthermore, they were primarily encountered in secondary or primary woodland, with some straying close to the forest border. The endemic genus of Friarbirds in Halmahera is White-streaked Friarbird. The Dusky Friarbird (*Philemon fuscicapillus*) is a Friarbird from another genus that lives in North Moluccas This organisms is also found only on Morotai Island, off the coast of Halmahera, and is endemic to the North Moluccas (Irham, 2012).

Most community in rural areas depend on the variety of forest products. Each variety of flora that grows and develops

in a forest has its own unique characteristics that are impacted by the climate, altitude, and other environmental factors (Irmayanti *et al.*, 2022). Made up of thousands of islands, Indonesia has a diverse local system and its traditional wisdom that is well respected and done by indigenous people (Nasir Tamaleneet al., 2017). Each ethnic groups with different cultures and cultural practices have the same purpose, that is to continue inherited cultures that they believe is good to the social and environmental aspects (Nasir Tamalene, 2017).

The growing urgency of modern society demand push the urgency of global sustainable development, so that the SDGs concept has fast acquired traction. Almost all of the world's societies agree that they want to achieve a balance of economic growth, environmental sustainability, and social inclusiveness, although the particular goals vary internationally, between civilizations, and within them. Certainly, no agreement has been reached on the trade-offs and synergies between economic, environmental, and social objectives. Nonetheless, a common focus on economic, environmental, and social goals is a characteristic of sustainable development and offers a broad consensus upon which the world may build (Sachs, 2012).

The friction of regulations that control the resources on mining site bring conflicts among landowners (horizontal conflicts) and between central and regional governments (vertical conflicts) (Alauddin, Alting and Karman, 2019). The key issue in this article is to go deep into environmental, social, and economical impact made by business actors and their mining activities. The goal is to know what can be done to take the edge off of the conflict, as well to understand community impacts and roles in conserving environments.

2. Materials and Methods

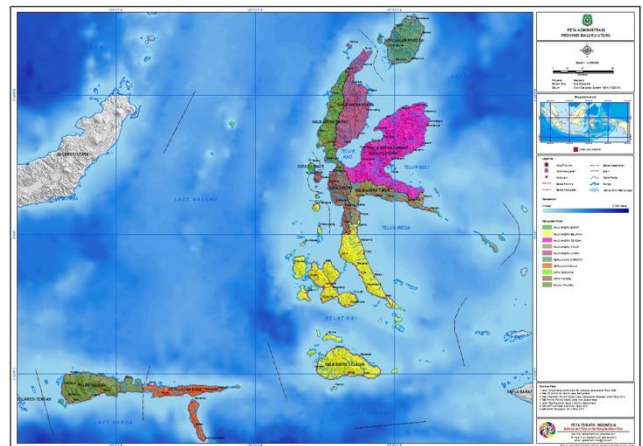


Fig. 1 Administrative map of Halmahera Island

This study was located in Halmahera Island, Indonesia. The island is divided into 5 districts: East Halmahera Regency, South Halmahera Regency, West Halmahera Regency, North Halmahera Regency, and Central Halmahera Regency.

This study used a reference-based literature study approach based on risk and impact studies and the notion of human ecology. Scientific publications from journals, documents, and extensive coverage are all sources of data. This sums up individual studies and lay out information of the study from the cited articles. The goal is to figure out what can be done to reduce the conflict's intensity, as well as to comprehend community impacts and roles in environmental conservation.

Assessment of the temporal impact projection is carried out through a scoring matrix assessment by applying 6+ strategic environmental assessment/SEA contents: 1) carrying capacity, 2) impact and risk estimation, 3) ecosystem service performance, 4) efficient use of natural resources, 5) vulnerability to climate change, 6) biodiversity disturbance, 7) economic development prospects, and 8) potential for conflict. The use of 8 assessment variables is to weight the environment affected holistically. Scoring used to weigh the impact of each aspects is based on Likert scale, where the score ranging from scoring scale of 1 (very weak) to 5 (very strong). The results analysis was carried out with a qualitative descriptive approach. The author made the score based on their perception based on the literature found.

