

The Strengthening Government Policies on Mineral and Coal Mining to Achieve Environmental Sustainability in Indonesia, Africa and Germany

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ABSTRACT

Indonesia has enacted a number of regulations dealing with issues of mining governance, and governance. However, the issuance of these various laws and regulations has resulted in illegal mining crimes resulting in environmental damage. The purpose of this study is to analyze sustainable mining governance policies in Indonesia, Africa and Germany. This research method uses a doctrinal legal approach. Resources have been compiled through an examination of mineral and coal mining laws and regulations, governance and environmental governance regulations, as well as reports from various authorities on the same subject. The results of this study show how Indonesia's previous mining law policies recognized local governments as the authority for licensing and monitoring mining activities. This policy was revoked based on the latest governance regulations and had an impact on the vacancy in monitoring mining activities at the district/city level, as a result of this vacancy there was environmental damage due to illegal mining and bad mining activities so that it was necessary to strengthen government policies in monitoring mineral and coal mining. Mining governance policies in Indonesia, Africa and Germany are currently starting to lead to environmental sustainability.



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1. Introduction

The development policy in the management of natural resources is based on the obligation to preserve the environment and achieve the goals of sustainable development¹. This is especially important in the era of local autonomy where countries have the authority to develop natural resources to attract foreign exchange and local income². Therefore, natural resources should be managed properly to have a long-term local and national economic impact to achieve this objective, it is necessary to implement the mandate outlined in Article 33, paragraph (3) of the 1945 Constitution of Indonesia, which stipulates

¹Umama Begum Ruba and Mohammad Samiul Ahsan Talucder, 'Potentiality of Homestead Agroforestry for Achieving Sustainable Development Goals: Bangladesh Perspectives', *Heliyon*, 9.3 (2023), 1–24 <https://doi.org/10.1016/j.heliyon.2023.e14541>

²Brian Ikaika Klein, 'Mineral Commons: Collective Claims to Territory in the Goldfields of Madagascar', *Political Geography*, 99.102783 (2022), 1–13 <https://doi.org/10.1016/j.polgeo.2022.102783>

that the state is responsible for controlling the earth, water, and other natural resources and using them for the prosperity of the people. Proper management of natural resources has the potential to have a long-lasting and positive impact on local and national economies. One such resource that can be optimized by the local government is mineral and coal mining, which plays a vital role in infrastructure development. As a result, the management of the mining industry must be handled with care, considering the close relationship between the industry and environmental issues such as mineral exploration, exploitation, management, refining, and transportation³. However, the issuance of environmental permits by the government often creates a dilemma as the environmental supervision carried out is suboptimal.⁴

The utilization of mining can have environmental and social impacts that should be considered and evaluated by the Provincial Government. In this scenario, the Provincial Government acts as a representative of the central government's policies towards the optimal utilization of mining. It grants concessions to mining entrepreneurs for the exploration of natural resources⁵. Minerals and coal are non-renewable natural resources found in the earth, and their management must be closely monitored to prevent long-lasting effects. Additionally, transparency must be upheld by disclosing the areas being explored through the publication of Mining Business Permits in Mining Business Permit Areas (MBPA). MBPA regulates the boundaries of mining areas to ensure optimal and thorough monitoring of the activities⁶. Mining supervision is guaranteed by the enactment of Law Number 23 of 2014 concerning Local Government. The Provincial Government is authorized to manage natural resources, especially mining. Provinces have control over mining permits and supervision through the Local Government. However, the new Law Number 3 of 2020 concerning Mineral and Coal Mining states that all permits are centralized⁷.

The persistence of illegal mining remains a significant concern in Indonesia. In the year 2022, the Criminal Investigation Agency received 2,700 reports of illegal mining and, based on information from the Ministry of Energy and Mineral Resources, identified 3,100 individuals as suspects with 2,741 mining activities without permits⁸. This necessitates supervision measures because businesses often ignore environmental problems caused by rock mining activities. The mining activities damage rural road infrastructure due to heavy

³Saija Luukkanen and others, 'Towards Waterless Operations from Mine to Mill', *Minerals Engineering*, 187.107793 (2022), 1–14 <https://doi.org/10.1016/j.mineng.2022.107793>

⁴Jingyi Dai and others, 'Coping with Giant Panda Nature Reserve Protection Dilemmas in China: Social Capital's Role in Forest Conservation', *Global Ecology and Conservation*, 42.e02379 (2023), 1–14 <https://doi.org/10.1016/j.gecco.2023.e02379>

⁵Toni Eerola, 'Corporate Conduct, Commodity and Place: Ongoing Mining and Mineral Exploration Disputes in Finland and Their Implications for the Social License to Operate', *Resources Policy*, 76.102568 (2022), 1–11 <https://doi.org/10.1016/j.resourpol.2022.102568>

⁶Yousef Ghorbani and others, 'Moving towards Deep Underground Mineral Resources: Drivers, Challenges and Potential Solutions', *Resources Policy*, 80.103222 (2023), 1–15 <https://doi.org/10.1016/j.resourpol.2022.103222>

⁷Achmad Sahri and others, 'A Critical Review of Marine Mammal Governance and Protection in Indonesia', *Marine Policy*, 117.103893 (2020), 1–16 <https://doi.org/10.1016/j.marpol.2020.103893>

⁸Katie L. Spencer and others, 'Implications of Large-Scale Infrastructure Development for Biodiversity in Indonesian Borneo', *Science of the Total Environment*, 866.161075 (2023), 1–13 <https://doi.org/10.1016/j.scitotenv.2022.161075>

equipment crossing these rural roads⁹. Furthermore, many accidents are caused due to road damage resulting from mining activities and the threat of landslides around post-mining areas excavated into unsustainable dead land. Health problems also arise due to the effects of dust, fueling complaints among residents that are against the mining activities¹⁰. Mineral and coal mining activities also contravened the mining management laws initiated by business actors. Additionally, there was still low supervision from the community around the area¹¹.

The ideal approach to natural resource management policy is based on the principles of sustainable development, encompassing the economic, ecological, and social integration pillars.¹² Previously, the 2014 Local Government Law recognized local governments as authorized entities for mining management. However, corruption in business licensing, involving both local and private political leaders, has become a pervasive issue.¹³ Currently, the supervision of mineral and coal mining is delegated to the Provincial Government. However, due to variations in the resources owned by each province and the extent of their supervision, the management of mineral and coal mining activities remains suboptimal¹⁴. As reported by the East Kalimantan Mining Advocacy Network (MAN), the continued operation of 151 illegal mines in four regions of East Kalimantan is a cause for concern, leading to growing indifference among local governments as the issuance of mining permits is centralized by the Central Government.¹⁵

Erina Pane and Adam Muhammad Yanis in their previous research Reconstruction of Fair Mining Policies in Lampung Province revealed that the management of mineral and coal mining must be supported by policies that are environmentally sound, because mining activities have the possibility of uncontrolled environmental damage while efforts that can be made by local governments is to pay attention to permits for managers, provide guidance, supervision, so that mining activities can be controlled and not damage the environment¹⁶. Mohammad Jamin and friends while in his research The Impact of Indonesian Mining Industry Regulations on the Protection of Indigenous Peoples revealed

⁹Samuel Nunoo and others, 'Impact of Artisanal Small-Scale (Gold and Diamond) Mining Activities on the Offin, Oda and Pra Rivers in Southern Ghana, West Africa: A Scientific Response to Public Concern', *Heliyon*, 8.12 (2022), e12323 <https://doi.org/10.1016/j.heliyon.2022.e12323>

¹⁰Ferdinand Adu-Baffour, Thomas Daum, and Regina Birner, 'Governance Challenges of Small-Scale Gold Mining in Ghana: Insights from a Process Net-Map Study', *Land Use Policy*, 102.105271 (2021), 1–16 <https://doi.org/10.1016/j.landusepol.2020.105271>

