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Good Environmental Governance Regulation in the Mining sector for the Purposes of Sustainable Development

[1]Imamulhadi, [2]Ismail Rumadan*

[1] Faculty of Law, Padjadjaran University, Bandung-Sumedang Street, Km. 21, Bandung 45363. Tel. +62-22 84288827.

[2] National Research and Innovation Agency (BRIN), Sasana Widya Sarwono Building, floor: 2, 3, 4, 5. Jend. Gatot Subroto Street No. 10, Jakarta 12710, Indonesia. Tel:+6225225711 and Faculty of Law Universitas Nasional Jakarta, Sawo Manila Street, Pejaten South Jakarta 12520.

Abstract: The issue at hand in this scholarly article pertains to the state of environmental regulation in the mining sector of Indonesia. In order to promote sustainable development, this research employs both a normative legal approach and an empirical examination of the factual aspects of mining activities that affect the environment. Several mining companies in Indonesia are subject to lax regulations and ineffectual law enforcement, as demonstrated by the results, with regard to pollution and environmental damage. Changes to the labor copyright law and the mineral and coal mining law, which are more concerned with increasing investment in mining for economic gain rather than tightening the regulations requiring mining companies to comply with environmental provisions, will increase the potential for environmental damage. This circumstance demonstrates that Indonesian mining sector regulations are progressively diverging from endeavors to promote sustainable development objectives.

Keywords: regulation, environmental, mining sector, sustainable development.

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1. Introduction

Indonesia possesses abundant mineral deposits, making it one of the countries with significant promise in this area. (Arif Setiawan, 2018). The mining industry in Indonesia is a crucial sector that generates significant revenues. Mineral and coal mines alone contribute about 25% of all government revenues, 20% of exports, and approximately 40% of total foreign direct investment in the mining sector (Yusgiantoro, Purnomo, 2020). The Indonesian government has awarded a significant number of mining business licenses because to the promising potential in this sector (Dedy Lesmana, 2020). By the conclusion of 2021, specifically on Sulawesi Island, the government has officially granted 293 mining permits for the extraction of nickel over the whole Sulawesi region. The source of this information is the Geoportal Ministry of Energy and Mineral Resources, specifically from the year 2021. Nevertheless, it is established that mining exploration licenses that lack proper organization and prioritize excessive commercial gains will adversely affect the environment (Jin LI, et al., 2016). As an illustration, the extraction of nickel on Sulawesi Island has resulted in significant ecological consequences, including the destruction of forests and contamination of seawater. Similarly, the Indonesian government expedites the nickel mining business by issuing borrow-to-use permits for forest regions, including both production and protected forest areas. This practice can hasten the deterioration of forest functions, as stated by Endang Naryono in 2023.

The issuance of large-scale mining exploration licenses, which involve extensive chemical usage and soil dredging, has a significant detrimental effect on environmental degradation and soil integrity (Benidire, 2020). According to the Mining Advocacy Network (Jatam), Indonesia has a minimum of 3,092 unreclaimed mining pits in 2020 (Mining Advocacy Network, 2024). According to the Indonesian Ministry of Forestry,

mining operations are responsible for around 70% of environmental harm in Indonesia. The extractive industry readily contravenes multiple legislative rules, such as Law Number 32 of 2009 on Environmental Management and Protection (PPLH), in pursuit of economic gains derived from mining operations (Kompas, 2022).

Mining activities can cause significant environmental damage, which can negatively affect sustainable development in multiple areas. This damage includes the loss of vital natural resources like deforestation and land degradation, as well as water and air pollution. These consequences disrupt the ecological balance and diminish the availability of resources for future generations. Environmental degradation has adverse economic consequences, such as decreased output in agriculture and fisheries, as well as higher health expenses resulting from diseases linked to contaminated surroundings. The susceptibility to natural catastrophes is also rising as a result of climate change and deforestation, posing a danger to social and economic stability and impeding endeavors towards sustainable development.

The aforementioned criteria demonstrate that excessive exploration and exploitation of mining natural resources are inconsistent with the objective of sustainable development (Agustinus Astono, et.all, 2023), as sustainable development advocates for "responsible production and consumption". This objective clearly highlights the need for prudent extraction, efficient production, controlled consumption, preservation, and effective disposal of end goods, including recycling of trash. Efficient waste management is crucial due to its direct impact on the ecology and overall atmospheric conditions of the Earth (Ganguly & Pandit, 2021).

The rapid environmental damage in mining activities in Indonesia is primarily caused by weak environmental governance regulations in the mining sector. These regulations include the irregular and sporadic granting of mining permits, as well as permits to use forest land for overlapping mining activities. The indiscriminate issuance of mining company licenses (IUP) that do not adhere to proper procedures and legal regulations has resulted in the overlapping of land usage. Government-issued IUPs for mining operations are typically situated within areas designated as conservation and protected forests. According to Nur Farida Ahniar (2017), there are 4.9 million hectares of coal mines in protected forest regions and 1.4 million hectares in conservation forest areas.

The license confusion is worsened by the multitude of mining businesses that lack organization in their administration. The locations provided by firms are ambiguous, and there is a lack of dedication in assigning funding for post-mining restoration. Hence, it is unsurprising that the repercussions of environmental degradation are extensive as a result of inadequate legislation governing mining practices.

Environmental regulation in the mining sector for sustainable development often faces challenges such as the incompatibility between national regulations and international standards, ineffective law enforcement that allows violations to go unpunished, and susceptibility to corrupt practices that can cause harm to the environment and local communities. Hence, a crucial aspect to investigate in this study is the regulatory status of the alignment between interests and environmental preservation in mining operations in Indonesia, with the aim of promoting sustainable development.

