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Legal Construction of Silica Sand Mining Activities in Natuna Causing Environmental Damage Impact

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Abstract

This research, titled "Legal Construction of Silica Sand Mining Activities in Indonesia (Natuna) Causing Environmental Damage," evaluates the legal framework governing silica sand mining in Natuna, Indonesia, and its impact on environmental degradation. The study uncovers significant weaknesses in the current legal framework for environmental protection, particularly in the context of silica sand mining. This mining in Natuna causes extensive environmental damage, affecting terrestrial and marine ecosystems, leading to biodiversity loss, land degradation, and water pollution. The research highlights a key failure in law enforcement against silica sand mining activities, attributed to a lack of environmental awareness, rampant corruption, and deficiencies in the legal framework. The paper advocates for legal changes to strengthen environmental protection, including increased legal sanctions for violators and improvements in the legal framework for more effective regulation of silica sand mining. Furthermore, the study emphasizes the crucial roles of government and society in environmental conservation. It recommends that the government should tighten supervision over mining activities and encourage eco-friendly technologies, while also empowering society to actively participate in monitoring and reporting environmental violations. The study also explores the environmental, social, and legal implications of silica sand mining in Natuna. It discusses the long-term ecological losses due to environmental damage and outlines the adverse social consequences for local communities, such as fishermen, who depend on natural resources for their livelihood. Additionally, the paper critically examines Indonesia's legal framework regarding silica sand mining, assessing its adequacy in protecting the environment and suggesting areas for legal improvement. Overall, the paper contributes to the discourse on sustainable and equitable natural resource management in Indonesia. It emphasizes the need for a comprehensive approach that includes legal, environmental, and social considerations. Effective legal reform and adherence to environmental and community welfare standards are crucial for ensuring sustainability and equity for all parties involved.

Keywords: *Silica Sand Mining, Environmental Protection, Legal Reform.*

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I. INTRODUCTION

In the context of mining activities enforcement in Indonesia, there are several relevant legal constructions, including:

1. **1945 Constitution of the Republic of Indonesia (UUD 1945)**: As the Indonesian constitution, it forms the basis for the creation of laws in the country. UUD 1945 provides the foundation for the regulation and supervision of mining activities in Indonesia.
2. **Mining Law (Undang-Undang Minerba)**: Law No. 4 of 2009 on Mineral and Coal Mining (UU Minerba) serves as the primary legal basis regulating mineral and coal mining activities in Indonesia. This law governs licensing, supervision, and sanctions related to mining, as well as the rights and obligations of related parties in mining activities.
3. **Government Regulations (PP)**: PP is a legal instrument issued by the government to implement the provisions of UU Minerba in more detail. An example is Government Regulation No. 23 of 2010 on the Implementation of Mineral and Coal Mining Business Activities, which regulates licensing procedures, supervision, and dispute resolution in mining activities.
4. **Ministerial Regulations (Permen)**: Permen are regulations issued by the Minister of Energy and Mineral Resources (ESDM) as the executor of UU Minerba. These regulations play a crucial role in governing the technical and administrative aspects of mining activities, such as licensing, mining plans, and environmental management standards.
5. **Ministerial Decrees (Keputmen)**: Keputmen are legal instruments issued by the Minister of ESDM to regulate technical matters related to mining business entities.

These legal constructions aim to ensure that mining activities are conducted according to appropriate standards and take environmental aspects into account, as well as provide a basis for action against violations that occur in mining activities in Indonesia. The background of this dissertation is the presence of silica sand mining activities in Natuna, which have significant environmental impacts. Silica sand is a mineral used in various industries such as the glass, ceramics, electronics, and construction industries. However, the exploitation of silica sand is often poorly regulated by existing laws.

The impacts of silica sand mining activities in Natuna include forest damage, loss of flora and fauna habitats, water and air pollution, and land degradation. This threatens the sustainability of the ecosystem and harms the local community, which depends on natural resources for their livelihood. The research in this dissertation aims to understand the existing legal construction in the enforcement of silica sand mining

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activities in Natuna. By considering the environmental impacts that occur, the research seeks to find weaknesses in existing laws and provide recommendations for improving law enforcement and environmental protection. Through this dissertation, it is hoped that effective legal solutions can be found to address the environmental damage caused by silica sand mining activities in Natuna. This is to protect the sustainability of the ecosystem and the lives of the local community, as well as ensure the sustainable management of natural resources in the future.

This journal aims to analyze the legal framework in the enforcement of silica sand mining activities in Natuna, Indonesia, and to identify the environmental damage impacts caused by these activities. The main focus of this research is on a deep understanding of the applicable legal framework, the effectiveness of law implementation, and policies related to the enforcement of silica sand mining activities in Natuna. Additionally, this paper explores environmental impacts such as ecosystem damage, soil degradation, water and air pollution, and the social impacts that occur. The primary objective of this research is to provide significant input towards environmental protection through the appropriate application of laws and support the development of more effective regulations and policies, in order to minimize the environmental damage impacts caused by silica sand mining activities in Natuna.