¹¹Tuija Mononen and others, 'Local Governance of the Mining Industry—Five Finnish Examples', *Resources Policy*, 82.103478 (2023), 1–11 <https://doi.org/10.1016/j.resourpol.2023.103478>

¹²Barbara Brenner and Barbara Hartl, 'The Perceived Relationship between Digitalization and Ecological, Economic, and Social Sustainability', *Journal of Cleaner Production*, 315.128128 (2021), 1–12 <https://doi.org/10.1016/j.jclepro.2021.128128>

¹³Lawrence O. Gostin and others, 'The Legal Determinants of Health: Harnessing the Power of Law for Global Health and Sustainable Development', *The Lancet Commissions*, 393.10183 (2019), 1857–1910 [https://doi.org/10.1016/S0140-6736\(19\)30233-8](https://doi.org/10.1016/S0140-6736(19)30233-8)

¹⁴Xiuyun Yang and Qiuping Chen, 'Mining Violations, Rent-Seeking, and Resource Governance in China: Evidence from Central Environmental Protection Inspection', *The Extractive Industries and Society*, 13 (2023), 101218 <https://doi.org/10.1016/j.exis.2023.101218>

¹⁵Pane Erina and Adam Muhammad Yanis, 'Reconstruction of Mining Policies on Justice in Lampung Province', *Bestuur*, 8.2 (2020), 139 <https://doi.org/10.20961/bestuur.v8i2.42830>

¹⁶Erina Pane, 'Reconstruction of Strengthening the Right to Sustainable Groundwater (Assessing Model Policy in Bandar Lampung City)', *Hasanuddin Law Review*, 2.3 (2016), 409 <https://doi.org/10.20956/halrev.v2i3.701>

that the need for mining regulations that reflect the recognition and protection of indigenous peoples' rights by standardizing reclamation and post-mining management is needed to provide implementation guidelines that suit the needs of the community¹⁷. This study aims to analyze regulations for the supervision of mining activities in Indonesia and in comparison with African countries and Germany, mining management must be carried out in layers of supervision starting at the national, provincial, district and even village levels so that loopholes for mining management abuse will be reduced and it is hoped that in the end mining management must prioritize environmental sustainability in accordance with the mandate of the Indonesian constitution. So based on the description above, the authors analyze and reconstruct government policies in supervising coal mineral mining to achieve environmental sustainability

2. Research Method

This research is based on doctrinal legal research on legal theory (concepts, rules, and principles) regarding mining governance in South Africa, Germany and Indonesia. This research is explanatory (explaining the law), hermeneutic (interpretation, argumentation), and evaluative (analyzing whether rules work in certain situations, or whether they are in accordance with the desired moral framework, legal principles, and societal goals) Part of the analysis is related to the research question using the supporting disciplines, namely law and the environment. The author provides a comparison of rules, cases, principles, and the conceptual framework of legal doctrine between South Africa, Germany and Indonesia. This research elaborates the research problem within a theoretical framework using relevant legal data, especially normative and authoritative sources. Normative sources include texts of laws, agreements, general principles of mining and environmental law, and the like. Authoritative sources are in the form of case law and scientific legal writings (literature). This research will be conducted using a problem-based approach: gathering facts, identifying legal issues, analyzing problems to find potential solutions, and arriving at tentative conclusions.

3. Results and Discussion

3.1. Government Policy in Supervision of Mineral and Coal Mining

There are two kinds of law rule state conceptions. The first conception is the law state, a rule concept in the sense of *rechtsstaat*. The second concept is a rule of law state in the sense of *the law rule*. *Rechtsstaat* is known in Continental European states, developed by Immanuel Kant, Paul Laband, Julius Stahl, and Fichte. Meanwhile, the rule of law in Anglo-Saxon states are pioneered by A.V. Dicey in England¹⁸. Julius Stahl stated that the rule of law should have four foundations. These include the protection of human rights, division of power, government based on legislation, and a state administrative court. A rule of law in the sense of *the law rule* should have at least three characteristics. The necessary characteristics include the upholding of the *law supremacy*, *equality before the law*, as well as guarantees and self-protection mechanisms for *due process of law* rights¹⁹. According to

¹⁷Mohammad Jamin, Abdul Kadir Jaelani, and Reza Octavia Kusumaningtyas, 'The Impact of Indonesia ' s Mining Industry Regulation on the Protection of Indigenous Peoples', *Hasanuddin Law Review*, 1.1 (2023), 88–105 <https://doi.org/10.20956/halrev.v9i1.4033>

¹⁸Khudzaifah Dimiyati and others, 'Indonesia as a Legal Welfare State: A Prophetic-Transcendental Basis', *Heliyon*, 7.8 (2021), e07865 <https://doi.org/10.1016/j.heliyon.2021.e07865>

¹⁹Blaise Kuemlengan and others, 'Enforcement Approaches against Illegal Fishing in National Fisheries Legislation', *Marine Policy*, 149.105514 (2023), 1–12 <https://doi.org/10.1016/j.marpol.2023.105514>

William G. Andrews, the pillars of constitutionalism as a rule of law state includes agreement on common goals or ideals, the rule of law as the foundation of government or state administration, the form of institutions, and state administrative procedures.²⁰ Law Number 23 of 2014 concerning Local Government states that Government affairs are implemented by the Local Government and the Local People's Representative Council. This is based on the principle of autonomy and co-administration of the Indonesia Unitary State as referred to in the Law of Indonesia.

Government Supervision of Mineral and Coal Mining is regulated in the Constitution, Laws, Government, Ministerial, Local, and Governor Regulations. Article 20A (1) of the 1945 Constitution states that the People's Representative Council has legislative, budgetary, and supervisory functions. Moreover, in Article 22D (3) The Local Representatives Council supervises the laws regarding local autonomy as well as regional formation, expansion, and merging. It also supervises central and local relations, management of natural and economic resources, state revenue and expenditure budget, taxes, education, and religion. The supervision results are conveyed to the People's Representative Council for consideration. Article 28H (1) states that everyone has the right to live in physical and spiritual prosperity. Also, everyone has the right to a place to live, a good and healthy environment, and health services. Article 33 (2) highlights the production sectors important for the state and affecting the livelihood of the people controlled by the state. (3) Earth, water, and the natural wealth contained therein shall be controlled by the state and used for people's prosperity. (4) The national economy is organized based on democracy, togetherness, fair efficiency, sustainability, environmental perspective, and independence. Additionally, this democracy ensures a balance of progress and national economic unity.

Law Number 4 of 2009 concerning Mineral and Coal Mining regulates the supervisory authority in Article 6 (f) Granting Mining Business Permits (IUP), coaching, community conflict resolution, and supervision of mining businesses in cross-provincial areas and sea areas of more than 12 miles from the coastline. (g) Granting of IUP, guidance, resolution of community conflicts, and supervision of mining businesses in cross-provincial areas and sea areas more than 12 miles from the coastline. (h) Granting of IUP, guidance, resolution of community conflicts, and supervision of production operations mining business with a direct environmental impact across provinces and sea areas of more than 12 miles from the coastline. (r) Guidance and supervision of post-mining land reclamation.²¹

Law Number 4 of 2009 concerning Mineral and Coal Mining stipulates supervisory authority by the Provincial Government in Article 7 (1) (b) Granting IUP, coaching, community conflict resolution, and supervision of mining business across districts, cities, and sea areas of 4-12 miles. (c) Granting of IUP, guidance, resolution of community conflicts, and supervision of production operation mining businesses in districts, cities, and sea areas of 4-12 miles. (d) Granting of IUP, guidance, resolution of community conflicts, and supervision of mining businesses that have direct environmental impacts across districts, cities, and sea areas of 4-12 miles. (j) Coordinating licensing and monitoring the

²⁰Tja Suntana and Tedi Priatna, 'Four Obstacles to the Quality of Constitutional Law Learning in Indonesia', *Heliyon*, 9.1 (2023), 1–8 <https://doi.org/10.1016/j.heliyon.2023.e12824>

²¹Budiman and Abdul Kadir, 'The Policy of Sustainable Waste Management Towards Sustainable Development Goals', *Journal of Human Rights, Culture and Legal System*, 3.1 (2023), 70–94 <https://doi.org/https://doi.org/10.53955/jhcls.v3i1.73>

use of explosives in mining areas according to their authority. (m) Fostering and supervising post-mining land reclamation. Furthermore, the supervisory authority possessed by the District and Cities Government in Article 8 of Law Number 4 of 2009 concerning Mineral and Coal Mining was canceled based on Law Number 23 of 2014 concerning Local Government.