2. Theoretical Overview of the Main Concepts

The word "sustainable development" is commonly used in various sectors that pertain to human life. The term originated in the latter half of the 20th century as a response to the rapid economic expansion occurring in numerous countries globally. This growth was sometimes accompanied with excessive and unregulated exploitation of natural resources. Mining activities, which are crucial for supplying essential raw materials and energy to several sectors, are frequently viewed as a significant hazard to the natural environment, causing pollution of the air, water, and land (Escanciano et al., 2010). The discussion surrounding mining activities and their potential for sustainable development (Mudd, G.M., 2010) has emerged as a result of public apprehensions regarding the ongoing environmental deterioration (Hilson, G., Murck, B., 2000). Some potential severe environmental consequences of mining include persistent soil erosion, excessive presence of heavy metals, and the occurrence of acid mine drainage (Hilson, G., Nayee, V., 2002). Thus, a primary obstacle for the industry is to prove that it enhances the welfare of present generations while safeguarding the standard of living for future generations (Azapagic, 2004, Azapagic, A.,

2004).
Today, mining firms are anticipated to react favorably to this challenge by taking on the duty for local and national development. In order to meet these demands and address the compatibility between productive activities and environmental and social protection, it is necessary for them to either adjust existing tactics or adopt new ones. This was highlighted by Claver, E., López, M.D., Molina, J.F., Zaragoza, P. (2004) and Wheeler et al. (2002). Companies are required to adhere to existing legislation and meet the expectations of external stakeholder groups.
According to a literature analysis, the mining sector has increasingly focused on social and environmental concerns since the early 1990s. It has actively tried to include sustainable development difficulties into its main business processes (Hilson and Murck, 2000). Multiple researchers have examined corporate strategies related to sustainable development issues. These researchers include Sinding (1999), Cowell et al. (1999), Warhurst and Noronha (2000), Hilson and Murck (2000), Fonseca (2010, 2011), Dutta et al. (2012), and Hassan and Ibrahim (2012). Furthermore, certain scholars have delineated the favorable consequences of mining operations (Mikesell, 1994; Dutta et al., 2012).
An important counterargument to the mining sector's contribution to sustainable development is that mineral resources are limited and cannot be replenished (Cowell et al., 1999). As a result, future generations will have less opportunities to utilize these resources (WCED, 1987). Furthermore, the primary instances of significant environmental catastrophes that have prompted public apprehension in the last four decades have predominantly taken place inside the mining and petroleum sectors (Warhurst, 2001). Some scholars contend that mining activities exert a substantial influence on both the environment and the nearby communities (Hilson and Murck, 2000;). The primary environmental risks associated with mining operations include alterations to the morphology of exploited areas, as well as the generation of noise, dust, and pollution of surface and groundwater. The combination of occupational diseases and accidents in mining activities has led to a dubious reputation for social responsibility (Lambert, 2001).
Conversely, mining has demonstrated its positive impact on sustainable development through its consideration for the well-being of the country, local community, and cultural preservation (Howitt, 2001). The current environmental discourse focuses on the interplay between corporations and the environment (Banerjee, 2002) on a global and national level. Warhurst (2001) focused on sustainability issues, while Jennings and Zandbergen (1995) examined institutional approaches to sustainability. They analyzed various aspects such as the construction of social and organizational contexts, the assessment of organizational sustainability values, the incorporation of sustainability into regulations, and the adoption of sustainable practices.
Various authors have undertaken case studies on mining businesses in various countries. Macedo et al. (2003) conducted an analysis of the past and present condition of the small-scale non-metallic mining business in Brazil, specifically focusing on environmental practices. In his study, Ghose (2003) conducted an analysis of environmental management strategies within the small-scale mining sector in India. Evangelinos and Oku (2006) conducted a study on the corporate environmental management practices of Greek mining enterprises and the procedures involved in getting a license to operate. Berkel (2007) has established a framework for measuring the efficiency of environmental practices in the Australian mining industry, known as eco-efficiency. Das (2009) conducted a comparative analysis of the environmental and sustainability performance of public and private mining enterprises in India.
Indeed, the literature search reveals that mining corporations have heightened their environmental consciousness and have begun using cleaner production methods and environmental management systems (Zhu et al., 2010). Hilson and Murck (2000) argue that the mining sector has the potential to promote sustainable development by reducing environmental and social effects at every stage of its operation. Gibson (2000) proposes that prompt rectification of any negative affects will improve the reputation of the mining industry. According to Barbara-Sánchez and Atienza-Sahuquillo (2010), implementing environmental strategies that prioritize energy saving, waste reduction, pollution avoidance, recycling, and ecological product design can result in enhanced product quality, decreased manufacturing costs, and access to new markets. In a similar vein, Driussi and Jansz (2006) argue that implementing certain management practices, such as environmental systems, pollution prevention technology, and

environmental training, might enhance organizations' ability to be accountable for environmental matters. It is well recognized that the mining industry has prioritized sustainable development (Cowell et al., 2000), and there have been multiple national and international efforts to create frameworks for sustainable development. As an illustration, the European Union (CEC, 2000) has advocated for goals centered around four overarching pillars, namely environmental protection, economic performance, social welfare and employment, and technical research and development. The Mining Association of Canada (MAC) has created an effort known as "Towards Sustainable Mining (TSM)" with the aim of improving the environmental, social, and economic performance of the sector in order to boost its reputation (Ford, 2005).

The International Council on Mining and Metals (ICMM) has established a set of 10 fundamental principles for excellent practice, which encompass ethical management and sustainable development (ICMM, 2005). Environmental management encompasses a broad spectrum of practices that must be implemented, including both obligatory actions such as the restoration of mining sites and the payment of taxes, as well as voluntary measures like environmental management systems and life cycle evaluations. Nevertheless, various obstacles can hinder the implementation of these practices, including the financial burden of short-term compliance expenses and the limited environmental consciousness among staff members (Nikolaou and Evangelinos, 2010).

Implementing ecologically sustainable strategies (Driussi and Jansz, 2006; Kapelus, 2002) can assist organizations in reducing adverse environmental effects and enhancing their responsibility towards environmental concerns. Several mines worldwide have adopted extensive environmental management systems (Hilson and Nayee, 2002), enabling them to predict and mitigate environmental impacts while also garnering local community support. Other mines have implemented internal codes of conduct and policies. Spanish corporations, particularly the major ones, have implemented ethical and sustainable policies. Additionally, there is a growing trend towards adopting environmentally conscious business practices (Fernández et al., 2005). Environmental sustainability refers to the preservation of natural resources and actions that enhance long-term environmental quality.

3. Methodology

3.1. Overview of the scientific field

The study focuses on obtaining data regarding the areas that have seen the most severe environmental damage due to mining activity in Indonesia, specifically Papua Province and Kalimantan Province. These provinces are known for being the main mining exploration areas in the country.