3. Results and Discussions

Halmahera Island is the largest island in Maluku Islands. Halmahera, that means "motherland," covers 6,865 square miles (17,780 square kilometres). On the western tip, an isthmus joins the northern peninsula to the others, forming a bay; at the mouth of this bay lie the territories of Ternate, from which North Maluku is controlled, and Tidore. The four peninsulas are separated by highly forested mountain chains ranging in altitude from 3,000 to 5,000 feet (900 to 1,500 meters), which are frequently interrupted by plains. The northern peninsula's area is volcanic, with three active volcanoes, one of which, Mount Gamkonora, rises to 5,364 feet (1,635 metres). There are various tiny rivers and lakes, as well as a cave near Weda that features stalactites.

Halmahera's community is extremely diversified. The Galela, Ternate, Makian, and Tobelo are the biggest ethnic groupings, with numerous individuals of Chinese or Arab heritage living in the northern and centre regions. Hunting, fishing, and gathering sago starch are the main sources of income for the people of Halmahera's interior. Rice is grown by the coastal inhabitants in temporary forest clearings. Coconuts, cocoa, cloves, nutmeg, and coffee are commercial crops farmed primarily along the coast. The emergence of nickel mining for sure impacted in the changes of land use, with previously open space for flora or forests becoming development sites.

The versatility of nickel is used in wide range of goods production, from automotive sector and electric vehicles to the production of stainless steel. Hence, mining activities continue to operate due to high demand. Halmahera is rich in metals and minerals underground and has been as a site of mining for years. Foreign mining companies have been mining gold, nickel, and cobalt in this island since 1999. In 2004, state-owned enterprise opened a mining site to extract nickel for approximately thirty years in the future. While quarry led to environment exploitation, it is contradicting with the customs of indigenous people.

Mining poses threats to the environment's biodiversity, abiotic, and sociocultural components, in addition to threatening the finite supply of nickel. The environmental damage produced by mining on tiny islands is not confined to damage to wildlife and seas. It does, in fact, have a human aspect to it. Human rights breaches abound in Indonesia's small islands, both on an economic, social, and cultural as well as a civil and political base. The takeover of people's sources of water, both streams and underground aquifers, is a hallmark of cultural human rights violations on tiny islands. Rain water might be used in the past. However, acid rain and mining contamination have rendered it difficult to ingest. Because

indigenous peoples make up the majority of small island residents, any breaches of human rights are also violations of indigenous peoples' rights.

The first little island to host mining activities is in Halmahera Island is Gebe Island. Gebe Island is administratively located in North Maluku Province's, Gebe Sub-District, Central Halmahera District. Gebe Island, southwestern Fau Island, and eastern Yoi Island are joined to each other. Until the end of the 1970s, the indigenous inhabitants of Gebe or Kacepo relied only on dry-land farming and fishing for a living. Coconut farms that produce copra and fruit trees provide the majority of the residents' income. Due to a lack of finance, some farmers produce nutmeg and cloves in tiny quantities for retirement. Other industries than agriculture and plantations had not yet grown at the time.