Law Number 33 of 2009 concerning the Protection and Management of the Environment regulates supervision in Article 71, (1) Ministers, Governors, Regents, or Mayors should supervise the compliance of those in charge of businesses and activities. This is based on laws and regulations regarding environmental protection and management. (2) Ministers, Governors, Regents, or Mayors could delegate their authority to supervise technical officials or agencies responsible for environmental protection and management. (3) In carrying out supervision, the Ministers, Governors, Regents, or Mayors determines an official for environmental supervision. Moreover, Article 72 states that Ministers, Governors, Regents, or Mayors should supervise the compliance of those in charge of businesses and activities with environmental permits. In Law Number 33 of 2009 concerning the Protection and Management of the Environment, Article 74 (1) stated that the environmental supervisor referred to in Article 71 paragraph (3) is authorized to a) monitor, b) ask for information, c) make copies of documents and necessary notes, d) enter a certain place, e) conduct photography, f) make audio-visual recordings, g) take samples, h) check equipment, i) check the installation and transportation means, and j) stop certain violations. (2) Environmental supervisory officials coordinate with civil servant investigators. (3) The person in charge of a business or activity cannot obstruct an environmental supervisory official's duties.²²

Law Number 23 of 2014 concerning Local Government states in Article 8 (1) that guidance and supervision by the Central Government referred to in Article 7 paragraph (1) regarding the implementation of Government Affairs by Local Provinces is performed by Ministers or heads of non-ministerial government agencies. (2) Guidance and supervision by the Central Government referred to in Article 7 paragraph (1) on the implementation of Local Government Affairs by district/cities is conducted by the Governor representing the Central Government. Article 373 (1) states that the Central Government shall guide and supervise the implementation of provincial Local Government. (2) The Governor as the representative of the Central Government guides and supervises the district and city Local Government implementation. Furthermore, the Appendix to Law Number 23 of 2014 concerning Local Government Concurrent Division of Governmental Affairs between Central and Provincial Governments, and Local Regency or Cities, Distribution of Government Affairs in the Energy and Mineral Resources Sector, Mineral and Coal Sector states that no supervision authority is exercised by the Government Regency or City area.²³

Law Number 3 of 2020 on Amendments to Law Number 4 of 2009 concerning Mineral and Coal Mining states in Article 1 (1) that the activity stages in research, management, and exploitation of minerals or coal include general investigations, exploration, feasibility

²²Paul Atagamen, 'Environmental Hazard : The Legal Issues Concerning Environmental Justice in Nigeria', *Journal of Human Rights, Culture and Legal System*, 3.1 (2023), 17–32 <https://doi.org/https://doi.org/10.53955/jhcls.v3i1.60>

²³Daniar Supriadi, 'The Regulation of Personal and Non-Personal Data in the Context of Big Data', *Journal of Human Rights, Culture and Legal System*, 3.January (2017), 33–69 <https://doi.org/https://doi.org/10.53955/jhcls.v3i1.71>

research, construction, mining, processing, refining, transportation, sales, and post-mining. In the old Law of 2009 concerning Mineral and Coal Mining, Article 1 (29) referred to a mining area (WP) is a region with mineral or coal potential. The area is not bound by government administrative restrictions and is part of the national spatial planning. Article 1 (32) of Law Number 4 of 2009 concerning Minerals and Coal states that WPR is part of the WP where mining business activities are carried out. Moreover, Article 1 (6) explains that a mining business is a mineral or coal exploitation activity encompassing investigation, exploration, feasibility research, construction, mining, processing, refining, transportation, sales, and post-mining. Law Number 3 of 2020 on amendments to Law Number 4 of 2009 concerning Mineral and Coal Mining divides the mining business into Mineral mining and Coal mining. Mineral Mining is classified into 1) Radioactive, including Radium, Thorium, and Uranium, 2) Metals, such as Gold and Copper, 3) Non-Metals such as Bars and bentonite, and 4) Rock, including Andesite, Clay, Urug Soil, Excavated Gravel, and Urug Sand.²⁴

Law Number 11 of 2020 concerning Job Creation in Article 162 states that people obstructing the activities of IUP holders, Special, People's, or Rock Mining Permits that meet the requirements in Article 86F (b) and 136 paragraph (21) shall be imprisoned for one year or fined 100,000,000.00 IDR. This means that Article 162 could reduce community participation and concern about mining in the surrounding environment. Government Regulation Number 55 of 2010 concerning Guidance and Supervision of the Mineral and Coal Mining Business Management Implementation regulates supervision in Article 13 (1). This article states that the Minister shall supervise the mining business management conducted by provincial and regency or city governments. Furthermore, Article 13 (2) states that Ministers, Governors, Regents, or Mayors shall supervise the implementation of mining business activities performed by IUP, IPR, or IUPK holders. Article 36 (1) reads that the Mining Inspector conducts supervision through a) Evaluating periodic or occasional reports, b) Periodic inspection or at any time, and c) Assessing the implementation of programs and activities. The authority for supervision by the district or city government was withdrawn from the local to the Provincial Government.²⁵

Government Regulation of Indonesia Number 22 of 2021 concerning the Implementation of Environmental Protection and Management in Article 272 regulates the control of environmental damage. Letter (h) is related to land resulting from mining business and activities. Paragraph (5) states that the standard criteria for Environmental Damage referred to in paragraphs 21 (f) to (i) are stipulated in a Ministerial Regulation. Government Regulation Number 96 of 2021 concerning the Implementation of Mineral and Coal Mining Business Activities regulates supervision in Article 150 paragraph (4). This article states that in case of the circumstances referred to in paragraph (2), the suspension is granted based on a) The results of supervision carried out by the Minister, and b) A request from the community. Article 192 reads that the Minister could delegate

²⁴Fatma Ulfatun Najicha and others, 'The Conceptualization of Environmental Administration Law in Environmental Pollution Control', *Journal of Human Rights, Culture and Legal System*, 2.2 (2022), 87–99 <https://doi.org/https://doi.org/10.53955/jhcls.v2i3.55>

²⁵Samuel J. Spiegel and others, 'Phasing Out Mercury? Ecological Economics and Indonesia's Small-Scale Gold Mining Sector', *Ecological Economics*, 144.July 2017 (2018), 1–11 <https://doi.org/10.1016/j.ecolecon.2017.07.025>

the authority to appoint officials responsible for supervising Mining Business activities to Governor as the Central Government representatives.²⁶

Presidential Regulation Number 55 of 2022 concerning the Delegation of Granting Business Permits in the Mineral and Coal Mining Sector regulates supervision in Article 1 paragraph (4). The article reads that Granting Business Permits entails allowing business actors to start and run their businesses or activities accompanied by coaching and supervision in mineral and coal mining. According to Article 2 (1), the delegation includes a) Supervising the delegated Business Licensing. Article 2 paragraph (6) states that the supervision in paragraph (5) (b) is implemented on a) Good Mining engineering principles and b) Mining business governance. Moreover, Article 2 paragraph (9) states that the results of supervision referred to in paragraph (8) violate the good mining techniques and management principles in paragraph (7). The Governor must follow up through a) Coaching or b) Administrative sanctions. Based on Article 2 paragraph (11), the delegation referred to in paragraph (1) cannot be sub-delegated to district or city local governments.²⁷