3.2. Source and Description of Data

The methodology employed includes the juridical-normative approach, as described by Soemitro (1990), as well as library research and desk research. Data and information collection involves searching for three types of legal materials. The first type is primary legal materials, such as laws and regulations, that are directly relevant to the research topic. The second type is secondary legal materials, including books, research findings, journals, scientific magazines, and various forms of media, both in print and online. The third type is tertiary legal materials, which encompass legal dictionaries and encyclopedias. The data gathering strategy employed in this study involved conducting a comprehensive review of relevant literature, including the work of Ibrahim (2006).

3.3. Methodology for analyzing data

This study employs a normative legal methodology, namely legal research that involves analyzing library materials or secondary sources (Soekanto & Mamudji; 1983). Additionally, it utilizes an empirical technique to investigate the factual aspects of mining activities and their environmental consequences. The legal concerns examined pertain to safeguarding environmental interests and promoting sustainable development within the context of Indonesia as a legal state. The primary legal documents were acquired directly from authorized sources and published in the form of law and jurisprudence (Sonata, 2015).

The employed data analysis method is qualitative analysis, which involves interpreting and examining legal laws that have been modified to suit present circumstances or phenomena (Sutopo & Arief, 2019).

Following the acquisition of data, the subsequent phase involves analyzing it using the process of legal interpretation. This entails examining the data and information in relation to the principles and norms of environmental law, both at the national and international levels. This analysis technique examines the existing environmental issues (ius constitutum) and the anticipated optimal framework (ius constituendum) for future environmental conservation.

The problem analysis employs a legal research methodology, wherein it examines the laws of environmental law and mining legislation that contradict the principles and norms of environmental law. Secondly, conduct research on legal systematics pertaining to laws and events associated with environmental legislation and regulations governing mining business licenses. Thirdly, conduct research on the level of vertical and horizontal synchronization, which pertains to institutional coordination in environmental management and regulation of mining activities. The objective is to determine the extent of coordination among relevant institutions in regulating, managing, and enforcing environmental protection.

4. Discussion

4.1. Environmental conservation in mining operations perspective on sustainable development

The word "sustainable development" is commonly used in various sectors that pertain to human life. The term originated in the latter half of the 20th century as a response to the rapid economic expansion occurring in numerous countries globally. This growth was sometimes accompanied with excessive and unregulated exploitation of natural resources. Mining activities, which are crucial for supplying essential raw materials and energy to several sectors, are frequently viewed as a significant hazard to the natural environment, causing pollution of the air, water, and land (Escanciano et al., 2010). The discussion surrounding mining activities and their potential for sustainable development (Mudd, G.M., 2010) has emerged as a result of public apprehensions regarding the ongoing environmental deterioration (Hilson, G., Murck, B., 2000). Some potential severe environmental consequences of mining include persistent soil erosion, excessive presence of heavy metals, and the occurrence of acid mine drainage (Hilson, G., Nayee, V., 2002). Thus, a primary obstacle for the industry is to prove that it enhances the welfare of present generations while safeguarding the standard of living for future generations (Azapagic, 2004, Azapagic, A., 2004).

Today, mining firms are anticipated to react favorably to this challenge by taking on the duty for local and national development. In order to meet these demands and address the compatibility between productive activities and environmental and social protection, it is necessary for them to either adjust existing tactics or adopt new ones. This was highlighted by Claver, E., López, M.D., Molina, J.F., Zaragoza, P. (2004) and Wheeler et al. (2002). Companies are required to adhere to existing legislation and meet the expectations of external stakeholder groups.

According to a literature analysis, the mining sector has increasingly focused on social and environmental concerns since the early 1990s. It has actively tried to include sustainable development difficulties into its main business processes (Hilson and Murck, 2000). Multiple researchers have examined corporate strategies related to sustainable development issues. These researchers include Sinding (1999), Cowell et al. (1999), Warhurst and Noronha (2000), Hilson and Murck (2000), Fonseca (2010, 2011), Dutta et al. (2012), and Hassan and Ibrahim (2012). Furthermore, certain scholars have delineated the favorable consequences of mining operations (Mikesell, 1994; Dutta et al., 2012).

An important counterargument to the mining sector's contribution to sustainable development is that mineral resources are limited and cannot be replenished (Cowell et al., 1999). As a result, future generations will have less opportunities to utilize these resources (WCED, 1987). Furthermore, the primary instances of significant environmental catastrophes that have prompted public apprehension in the last four decades have predominantly taken place inside the mining and petroleum sectors (Warhurst, 2001). Some scholars contend that mining activities exert a substantial influence on both the environment and the nearby communities (Hilson and Murck, 2000;). The primary environmental risks associated with mining operations include alterations to the morphology of exploited areas, as well as the generation of noise, dust, and pollution of surface and groundwater. The combination of occupational diseases and accidents in mining activities has led to a dubious reputation for social responsibility (Lambert, 2001).

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Implementing ecologically sustainable strategies (Driussi and Jansz, 2006; Kapelus, 2002) can assist organizations in reducing adverse environmental effects and enhancing their responsibility towards environmental concerns. Several mines worldwide have adopted extensive environmental management systems (Hilson and Nayee, 2002), enabling them to predict and mitigate environmental impacts while also garnering local community support. Other mines have implemented internal codes of conduct and policies. Spanish corporations, particularly the major ones, have implemented ethical and sustainable policies. Additionally, there is a growing trend towards adopting environmentally conscious business practices

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4.2. Environmental impact statistics pertaining to mining in Indonesia

Undoubtedly, mining operations presently provide the resources essential for the advancement of the nation's economy and significantly contribute to workforce development and the current demand for advanced technology. However, they also pose environmental concerns and the risk of resource depletion, which not only damages and harms the local natural environment but also has the potential to worsen ecological consequences. The following is a factual, empirical description of the environmental impact of mining operations in a number of Indonesian mining regions.

