

Study of the Public Health Impact Due to Environmental Pollution by Mining Activities in the District. Berau – East Kalimantan, in the perspective of Law No. 23 of 2009 concerning Environmental Protection and Management

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Abstract

Mining activities in Berau Regency, East Kalimantan, have made a significant contribution to the economy, but have also had a negative impact on the environment and public health. This research aims to examine the impact on public health due to environmental pollution by mining activities, as well as the effectiveness of implementing Law No. 23 of 2009 concerning Environmental Protection and Management. The research uses a normative and empirical juridical approach using interview, observation and document analysis methods. The research results show that there is a relationship between environmental pollution and increased morbidity and mortality in communities around the mine. The conclusion of this study recommends improving environmental management and implementing public health protection policies.

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1. INTRODUCTION

Mining activities have an important role in the national economy, especially in resource-rich areas such as Berau Regency, East Kalimantan. Mining in this region has made a significant contribution to economic growth, including increasing Regional Original Income (PAD), job creation and infrastructure development. However, on the other hand, this activity often causes environmental pollution which has a serious impact on public health. These impacts include degradation of air, soil and air quality, which ultimately increases the prevalence of diseases, such as acute respiratory infections (ARI), skin disorders and other chronic diseases among local communities.

In context *to be there* (what exists), the reality on the ground shows that environmental pollution due to mining activities is still a serious problem. Even though there are regulations governing environmental and health management, such as Law No. 23 of 2009 concerning Environmental Protection and Management (PPLH), their implementation at the regional level is often weak. Ineffective supervision, minimal sanctions for violators, and low budget allocation for mitigating environmental impacts are obstacles that are often encountered.

Rather, in perspective (what should be), the ideal goal of environmental management and protecting public health is to create a balance between the economic benefits generated by mining activities and efforts to protect the environment and public health. Law No. 23 of 2009 and Law No. 36 of 2009 concerning Health provide a clear legal framework to

realize this balance. Ideally, implementation of these regulations is carried out through concrete steps, such as the implementation of a comprehensive Environmental Impact Analysis (AMDAL), granting strict environmental permits, and regular monitoring of mining operations.

This research raises two main issues that attempt to bridge *to be there* and *there should* as follows;

- First, the effectiveness of implementing Law No. 32 of 2009 in providing legal protection to communities affected by mining activities.
- Second, protecting public health in accordance with Law No. 36 of 2009. This research aims to determine the extent to which existing regulations are able to overcome the problems that occur, as well as provide recommendations for improvements that can be implemented to support better environmental management and public health protection in the future. .

By making Berau Regency the focus of the study, this research offers a comprehensive perspective on the challenges and opportunities in managing the environmental and health impacts of mining activities. This approach is not only relevant for academics and practitioners, but also for policy makers responsible for planning and monitoring in the mining sector.

2. RESEARCH METHOD

This research uses a normative juridical approach combined with empirical methods to analyze the impact of environmental pollution due to mining activities on public health in Berau Regency, East Kalimantan. This approach allows researchers to understand the implementation of existing regulations and relate them to reality on the ground.

A. Research Design

This research design includes the following key elements;

1. Juridical Normative Approach.

Review relevant laws and regulations, including Law no. 23 of 2009 concerning Environmental Protection and Management (PPLH) and Law no. 36 of 2009 concerning Health. The focus is on understanding the legal norms and policies that form the basis of environmental protection and public health.

2. Empirical Approach:

Using primary data through field observations, interviews and questionnaires to get a real picture of the environmental and public health impacts experienced around mining sites.

3. Combination Analysis (Descriptive and Quantitative).

Combining qualitative and quantitative analysis to find correlations between mining activities, environmental impacts, health impacts, and regulatory implementation.

B. Research Procedures

This research procedure was carried out through the following stages:

1. Planning Stages:

- a. Identify problems through literature studies and government reports.
- b. Determining the research location, focusing on the area around the mine in Berau Regency.
- c. Preparation of research instruments, such as interview guides, questionnaires, and field observation formats.

2. Level of Data Collection:
 - a. Document Study.
Review AMDAL documents, public health reports and environmental statistics from relevant agencies.
 - b. Observation Field.
Directly monitor the physical environmental conditions around the mine to identify the impact of pollution.
 - c. Interview:
Involving affected communities, government officials and mining company representatives to explore subjective data.
 - d. Statistical Data Collection.
Collecting data on community morbidity and mortality from reports from the Berau District Health Service.
3. Level of Data Analysis.
 - a. Data processing.
Group data based on variables such as economy, environment, and health.
 - b. Correlation Analysis.
Compare quantitative data to find relationships between mining activities and their impacts on health and the environment.
 - c. Data Validation.
Triangulation was carried out by comparing the results of interviews, field observations and official document studies.