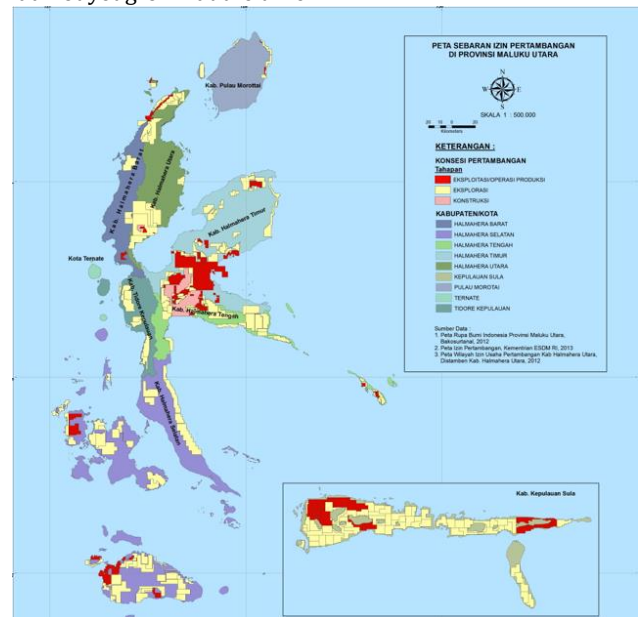


Fig. 2 Mining permit distribution map in northern Maluku Province

North Maluku Province, particularly Central Halmahera Regency, has a large number of mineral mining licenses and activity. Gebe Island has long been one of North Maluku's most prominent mining regions. It's been going on since 1979. Nickel was the focus of the island's mining operations. This specialization was carried out because Gebe is thought to have a mineral deposit that might be exploited. This stemmed from a study conducted in Halmahera, which found that the majority of North Maluku's sediment contains a significant amount of nickel. However, exploration was not done explicitly at the time. According to this study, between 1969 and 1975, a company undertaking survey and nickel ore exploration on islands around Halmahera discovered Nickel sediment in Gebe Island that was highly promising (Berlianty, 2015). In the 1980s, mining company operated the first mine in North Maluku. It is a state-owned firm and contracting behemoth, arrived on the island in 1979. This firm took over the majority of the villagers' crop grounds and drastically altered their lifestyles. It extracted nickel ore on 1,225 hectares of Gebe Island, primarily on the Oeboulie Peninsula on the island's southwestern side. Despite years of mining natural resources on Gebe Island, the firm ceased operations in 2004. The decision was made because to unfulfilled yields goals up until the year 2000.

The mining company constructed supporting facilities on Gebe Island that were partially accessible to the public. The

purpose of constructing such equipment was to aid in the production of their principal commodity, nickel. From the construction of employee settlements to the construction of an airfield, tasks are assigned bureaucratically based on their final studies and job titles. A residential block and a mess of the company's bureau were the settlement possibilities. The firm additionally possessed an upmarket housing complex with security stations and entrances. Employees and business leaders, the majority of whom were migrants from other islands, were granted access to different facilities developed by the mining firm. Residents of Gebe Island, who mostly worked as farmers or fisherman, lacked the necessary skills to work in the mining business. As a result, the mining company's job options for locals were confined to heavy equipment guard, gardener, and cleaning service employee positions. As a result, according to the people of Gebe Island, the mining corporation is one of the companies that must be held accountable for the changes in the landscape and livelihood of Gebe residents as a result of the halted activities.

The mining company has sparked friction in the public both during its operations and after it stopped mining. People receive no tangible benefits from mining, and instead face a slew of new challenges. The Central Halmahera Regent also issued 12 new Mining Business Permits, perhaps causing more damage to Gebe Island's region. When the firm has completed mining the island's natural resources, this will escalate into a massive conflict. Mining on Gebe Island is extremely harmful, with just a few handfuls benefiting. Shareholders of mining include political elite, international investors, local and national legislators, party elites, and former army military leaders who sit on executive board to preserve these enterprises' assets (Naim *et al.*, 2018). The goal of exploitation is to make a profit. Profit is the most important factor, and it becomes the primary goal of all mining operations. As a result, the primary goal of the company's actions is to make a profit or grow stock price as much as possible, either directly or indirectly (Berlianty, 2015).

Moving on to the North Halmahera, North Halmahera Regency has a long record of societal unrest, which culminated in 1999-2000 (Safi, 2017). The fight erupted due to the presence of mining ground in the Hoana Modole, Hoana Pagu, and Hoana Towiliko (Kao Lake, West Kao, Kao Staad) customary region, which sparked a tribal war. In West Halmahera Regency and North Halmahera Regency, the war continued to muddy borders. Resource extraction businesses began to operate as social circumstances improved. Mining corporations used persuasion to improve their Corporate Social Responsibility (CSR) performance in the local people (Gumuru, 2014). If both the community surrounding the mine and the miners are unaware of the dangers of mercury and cyanide to the environment, environmental issues can quickly escalate. Luckily, the public started to acknowledge the dangers of mercury and cyanide in the housing neighbourhood surrounding the site ("Program Kesadaran Bahaya Merkuri Dan Sianida," 2018).

The people of North Halmahera, who depend on the sea for their daily needs, are exposed to the dangers of heavy metals from mining. Mercury and arsenic levels in Kao Bay fish have

been found to be higher above the permitted threshold for the food reference standard. The Hazard Quotient (HQ) ratings among most fish were still greater than one, indicating that they are not fine to eat. The build-up and biomagnification processes in Kao Bay's living marine ecosystems pose a long-term threat to tainted fish eating (Amqam *et al.*, 2020). Besides, fishermen find it more difficult to find fish near mining regions than in non-mining areas. This condition is most likely caused by a drop in quality of water, which prevents fish from adapting and causes them to migrate to other areas. This suggests that nickel mining operations have harmed the fishing grounds.