4.2.1. The Debilitating Capacity of PT Freeport Indonesia The tailings Pollution in the Sea Coast and Downstream River of Timika, Papua

Mining frequently generates effluents that contaminate water, endanger aquatic ecosystems, and, if used for domestic purposes, may be hazardous to human health. According to Adolfina Kuum, Alfrete Yosep Pinimet, and Toni Yamame (2021), the improper disposal of PT Freeport's sediments has detrimental health effects on local inhabitants, particularly in the vicinity of the waste disposal area. One member of the impacted indigenous community, citing a story from Amatus, stated, "Children in Pasir Hitam Village are experiencing acute illnesses, including fevers, skin disorders, sudden headaches, cramps in the hands and legs, and appetite loss." "As a consequence, numerous victims perish each day and month."This is due to the fact that we continue to stand and breathe waste air from Freeport tailings, bathe and cleanse in water from the tailings, and stand every day. Frequently, we are compelled to drink rainwater or travel considerable distances to neighboring communities in search of potable water. However, during the dry season, the repercussions are catastrophic as we are compelled to engage in activities that are both hazardous and unavoidable. Adolescents were observed immersing in a river that had been polluted with hazardous waste (Kuum et.al., 2021).

Fish mortality in PT Freeport Indonesia tailings discharge area river Source: Lepemawil, 14 March 2020.

Engel Motatea, an indigenous person impacted in the Mimika Far East District, expressed, "PT Freeport intentionally sows discord among us through this inequitable aid, thereby eradicating any remaining sense of unity among us." The present issue arises from the disposal of tailings at Freeport, where mud damages the propellers of watercraft engines.

Motatea describes the divisive approach as an inequitable allocation of "aid" based on the head of household. Consequently, the community frequently experiences inter-village conflicts. This is the source of discord and hostility between neighboring communities. In no way can what Freeport considers assistance be compared to the devastation and losses they have incurred. Access closures, environmental degradation, and the devastation of river ecosystems are remunerated only with coffee, rice, sugar, and nets distributed erratically every six months.

Strong allegations that PT Freeport Indonesia manipulated its environmental impact assessment document precipitated the aforementioned circumstances. San Afri Awang, Director General of Forestry Planning and Environmental Management at the Ministry of Forestry, stated that mine sediment had seeped into estuaries, forests, and rivers. This, according to Mr. Awang, has not been consolidated in the environmental file for Freeport. "The effect is pervasive." It is necessary to include an Environmental Impact Assessment (EIA) addendum as the subject matter surpasses the boundaries of the authorized domain.

Freeport invited village elites and community leaders to a hotel in Timika in 2020 to discuss the revision of the EIA in an effort to garner support. The truth is that Freeport has been operating mining operations and exploitation on the land of Amungsa Bumi Kamoro in Timika without an environmental permit for the duration of its existence there. The discourse surrounding the EIA was expeditious and failed to adhere to the EIA phase. Consequently, there is substantial suspicion that pollution is manifesting in five additional rivers within Mimika, specifically Ajkwa/Wanogong, Nipan, Sampa, Yamaima, Kopi, and Manarjawe, in addition to the Ajkwa River. (2021; Adolfina Kuum et al.).

4.2.2. The effects of mining operations on biodiversity

Throughout the mining life cycle, from exploration to post-mining transition, significant direct, indirect, and cumulative environmental impacts may result from mining activities. Changes in land use and deforestation, pollution, greenhouse gas emissions, and the inadvertent introduction of invasive species are just a few of the numerous factors that can have an impact on biodiversity. Simply stated, biodiversity refers to the variety of life forms and interactions that exist on Earth. Biodiversity can be conceptualized as the "stock" that ensures human survival and economic well-being by means of the ecosystem services it delivers that is, the beneficial processes through which the environment accommodates human populations. Aware of the function that ecosystem services and biodiversity perform, governments and mining companies are placing a greater emphasis on their conservation and protection.

PT.KPC concession located in Tebangan Lembak village, Bengalon sub-district, East Kutai district. Photo: Iatam: 18 March 2022

The inevitability of mining impacts on biodiversity necessitates careful consideration by governments and communities as they attempt to balance conservation requirements with development priorities. According to a report published on June 24, 2023, Kompas warns that the extraction of coal and nickel may endanger vital biodiversity regions in Kalimantan, Sulawesi, and Maluku (Yoesep Budianto, 2023). According to analyses, mining regions intersect with these areas abundant in biodiversity (Budianto, 2023). Land clearance, topsoil excavation, and overburden removal are mining operations that disrupt ecological processes and have detrimental effects on the surrounding landscape. The degradation of ecological processes possesses the capacity to diminish wildlife habitats and the local biodiversity. Action Ecology and Emancipation of the People (AEER) determined that mining activities on Kalimantan Island present a substantial peril to the island's biodiversity through an analysis of data on both the island's biodiversity and mining operations. Mining operations in the vicinity of wildlife habitats endanger numerous protected species, as designated by the Ministry of Environment and Forestry (KLHK) or the International Union for Conservation of Nature (IUCN). (2022, Aryo Bhawono).

Degradation also threatens a variety of ecosystems that serve as vital habitats for wildlife, including mangrove forests and dryland forests. This peril arises due to the mine site's proximity to critical ecosystems and the habitats of endangered species that sustain both human beings and fauna in the area. Pongo pygmaeus (Bornean orangutan), Sphyrna lewini (hammerhead shark), Helarctos malayanus (sun bear), and Nasalis larvatus (proboscis monkey) are significant species that have been impacted by mining operations in Kalimantan (Aryo Bhawono, 2022).

4.3. Regulations Governing Environmental Management in Mining Operations

Environmental governance in the mining sector of Indonesia pertains to a set of governmental policies, laws, and regulations that dictate the appropriate management of natural resources and environmental

impacts by the mining industry. Ensuring that mining operations are carried out in a responsible, efficient, and sustainable fashion with regard to the environment and society is the primary objective.

With regard to environmental management, mining companies engaged in the exploitation of natural resources that have adverse environmental or social effects are jointly obligated by the environmental protection and management law (UUPPLH) and the mineral and coal law (Minerba Law) to develop and uphold an environmental impact planning document Environmental Impact Assessment (EIA). This document comprises three components: an environmental impact assessment, an environmental management strategy, and an environmental monitoring system. When EIA documents are unnecessary, Environmental Management Efforts (UPL) and Environmental Monitoring Efforts (UKL) documents should be drafted.

As stipulated in Law No. 32/2009 on Environmental Protection (UUPPLH), an environmental impact assessment (EIA) document comprises the outcomes of a scientifically organized and systematically conducted activity study employing a multidisciplinary study approach. Consequently, the study ought to be coherent and comprehensive-integral (integrated-cross-sectoral) in its structure.