Article 2 of the Minister of Energy and Mineral Resources Regulation Number 26 of 2018 concerning Implementation of Good Mining Principles and Supervision of Mineral and Coal Mining regulates a) Implementation of good mining principles, b) Supervising the Mining Business management, and c) Supervising the Mining Business activities implementation. In Article 45, the Minister and Governors are authorized to supervise the good mining engineering principles stated in Article 3 paragraph (2) (a), Processing and Purification technical principles in Article 4 paragraph (2) (a), and good mining service business technical principles in Article 5 paragraph (2) (a). Furthermore, Article 50 (8) is related to administrative sanctions stated in paragraphs (1) to (7), including a) written warning, b) temporary suspension of business activities, and c) license revocation. Based on paragraph (9), administrative sanctions referred to in paragraph (8) are given by the Minister or Governor according to their authority.²⁸

Regulation of the Minister of Energy and Mineral Resources Number 7 of 2020 concerning Methods of Granting Areas, Permits, and Reporting on Mineral and Coal Mining Business Activities regulates the supervision in Article 68 (1). This article states that holders of IUP Production Operations for processing and refining must a) prepare and submit the Work Plan and Annual Budget to the Minister or Governor by their authority to obtain approval, b) submit periodic written reports on the Annual Work Plan and Budget and the implementation of Mining business activities conducted, c) obtain approval to use foreign workers from the agency in charge of manpower affairs, d) obtain approval from the approval of the Annual Work Plan and Budget for changes in investment and financing sources, including changes in paid-up and issued capital. According to Article 68

²⁶Delia E. Bruno and others, 'Artisanal and Small-Scale Gold Mining, Meandering Tropical Rivers, and Geological Heritage: Evidence from Brazil and Indonesia', *Science of the Total Environment*, 715 (2020), 136907 <https://doi.org/10.1016/j.scitotenv.2020.136907>

²⁷Bambang Hudayana, Suharko, and A. B. Widyanta, 'Communal Violence as a Strategy for Negotiation: Community Responses to Nickel Mining Industry in Central Sulawesi, Indonesia', *Extractive Industries and Society*, 7.4 (2020), 1547–56 <https://doi.org/10.1016/j.exis.2020.08.012>

²⁸Stephan Bose-o Reilly and others, 'Special Session 13 Preventing Tuberculosis and Lung Disease with Silica Dust Controls: The Case for Primary Prevention Special Session 14 Preventing and Managing Occupational Shoulder Disorders', *Safety and Health at Work*, 13 (2019), S27–28 <https://doi.org/10.1016/j.shaw.2021.12.792>

paragraph (2), the approval of the Annual Work Plan and Budget referred to in paragraphs (1) (a), (b), and (d) is granted after evaluating the mining business activity monitoring results from the previous year.²⁹

Local Regulation of Yogyakarta Number 1 of 2018 Concerning the Management of Metal Mineral, Non-Metal Mineral, and Rock Mining Businesses regulates supervision in Article 104 (1). The article reads that mining business activities are supervised in an integrated manner by a) River Basin Office, b) Mine Inspector, c) the Organization of Local Energy and Mineral Resources, d) Environmental Local Equipment Organization, and e) the Organization of local spatial layout. Local Regulation of Central Sulawesi Province Number 2 of 2018 concerning the Management of Mineral and Coal Mining regulates supervision in Article 5. According to this article, the Authority of the Provincial Government in managing mineral and coal mining is responsible for coordinating permits and supervising usage, and explosives in mining areas, as well as guiding and overseeing reclamation and post-mining.³⁰

Local Regulation of West Kalimantan Province Number 3 of 2018 concerning Mineral Mining states in Article 67 (1) that the Mining Business is managed by the Governor and technically conducted by the Service. Paragraph (2) reads that organizing Mining Business management referred to in (1) requires a) reporting on the organization and execution of Mining Business activities under their authority at least once in six months to the Minister, b) managing Mineral and Coal Mining Business data, and c) preparing and determining a blueprint for community development and empowerment based on the Director General's consideration.³¹

Article 111 paragraph (1) of Local Regulation of South Kalimantan Province Number 5 of 2019 concerning Mineral and Coal Mining Management reads that mineral and coal mining management is supervised and controlled regarding business activities. According to paragraph (2), the supervision and control referred to in paragraph (1) include a) administration of permits related to the mining business, b) mining technical, c) production and marketing, d) finance, e) mineral and coal resource conservation, environmental management, reclamation, and post-mining, f) occupational safety as well as health and mining operations, g) use of goods and services, mastery, development, and application of technology, as well as domestic engineering and design capabilities, h) mineral and coal data management, I) mining technical manpower development, j) local community development and empowerment, k) other mining business activities that concern the public interest, and l) quantity, type, and quality of mining business results. Paragraph (3) states that supervision is performed by Local Devices responsible for mineral and coal mining affairs, while (4) reads that technical supervision is implemented by the Mining Inspector and mine supervisor appointed by the Governor. Additionally, paragraph (5) stipulates that

²⁹M Mansyur and others, 'Business Continuity amidst COVID-19 Pandemic, Experience on Mining Sector in Indonesia', *Safety and Health at Work*, 13 (2022), S26–27 <https://doi.org/10.1016/j.shaw.2021.12.1199>

³⁰Fabricio Maia and others, 'The Need for Technological Improvements in Indonesia's Artisanal Cassiterite Mining Sector', *Extractive Industries and Society*, 6.4 (2019), 1292–1301 <https://doi.org/10.1016/j.exis.2019.07.010>

³¹Matthew Libassi, 'Mining Heterogeneity: Diverse Labor Arrangements in an Indonesian Informal Gold Economy', *Extractive Industries and Society*, 7.3 (2020), 1036–45 <https://doi.org/10.1016/j.exis.2020.06.015>

further provisions regarding the supervision and control stated in paragraph (1) are regulated in a Governor's Regulation.³²

Article 74 (1) of Jambi Province Local Regulation Number 11 of 2019 concerning Mineral and Coal Mining Management states that mineral and coal mining management is supervised regarding the resulting business activities. In the same article, (2) reads that the supervision referred to in paragraph (1) is implemented by supervisory officials appointed by the Governor and Mining Inspector functional officials. Paragraph (3) states that the supervision conducted by the supervisory official referred to in paragraph (2) includes a) marketing, b) finance, c) mineral and coal data management, d) mining technical manpower development, e) local community development and empowerment, f) other mining business activities that concern the public interest, g) IUP management, h) quantity, type, and quality of mining business results, and i) management of post-mining reclamation by the provisions agreed by the initiator in the post-mining management plan document. Furthermore, Article 76 (1) states that the Governor in carrying out affairs under the authority of the provincial region may assign district or city and village local governments based on co-administration. Paragraph (2) reads that the task of assisting the district or city and village local government is regulated by a Governor Regulation.³³

Article 148 (1) of Regulation of Yogyakarta Number 39 of 2022 concerning the Implementation of Mining Business Activities for Metal Minerals, Non-Metal Minerals, Certain Types of Non-Metal Minerals, and Rocks states that the Governor could form a Coordinating Team for Supervision of Business Licensing. This is based on the risk of business permits to supervise the mining sector delegated by the central government. In this integration, the central government comprises a) a technical recommendation provider, b) a permit issuer, c) mining supervision elements, d) law enforcement, e) local government infrastructure policy, and f) governance and the Civil Service Police Unit. Paragraph (2) states that the Coordinating Team for Supervision of Risk-Based Business Licensing referred to in paragraph (1) must coordinate with the Coordinating Team for Supervision of Risk-Based Business Licensing. Additionally, paragraph 3) reads that the establishment of the Risk-Based Business Licensing Supervision Coordinating Team referred to in paragraph (1) is stipulated by Governor Decree.³⁴