Open pit drilling is used to extract nickel ore in East Halmahera Regency. Other heavy metals such as copper (Cu), arsenic (As), iron (Fe), and platinum (Pt) are commonly found in nickel ore (Pt). This heavy metal trash has a good chance of entering the waterways near the mining zone via streams. Heavy metals can lead to a rise in precipitated particles in the water, lowering aquatic environment. The number of dissolved particles in a water, whether biological (phytoplankton, zooplankton, and biodegradation) or inorganic (sediment, red soil or clay, and minerals), increases the turbidity rate. This rise in turbidity could have a negative impact on fish habitats and fishing grounds (Sariato, Simbolon and Wiryawan, 2016).

For modern society, the use of natural resources is very helpful for life in various fields. But in fact, this is the opposite for indigenous people who have to deal with foreign business actors who take advantage of their land and environment. Business actors' interest on nickel in Halmahera Island is a threat to its people. Gender, class, age, and ethnicity all shape how individuals and groups are impacted by quarrying, as well as their ability to engage in programs and initiatives and opposition (Großmann, Padmanabhan and von Braun, 2017).

Acid rain, heavy metal soil contamination, biodiversity and water resource impacts, greenhouse gas emissions, and climate change have all been associated with the nickel mining activity. To maintain business viability, new nickel technologies must clearly address environmental aspects as well as traditional metallurgical issues. For a decade or more, the mining industry has been under pressure to lower local costs and hazards while also providing more favourable and long-term advantages to communities. Some of this strain stems from global worries about the sustainability of current trends in economic development, income disparity, social harmony, and environmental integrity. A few were unique to mining projects and the mining industry. A spate of major tailings dam collapses in numerous nations has highlighted recurring concerns of health and ecological destruction, while well-publicized incidents of violent opposition from local community have exposed acute local resentment about socio-economic repercussions. As a result, host countries' policy inclinations have shifted, and the financial community has become more cautious.

An assessment is made based on the impact analysis in the form of a score between mining activities and disruption assessment criteria. The value from each aspect was a perception of the author, based on the literature analysis on the implementation of pre-mining, mining operation, and post-mining activities.

Table 1

Assessment of mining activity's impact on environmental criteria.

Activity	Disruption Assessment Criteria								Estimated disruption of sustainable development
	Carrying capacity	Risk and impact	Ecosystem service performance	Efficient use of natural resources	Climate change vulnerability	Biodiversity threat	Economic potential	Potential conflict	
Early exploration	3	2	2	2	1	2	3	4	2.375
Facility construction	3	3	4	4	2	4	2	4	3.25
Mine Operation	4	5	4	4	4	5	2	5	4.125
Post operation	5	5	5	4	4	5	5	5	4.75
Mine with comprehensive planning (SEA)	3	3	4	3	3	5	2	3	3.25
No mining	1	1	1	1	1	1	3	2	1.375

Assessment criteria

1 Very weak, 2 weak, 3 fair, 4 strong, 5 very strong

The evaluation findings illustrate the impact of mining at a certain level of activity. On a scale of 1 (extremely weak) to 5 (very strong), the mine's initial exploration yielded a result of 2,375, indicating that the impact is weak. Given that not all indigenous peoples can accept the opening of a mine at this level of activity, the risk of conflict is fairly significant. The result for construction of supporting facilities for mining activities is 3,25. Given the requirement for land clearing, the practice is currently quite harmful to the biodiversity equilibrium. Except for economic potential, each criterion is given stronger disruption examination. Basically, the enormous number of new foreign visitors and anthropogenic activities can provide a business opportunity as well as a work chance.

Mining activities are a multi-decade project. The longer the project runs, the greater the capacity disruption, the greater the dangers and repercussions, endangering the environment's balance and biodiversity, and making it subject to conflict. Changes in the landscape in mining areas can also lead to conflicts between indigenous peoples and the surrounding communities. waste generated by mining is not limited to mining areas, but can affect other areas. Mining operation yielded a result of 4,125. This activity is considered to have a strong impact on environment. However, this might potentially benefit indigenous peoples' livelihoods.

With a score of 4.75, post-mining operations are the activities that have the greatest impact on environmental conditions and equilibrium. Unlike other activities that benefit the economy with the growth of new potentials, post-mining site is mostly not treated as it should be so that the condition of the land is neglected. This evaluation value is quite far from the results of a comprehensive mining planning evaluation that resulted to a score of 3,25. Mining with a comprehensive planning still very much harmful to biodiversity, but the other criteria is not as damaged as much. It is quite fair considering a huge project is not fatal to the environment.

The assessment that has been carried out has produced results that are in accordance with the case study above. Mining operations that occur are always exploitative, thus endangering the local ecology and affecting the social life of indigenous peoples. To reduce the effects of mining operations, a substantial effort is required.