The EIA component of the UUPPLH-based licensing system comprises an assessment of the environmental consequences of business and activity design, an examination of the surrounding environment, community input and feedback regarding the aforementioned plans, projections of future impacts, and an evaluation of the extent to which the continued implementation of the activity plan will impede environmental preservation.

In regard to the stipulations mandating the possession of an EIA by any company engaged in natural resource exploration, Article 36, paragraph 1 of the previous Minerba law, Law No. 4/2009 on Minerba, affirms that an EIA is a compulsory document that is indispensable for the acquisition of a Mining Business License. This provision serves as a continuation of the mandate outlined in Article 22, paragraph 1 of the UUPPLH, which stipulates that an EIA document must be attached to any business or initiative that significantly affects the environment.

Additionally, UUPPLH stresses the significant role that the government and regional governments play in regulating EIA-related regulations. The involvement of local governments is intricately linked to the decentralisation policy of governance that ensued following the 1945 Constitutional amendment that transferred to them a portion of the central government's authority, including mining management. Legislation No. 32/2004 on Local Government regulates the authority of local governments and legitimizes their position with regard to the issuance of permits for mining enterprises. Numerous legal products in the form of local regulations have been promulgated since the implementation of this provision in an effort to maximize the utilization of natural resources and regulate the tax and retribution collection mechanism. Generally, the formulation of these regulations is driven solely by the desire to increase regional original revenue through profit maximization, with little regard for the environment that mining activities directly impact.

The legal provisions pertaining to environmental considerations in mining operations are elaborated upon in Government Regulation number 23 of 2010. Environmental considerations are one of the requirements for corporations to obtain exploration and production operation licenses, per Article 23 of PP No. 23 of 2010. In addition, according to Article 26 of PP No. 23 of 2010, the certification of environmental documents in accordance with environmental legislation constitutes environmental criteria (as stated in Article 23). In addition, it is imperative that mining ventures adhere to the legal prerequisites for environmental approval in Indonesia,

a. as stipulated in Law No. 32/2009 on Environmental Protection and Management.
b. an environmental permit regulation issued by the government under number 27/2012.
c. Regulation No. 11/2006 of the Minister of the Environment regarding the categories and activities of investment plans that are subject to EIA.

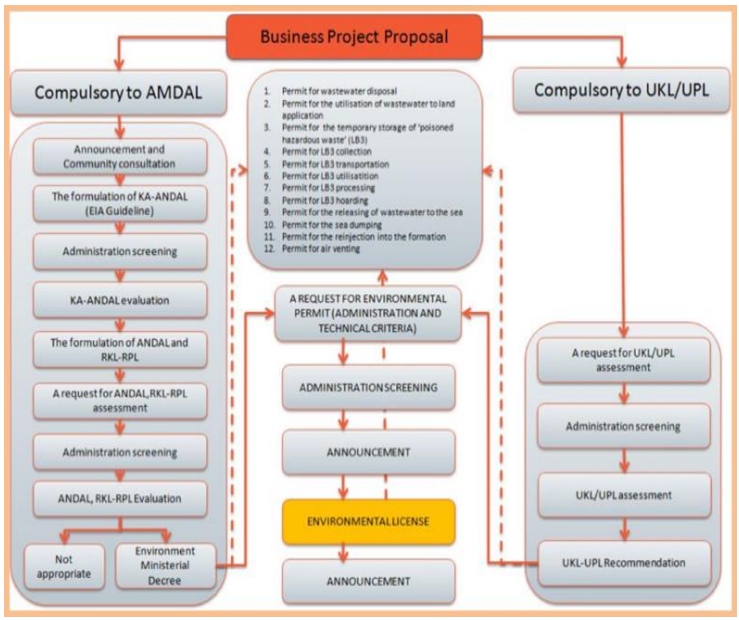
An essential component of the existing environmental certification system in Indonesia is the mandatory acquisition of environmental permits by business entities as a component of the EIA and UKL/UPL procedures. In addition, the acquisition of other pertinent business licenses by the business entity is contingent upon the possession of the environmental permit. Permits for the environment may be issued

by the Regent/Mayor, the Minister of Environment, or the Governor, in accordance with their respective spheres of authority (Wildan Faza Agustian, Fatma Ulfatun Najicha, 2021). Additional factors that warrant consideration regarding the current issuance of environmental permits include the following (Bernadetta Devi and Dody Prayogo, 2013):

a. Compulsory environmental audits: Organizations that are presumed to be non-compliant with environmental regulations and are anticipated to have substantial environmental impacts are obligated to conduct periodic environmental audits. The Minister of the Environment is authorized to conduct the environmental assessment or appoint a third party to do so in the event that the company fails to do so.

b. Fund guarantee: Adherents of environmental permits are obligated to establish an environmental guarantee fund, which shall be utilized for the purpose of environmental restoration and rehabilitation.

Diagram of EIA processes in Indonesia



4.4. Environmental Instrument Weakness in the Revision of Mineral and Coal Law and the Law on Job Creation

Mining companies that conduct mining exploration are subject to stringent legal regulations outlined in UUPPLH No. 32 of 2009 and Mineral and Coal Law No. 4 of 2009 (Minerba Law). However, despite these regulations being extremely stringent, mining companies continue to violate environmental legal norms in practice (WALHI et al., 2022). This was previously discussed in the context of empirical facts concerning the environmental impact of mining in Indonesia. To make matters worse, the revision of Minerba Law No. 3 of 2020 weakened and diminished the rule of law with regard to compliance with environmental interests. The Minerba Law's dilution of environmental instruments designed to prevent and regulate environmental destruction Revision encompasses law enforcement and mining licensing.

Certain provisions within the revised Minerba Law exhibit a propensity for coal exploitation and provide preferential treatment to coal mining corporations. The article discusses, among other things, the provision of tax incentives and facilities for mining companies, the assurance of development contract extensions, the application of loss of environmental carrying capacity criteria in determining the mining business license area, and so forth. Coal will ultimately contribute to climate change and greenhouse gas emissions increases as a result of significant energy investments and effortless licensing processes.