3.1. The Strengthening Government Policies in Germany to Achieve Environmental Sustainability

The history of mining in Germany is very long, mining dates back to the 13th century.³⁵ Coal mining in Germany has been a major economic driver in supporting German

³²Maribeth Erb, Adonara Elizabeth Mucek, and Kathryn Robinson, 'Exploring a Social Geology Approach in Eastern Indonesia: What Are Mining Territories?', *Extractive Industries and Society*, 8.1 (2021), 89–103 <https://doi.org/10.1016/j.exis.2020.09.005>

³³Rezki Syahrir, Frances Wall, and Penda Diallo, 'Socio-Economic Impacts and Sustainability of Mining, a Case Study of the Historical Tin Mining in Singkep Island-Indonesia', *Extractive Industries and Society*, 7.4 (2020), 1525–33 <https://doi.org/10.1016/j.exis.2020.07.023>

³⁴Sulista Sulista and Fadhila Achmadi Rosyid, "'The Economic Impact of Tin Mining in Indonesia during an Era of Decentralisation, 2001–2015: A Case Study of Kepulauan Bangka Belitung Province'", *Extractive Industries and Society*, 10.March (2022), 101069 <https://doi.org/10.1016/j.exis.2022.101069>

³⁵Pao Yu Oei, Hanna Brauers, and Philipp Herpich, 'Lessons from Germany's Hard Coal Mining Phase-out: Policies and Transition from 1950 to 2018', *Climate Policy*, 20.8 (2020), 963–79 <https://doi.org/10.1080/14693062.2019.1688636>

industrialization for centuries, coal mining has played an important role in Germany's socio-economic history³⁶. It not only boosted its industrialization but also supported its recovery after World War II³⁷. Mineral resources played an important role in the European economy and the sustainable supply of mineral resources played such an important role that various policies were made for example, mining, development and trade policies, environmental protection, and securing land and mineral wealth for the sustainability of future generations³⁸. The energy transition, decarbonization and the future of manufacturing will not end the import dependence of the German national economy, but will most likely result in a shift in dependence on the rapidly increasing need for new raw materials while domestic resources can contribute to but not fully meet the growing demand³⁹. Germany implements policy instruments suitable for ending coal-fired power generation at minimum cost to achieve national climate targets. Climate change mitigation fuels the complexity demonstrated by the controversial issue of phasing out coal power⁴⁰. Greenhouse gas emissions have been stagnant in Germany despite increasing use of renewable energy. This makes the government's energy transition seem inconsistent and triggers discussions about phasing out coal⁴¹. Germany, Finland, Britain, Portugal and Greece were the first European countries to introduce and develop their own mineral policies. Germany is one of the countries in the world to have set a goal of climate neutrality by or before 2050 in its national legislation, with a particular focus on reducing greenhouse gas emissions in energy, buildings, transport, industry and agriculture⁴². as a pioneer in climate change policy. Coal phasing out of energy sector German Bundestag 2020 creates legal basis for coal phasing out 2038, then revised to 2030 by new coalition government in September 2021⁴³

Germany's Federal Constitutional Court ruled that the 2019 Federal Climate Change Act, which has served as the central climate policy reference point for phasing out coal, should be amended and tightened. framing European climate politics and providing critical discourse analysis of the European Green Deal. The rapid transition to low-carbon development around the world has been contested by discourses that aim to recognize the

³⁶Katja Müller, 'Mining, Time and Protest: Dealing with Waiting in German Coal Mine Planning', *The Extractive Industries and Society*, 6.1 (2019), 1–7 <https://doi.org/10.1016/j.exis.2018.09.001>

³⁷Gustavo Aristizabal-H and others, 'Sustainability of Coal Mining. Is Germany a Post-Mining Model for Colombia?', *Resources Policy*, 81.September 2022 (2023), 103358 <https://doi.org/10.1016/j.resourpol.2023.103358>

³⁸Michael Tost and others, 'Mining and Europe's World Heritage Cultural Landscapes', *Resources*, 10.2 (2021), 1–17 <https://doi.org/10.3390/resources10020018>

³⁹Ralph Watzel, 'Minerals for Future Technologies: How Germany Copes with Challenges', *Geological Society, London, Special Publications*, 526.1 (2023), 1–12 <https://doi.org/10.1144/SP526-2022-12>

⁴⁰Konrad Gürtler, David Löw Beer, and Jeremias Herberg, 'Scaling Just Transitions: Legitimation Strategies in Coal Phase-out Commissions in Canada and Germany', *Political Geography*, 88 (2021), 102406 <https://doi.org/10.1016/j.polgeo.2021.102406>

⁴¹Anna Leipprand and Christian Flachslund, 'Regime Destabilization in Energy Transitions: The German Debate on the Future of Coal', *Energy Research and Social Science*, 40.September 2017 (2018), 190–204 <https://doi.org/10.1016/j.erss.2018.02.004>

⁴²Olga Janikowska and Joanna Kulczycka, 'Impact of Minerals Policy on Sustainable Development of Mining Sector – a Comparative Assessment of Selected EU Countries', *Mineral Economics*, 34.2 (2021), 305–14 <https://doi.org/10.1007/s13563-021-00248-5>

⁴³Tobias Haas, Jeremias Herberg, and David Löw-Beer, 'From Carbon Democracy to Post-Fossil Capitalism? The German Coal Phase-out as a Crossroads of Sustainability Politics', *Sustainability: Science, Practice, and Policy*, 18.1 (2022), 384–99 <https://doi.org/10.1080/15487733.2022.2069542>

inseparability of social and ecological concerns⁴⁴. Environmental factors are described as the main cause of forest destruction, nature conservationists also blame the forestry sector. Forest management practices are identified as key instruments that contribute to solutions and social responsibility and the consequences of forest destruction are ignored⁴⁵.

The cessation of coal use as a whole is no exception due to the clean performance discourse and their success in delegitimizing coal as a climate-damaging energy source⁴⁶. For thousands of years, mining has been a source of not only great economic wealth, but also social and environmental concerns. Mining innovations that are used, or that will be used in the future, can contribute to achieving the SDGs in Europe, the concept of innovation does not only describe the synergies between SDGs, but also trade-offs or imbalances between each SDGs⁴⁷. The movement of raw materials can be one of the most challenging tasks in open pit mining, with the transportation of trucks being the largest factor in mining costs and generating large greenhouse gas emissions. Continuous conveyor installations as opposed to trucks are a real alternative as they reduce dead loads, reduce greenhouse gas emissions and even reduce costs in many cases. Transport in mines in mines, there is a continuous substitution of technology that has not yet been adopted by the German quarrying industry⁴⁸. In Germany, the shutdown of this industry poses major challenges, which have been overcome through a process of regional structural transformation that continues to date, Germany's plan to remove coal from its energy matrix also poses major challenges that have increased due to the current energy crisis in Europe. In the case of Colombia, the global trend to reduce coal consumption will definitely affect its national finances in the medium term⁴⁹. Communities wanted transparent and understandable information, felt positive about mine water treatment and opposed mine flooding in general⁵⁰.