Reclamation must be done post mining activity. It is a complicated procedure as each physical, chemical, and

biological process in the soil must be managed individually to make sure every property is restored. Reclamation of mining sites by closing mine pit without restoring the soil to its initial condition yields in the destruction of the soil physical properties. Damaged soil properties affect land conditions where land state is prone to changes in climate cycles. As mentioned before, land reclamation is difficult and has many barriers such as soil compaction, low soil pH, decreased number of good microorganisms and heavy metal contamination in the soil (Drakel *et al.*, 2021).

The absence of mining will certainly not disrupt the ecosystem's balance, given that indigenous peoples do not engage in extreme environmental activities. However, they may not get the chance to open additional livelihood to help their economy. The mine's opening, however, had little impact on the indigenous people's economy. Certainly, the opening of mines benefits some community organizations. However, the majority of people are not positively impacted.

The benefits received by indigenous peoples are not comparable to the use of these resources. Ex-mining land rehabilitation and revegetation are not inexpensive. The state's economic gains are insufficient to compensate for many people's ecological losses. Because of the interconnectedness of environmental circumstances, damage in one region might have an impact on the balance of other places. Finally, the country will suffer as a result of the high number of deteriorated habitats.

In Government Regulation Number 78 of 2010 concerning Reclamation and Mining Closing, that the reclamation plan includes:

- land use before and after the mine;
- land clearing plan;
- The program reclaiming disturbed, and land mined by land outside the former mining that is temporary and permanent;
- Criteria for the Standards including standards for land regulation, civil work, and finishing; and
- The reclamation plan consists of direct costs and indirect costs.

(Herdiansyah *et al.*, 2018)

The integrated attention to social, cultural, economic, and ecological elements during and beyond the project's expected duration is required by the sustainability-centred environmental assessment. The need for a broad agenda and a

priority on long-term advantages offered a solid foundation for successful dispute resolution, and it had a significant impact on project development, approval criteria, associated commitments, and implementation monitoring plans.

Environmental assessments might be an essential tool for comprehensive and critical review of prospective enterprises in plenty of other countries. They are usually the most easy and accessible empowered social platforms for significant project-related discussion. Such a comprehensive evaluation is both practical and important for a thorough examination and weighing of the relevant goals, options, issues, and possibilities. The instance also demonstrates the importance of focusing on long-term outcome, not merely harm avoidance reliability, but also the sustainability of gains and the chances for bridge to endless opportunities.

Power measurements may be useful in resolving conflicts amongst indigenous peoples and mining companies. This was especially important for the local people, who are frequently the least powerful in such decisions. As a result, their concerns had to be taken seriously, and they had to be involved in the project's deliberations and negotiations (Gibson, 2006).

The nickel-based industry actually has to face continuous challenges, such as nickel's minimal contribution to the national economy, which was roughly 0.096 percent in 2016. The issue stems from the Indonesian nickel industry's structure. As a result, the domestic nickel supply chain has less-than-ideal links. A lot of nickel ore was shipped before the policy of increasing added value was implemented. Meanwhile, for their manufacturing activities, the current industrial company group imports nickel-based raw materials. Furthermore, the quantity of finished items imported to suit the needs of the domestic market is relatively considerable. Although Indonesia is the world's largest producer of nickel, it is not the world's largest producer of processed nickel because Indonesian products are exported as raw materials. Because of the lack of nickel-based industrialisation (middle/downstream sector), other nations benefit from the added value of this commodity. The government subsequently took steps to halt mineral ore exports, which was regarded necessary since it might boost the value of mining goods, state revenues, and labour, as well as provide raw materials for intermediate and downstream businesses (Suherman and Saleh, 2018).

Mining in Indonesia, which is intended to boost the country's economy, has yet to reach the surrounding communities, particularly on Halmahera Island. Encounters between Indigenous Peoples and the Mining Industry, on the whole, result in native land owners losing their rights and new forms of impoverishment being inflicted on already poor people. This new poverty is the inability to minimize or mitigate the risk of destitution that comes with firm mining development. Land loss, short - run and long health consequences, restrictions on access to public goods, homelessness, financial strain, social disintegration, food shortages, failure of civil and human rights, and spiritual ambiguity are all issues that indigenous people face. At the very least, every nickel industrial chain must prioritize the utilization of local content for labour, goods, and services, as outlined in Law No. 4 of 2009 Article 106 and Government Regulation Number 23 Articles 86 to 88.