C. Research Algorithm

This research process is described in the following algorithm:

1. Initial Data Input.
Includes literature, AMDAL reports, and public health statistical data.
2. Field Data Collection.
Direct observation, interviews, and statistical data collection.
3. Data Classification.
Grouping data based on research variables: economic, environmental, and health.
4. Analysis Data.
 - a. Qualitative: Descriptive of the impacts of pollution and legal policies.
 - b. Quantitative: Statistical analysis of the impact on community morbidity and mortality.
5. Evaluation with Regulations.
Comparing research results with Law no. 23 of 2009 and Law no. 36 of 2009.
6. Output:
Policy recommendations for mitigating environmental impacts and improving public health.

D. Tables and Diagrams

Table 1. Mining Impact Variables

Variable	Economy	Environment	Health
Regional Income	✓	-	-

Variabl e	Econ omy	Enviro nment	Health
Air Pollutio n	-	✓	✓
Commu nity Morbidi ty	-	-	✓

Research Flow Diagram

Shows a flow diagram explaining the research steps, from initial data collection to policy recommendations.

Research Flow Diagram includes:

Input Data → Field Data → Impact Analysis → Evaluation of the Law → Preparation of Recommendations

1. Data Input (Literature and Statistics). To compare problems between the benefits of activities, results, economic benefits and health impacts for the community.
2. Data Collection (Interviews and Observations). To obtain factual information in the field regarding mining activities and their impacts
3. Analysis (Qualitative and Quantitative) on the impacts caused, whether there are preventive actions and handling of existing problems
4. Evaluation of Results against Regulations in the licensing and supervision process
5. Prepare recommendations to anticipate impacts and next steps for improvement in governance, reclamation systems and law enforcement.

Additional explanation of this research method;

This research not only identifies impacts but also the extent to which regulations can be an effective instrument in mitigating environmental and health impacts due to mining activities. The resulting recommendations aim to strengthen synergy between government policies, business actors and society to create hatred towards the environment.

3. RESEARCH RESULTS AND DISCUSSION

RESEARCH RESULT

1. Economic Impact

Mining activities increase regional income by 70%, but only 10% of this income is allocated to environmental and public health programs.

Aspect	Percentage
Regional Income	70%
Environmental and Health Impacts	10%

2. Environmental Impact

- Water pollution due to mining waste causes 65% of water sources around mines to be unfit for consumption.
- Air pollution increases to exceed the threshold.
- Soil degradation causes damage to local ecosystems.

3. Health Impact
 - Increase in ISPA cases by up to 45% in affected areas.
 - The emergence of skin diseases due to water contamination.
 - Chronic diseases such as cancer are starting to be detected in the population around the mine.
4. Handling Actions

Only 30% of environmental management recommendations are implemented. Public health programs, such as routine check-ups, are still limited.

DISCUSSION

1. Effectiveness of Implementation of Law no. 32 of 2009.

This research identified a number of weaknesses in the implementation of Law no. 32 of 2009 concerning Environmental Protection and Management (PPLH). This law mandates sustainable environmental management through various instruments, including AMDAL, environmental permits, and sanctions for violations. However, research results show that the effectiveness of implementing this regulation is still far from expectations due to the following factors:

- Weaknesses in Supervision: Local governments have limited human and technical resources to monitor mining companies' compliance with environmental regulations.
- Low Law Enforcement: Many environmental violations by mining companies are not responded to with adequate legal action, either due to weak evidence or conflicts of interest.
- Lack of Environmental Education and Awareness: The public and business actors often do not fully understand their responsibilities towards environmental conservation.

2. Legal Protection Based on Law no. 36 of 2009

In the context of public health, Law no. 36 of 2009 concerning Health provides a legal framework to protect the public from health threats resulting from environmental pollution. However, the implementation of this protection also faces various obstacles, including:

- Limitations of Preventive Programs: Public health programs tend to focus on treatment rather than prevention, so that the health impacts of environmental pollution such as respiratory and skin diseases are not treated effectively.
- Lack of Integration Between Sectors: Coordination between environmental services and health services is often not optimal, so that control of contamination at the source is not carried out in an integrated manner.
- Infrastructure and Budget Constraints: Affected areas, especially remote areas around mines, often lack adequate health facilities.

3. Correlation of Mining Activities, Environmental Damage, and Public Health

Mining activities have a multidimensional impact on the economy, environment and public health. Some important points of this correlation include:

A. Mining Activities and Economic Development.

Mining makes a significant contribution to regional income and employment, but these economic benefits are often disproportionate to the environmental damage and health impacts they cause.