II. LITERATURE REVIEW

Silica sand, consisting mainly of silica or silicon dioxide (SiO2), is a widely used natural material in the construction industry for making concrete, ceramics, glass, ferrosilicon, and other materials. Its properties include high strength, corrosion and weather resistance, binding and tightening abilities, and support for plant growth in agriculture. Uniform size and consistency also make silica sand ideal for particle size-based separation processes in filtration and chemical industries. However, inhaling silica sand particles can pose health risks like silicosis. Silica sand mining, where silica sand is extracted, involves digging or drilling into the earth's layers containing the sand. This sand, containing 95 to 99% silicon dioxide, is processed through washing, drying, sorting, magnetic separation, and chemical purification. These mines are found in countries with significant silica sand deposits, like the USA, China, Russia, and Brazil. Environmental and safety regulations are crucial in mining, as it can impact forests, water ecosystems, and cause air pollution and soil erosion.

Environmental damage from silica sand mining includes deforestation, soil erosion, water ecosystem disruption, air pollution, and freshwater scarcity. Responsible mining practices, environmental monitoring, eco-friendly methods, and land rehabilitation post-mining are essential to mitigate these damages. Indonesian law governs silica

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sand mining through the 2009 Mineral and Coal Mining Law. This includes mining permissions, environmental and safety regulations, government monitoring, and sanctions for violations. Thus, mining regulation involves mining laws, permits, environmental and work safety, inspections, and legal actions for non-compliance.

Silica sand, or "pasir silika," is a mining material high in silicon dioxide (SiO2). Its potential as a resource largely depends on the presence of silica-rich sand deposits in a region. Factors determining this potential include the existence of silica sand deposits with high silicon dioxide concentration, influenced by geological factors like volcanic activity. The quality of silica sand is crucial; it should have high silicon dioxide concentration, typically over 95%, and low levels of undesirable elements like iron oxide. Accessibility and volume of these deposits are important, as well as environmental quality surrounding these deposits, considering the potential environmental impacts of silica sand mining and processing, like soil erosion and air or water pollution. Market demand also influences the potential, as silica sand is used in various industries such as glass, construction, chemicals, and electronics.

To sustainably harness silica sand resources, further exploration and research are necessary to understand the extent of resources in a region and develop environmentally friendly mining practices. Potential sources of silica sand data can be found through government agencies like the Department of Mining and Energy or Geological Agencies, academic research, silica sand industry companies, industry associations, and public libraries or research institutions with access to geological and mining databases, including global projects like the United States Geological Survey's Global Mineral Resource Assessment Project. Silica sand is widely used in construction, electronics, glass, ceramics, and cosmetics. It can be obtained from natural deposits in alluvial sands, riverbeds, or crustal sands, as well as through river filtration, coastal deposits, industrial waste processing, and sustainable mining methods like seabed mining and green technology processing of natural sands. However, silica sand mining activities have serious environmental impacts, including land damage, water pollution, air pollution, soil erosion, and biodiversity loss. These impacts call for strict protection measures and appropriate monitoring policies to safeguard the environment from the negative effects of silica sand mining.

III. METHODOLOGY

The research methodology for studying the legal aspects of silica sand mining activities in Natuna and their environmental impacts encompasses several approaches:

1. **Normative Legal Research Method**: This involves a thorough study of existing legal regulations relevant to silica sand mining in Natuna. The researcher will deeply examine laws related to silica sand mining and environmental protection to find applicable legal solutions.
2. **Empirical Legal Research Method**: This approach involves collecting empirical data through interviews, observations, or questionnaires with relevant parties such as government officials, miners, environmental activists, and local communities. The gathered data will be used to understand the legal realities and illustrate the environmental impacts caused by silica sand mining activities in Natuna.
3. **Comparative Research Method**: This method involves comparing the laws applicable in Natuna with those in other regions with similar geographical conditions and environmental issues. The researcher will compare and analyze how laws against silica sand mining activities are implemented in other areas and the resulting environmental impacts.
4. **Interdisciplinary Research Method**: This approach involves a cross-disciplinary perspective, where the researcher collaborates with experts from various fields like law, environmental science, geology, and socio-economics. The goal is to gain a more comprehensive understanding of the various aspects related to silica sand mining activities and their environmental impacts.

   Based on these research methods, the author can develop a research framework to examine the legal construction of silica sand mining activities in Natuna and the resulting environmental damages.