The Tabaru indigenous people have traditional knowledge that is practiced in their daily life. Plantation and forest products are used to provide their fundamental necessities in their traditional way of life. Their economic and cultural requirements are dependent on natural resources. On Halmahera Island, the indigenous Tabaru people has local

wisdom on the ethics of natural resource conservation, particularly plant conservation, through religious-based cultural control. The employment of horticultural procedures that affect crop protection, plant disease prevention, and crop production is known as cultural control. This endeavour attempts to improve plant pest and disease resistance as well as fruit output. The Sasi method is one of many practices done by the Tabaru people. The Sasi approach has conservation value since it protects, uses, and manages religious-based flora. People believe that if they plant Sasi in their gardens, God will protect them, boost their yields, and decrease disease threats. Sasi, on the other hand, has a restriction against harvesting for personal or collective gain. If someone is caught collecting the crop from Sasi's plantation on purpose, they will be unwell because they have broken the pledge that was agreed upon (Henie et al., 2019).

Other tribe, called The Tobelo Dalam (Togutil) tribe from Halmahera Island has several local wisdoms that have been passed down by their ancestors from generation to generation, called Ngonyeoko and Magilio Ruku or forbidden forest, utilization forest area (Mialolingiri), and river forest area. The forbidden woodland region (taboo) is thought to be a sacred environment that the local population should not harm. The villagers believe that the wooded area contains a mysterious energy. As a result, locals should avoid passing through the forest since they may become ill or even die. The only method to get access to the restricted woodland zone is to conduct the Homaliloa ritual. This ritual is performed to seek direction on welfare by spelling out the letters in the local language: *eh nenanga mima doyanga o ka nia-nia ngongaha ka, ne dia donongoho ho uha ni mi tigi-tigi deo uha mi gagawa ma*, which translates to "We are an inheritance-You, we ask You not to bother us". The forbidden forest is a large area that serves as a life support system.

The Tobelo Dalam (Togutil) tribe uses the utilization forest region (Mialolingiri) to suit their daily needs. Cultivation, hunting, and gathering are among the activities allowed in this zone. The location provides various benefits to the Tobelo Dalam (Togutil) Tribe's people and encourages them to use it appropriately. Utilization zones serve as economic resources that meet fundamental human requirements while also enhancing welfare. The Tobelo Dalam (Togutil) indigenous people have mostly settled, but some have relocated. This nomadic life makes them gain knowledge related to lifestyle to survive in the forest. The purpose of nomadic life is to avoid consumptive behaviour and a modern lifestyle that tends to be materialistic so as to maintain the balance of forest resources. Authoritative informants in this study stated that by living a nomadic life, they can apply nomadic attitudes such as hunting and utilizing plants as needed. This remote community considers that they are part of the forest and that gives them the right to protect and use the forest. This tradition is kept for the benefit of forest sustainability, i.e., reducing the future impact of climate change. Nomadic people relocate to other locations within the same area when the quantity of animals in an area decline. The length of their stay is determined by the available resources. The outcomes of these hunts are shared with the rest of the community. Because forests play a vital role in the ecological system, forests are an inseparable component of the Tobelo Dalam (Togutil) people's lives.

For the Tobelo Dalam (Togutil) people, the river forest is very important. The river flow is regulated by the wooded area surrounding the river. This tribe like to build buildings near the river because it is a good location for activities like fishing and washing. The state of the watershed is a priority that must be

safeguarded. The primary goal of river management is to maximize the resource's long-term value while avoiding future harm to the local environment. This isolated community protects the forest by planting trees. The Tobelo Dalam (Togutil) tribe's reforestation project tries to minimize erosion by carpeting the ground with bushes. Cropping patterns, bold cropping patterns, row cropping patterns, and shielding channels can all be used to accomplish this. Reforestation is also carried out in watersheds to reforest key forests. Reforestation's major activity is planting trees in the forest to maximize forest cover and offer advantages to the Tobelo Dalam (Togutil) Tribe community, ensuring that forest functions and community requirements are in sync. It is intended that the Tobelo Dalam (Togutil) people's reforestation efforts may help to mitigate local, national, and global climate change.