- Positive impact:

Increased regional income through royalties and taxes.

Absorption of local labor.

- Negative impact:
 - Inequality of budget allocation, where only a small portion is allocated to environmental and health programs.

B. Environmental Impact.

Coal mining in Berau Regency causes air, soil and air pollution. The AMDAL report shows that more than 60% of the air around the mine is contaminated with heavy metals such as mercury and arsenic. In addition, blasting and mining activities produce dust and air pollution which affects the quality of life of local communities.

C. Public Health Impact.

Health impacts due to environmental pollution include:

- Respiratory Disorders: Acute Respiratory Infections (ARI) are one of the most frequently reported diseases.
 - Skin Diseases: Air contamination increases the incidence of dermatitis and other skin diseases.
 - Chronic Diseases: Long-term exposure to heavy metals can increase the risk of cancer and internal organ disease.
4. Preventive Actions and Health Recovery Efforts to address public health impacts include:
- Prevention Program: Health education, mask distribution, and monitoring drinking water quality.
 - Health Recovery: Routine medical examinations and provision of treatment to affected communities.
 - Strengthening Health Infrastructure: Construction of health facilities closer to mining sites.
5. Law Enforcement Effective law enforcement requires:
- Strict Sanctions: Imposing fines or revoking permits against companies that violate environmental regulations.
 - Transparency and Accountability: Increasing public participation in the process of monitoring and reporting violations.
 - Intersectoral Coordination: Cooperation between environmental services, health and law enforcement officials to ensure holistic policy implementation.

Percentage Correlation Table

Table 1. Impact of Mining on the Economy, Environment and Health

Aspect	Positive impact (%)	Negative impact (%)
Economy	70	30
Environmental damage	20	80
Health problems	10	90

Table 2. Level of Regulatory Implementation

Regulations	Optimal Implementation (%)	Still Needs Improvement (%)
UU no. 32 of 2009 (PPLH)	40	60
Law No.36 of 2009 (Health)	50	50

4. CONCLUSION

This research reveals that mining activities in Berau Regency make a significant contribution to the regional economy through increasing regional income and providing employment opportunities. However, these economic benefits cannot offset the negative impacts on the environment and public health. Environmental damage, including air, soil and air pollution, as well as reduced quality of life due to health problems, such as ARI, dermatitis and chronic diseases, are prominent impacts of mining activities.

UU no. 32 of 2009 concerning Environmental Protection and Management, which aims to ensure that ecosystems are not implemented optimally. Weak supervision, minimal sanctions for violators, and low public awareness and participation hamper the effectiveness of this regulation. Likewise, Law no. 36 of 2009 concerning Health, which aims to protect the public from health risks, still faces obstacles in its implementation. Public health programs are often reactive and do not address the root of the problem, such as controlling contamination at the source.

Wider Scope of Conclusion:

1. Economic and Social Inequality.

The economic benefits of mining are felt more by companies and the government, while local communities, especially those around mines, actually face social and health risks. This inequality creates a disparity between economic growth and societal welfare.

2. Weaknesses in the Surveillance System.

Local governments face challenges in ensuring mining companies' compliance with environmental regulations. Lack of experts, lack of monitoring technology, and potential conflicts of interest are the main obstacles.

3. Low Law Enforcement.

Sanctions applied for environmental violations often do not provide a deterrent effect. This has an impact on environmental pollution and degradation which affects public health in the long term.

4. Dependence on Environmentally Unfriendly Energy Sources.

Coal mining activities remain a mainstay in the national economy, even though its impact on climate change and the environment is clear. Policies that focus more on the clean energy transition need to be prioritized.

Recommendation:

1. Strengthening Supervision.

Local governments need to increase their supervisory capacity through expert training, use of technology such as satellite-based monitoring, and community involvement in reporting violations.

2. Increased Budget Allocation.

The majority of regional income from the mining sector must be allocated to environmental protection and public health programs, including the construction of health facilities in remote areas.

3. Education and Community Participation.

Increasing public awareness about the importance of environmental management and health can be done through community campaigns, involvement of local communities in mining waste management, and transparency of information about environmental impacts.

4. Revision of Policies and Regulations.

Environmental and health regulations need to be updated to be stricter in providing sanctions, tighten environmental permits, and encourage mining companies to adopt environmentally friendly technology.

5. Increasing Collaboration between Sectors.

Close cooperation between environmental services, health services, mining companies and communities must be a priority in creating holistic and sustainable policies.

Implementation of Law no. 32 of 2009 and Law no. 36 of 2009 must be strengthened through policy synergy, stricter supervision, and involvement of all stakeholders. Further research also needs to be directed at developing indicators of successful environmental and health management, as well as more inclusive community participation mechanisms.

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