Within the licensing sector, the automatic extension of Special Mining Business licenses (IUPK) is ensured for proprietors of Contracts of Work (KK) and Coal Mining Concession Work Agreements (PKP2B), per the provisions of Article 169 A paragraph (1) of the Minerba Law. Additionally, it is clarified that organizations that have not been granted an extension of the contract or agreement are eligible for a maximum extension of two ten-year periods. Then, for a maximum of ten years, companies that have been granted an extension

of the contract or agreement are assured of another extension.10 This provision specifies that contract licenses of companies whose negligence has been established and which do not engage in reclamation or post-mining operations may still be extended. Despite being in compliance with Article 169A of the Minerba Law, the government offers contract extensions in the form of PKP2B and KK twice for a period of ten years under the guise of bolstering state revenue. The expansion of coal operations by PT Kaltim Prima Coal (PT KPC), PT Arutmin, and PT Kendilo Coal Indonesia exemplifies this point. Regarding PT KPC, it is approximated that the organization abandoned 71 mining pits that have yet to be reclaimed. Furthermore, KPC allegedly contaminated the Bendili River in 2015, resulting in a reduction in clean water production by the regional potable water company. KPC subsequently paid a Rp11.39 billion fine. Furthermore, flooding and devastation were inflicted upon the Bengalon and Sangatta watersheds as a result of these mining operations (WALHI, 2022).

Licensing ought to be incorporated as one of the mechanisms of environmental law. Permits serve as an exception to a legally imposed prohibition (Atmosudirdjo, 1994). This means that while it is technically illegal for anyone to harm the environment, those who obtain a permit are permitted to do so under certain conditions. To safeguard the environment against community activities, environmental licenses are issued by the government (Harsanto Nursadi et al., 2018). However, the improper utilization of the licensing function, which was previously employed to safeguard the environment, has ensued due to the assurance of automatic contract extension. The environment-protecting purpose of licenses will be in direct opposition to the automatic renewal of government-issued licenses, which will ultimately permit environmental devastation in the mining industry.

A further licensing-related issue is the elimination of two criteria that were previously used to establish the Mining Business Licence Area (WIUP). The criteria that were eliminated were the population density and environmental carrying capacity criteria. WIUP is determined solely by national mineral and coal management plans, the availability of data on mineral or coal resources and/or reserves, and area status, in accordance with the Minerba Law. By omitting environmental carrying capacity and including area status in the determination of WIUP, mining exploitation in regions already suitable for legal mining will be legitimized. Nevertheless, when evaluated according to the criterion of environmental carrying capacity, it will prove inadequate to sustain these activities and may even surpass the environment's carrying capacity. Presumably, once an area's bearing capacity has been surpassed, it is no longer intended for further exploitation. This article deviates from the principles of sustainability, which are fundamental to spatial planning and guarantee the continuity and conservation of carrying capacity and environmental capacity. Furthermore, it lacks adherence to the fundamental tenets of sustainability and environmental consciousness at UUPPLH. Thus, it can be asserted that the government does not provide assurances regarding the environmental's sustainability and long-term viability.

By failing to adhere to the principles of environmental sustainability and sustainability, the removal of the environmental carrying capacity criteria in WIUP further violates the sustainable development principle. Carrying capacity for the environment should be a primary concern in development. This is necessary to guarantee the environment's ability to sustain human life (Andri Gunawan Wibisana and Laode M Syarif, ed.) and to preserve the environment's integrity, thereby preventing the degradation of the current ecosystem and securing the standard of living for current and future generations (Syaharani and Muhammad Alfitras Tavares, 2020).

Legislation No. 6 of 2023, which pertains to job creation, is an additional legal standard that undermines environmental instruments in mining operations (Reyhandhi Alfian Muslim and Fatma Ulfatun Najicha, 2022). The Job Creation Law was enacted with the intention of stimulating domestic investment in order to advance the economic growth of Indonesia. Nevertheless, this choice runs counter to endeavors aimed at conserving and preserving environmental functions. The implementation of the Job Creation Law diminishes the significance of environmental permits as a mandatory requirement for mining enterprise licenses. The reason environmental permits are established is because it is unreasonable to expect businesses and activities to voluntarily and intentionally engage in environmental management. The purpose of environmental permits, which are a component of environmental regulations, is to avert the occurrence of externalities. The prevention is subsequently implemented through the imposition of

regulations on all activities that possess the capacity to significantly affect the environment, including but not limited to limitations on the discharge of pollutants and the generation and administration of refuse.
However, with the implementation of the Job Creation Law, the term "environmental permit" is eliminated and replaced with "environmental approval," leaving the business licensing regime with only one permit remaining—the business permit (Andri Gunawan Wibisana, 2017). The aforementioned arrangement diminishes the utility of the Environmental Permit as a regulatory instrument for the environmental management responsibilities of an enterprise, including mining operations, since it is no longer a prerequisite for obtaining a business permit. Furthermore, the Job Creation Law fails to provide an elucidation of the mechanism employed to monitor infringements of environmental impact-causing activities or enterprises. The abolition of the Environmental Permit form also eliminates the public's ability to petition the state administrative court regarding environmentally damaging activities or enterprises.
Drawing from the aforementioned description, one may deduce that the erosion of environmental licensing mechanisms in the Job Creation Law and the new Mining Law does not align with the pursuit of sustainable development in Indonesia's economic recuperation through the investigation of natural resources within the mining industry. This demonstrates that neither the Job Creation Law nor the Minerba Law prioritize environmental sustainability in their regulations. The Minerba Law and Job Creation Law may contain provisions that permit high-carbon enterprises and investments to exploit loopholes, thereby impeding their alignment with emission reduction strategies and the equitable transition to low-carbon development, which is a key component of the sustainable development goals.
As previously elucidated, when considering articles that undermine environmental instruments and articles that facilitate licensing and tax incentives for mining investments, it becomes indisputable that the government continues to prioritize investments in high-carbon fossil fuels. Furthermore, an estimated 250 million forests are being felled annually in order to supply power plants with coal (Adi Ahdiat, 2021). Hence, the ratification of the Job Creation Law and the Minerba Law under the guise of restoring and augmenting national economic growth stands in stark contrast to the steadfast dedication to sustainable development.

