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Ecological Losses in Cases of Environmental Damage Due to Mining Business Activities

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Abstract: The reclamation after mining business activities provides concrete evidence of how should the management of ecological losses received by the environment due to environmental damage, which is often only from the aspect of economic value. But further than that actually, the ecological loss itself is how about restoring the environment that has been damaged. The calculation of reclamation also only calculates from an economic point of descriptive analytical method with a normative juridical approach. Based on the results of the first study, ecological losses generally only focus on how to compensate for the loss in economic value. Whereas further than that, the regulation of the calculation of ecological losses is environmental recovery which requires a longer time than just post-mining reclamation on an economic side only, but instruments in environmental law such as administrative instruments are needed as a preventive measure against ecological losses, civil as the responsibility of business actors, to criminal acts as a form of compliance in order to achieve law enforcement. Second, in applying the regulation in the field, legal practitioners do not define ecological loss”in the same voice. There are different interpretations that ecological losses in the perspective of law are that enforces define completely and equally that ecological losses are not only assessed from the financing of compensation.

Keyword: Environmental Law, Ecology Losses, Reclamation.

INTRODUCTION

Indonesia has abundant natural resources. The abundance of natural resources in Indonesia attracts various parties seeking to maximize profits in a short period of time through uncontrolled resource exploitation, prioritizing economic gains over social impacts and environmental damage. Mining business activities, as one of the natural resource exploitation activities, generally cause damage to the environment. Environmental damage in mining areas can result in significant ecological, social, and economic losses. Mining activities generally cause ecological losses where the actual recovery of the environment is not proportional to the damage caused by mining activities. Ecological losses are not only in the form of costs that will be paid by business actors but also direct impacts on the environment, such as deforestation, ex-mining pits that ultimately damage soil texture, the death of endemic plants

due to soil contamination by chemicals, and other impacts on the environment and mining areas. Business actors are required to carry out reclamation and post-mining activities, as well as place reclamation guarantees, to minimize ecological losses resulting from mining activities. One of the important issues in improving mineral and coal mining governance in Indonesia is the extent to which mining license holders comply with reclamation and post-mining activities (Umar & Hijriani, 2021).

Referring to Article 1 point 12 of the Minister of Energy and Mineral Resources Regulation Number 26 of 2018 concerning the Implementation of Good Mining Practices and Supervision of Mineral and Coal Mining, reclamation is an activity at every stage of mining within the scope of structuring, restoring, and improving the quality of the environment and ecosystem so that it functions again according to its designation.

Furthermore, Article 1, point 13, defines post-mining activities as planned, systematic actions that restore natural environmental functions and social functions in accordance with local conditions throughout the mining area.

In carrying out reclamation and post-mining, there are environmental principles that must be met, as stated in Article 4 paragraph 1 of Government Regulation No. 78/2010 on Reclamation and Post-Mining. Ecological damage refers to harm inflicted upon the environment, ecosystems, plants, animal ecosystems, and water and air pollution. Exploitation of natural resources has caused adverse impacts, one of which is ecological damage.

The environment is a source of life support for humans and other living things in order to survive and improve the quality of life itself. Therefore, the environment, which is a gift from God Almighty, must be preserved for the benefit of current and future generations.

The change in landscape appearance is the main impact of open-pit coal mining activities. Land that was once forests, hills, plantations, or farms is now devoid of vegetation and filled with pits. Despite many company promises and government guarantees for reclamation, the reality is that very few landscapes have been restored to their original condition before mining activities (Wijaya, 2017).

For example, in East Kalimantan Province, there are around 100,000 ha of forest area used for mining, out of a total of 14 million ha of forest area in East Kalimantan. And most companies that utilize forest areas are large companies that have mining licenses through Coal Mining Concession Work Agreements (PKP2B) issued by the central government. The problem is that the issuance of these licenses is not followed by a process of collecting data on mineral content without seeing the land to be mined with the naked eye. On the other hand, the growth of the coal mining sector has also caused problems related to environmental issues, health issues, deforestation, and the degradation of forest areas (Hendar, 2014).