Implementation of the SDGs can link sustainable mining to green recovery, drive better environmental performance, improve circular economy, inform decision-making, and drive innovation and capacity growth⁵¹. Sustainability in the mining and raw materials sector is a

⁴⁴Juan Antonio Samper, Amanda Schockling, and Mine Islar, 'Climate Politics in Green Deals: Exposing the Political Frontiers of the European Green Deal', *Politics and Governance*, 9.2 (2021), 8–16 <https://doi.org/10.17645/pag.v9i2.3853>

⁴⁵Philipp Mack, Jakob Kremer, and Daniela Kleinschmit, 'Forest Dieback Reframed and Revisited? Forests (Re)Negotiated in the German Media between Forestry and Nature Conservation', *Forest Policy and Economics*, 147.November 2022 (2023) <https://doi.org/10.1016/j.forpol.2022.102883>

⁴⁶Jochen Markard, Adrian Rinscheid, and Linda Widdel, 'Analyzing Transitions through the Lens of Discourse Networks: Coal Phase-out in Germany', *Environmental Innovation and Societal Transitions*, 2021, 315–31 <https://doi.org/10.1016/j.eist.2021.08.001>

⁴⁷Andreas Endl and others, 'Europe's Mining Innovation Trends and Their Contribution to the Sustainable Development Goals: Blind Spots and Strong Points', *Resources Policy*, 74.July (2021) <https://doi.org/10.1016/j.resourpol.2019.101440>

⁴⁸Tobias Braun, Alexander Hennig, and Bernd G. Lottermoser, 'The Need for Sustainable Technology Diffusion in Mining: Achieving the Use of Belt Conveyor Systems in the German Hard-Rock Quarrying Industry', *Journal of Sustainable Mining*, 16.1 (2017), 24–30 <https://doi.org/10.1016/j.jsm.2017.06.003>

⁴⁹Aristizabal-H and others.

⁵⁰Christian Walkersdorfer, Stefanie Walter, and Elke Mugova, 'Perceptions on Mine Water and Mine Flooding – An Example from Abandoned West German Hard Coal Mining Regions', *Resources Policy*, 79.July (2022), 103035 <https://doi.org/10.1016/j.resourpol.2022.103035>

⁵¹Muhammet Deveci, Pablo R. Brito-Parada, and others, 'Rough Sets Based Ordinal Priority Approach to Evaluate Sustainable Development Goals (SDGs) for Sustainable Mining', *Resources Policy*, 79.October (2022) <https://doi.org/10.1016/j.resourpol.2022.103049>

key target on the EU Green Deal agenda. objective of providing a tool to evaluate and rank global risk factors that may affect the development of sustainable mining⁵². Innovative and sustainable development based on the Triple Helix Model (THM), as well as the concept of Open Innovation (OI) and Environmental, Social and Governance (ESG) principles were identified as opportunities for its sustainable development. The combination of these solutions should enable the sustainable development of the industry, safeguarding its economic and social interests and reducing its negative impact on the environment. The use of new clean technologies in the operation and burning of coal should reduce the emission of harmful substances into the environment⁵³.

Sustainable mining in Germany can be linked to legal system theory, namely legal structure, legal substance, and legal culture. The legal structure responsible for supervising and regulating sustainable mining activities in Germany, namely the Ministry of Environment, Nature Conservation and Safety is responsible for the development and implementation of environmental, nature conservation and nuclear safety policies in Germany. BMUB also pays attention to sustainable mining and promotes the development of environmentally friendly technologies in the mining sector; The Federal Institute for Geosciences and Natural Resources is an independent research institute under the auspices of BMUB and is responsible for research and development of mineral and energy resources in Germany; The Federal Mining Commission is responsible for issuing mining permits and overseeing mining activities in Germany; The Commission for the Environment and Nature Conservation is responsible for research and development related to the environment and nature conservation in Germany. UBA also provides advice to the government regarding sustainable environmental and nature conservation policies; Local Government Institutions are local government institutions responsible for supervising mining activities and management of mineral resources in their respective areas; The German Mining Industry Association is the organization representing the mining industry in Germany, including mining companies, mining equipment manufacturers and related service providers. The German Mining Industry Association plays a role in promoting sustainable mining activities in Germany and contributes to the development of technology and innovation to ensure responsible and sustainable mining operations⁵⁴.

Following are some of the regulations related to sustainable mining in Germany, namely the German Federal Mining Act, which is the basic regulation of mining law in Germany. This Act provides a legal framework to regulate mining activities in Germany and protect the environment and public health; The German Environmental Protection Act i.e. regulations provide the legal framework to prevent and mitigate the negative impacts of industrial activities on the environment and human health. This law covers regulation of pollutant emissions and waste, management of hazardous and toxic materials, and control of noise and vibrations; German Nature Protection Act, namely regulations protecting and

⁵²Muhammet Deveci, Emmanouil A Varouchakis, and others, 'Evaluation of Risks Impeding Sustainable Mining Using Fermatean Fuzzy Score Function Based SWARA Method', *Applied Soft Computing*, 2023, 110220 <https://doi.org/10.1016/j.asoc.2023.110220>

⁵³Jarosław Brodny and Magdalena Tutak, 'Challenges of the Polish Coal Mining Industry on Its Way to Innovative and Sustainable Development', *Journal of Cleaner Production*, 375.July (2022) <https://doi.org/10.1016/j.jclepro.2022.134061>

⁵⁴Jari Lyytimäki and others, 'Mining in the Newspapers: Local and Regional Media Representations of Mineral Exploration and Mining in Finland, Germany, and Spain', *Mining, Metallurgy and Exploration*, 38.5 (2021), 1831–43 <https://doi.org/10.1007/s42461-021-00453-4>

conserving nature and wildlife in Germany, including the protection of biodiversity, flora and fauna; German Government Regulations on Underground Mining, namely regulations governing the technical regulations for underground mining activities in Germany; German Government Regulations on Open Pit Mining, namely regulations governing the technical regulations for open pit mining activities in Germany; The Mining Transparency Initiative is a global legal framework that provides open access to communities about contracts and payments between mining companies and governments, to prevent corruption and ensure fair and sustainable resource management⁵⁵. The legal culture in Germany greatly influences the way mining regulations are implemented. The government and people in Germany are very aware of the importance of the environment and sustainability, so mining regulations are very strict to protect the environment and public health. This is reflected in the implementation of strict environmental standards and stringent environmental monitoring⁵⁶. That analysis of sustainable mining in Germany shows that there is a close relationship between legal system theory and the success of regulating sustainable mining. An effective legal structure that pays attention to environmental and public health perspectives and strict legal substance to regulate mining activities can create a better legal culture and strengthen public awareness of the importance of sustainable mining.

3.2. The Strengthening Government Policies in Africa to Achieve Environmental Sustainability

Based on historical documentation and pictorial representations, it is said that mining in African countries has been going on for centuries, such as diamond mining in southern Africa⁵⁷. Large-scale extractive industries contribute significantly to revenues in mineral-rich African countries, little is known about their effectiveness, and approaches can better align their contributions to the sustainable development of local communities and the environment around their mining sites⁵⁸. Development challenges facing mineral-rich Africa, although blessed with abundant mineral wealth, the continent continues to be plagued by rampant poverty and struggles to industrialize⁵⁹. Mining companies around the world have been major drivers in the creation of mining towns as has been the case in Australia, Canada and South Africa⁶⁰.

⁵⁵ Naja Marot and Jörn Harfst, 'Post-Mining Landscapes and Their Endogenous Development Potential for Small- and Medium-Sized Towns: Examples from Central Europe', *Extractive Industries and Society*, 8.1 (2021), 168–75 <https://doi.org/10.1016/j.exis.2020.07.002>

⁵⁶ Christina von Haaren and Anna-Lena Vollheyde, 'Landscape Planning in Germany', *International Review for Spatial Planning and Sustainable Development*, 7.4 (2019), 148–66 https://doi.org/10.14246/irspda.7.4_148

⁵⁷ Michael Chazan and others, 'Mining on the Frontier: Archaeological Excavation of the Historical Component at Canteen Kopje, Northern Cape Province, South Africa', *Quaternary International*, 614.July (2022), 146–63 <https://doi.org/10.1016/j.quaint.2021.07.019>

⁵⁸ Chazan and others.