IV. RESULT AND DISCUSSION

The regulation of silica sand mining in Natuna, Indonesia, involves various legal frameworks and laws. The primary law governing mining activities is the 2009 Law on Mineral and Coal Mining, which provides a framework for all mining activities, including sand mining. Additionally, the 2010 Government Regulation on the Implementation of Mineral and Coal Mining Activities details the execution and supervision of mining activities, including sand mining. Regional regulations, such as the West Java Provincial Regulation on Silica Sand Mining Master Plan, further define the location of sand mines, licensing requirements, and environmental management plans. Environmental and occupational safety regulations must also be adhered to by companies or individuals involved in sand mining. Enforcing these regulations involves multiple agencies and departments responsible for overseeing and implementing these rules. Key agencies include the Ministry of Energy and Mineral Resources, responsible for regulating and supervising the mining sector; the

Environmental Management Agency, which monitors environmental impacts and grants environmental permits; the Police, particularly the Special Criminal Directorate, enforcing laws against illegal mining; the Prosecutor's Office, investigating and prosecuting legal violations in mining; the Ministry of Environment and Forestry, managing and conserving the environment and imposing administrative sanctions for environmental violations; and the Corruption Eradication Commission, targeting corruption in sand mining activities. The involvement of other agencies like the Ministry of Public Works and Housing in supervision and licensing is also crucial.

Challenges in enforcing these regulations include raising public awareness about the importance of environmental conservation, strengthening law enforcement against environmentally harmful mining activities, overcoming resource limitations, fostering stronger partnerships among stakeholders, and changing behaviors of those involved in harmful mining practices. Addressing these challenges requires comprehensive and collaborative efforts among the government, society, and the private sector. Environmental protection and natural resource conservation are key issues in Indonesia. Government initiatives include establishing conservation areas, combating illegal logging and fishing, promoting renewable energy, and educating the public about environmental conservation. However, challenges like ongoing illegal logging and climate change threats persist, demanding ongoing commitment and actions.

Implementing environmental protection measures in silica sand mining involves conducting comprehensive environmental studies, effective waste management plans, dust control measures, air quality monitoring, and implementing rehabilitation plans. Training and collaboration with relevant parties are essential for sustainable environmental management.

Community involvement in environmental monitoring is vital for sustaining natural resources and protecting the environment. Community roles include raising awareness, reporting violations, overseeing mining licenses, advocating for stricter environmental policies, and participating in environmental management planning. For environmental sustainability in silica sand mining, comprehensive environmental assessments, reducing environmental impacts, strict monitoring and recovery efforts, local community involvement, and research and innovation are crucial. Adapting policies and practices to support sustainable management is key to mitigating environmental impacts and responsibly managing resources.

V. CONCLUSION

The main conclusions of the study may be presented in a short Conclusions section, which may stand alone or form a subsection of a Discussion or Results and Discussion

section. The conclusion section should lead the reader to important matter of the paper. It also can be followed by suggestion or recommendation related to further research. Limitation and contribution of research should be addressed in this section.

The research titled "Legal Construction of Silica Sand Mining Activities in Indonesia (Natuna) Causing Environmental Damage" provides several key conclusions and implications:

1. **Environmental Law Analysis**: The paper reveals weaknesses in the current legal framework for environmental protection in the context of silica sand mining in Natuna, Indonesia.
2. **Causes of Environmental Damage**: It shows that silica sand mining in Natuna causes significant environmental damage, affecting both terrestrial and marine ecosystems. This includes biodiversity loss, land degradation, and water pollution.
3. **Failure in Law Enforcement**: There is a noted failure in law enforcement against these mining activities, attributed to a lack of environmental awareness, prevalent corruption, and inadequacies in the legal framework.
4. **Need for Legal Changes**: The research advocates for legal amendments to strengthen environmental protection, suggesting heightened legal sanctions for violators and enhancements in the legal framework for more effective regulation of silica sand mining.
5. **Role of Government and Society**: The study emphasizes the crucial roles of both government and society in environmental conservation. It recommends that the government should enhance supervision over mining activities and encourage the use of eco-friendly technologies, while society should be engaged in monitoring and reporting environmental transgressions.

The paper's insights into the legal and environmental aspects of silica sand mining in Natuna highlight the urgent need for improved environmental protection through legal reforms and active stakeholder participation.

Implications and Relevance:

The research carries significant implications and relevance:

1. **Environmental Implications**: It discusses the detrimental impact of silica sand mining on the environment in Natuna, highlighting potential long-term ecological losses.
2. **Social Implications**: The study outlines the adverse social consequences of irresponsible mining practices on local communities, such as fishermen, who rely on natural resources for their livelihood.
3. **Legal Implications**: It critically examines Indonesia's existing legal framework for silica sand mining in Natuna, assessing its adequacy in protecting the

environment and local communities, and suggests potential areas for legal improvement.

The paper's relevance lies in its contribution to the discourse on sustainable and equitable natural resource management in Indonesia, underlining the need for a comprehensive approach encompassing legal, environmental, and social considerations. Effective legal reform and adherence to environmental and community welfare standards are key to ensuring sustainability and equity for all parties involved.

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