Post-mining land reclamation in East Kalimantan Province can still be counted on the fingers. Of the approximately 1,200 operating mining companies, only a small number have fulfilled their obligation to conduct reclamation as stipulated in the relevant laws and regulations. This was stated by the Head of the Research and Development Center for Forest Productivity Improvement, Dr. Ir Bambang Trihartono.

Mining business activities give rise to responsibilities for mining business actors with licenses, namely the obligation to carry out reclamation and post-mining. Reclamation activities are carried out in both forest and non-forest areas. However, reclamation obligations remain a problem to this day. Various reasons are often found for the failure of reclamation implementation, including lack of compliance with the obligation to place reclamation guarantee funds, no planning in reclamation, coal content that has not been completely extracted, and technical reasons for not being able to carry out reclamation activities (Muhdar, 2016).

Ecological damage is in principle of unlimited value because ecosystems cannot be created by humans, so if there has been ecological damage, it will be destroyed or difficult to recover

(irreversible) (Wasis, 2019). Restoration of the damaged ecosystem can only be done by God, the Creator of the Universe.

Former mining areas are vulnerable to future ecological disasters if environmental protection in the form of reclamation and post-mining activities is not carried out. It is also important to regulate the calculation of ecological losses caused by mining activities.

The problem formulations in this study include:

1. How is the calculation of "ecological loss" due to environmental damage on post-mining land that is not reclaimed regulated and implemented?
2. How is "ecological loss" interpreted from a legal perspective in cases of environmental damage due to mining business activities?.

METHOD

The approach used is the normative juridical approach. Research with a normative juridical approach is legal research based on library studies (Soekanto, 2007). In this type of legal research, the law is conceived as what is written in the legislation or as a rule or norm that serves as a standard for human behavior deemed appropriate (Amiruddin & Asikin, 2008). Additionally, this research also employs a descriptive-analytical approach, which is a study that describes the object of the main problem comprehensively and systematically (Sunggono, 2006). From the analysis of the collected data, it is expected to provide an overview of the causality and law enforcement related to ecological losses on post-mining land that is not reclaimed, resulting in state losses from the perspective of environmental law.

RESULTS AND DISCUSSION

Example Cases of Calculating Ecological Losses Due to Environmental Damage on Post-Mining Land

In practice, there have been many cases of environmental damage due to mining activities that were not reclaimed. Based on library research, there are not many cases related to environmental damage caused by mining activities that did not conduct reclamation and/or post-mining activities that involve detailed calculations of ecological losses for which businesses are held accountable. Some of these cases are as follows:

1. Supreme Court Decision Number 987 K/Pid.Sus/2012

The defendant engaged in exploration activities by taking samples through the creation of 180 holes by PT. BMI on Beneh Island, thus obligating PT. BMI to carry out reclamation.

In this case, the Public Prosecutor included a description of the calculation of ecological losses caused by the unreclaimed post-mining land in the indictment. This calculation was derived from an assessment conducted by expert Ir. Basuki Wasis during the investigation process, but the method used by the expert for calculating these ecological losses was not explained. However, the calculation of ecological losses only reached the indictment stage. There were no demands or evidence regarding compensation for the ecological losses calculated during the investigation and described in the indictment. The panel of judges, in their verdict, did not include the amount of ecological losses incurred from the defendant's actions as something that needed to be compensated.

2. Supreme Court Decision Number 1026 K/Pid.Sus/2012

The defendant conducted mining activities without a business license, causing pollution and/or environmental damage in the form of destruction/disruption of the natural forest conversion, which resulted in irreversible damage to the soil's chemical properties, making it impossible to restore the land to its original state due to the soil formation process that took millions of years (MK, 2012).