4.5. Regulating Good Environmental Governance from the standpoint of sustainable development

It is crucial to incorporate the concept of sustainable development into mining legal frameworks. This is because the mining industry primarily relies on extracting raw materials, which are typically non-renewable resources. The industry operates under specific industrial conditions and is frequently criticized for its adverse environmental effects. Surface mining of minerals often leads to surface deterioration, whereas underground mining operations can result in mining-related damage and disturbances in water management. Further accusations against the mining industry are to the containment of flotation effluents. Critics argue that it is extremely challenging to completely eradicate the environmental consequences of mining activities (Jonek-Kowalska, 2016).
Nevertheless, it is frequently overlooked that mining, from a historical perspective, is one of the first recorded human endeavors, playing a significant role in the advancement and evolution of humanity (Dubiński, 2013). The extraction and utilization of natural resources play a crucial role in shaping the economic and societal progress of nations and civilizations. This significance was explicitly highlighted in the slogan of the 18th World Mining Congress, held in the United States in 2000 - "It all starts with mining." Renowned scientist Max Planck once stated that while mining may not be the exclusive focus, it is an essential component without which everything else loses its significance (Dubiński, 2013).
The statement above indicates that mining is an integral part of human life and civilization, playing a crucial role in the development of a nation. Therefore, it is imperative to establish stringent regulations to ensure that mining operations are managed in a manner that prioritizes the economic interests of the present generation without disregarding the needs of future generations. Hence, it is crucial to establish a transparent, robust, and rigorously enforced legal framework to govern the operations of the mining industry. Robust regulation can effectively ensure that mining methods adhere to the prescribed boundaries in order to safeguard the environment and communities, as well as guarantee long-term economic viability. Additionally, it can contribute to establishing a sense of assurance for mining businesses

and the communities in close proximity. When the rule of law lacks clarity or stringency, mining companies may disregard environmentally sustainable methods in favor of achieving higher economic gains. They may lack incentives to invest in ecologically sustainable technology and strategies or to adhere to stringent environmental regulations.

Effective regulatory frameworks in mining activities encompass meticulous and organized procedures to oversee diverse facets of mining operations. Regulations ought to incorporate stringent environmental criteria, encompassing the monitoring and alleviation of the potential environmental ramifications associated with mining operations. This include the regulation of water and air pollutants, the surveillance of soil quality, and the prevention of soil erosion and land degradation. Furthermore, rules must include the well-being and security of nearby communities by guaranteeing that mining waste does not contaminate the surrounding ecosystem.

Effective mining governance legislation must also have social and economic dimensions, which entail safeguarding the rights of local populations or indigenous peoples to their land and natural resources, as well as ensuring fair distribution of economic advantages derived from mining activity. The enforcement of rules is a crucial aspect in ensuring that mining corporations adhere to specified environmental standards and are held responsible for their conduct. Strong law enforcement is necessary for this purpose. Regulations should include the enduring obligations of mining firms for the restoration of the environment and reclamation efforts once the mine ceases operations. Additionally, appropriate funding mechanisms should be established to support these post-mining reclamation activities. By implementing appropriate regulatory frameworks, mining operations can be carried out in a manner that is both sustainable and responsible, ensuring a harmonious equilibrium between economic, environmental, and social concerns.

The regulation of the mining company licence procedure is an essential measure that must be treated with utmost importance in order to safeguard the natural environment and promote sustainable development. These restrictions must not only guarantee that mining activities do not cause lasting harm to the environment, but also consider the long-term effects on ecosystems and local communities. This law must include Environmental Impact Assessment, waste and emissions control, as well as reclamation and restoration initiatives as essential components. Furthermore, the active participation of the community in the decision-making process and the ongoing assessment of environmental consequences are crucial for guaranteeing the effective execution of this rule. By implementing rigorous punishments and efficient law enforcement, regulations on mining licenses can serve as a crucial tool in upholding a harmonious equilibrium between the demands of the mining sector and the preservation of the natural environment for future progenies.

Various factors must be taken into account when formulating a mining license regulation that promotes sustainable development:

a. Implementation of stringent legislation mandating mining corporations to conduct Environmental Impact Assessments. Mining companies should be mandated to perform a comprehensive environmental impact assessment prior to initiating mining operations. The Environmental Impact Assessment (EIA) should encompass a comprehensive examination of the potential effects on land, air, water, plant and animal life, as well as the surrounding human population in the vicinity of the mining site.

b. Legal regulations pertaining to environmental compensation should provide specific criteria for the inclusion of environmental compensation as an integral component of the mining license application procedure. One way to achieve this is by engaging in activities such as land restoration, the re-establishment of natural ecosystems, or participation in environmental protection programs in the nearby region.

c. Waste and Emissions Management: Regulations should dictate the handling of waste and emissions resulting from mining operations, encompassing solid waste, liquid waste, and gas emissions. Stringent waste and emission management criteria should be enforced to mitigate adverse environmental effects.

d. Technology and Innovation: Allocating resources to cutting-edge technologies and adopting creative methods might effectively reduce the environmental consequences linked to mining activities. This

include advancements in mineral processing methodologies, waste disposal strategies, water reutilization, and energy conservation.

e. Reclamation and Restoration: Regulations should consider the need for reclamation and restoration of areas that have been exploited for mining activities. This include the processes of regrowth of vegetation, rehabilitation of ecosystems, and the reestablishment of habitats for species.

f. Community Involvement: Regulations should guarantee the proactive participation of local communities in the decision-making process concerning mining licenses. Communities should be afforded the chance to express their opinions and concerns regarding the environmental and social ramifications of mining operations.

g. Regulations should include provisions for ongoing monitoring of the environmental effects of mining operations. It is necessary for companies to regularly provide regulatory authorities and communities with updates on the outcomes of their monitoring efforts.

h. Transparency and accountability are essential in the mining industry. Companies must operate in a transparent manner and take responsibility for their environmental impact. This entails consistently monitoring and reporting on environmental indicators, adhering to regulatory obligations, and participating in third-party audits and evaluations.

i. Implementing long-term planning and adaptive management strategies can enable mining operations to effectively respond to evolving environmental conditions and community expectations. This may need regular evaluation and modification of environmental management strategies, using monitoring data and input from stakeholders.

j. Collaboration and partnerships are crucial in addressing the many environmental concerns linked to mining. This involves working together among government agencies, industry stakeholders, civil society organizations, and academic institutions. Through the integration of resources, knowledge, and views, stakeholders can collaborate in order to cultivate inventive solutions and exemplify optimal methods.

k. Sanctions and enforcement: Regulations ought to enforce stringent penalties for firms that breach environmental stipulations outlined in mining licenses. Stringent law enforcement is needed to guarantee adherence to environmental standards.