⁵⁹ Fabien Muhirwa and others, 'Linking Large Extractive Industries to Sustainable Development of Rural Communities at Mining Sites in Africa: Challenges and Pathways', *Resources Policy*, 81 (2023), 103322 <https://doi.org/10.1016/J.RESOURPOL.2023.103322>

⁶⁰ Lochner Marais and others, 'The Changing Nature of Mining Towns: Reflections from Australia, Canada and South Africa', *Land Use Policy*, 76.November 2017 (2018), 779–88 <https://doi.org/10.1016/j.landusepol.2018.03.006>

Minerals contribute to the economy and social welfare of the people of African countries, the impact of mining can result in a dire situation for the economy and security of the country including the social welfare of the people. The positive benefits for the community from mining are increased direct employment and improved quality of life while the negative impacts of mining are increased migration, inadequate infrastructure and poor services. need to build a better foundation and understanding of the positive and negative impacts of mining⁶¹. Government policies that are not critical in Africa towards mining and development require a more careful approach to be followed by alternative approaches for safe and comfortable mining activities⁶². Technically mining companies must switch to technology that can produce sustainable products so that technology confirms that companies are ready to switch to sustainable business models⁶³. Department of Mineral Resources and Energy (DMRE) in South Africa by reforming the Mineral and Petroleum Resources Development Act with the aim of pro-environmental management of mining thereby creating opportunities for historically disadvantaged people to benefit from South Africa's mineral resources.⁶⁴

The Sustainable Development Goals (SDGs) have been adopted by countries and corporations around the world, including large mining companies. Operationalization of SDGs in the mining industry by defining and measuring a series of SDGs indicators for mining host communities. This new barometer of SDGs for the mining industry focuses on communities at mining locations. The SDGs opportunity exists to increase mineral industry monitoring to promote inclusive socio-economic development⁶⁵. Mining management reform needs national and regional political support so that ongoing reforms will fit the existing agenda⁶⁶. Sustainable mining reform can be linked to broader development initiatives, such as achieving the SDGs⁶⁷. The country and peacebuilding strategy increasingly features natural resource governance reforms that seek to ensure that natural resource management is legal, transparent and beneficial for lasting peace and development⁶⁸. Mineral-rich African countries should optimize the benefits derived from

⁶¹ P. Dikgwatlhe and F. Mulenga, 'Perceptions of Local Communities Regarding the Impacts of Mining on Employment and Economic Activities in South Africa', *Resources Policy*, 80 (2023), 103138 <https://doi.org/10.1016/j.resourpol.2022.103138>

⁶² Lochner Marais, Jan Cloete, and Molefi Lenka, 'The Plight of Mining Cities in South Africa: Planning for Growth and Closure', *Cities*, 130 (2022), 103965 <https://doi.org/10.1016/j.cities.2022.103965>

⁶³ Puti Sinansari, Anandita Ade Putri, and Agnieszka Lopatka, 'Value of Sustainable Business Model in Mining Company: A Case Study', *Procedia Computer Science*, 207.Kes (2022), 4142–50 <https://doi.org/10.1016/j.procs.2022.09.477>

⁶⁴ Vidette Bester, 'Towards a Sustainable Artisanal Gold Mining Sector in South Africa: Proposed Developmental Initiatives', *Journal of Rural Studies*, 97 (2023), 375–84 <https://doi.org/10.1016/j.jrurstud.2022.12.029>

⁶⁵ Megan J. Cole and Jennifer L. Broadhurst, 'Measuring the Sustainable Development Goals (SDGs) in Mining Host Communities: A South African Case Study', *Extractive Industries and Society*, 8.1 (2021), 233–43 <https://doi.org/10.1016/j.exis.2020.11.012>

⁶⁶ Cindy Wilhelm, "'Local Content Is Politics": An Examination of the Origins of Local Content Policies in Guinea's Mining Sector', *Extractive Industries and Society*, 13.September 2022 (2022), 101158 <https://doi.org/10.1016/j.exis.2022.101158>

⁶⁷ Roy Maconachie and Felix Conteh, 'Artisanal Mining Policy Reforms, Informality and Challenges to the Sustainable Development Goals in Sierra Leone', *Environmental Science and Policy*, 116.October 2020 (2021), 38–46 <https://doi.org/10.1016/j.envsci.2020.10.011>

⁶⁸ Cole and Broadhurst.

emerging Earth Observing technologies and related spatial data to measure the mining sector's contribution to the SDGs⁶⁹.

The legal structure in the implementation of mining activities in Africa, namely the Ministry of Mines is responsible for monitoring and regulating mining activities at the national level, the Environmental Management Agency is responsible for monitoring and regulating mining activities that have an impact on the environment; The Occupational Health and Safety Supervisory Agency is responsible for monitoring and regulating occupational health and safety at mine sites; The Mining Council provides advice and recommendations to the government in making decisions related to policies and regulation of mining activities; and the Local Community Committee which plays a role in involving local communities in decision-making related to mining activities and strengthening corporate social responsibility⁷⁰. The legal substance that regulates mining activities in Africa, namely the National Environmental Management Act, 1998, South Africa regulates environmental management and protection of natural resources related to mining activities; The Mining Act, 2010, Tanzania governs the management of mineral resources and exploration rights, as well as the requirements for mining permits; Mining and Quarrying Safety and Health Regulation, 2017, Nigeria provides guidelines and requirements relating to occupational health and safety in mining activities; Code Minier, 2015, Mali regulates requirements and obligations for mining companies, including environmental protection and occupational health and safety; Mining and Minerals Policy, 2013, Zambia regulates and establishes a policy framework for the management of mineral resources in Zambia, including environmental and occupational health and safety requirements. These regulations are an example of how governments in Africa are strengthening regulations and requirements relating to mining activities, with the aim of ensuring that these activities are carried out in a sustainable manner, respecting the environment and the rights of local communities⁷¹.

Environmentally friendly practices are possible in mining activities, even in small companies. These practices can enhance the image of mining companies and help them achieve a better environmental balance. Even if companies that have adopted environmental practices are satisfied with the results, there is still a long way to go; therefore support from government and professional associations seems necessary to encourage the adoption of these practices⁷². That analysis of sustainable mining in African countries shows that there is a close relationship between legal system theory and the success of managing sustainable mining. An effective legal structure in paying attention to environmental and public health perspectives and strict legal substance to regulate mining activities have not been able to create a better legal culture and strengthen public awareness of the importance of sustainable mining.

⁶⁹ Abdul Wadood Moomen and others, 'Assessing the Policy Adoption and Impact of Geoinformation for Enhancing Sustainable Mining in Africa', *Journal of Cleaner Production*, 241 (2019), 118361 <https://doi.org/10.1016/j.jclepro.2019.118361>

⁷⁰ Mwemezi J. Rwiza and others, 'Artisanal and Small-Scale Mining in Tanzania and Health Implications: A Policy Perspective', *Heliyon*, 9.4 (2023), e14616 <https://doi.org/10.1016/j.heliyon.2023.e14616>

⁷¹ Caitlin C. Corrigan, 'Deriving Social Benefits from Mining through Regulation: Lessons Learned in South Africa', *Extractive Industries and Society*, 6.3 (2019), 940–47 <https://doi.org/10.1016/j.exis.2019.05.017>

⁷² Carla Vintró, Lluís Sanmiquel, and Modesto Freijo, 'Environmental Sustainability in the Mining Sector: Evidence from Catalan Companies', *Journal of Cleaner Production*, 84.1 (2014), 155–63 <https://doi.org/10.1016/j.jclepro.2013.12.069>

3.3. The Strengthening Government Policies in Indonesia to Achieve Environmental Sustainability

Laws and regulations should be formed based on public needs. Nonet and Selznick demonstrate this approach through examples of good due process. This concept allows the procedural regularity of decision-making from established legal rules. The ideal responsive law demands a more flexible interpretation that views the rule of law as bound to specific problems and contexts. Therefore, responsive law could be interpreted as a concept initiated to meet certain demands. In this regard, the law is made more responsive to urgent social circumstances and needs, as well as to social justice issues⁷³. This means that Responsive Law is a theoretical model offering something beyond the procedural process. The Law is a facilitator that recognizes public desires and finds public commitment to realizing substantive justice. The characteristic of Responsive Law is the shift of emphasis from rules to principles and goals. Furthermore, it prioritizes the will of the public as a legal objective.⁷⁴

Lawrence M. Friedman stated every legal system comprises three sub-systems, including legal substance, structure, and culture. Legal substance includes material as outlined in statutory regulations. The legal structure concerns implementing institutions, their authority, and personnel or law enforcement officials. Meanwhile, legal culture concerns the behavior of society.⁷⁵ These three elements influence law enforcement in a society or state, which synergize to achieve justice. Sustainable development is a conscious and planned effort that integrates environmental, social, and economic aspects into a development strategy⁷⁶. The goal is to ensure environmental integrity as well as the safety, capability, welfare, and quality of present and future generations' life. Preservation of environmental functions encompasses efforts to maintain the continuity of the environment carrying capacity. In this regard, natural resource management should meet the ideal prerequisites. This requires protecting natural resources and the surrounding community's welfare. Additionally, the social community must support natural resource utilization activities⁷⁷.