In this case, the Public Prosecutor included a description of the calculation of ecological losses caused by soil and environmental damage due to bauxite ore mining on Kas Island. This

calculation was also conducted by the same expert, Ir. Basuki Wasis. During the investigation process, the method used by the expert to calculate these ecological losses was not explained. Unlike the previous case, in this case, the ecological loss calculation detailed in the investigation and described in the indictment served as the basis for imposing fines, which were divided into fines for environmental rehabilitation and deposited into the State Treasury.

3. District Court of Kotamobagu Decision Number 114/Pid.B/LH/2020/PN Ktg

In this case, the defendants Hartono Novri Aziz and Sumitro were charged with having committed or participated in the act of deliberately bringing heavy equipment and/or other tools typically suspected to be used for mining activities and/or transporting mining products within the forest area without permission as referred to in Article 17 paragraph (1) letter a of the Mineral and Coal Mining Law, and thus threatened with criminal charges under Article 89 paragraph (1) letter b of Law No. 18 of 2013 on the Prevention and Eradication of Forest Destruction in conjunction with Article 55 paragraph (1) number 1 of the Criminal Code.

It was found that the excavation holes resulting from the defendants' mining activities caused ecological damage to the forest. In this case, the Minister of Environment Regulation Number 7 of 2014 had been enacted, allowing for the calculation of ecological losses through the approach outlined in the regulation. Interestingly, in this case, ecological losses became one of the considerations for the panel of judges in their decision.

Regulation of the Calculation of Ecological Losses in Mining Activities in Indonesia

In efforts to improve public welfare, development cannot be separated from the use of natural resources. One such development aimed at enhancing public welfare is the mining sector, which has brought numerous benefits, including increased prosperity, higher per capita income, improved educational standards, and greater health awareness. However, development involving extensive exploration of mineral resources also has negative impacts. The increasing exploitation of mineral resources carries the risk of environmental damage, affecting the fundamental structure and function of ecosystems that support life. Environmental pollution will become a social burden, ultimately requiring society and the government to bear the costs of recovery. All these are forms of ecological losses that society collectively bears.

As a key driver of Indonesia's economic development, mining activities have resulted in various forms of environmental damage that accumulate not only through economic figures but also directly harm the environment, eventually leading to changes in the physical form and function of the environment itself.

Specifically, ecological losses are regulated in several laws and regulations in Indonesia, including Law No. 32 of 2009 on Environmental Protection and Management, Minister of Environment Regulation No. 4 of 2013 on Procedures for Settling Environmental Disputes, and Minister of Environment Regulation No. 7 of 2014 on Environmental Damage Assessment. These regulations essentially govern all forms of ecological losses caused by business activities that directly explore and exploit natural resources as part of the environment.

Law enforcement is an effort to realize the ideals and concepts of law that the public expects. Law enforcement is a process involving many aspects (Dellyana, 1988). Environmental law is very complex and encompasses various legal instruments. Environmental violations range from minor offenses, such as household waste disposal, to severe damage caused by mineral resource mining. Therefore, law enforcement implementation is also diverse, including administrative, civil, and criminal sanctions.

As part of environmental law enforcement, ecological losses can be calculated using various instruments, whether administrative, civil, or criminal. Ecological losses refer to damages related to ecology. Ecology studies the reciprocal relationships between living organisms and their environment, meaning any loss is inherently experienced by the environment itself. In applying ecological science to repair or restore a damaged or disrupted ecosystem to an

approximation of its original condition, ecological principles and knowledge are crucial. Understanding the fundamental issues within a damaged ecosystem is essential since ecosystems are an integral part of the environment.

In mining activities, ecological losses are inevitable. Environmental law instruments compel businesses that cause environmental damage leading to ecological losses to be accountable under the relevant legal instruments, especially since post-mining activities typically result in ecological losses that are disproportionate to the environmental damage caused by mining activities. These instruments are used to assert regulatory authority over potential ecological losses, forming the foundation for environmental law enforcement and regulation. Consequently, administrative, civil, and criminal instruments serve as safeguards against environmental damage.