The Tobelo Dalam (Togutil) Tribe also reforests woodlands that have been abused. The replanting was done with the help of the East Halmahera Government and the North Maluku Natural Resources Conservation Center, which organized a group of farmers. Maku Tuda and Oga Raga are two farmer groups. Farmers' jobs include providing seeds, caring for seeds, and reforesting crucial areas. This is done in a specific order to keep the forest stable. The used forest area is preserved for society's purposes since people consider the forest to be their home (Tamalene *et al.*, 2015). The Aketajawe-Lolobata National Park on Halmahera island was established in 2004 and now protects an estimated 9.4 percent of the island's terrestrial terrain. Even protected areas like the NP, however, are threatened by unlawful invasion and logging (M. Abdo, unpublished data), and unprotected woods are threatened by mining and conversion to agriculture or plantations (M. Abdo, unpublished data). Conservation-relevant information is desperately needed in Maluku to help reduce these threats to biodiversity (Abdo, 2017). This also proves that there are many parties that lack on the sustainable development vision. Also, the follow up action from the local government might not be strong enough to protect the biodiversity in Halmahera.

These local wisdom examples prove that many of the indigenous peoples are closely related and dependent on nature. The influx of people, lifestyles and foreign activities that greatly change the landscape and restrict the living space of indigenous peoples will suppress the sustainability of indigenous peoples' lives.

The far more important long-term threats from mining are those that jeopardize indigenous peoples' rights to their customs and traditions, as well as degrade indigenous "wealth" and well-being. Non-indigenous shareholders are unconcerned about or ignorant about indigenous prosperity. 'Wealth' among indigenous peoples is not expressed in monetary terms and cents. It can be found in their social and environmental perceptions of their surroundings, as well as in behaviours that have proven useful in preserving their cultures and lifestyles across centuries. Income from conventional sources, availability to public goods, sustainable livelihoods, social coherence, spiritual assurance, and mutual help in situations of need are all examples of indigenous riches. When a group is challenged with mining-related relocation or displacement, dangers to wealth are dramatically magnified. Indigenous peoples do not forfeit control over the situation as a result of an encounter, but rather better their wellbeing and have their collective wealth increased.

Indigenous peoples and mining companies should have a good relation. There should be no discrimination against any group. Miners must also be conscious that the higher the

environmental exploitation, the faster the available resources will deplete. Essentially, an agreement can be reached to reduce the amount of inequity. Mining has the potential to encourage indigenous peoples by:

- a) enabling them to achieve their objectives,
- b) reducing poverty and ensuring communal and individual comforts,
- c) providing access to training and labour, and
- d) gains from the project are shared.

(Downing *et al.*, 2002)

One of the responsibilities that the firm must fulfil is Corporate Social Responsibility (CSR). In Indonesia, CSR is strictly regulated by Law Number 40 of 2007 on Limited Liability Companies, Law Number 25 of 2007 on Investment, and Minister of State-Owned Enterprises Regulation Number PER-5/MBU/2007 on the State-Owned Enterprises Partnership Program with Small Enterprises and Environmental Development Programs. Law Number 4 of 2009, also known as the Minerba Law, as stipulated in Article 108 paragraph (1) using the term development and community empowerment program; Law Number 13 of 2011 in Article 36 paragraph (1) and (2), which contains the funds set aside by the company for dealing with the poor; Government Regulation Number 23 of 2010 in Chapter XII concerning the Implementation of Community Development and Empowerment and Government Regulation Number 23 of 2010 in Chapter XII concerning the Implementation of Community Development and Empowerment; Government Regulation Number 47 of 2012 concerning Social and Environmental Responsibility required by Limited Liability Companies. CSR is a commitment to act ethically, lawfully, and to improve the quality of life of employees and their families, as well as local and broad communities (Puspa Kusuma and Ginting, 2021). However, mining corporations have not performed ideally in terms of CSR activities, which is one of the reasons why the government has proceeded to enact local restrictions. There are various indications that can be used to assess the seriousness with which a corporation engages in CSR efforts. First and foremost, not all companies have CSR standard operating procedures (SOP). Second, not all organizations have dedicated CSR departments or divisions, since CSR activities are still handled by the Human Resources Development Division or the Public Relations Division. Third, the corporation does not invest in human resources (HR) that are capable of managing CSR (Yulina and Sobandi, 2020).