Government policies in the Supervision of Mineral and Coal Mining can now be dissected with a legal system analysis knife from Lawrence M. Friedman, while the results of the analysis are: Legal substance Legislation related to Government Policy in Supervision of Mineral and Coal Mining is, since Law Number 23 of 2014 concerning Regional Government comes into force, the authority for permits, guidance and supervision of districts/cities is handed over to the province, the authority must still be given because some provincial areas are very large, making it difficult for the supervision that needs to be carried out by the province, therefore changes are needed to Presidential

⁷³ Jawahitha Sarabdeen, Emna Chikhaoui, and Mohamed Mazahir Mohamed Ishak, 'Creating Standards for Canadian Health Data Protection during Health Emergency – An Analysis of Privacy Regulations and Laws', *Heliyon*, 8.5 (2022), e09458 <https://doi.org/10.1016/j.heliyon.2022.e09458>

⁷⁴ Hanim Kamaruddin and others, 'Legal Aspect of Plastic Waste Management in Indonesia and Malaysia: Addressing Marine Plastic Debris', *Sustainability*, 14.12 (2022), 6985 <https://doi.org/10.3390/su14126985>

⁷⁵ Ija Suntana and others, 'Ideological Distrust: Re-Understanding the Debate on State Ideology, Normalization of State-Religion Relationship, and Legal System in Indonesia', *Heliyon*, 9.3 (2023), e14676 <https://doi.org/10.1016/j.heliyon.2023.e14676>

⁷⁶ Susan Baker, Natasha Constant, and Poppy Nicol, 'Oceans Justice: Trade-Offs between Sustainable Development Goals in the Seychelles', *Marine Policy*, 147.105357 (2023), 1–14 <https://doi.org/10.1016/j.marpol.2022.105357>

⁷⁷ Aristizabal-H and others.

Regulation Number 55 of 2022 concerning Delegation of Granting Business Permits in the Mineral and Coal Mining Sector which authorizes districts/cities to supervise the implementation of mining activities as part of co-administration mandated in Article 91 of Law Number 23 of 2014 concerning Regional Government.

The legal structure, which is related to Government Policy in the Supervision of Mineral and Coal Mining, while the legal structure in the supervision of mineral and coal mining currently only consists of 2 (two) institutions, namely the Directorate General of Mineral and Coal, Ministry of Energy and Mineral Resources and Mining and Energy Services of the Provincial Government, while the area of Indonesia is the largest archipelagic country after the United States with a total of 13,465 islands, a land area of 1,922,570 km² and a water area of 3,257,483 km² with different geographical locations⁷⁸. Therefore, it is necessary to have district/city governments that can assist in supervising the management of mineral and coal mining throughout Indonesia. The legal culture that in Supervision of mining activities has been regulated in Law Number 4 of 2009 concerning Mineral and Coal Mining Article 113 paragraph 4) The temporary suspension as referred to in paragraph (1) letter c can be carried out by a mine inspector or carried out based on community requests to the Minister, governor or regent/mayor in accordance with their authority. In the elucidation of Article 113 Paragraph (4) The community's request contains an explanation of the condition of the environmental carrying capacity of the area associated with mining activities. The community through the Mining Advocacy Network (JATAM) has carried out a supervisory function based on its duties and functions as an institution that has contributed to increasing legal awareness related to monitoring mining management.

The analysis shows an imbalance in the supervision of mineral and coal mining. The first imbalance relates to legal substance. Since enacting Law Number 23 of 2014 concerning Local Government, the authority for permits, guidance, and supervision for districts or cities has been handed over to the province. This authority should be given because some provincial areas are very large, hampering supervision by the provinces. Therefore, it is necessary to amend Presidential Regulation Number 55 of 2022 concerning the Delegation of Granting Business Permits in the Mineral and Coal Mining Sector. This amendment authorizes districts or cities to supervise mining activities as part of the assistance task mandated in Article 91 of Law Number 23 of 2014 concerning Local Government. The legal structure in supervising mineral and coal mining only comprises the Directorate General of Mineral and Coal, the Ministry of Energy and Mineral Resources, as well as the Mining and Energy Service of the Provincial Government. This happens despite Indonesia being the largest archipelagic state after the United States. Indonesia has 13,465 islands, a land area of 1,922,570 km², and a water area of 3,257,483 km² with different geographic locations⁷⁹. Therefore, district and city governments should help supervise the mineral and coal mining management throughout Indonesia. The community's legal culture has been formed with the existence of the JATAM institution. This institution has executed a supervisory function based on its duties and functions to help increase the legal awareness related to mining management supervision. The nature and purpose of supervision could be preventive or repressive. Preventive supervision

⁷⁸Kamaruddin and others.

⁷⁹Muhamad Iko Kersapati and Josep Grau-Bové, 'Geographic Features Recognition for Heritage Landscape Mapping – Case Study: The Banda Islands, Maluku, Indonesia', *Digital Applications in Archaeology and Cultural Heritage*, 28.January (2023), 1–12 <https://doi.org/10.1016/j.daach.2023.e00262>

entails preventing inappropriate mining activities through monitoring ministries, provinces, districts, and cities to avoid environmental damage. Meanwhile, repressive supervision is implemented by law enforcement officials regarding unpermitted activities. There is an urgency to strengthen government policies regarding the supervision of mineral and coal mining. The goal is to realize environmental sustainability through amendments to Presidential Regulation Number 55 of 2022 concerning the Delegation of Granting Business Permits in the Mineral and Coal Mining Sector. This necessitates granting authority to districts and cities to carry out mineral and coal mining activities. Therefore, the role of district or city governments in realizing environmental sustainability should be consistent with local services as agencies overseeing the environment.

4. Conclusion

The management of natural resources should be conducted in a sustainable and environmentally responsible manner, as prescribed in the Constitution of Indonesia. As mineral and coal mining involve non-renewable resources found on the earth, it is imperative that efforts are made to minimize negative environmental impacts associated with such exploration. This necessitates the implementation of comprehensive and collaborative supervision among the central, provincial, and district or city governments. However, the current government policies regarding the supervision of mineral and coal mining fall short of optimal standards. The authority of district or city governments in supervising mineral and coal mining activities has been revoked by the Local Government Law Number 23 of 2014, leading to a gap in supervisory institutions at the district or city level. In light of this, this research recommends the improvement of policies through amendments to Presidential Regulation Number 55 of 2022 regarding the delegation of granting business permits in the mineral and coal mining sector. This would allow districts and cities to conduct mineral and coal mining activities, ensuring that their role in promoting environmental sustainability aligns with regional services considered as environmental oversight agencies. Meanwhile, mining management that is in accordance with environmental sustainability in Germany is very advanced so that it can be used as an example in mining management and in African countries mining management is moving towards management that pays attention to the environment.

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