Ecological losses mean the environment and ecosystem have been damaged, necessitating preventive instruments before such damage occurs, as well as measures after the fact, including holding responsible parties accountable for mining activities. Ecological losses are not limited to the costs incurred by those causing or damaging the environment but also include direct impacts on the environment, such as deforestation, excavation pits disrupting soil texture, and the death of marine life commonly found in coastal mining areas. Environmental law, through its instruments, provides legal certainty that ecological losses can be assessed in two aspects: ecological losses with economic value and ecological losses calculated through the instruments within environmental law.

Furthermore, in addition to the ecological losses due to mining through the application of environmental laws and legal instruments as binding enforcement, there are also calculations of ecological losses resulting from mining damage, which consist of ecological loss costs, environmental economic losses, and environmental restoration costs. Specifically, ecological losses are assessed in economic terms and have monetary value divided into the following components:

1. Costs of restoring water management functions;
2. Costs of water regulation;
3. Costs of erosion and runoff control;
4. Costs of soil formation;
5. Costs of nutrient recycling;
6. Costs of waste decomposition functions;
7. Costs of biodiversity loss;
8. Costs of genetic resource loss; and
9. Costs of carbon release.

This monetary formulation is regulated in Chapter III, Appendix II of the Minister of Environment Regulation Number 7 of 2014 on Environmental Damage and/or Pollution-related Ecological Losses.

Mining activities generally result in environmental damage, which leads to environmental issues. Environmental damage in mining areas can result in the loss of ecosystems' ability to provide ecosystem services, leading to significant ecological, social, and economic losses (Supardi, 1994). The presence of ecosystem services can provide goods and services beneficial to human welfare (Wahyudin et al., 2017).

The vast wealth of Indonesia's natural resources attracts various parties seeking to maximize profits in a short time through uncontrolled exploitation. The management of natural resources has often prioritized maximizing economic gains without considering social aspects and environmental damage.

Application of Ecological Loss Calculations on Post-Mining Land for Environmental Law Enforcement

The management of natural resources and the environment needs to be accompanied by actions that promote the general welfare as stated in the 1945 Constitution. The Environmental Protection and Management Law (UUPPLH) serves as the legal framework for environmental management in Indonesia, forming the basis for environmental management regulations, and aligning with existing regulations into a cohesive and comprehensive system (Wahyudin et al., 2017). The scope of environmental protection and management includes (Pemerintah Republik Indonesia, 2009):

- a. Planning;
- b. Utilization;
- c. Control;
- d. Supervision; and
- e. Law enforcement.

Environmental law enforcement is the final link in the regulatory chain of environmental policy planning. As the final link, many people consider environmental law enforcement only through the judicial process. This perception suggests that environmental law enforcement is merely repressive, i.e., it only occurs after cases of pollution and/or environmental damage have taken place (Akib & Hum, 2019). According to Daud Silalahi, environmental law enforcement in Indonesia encompasses both compliance and enforcement (Akib & Hum, 2019). This underscores the critical need for environmental law enforcement.

Environmental law enforcement should be seen as a tool to achieve objectives. The goal of environmental law enforcement is the regulation of the values of ecosystem carrying capacity protection and environmental function (Priyanta & Astriani, 2015). Regulation in environmental law means "the full implementation of environmental requirements." Regulation is considered achieved when all environmental requirements are met or carried out by environmental law subjects (Priyanta & Astriani, 2015).

Mining is a business activity that requires extensive exploration and exploitation of mineral resources, which directly damages land or the environment as it should. Regarding ecological losses, mining business operators who cause environmental damage often focus only on monetary compensation. While this is not entirely wrong, as mining activities have significant economic value, compensation is the responsibility of the business operators. However, compensation should not be limited to monetary compensation to fellow humans but should also extend to the environment.