The compensation offered by the nickel mining company on the island of Halmahera to the people of Sawai is not in accordance with these international norms and standards. a number of studies related to the evaluation of livelihoods, and an assessment of the cost of replacing agricultural livelihoods released through compensation agreements have been carried out. research shows that despite such studies, compensation agreements do not adequately replace people's livelihoods, nor do they compensate them for the social and economic upheavals associated with the entire life of the project. In addition, the process of making compensation agreements does not comply with this international standard. Indonesia's Public Land Acquisition Law No. 2 of 2012. also reflects these principles, stipulating that compensation to customary land owners must be in the form of replacement land, resettlement or other forms agreed by the relevant indigenous peoples. For instance, the cash price offered to communities in exchange for ceding their rights to agricultural land is not a realistic appraisal of the property's value. The cash compensation figure is generated using the current market value, which is decided

by the corporation using an opaque system involving outside advisors. It disregards the property's value to the firm, including the value of nickel reserves, and instead views the area as nothing more than isolated, forested, semi-agricultural terrain. Even when compensation for mature plants is added, the compensation price remains low (Balaton-Chrimes et al., 2016).

From the cases above, it can be linked to the scoring assessment where pre-mining, mining operation, and post-mining still give a lot of downsides to the indigenous people. Although there are laws and guidelines provided for the companies, the exploitation of resources is still very much on going. This would influence in the climbdown of the efforts given by the other sectors to achieve the SDGs.

Across the SDGs, the mining industry can have both positive and negative effects. Mining can help to boost economic growth by creating good jobs, growing businesses, generating tax revenues, and connecting infrastructure. Many of the minerals mined are also essential components of technology, infrastructure, energy, and agriculture. Mining, on the other hand, has a long history of contributing to many of the issues that the SDGs seek to address, including environmental degradation, population displacement, worsening economic and social inequality, armed conflict, gender-based violence, tax evasion and corruption, increased risk for a variety of health issues, and abuses of human rights. Unwise compensation and fulfilment of obligations by mining companies is contrary to the principles of sustainable development. Whereas mining industry has the ability to positively contribute to the 17 SDGs.

However, stakeholders still fail in implementing sustainable development. In the cases above, it can be seen that economic factors are the priority of mining companies. Damage to ecological functions results in an imbalance of ecosystems and a decrease in the ability of nature to support the lives of indigenous peoples. In addition, mining that does not adhere to the principle of sustainable development also narrows the scope and potential for community economic development. Whereas, there are many ways that mining companies and government stakeholders can pursue to process mines based on the globally agreed principles of sustainable development.

Companies can link their activities with the Sustainable Development Goals. Social inclusion, environmental sustainability, and economic development and good governance are all important aims. Mining may have a tremendous impact on local communities by providing economic and social opportunities. Companies have to support participatory local decision-making processes about mining operations, equitable benefit allocation, and grievance resolution, as well as identify and expand opportunities to strengthen the voice and influence of marginalized groups, including women, to ensure that increased economic opportunities brought by the mines reduce, rather than increase inequality. Mining corporations must allow indigenous peoples to establish new economic opportunities relating to mining operations, associated service providers, or new domestic economy linked with mining, such as recruitment, education, and business development. Mining companies should continue to seek to integrate change into their core businesses and, together with the mining industry as a whole, promote meaningful collaboration, partnerships and discourse with government, civil society, communities and other stakeholders to realize their full potential for contribute to the achievement of sustainable goals (Sonesson, 2016).

4. Conclusion

More and more mining corporations are obtaining nickel to meet the needs of modern society. Nickel is highly useful in satisfying the necessities of contemporary society, but it comes at the price of other community groups, particularly indigenous peoples. The benefits of nickel mining are felt by modern society, mining companies, foreign employees, and the government. In contrast to indigenous peoples, they lose their land, heritage, livelihood, culture, and traditions as a result of declining environmental quality, which is not guaranteed owing to mining land follow-up. Mine establishment has an impact on many facets of life, affecting diverse groups of indigenous peoples. The government has established regulations to regulate mining activities, including post-mining follow-up. Mining corporations, on the other hand, have not fully met their duty to follow up on all affected aspects.

The Sustainable Development Goals have yet to be implemented, despite the fact that they are critical to eliminating current and future conflicts. Local wisdom which is the culture of indigenous peoples in the conservation of ecological functions is now affected by mining operations. Now that the land use changes have altered their land, they can no longer do some of their tradition, as well as to lose their source of livelihood.

The government, which is responsible for regulating and overseeing mining activities, will eventually face a choice between upholding indigenous peoples' rights and favouring the state economy. The mining industry must improve its engagement, partnership, and discussion with other industrial sectors, governments, civil society, and local people to achieve sustainable development.

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