By incorporating these elements into mining license requirements, the government may guarantee that mining operations not only function securely and conscientiously, but also make a positive impact on development. By implementing a comprehensive strategy that encompasses adherence to regulations, advancements in technology, active involvement with the community, and careful long-term planning, mining operations can effectively reduce their negative impact on the environment and actively promote the welfare of current generations. This approach also ensures a sustainable future that prioritizes the requirements of the environment and local communities.

5. Synopsis of the Main Research Outcomes

Mining plays an essential role in supplying raw materials and energy but also poses significant environmental hazards, such as air, water, and land pollution. The discourse on mining and sustainable development emerged as concerns about environmental degradation increased. Key issues related to mining include soil erosion, heavy metal contamination, and acid mine drainage. To balance resource extraction with environmental preservation, mining companies are encouraged to adopt sustainable practices. Sustainable development in mining emphasizes the importance of productive activities coexisting with environmental and social protection. Mining companies are now expected to address these issues in their operations, and since the 1990s, the sector has increasingly focused on them. However, there are challenges and criticisms that mineral resources are finite, raising concerns about their availability for future generations. Additionally, environmental disasters linked to mining have heightened public concerns, including accidents and pollution affecting ecosystems and local communities.

Several mining companies have started adopting environmental management systems, focusing on reducing environmental impacts at every stage of operation. Some have introduced eco-efficiency measures and sustainable policies that improve product quality and reduce costs. Efforts such as the International Council on Mining and Metals (ICMM) principles for ethical management are designed to

promote sustainable development. Case studies from various countries like Brazil, India, Greece, and Australia show that mining companies are becoming more environmentally aware, implementing cleaner production methods, and striving to mitigate environmental impacts.

In Indonesia, mining, particularly by PT Freeport Indonesia, has had serious environmental consequences, such as pollution from tailings in coastal and river areas. Local communities have experienced health problems, including skin disorders and fevers due to contamination, as well as facing environmental degradation, social discord, and conflicts over aid distribution. Some mines have successfully implemented comprehensive environmental management systems, helping to predict and reduce environmental damage while gaining community support. The mining industry is also moving toward recycling, energy conservation, and pollution prevention to enhance sustainability. Overall, the mining sector faces significant challenges in proving its contributions to sustainable development, but with the adoption of sustainable practices and eco-efficiency strategies, there is potential for mining to align with long-term environmental preservation and community well-being.

6. Conclusions

The absence of stringent regulations and efficient law enforcement is a significant factor that contributes to environmental degradation caused by mining companies in Indonesia. This issue is further exacerbated by the recent amendment of two legal statutes, namely the mineral and coal mining law and the labor copyright law, which prioritize economic profit objectives and investment in mining. Several mining firms often neglect their responsibility to adhere to environmental restrictions due to their fixation on pursuing numerous economic advantages through exploiting ambiguous legal regulations and ineffective law enforcement. The absence of rigorous law enforcement or the ambiguity in the regulation.

Furthermore, issues can develop throughout the process of obtaining mining licenses where there is insufficient consideration of the environmental consequences or disregard for the perspectives of local populations directly impacted by the mining activities. This can lead to mining practices that are not conducive to sustainable development and cause harm to the environment and natural resources.

In order to tackle these problems, it is necessary to implement rigorous reforms in the legislation governing mining business licenses and to enforce the law effectively against the mining industry, particularly in relation to environmental compliance and initiatives aimed at promoting sustainable development. Several crucial factors must be carefully examined while developing stringent restrictions. First and foremost, it is imperative to establish stringent legislation that mandate mining corporations to carry out an Environmental Impact Assessment before to commencing any mining operations. The EIA must encompass an assessment of prospective ramifications on the terrestrial, atmospheric, aquatic, botanical, zoological, and human aspects in the vicinity of the mining location. Moreover, rules ought to incorporate environmental compensation prerequisites as a component of the mining permit procedure, encompassing activities like land rehabilitation, reinstatement of indigenous ecosystems, or donations towards environmental safeguard initiatives in the vicinity. Stringent regulations should be implemented to effectively manage waste and control emissions, in order to minimize detrimental effects on the environment. Additionally, the utilization of technology and innovation should be encouraged to mitigate the environmental consequences related with mining.

Additionally, it is crucial to consider the necessity of reclaiming and restoring areas that have been exploited, as well as ensuring the active participation of local populations in decision-making processes pertaining to the plan, process, and post-mining activities. Moreover, the establishment of partnerships among the government, industry, civil society, and academic institutions, along with the implementation of flexible management strategies and strategic planning, can foster a more environmentally sustainable mining sector in Indonesia.

7. Limitations, Implications, and Further Directions of Research

Research on the impacts of mining reveals limitations in the accuracy of environmental data, particularly due to the frequent use of secondary data or self-reported information from mining companies, which can reduce the reliability of the findings. Additionally, studies typically focus on a limited number of case studies, which may not reflect the conditions of small-scale mining around the world. Geographic bias also poses a challenge, as many studies are concentrated in certain regions like Papua and Kalimantan, while the impacts in other regions remain underexplored. Furthermore, most research analyzes short-term impacts without considering long-term effects, including post-mining rehabilitation.

The implications of these findings are broad, particularly in terms of policy and regulation. Governments need to tighten regulations to ensure that mining companies operate in a more environmentally responsible manner. Corporate social responsibility has also become crucial, with mining companies expected to contribute positively to the surrounding communities and environment. Some companies have already implemented sustainable practices and cleaner technologies, which not only have positive environmental effects but also improve efficiency and their business reputation. Public health around mining areas is another major concern, as pollution from mining operations often negatively impacts local populations.

Future research should focus on more comprehensive long-term studies, especially regarding the cumulative impacts of mining and environmental rehabilitation after mine closures. Furthermore, small-scale and artisanal mining needs greater attention, as its contribution to environmental degradation is often overlooked. Technological innovations in environmental management within mining operations also represent an important area for study, with the goal of reducing negative impacts and increasing efficiency. Research centered on local communities, especially indigenous populations, will provide deeper insights into social impacts and the effectiveness of rehabilitation programs. The circular economy model, which emphasizes recycling and waste reduction, also presents a promising direction for aligning mining with global sustainability goals.

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