The ecological damage caused by mining cannot be repaired as quickly as the business operations begin and end; it takes decades, and some damage may never be repaired. Therefore, business operators who harm the environment should be aware of the importance of the ecological losses incurred. Ecological losses are inherently long-term.

To avoid potential disasters that may not be felt now but could be devastating if the environment continues to degrade, humanity as a whole will suffer numerous losses. Environmental degradation could lead to natural disasters, depletion of natural resources, greenhouse effects, and far greater losses compared to economic losses. The problem is that our society is often indifferent to these ecological losses, and business operators who cause environmental damage focus only on compensating local residents.

In practice, the application of ecological loss calculations faces various obstacles. Principally, implementing ecological loss calculations is challenging because of its broad interpretation. These losses are not only monetary but also involve the loss of ecosystem functions and environmental aspects, which are difficult to restore in the short term as they relate to human connections. For environmental law enforcement to achieve the intended outcomes regarding ecological losses, it is necessary to apply the relevant principles, legal norms, and regulations.

This relates to the actual application of environmental law and its effectiveness in society (Sodikin, 2010).

Furthermore, the regulation in the Minister of Environment Regulation Number 7 of 2014 is not readily applicable because its formulation is descriptive, which poses challenges in its application. Legal norms need to have a prescriptive nature (Perwira et al., 2022).

As seen in the cases discussed, there are differences in the interpretation of ecological loss calculations. Therefore, the application of definitions in each environmental case with ecological loss issues encounters obstacles due to varying interpretations of "ecological losses" from a legal perspective, which hinders environmental law enforcement.

Based on the above principles, the challenges in applying ecological loss calculations can be viewed through their regulatory aspects, which originate from legislation and may be caused by (Perwira et al., 2022):

- a. Failure to follow the principles of the applicability of laws;
 - b. Lack of necessary implementing regulations to enforce the law;
 - c. Ambiguity in the wording of the law, leading to confusion in interpretation and application.
- When considering the principles of the applicability of a law, the UUPPLH as a whole has fulfilled these principles.

As the main enforcer of the law, judges must have consistent interpretations. This is evident because judicial decisions become precedents for future cases involving ecological losses. Judges play a significant role in law enforcement, particularly in handling mining business cases. Consistency in defining ecological losses is essential in handling such cases.

Inadequate oversight by law enforcement officials can weaken the function of the law itself. As illustrated by the three similar cases of ecological losses due to mining activities, differing judicial interpretations have resulted in environmental cases becoming less argumentative and lacking in environmental legal reasoning.

For instance, in two separate cases, the Supreme Court Decisions Number 987/K/Pid.Sus/2012 and Number 1026/K/Pid.Sus/2012, concerning environmental damage caused by PT BMI's mining activities without proper permits (IUP, IUPK, or IUPR) and the failure to reclaim 180 mining pits, the public prosecutor's demands varied in defining ecological losses. This case presents different perspectives on what constitutes "ecological losses." In practice, ecological losses can be interpreted as a monetary compensation calculation, while in another case, the definition of "ecological losses" in case number 114/Pid.B/LH/220/PN. Ktg, regarding illegal mining in forest areas, is treated differently. The Supreme Court Decision Number 1026/K/Pid.Sus/2012 defines "ecological losses" as unmet administrative violations. Therefore, from the outset, the application of "ecological losses" was not based on the actual environmental legal instruments.

Furthermore, calculating ecological losses due to unreclaimed post-mining activities is highly relevant for both civil and criminal law enforcement. Civil lawsuits against mining activities that harm the community are regulated in Article 145 paragraphs (1) and (2) of Law Number 3 of 2020. It stipulates that communities directly affected by negative mining activities are entitled to fair compensation for damages resulting from mining operations and/or to file lawsuits for damages caused by non-compliant mining operations. There are no further provisions or explanations about what constitutes a mistake in mining operations. Such errors are likely technical, caused by human error, implementation mistakes, or planning errors, leading to community losses. Ideally, these losses can include ecological losses, considering the legal basis and calculation method for ecological losses provided in the Minister of Environment Regulation Number 7 of 2014 concerning Environmental Damage Compensation due to Pollution and/or Environmental Damage.

CONCLUSION

The regulation of "ecological losses" due to environmental damage on post-mining land refers to Law Number 32 of 2009 concerning Environmental Protection and Management. This has been further detailed in the Minister of Environment Regulation Number 4 of 2013 concerning Environmental Dispute Settlement Procedures and Minister of Environment Regulation Number 7 of 2014 concerning Environmental Damage Due to Pollution and/or Environmental Damage.

In practice, the application of ecological loss calculations on post-mining land in the context of environmental law enforcement has not been implemented as expected under the aforementioned regulations. This is due to differences in interpretation among law enforcers regarding "ecological losses" and their application in environmental cases that focus on the state of ecological losses. However, there have been instances where judicial interpretations in environmental cases have included or excluded ecological losses in their decisions, despite being outlined in the charges and involving experts for calculations.

Law enforcers lack a unified vision and interpretation of the law, as seen in their understanding of the definition of "ecological losses." Essentially, the application of "ecological losses" cannot be separated from the realm of post-mining reclamation. The presence of numerous mining pits not only disrupts the surrounding ecosystem, both biotic and abiotic, but also underscores the importance of law enforcement in achieving successful environmental law enforcement, especially in the mining sector. Continuous ecological losses resulting from case handling by law enforcers indicate that the law cannot be applied effectively. These factors are closely related to public awareness. Legal awareness can only progress well if both law enforcement and public awareness are aligned. As Soerjono Soekanto stated, the public needs law enforcers who can serve as role models so that the public is willing to follow the instructions given by law enforcers. Thus, environmental protection and management can be implemented effectively, and the decisions made will provide the community with an understanding of what ecological losses truly are. The application of "ecological losses" is challenging, especially when law enforcers have varying levels of understanding. Although the law evolves with societal changes, this actually reinforces the function of the law itself.

REFERENCE

- Agus Umar, Hijriani, "Ambiguitas Penerapan Sanksi Kegiatan Reklamasi dan Pascatambang", *Delega Tata Jurnal Ilmu Hukum*, Volume 6 Nomor 1, Januari – Juni 2021
- Ammiruddin dan Zainal Asikin, *Pengantar Metode Penelitian Hukum*, Jakarta: PT. Raja Grafindo Persada, 2008
- Bambang Sunggono, *Metodologi Penelitian Hukum*, Raja Grafindo Persada, Jakarta, 1997
- Daud Silalahi, "Hukum Lingkungan Dalam Sistem Penegakan Hukum Lingkungan Indonesia", Bandung: Alumni, 2001
- Dr. Ir. Basuki Wasis, M., "Perhitungan Kerusakan Ekologis dari Daya Rusak Pertambangan Sebagai Kerugian Negara", Makalah dalam Workshop Perhitungan Kerugian Sosial Ekologis Akibat Daya Rusak Tambang Sebagai Kerugian Negara, Jakarta, 15-17 Juli 2019
- Dr. Ir. Basuki Wasis, M., "Perhitungan Kerusakan Ekologis dari Daya Rusak Pertambangan Sebagai Kerugian Negara", Makalah dalam Workshop Perhitungan Kerugian Sosial Ekologis Akibat Daya Rusak Tambang Sebagai Kerugian Negara, Jakarta, 15-17 Juli 2019
- Hendar, "Izin Tambang Marak Reklamasi Lahan Pasca-Tambang Tak Berjalan di Kaltim", dalam <https://www.mongabay.co.id/2014/01/06/izin-tambang-marak-reklamasi-lahan-pasca-tambang-tak-berjalan-di-kaltim/>, diakses pada tanggal 4 Desember 2022, pukul 15.15

- Hilda Ainy Apriliany, Aspek Hukum Reklamasi Pertambangan Batubara pada Kawasan Hutan di Kalimantan Timur”, *Journal of Mutidisciplinary Studies* Volume 11 Nomor 01 Juni 2020, hlm. 11.
- Iman Supardi, *Lingkungan Hidup dan Kelestariannya*, Bandung: Alumni, 2003
- Indra Perwira, Giri Ahmad Taufik, dan Mulki Shader, ”Valuasi Kerugian Lingkungan Hidup: Studi atas Persepsi Hakim dalam Putusan Pengadilan Pada 2009-2019”, *Jurnal Bina Mulia Hukum*, Volume 6 Nomor 2 Maret 2022
- Maret Priyanta and Nadia Astriani, *Buku Ajar Hukum Lingkungan*, Bandung: Kalam Media, 2015
- Muhammad Akib, *Hukum Lingkungan Perspektif Global dan Nasional*, Jakarta: Raja Grafindo Persada, 2014
- Muhammad Muhdar, Aspek Hukum Reklamasi Pertambangan Batubara pada Kawasan Hutan di Kalimantan Timur”, *Jurnal Mimbar Hukum* Volume 27 Nomor 3, Oktober 2015, hlm. 474.
- Peraturan Menteri ESDM Nomor 26 Tahun 2018 tentang Pelaksanaan Kaidah Pertambangan yang Baik dan Pengawasan Pertambangan Mineral dan Batubara
- Peraturan Menteri Lingkungan Hidup Nomor 4 Tahun 2013 tentang Tata Cara Penyelesaian Sengketa Lingkungan Hidup
- Peraturan Menteri Lingkungan Hidup Nomor 7 Tahun 2014 tentang Penilaian Kerusakan Lingkungan
- Putusan Mahkamah Agung Nomor 1026 K/Pid.Sus/2012
- Putusan Mahkamah Agung Nomor 987 K/Pid.Sus/2012
- Putusan Pengadilan Negeri Kotamobagu Nomor 114/Pid.B/LH/2020/PN Ktg
- Shant Dellyana, *Konsep Penegakan Hukum*, Yogyakarta: Liberty, 1988
- Soerjono Soekanto dan Sri Mamudji, *Penelitian Hukum Normatif Suatu Tinjauan Singkat*, PT. Rajagrafindo Persada: Jakarta, 2009
- Soerjono Soekanto, *Kesadaran Hukum dan Kepatuhan Hukum*, Jakarta: Rajawali Pers, 1982
- Solikin, “Penegakan Hukum Lingkungan Menurut UU No. 32 Tahun 2009”, *Jurnal Kanun* Nomor 52, Desember 2010
- Sukanda Husin, *Penegakan Hukum Lingkungan Indonesia*, Cetakan Kedua, Jakarta: Sinar Grafika, 2009
- Taufik Wijaya, “Reklamasi Lahan Tak Efektif. Bentang Alam yang Berubah Pasca Pertambangan Batubara di Sumsel (Bagian-2)”, dalam <https://www.mongabay.co.id/2017/05/05/reklamasi-lahan-tak-efektif-bentang-alam-yang-berubah-pasca-pertambangan-batubara-di-sumsel-bagian-2/>, diakses pada 4 Desember 2022, pukul 15.18
- Undang-Undang Nomor 3 Tahun 2020 tentang Pertambangan Mineral dan Batubara
- UU Nomor 32 Tahun 2009 tentang Pengelolaan dan Perlindungan Lingkungan Hidup
- Wahyudin. Y, T Kusumastanto, L. Adrianto, dan Y Wardianto, ”Jasa Ekosistem Lamun untuk Kesejahteraan Manusia”, *Jurnal Omni-Akuatika*, Volume 12 Nomor 3