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Research Article

Environmental and Social Impact Analysis of the Development of the Mrican Baru Final Disposal Site (TPA) in Ponorogo Regency

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Abstract

The issue of waste management in Ponorogo Regency is becoming increasingly complex as waste generation rises and the capacity of the existing Final Disposal Site (TPA) is limited. The development of the Mrican Baru TPA with a sanitary landfill system is planned as a long-term solution, but it has the potential to cause environmental and social impacts. This study aims to analyze the environmental conditions and the social perceptions of the community regarding the planned development of the Mrican Baru TPA. The research method used is quantitative with a descriptive-analytic approach. Data was collected through environmental quality measurements (water and air), distribution of questionnaires to surrounding communities, and the review of UKL-UPL documents and operational data from the Environmental Agency. The results show that the existing environmental quality conditions are still below environmental standards; however, there is potential for increased environmental pressure during the operational phase of the TPA. Community perceptions of the TPA development are moderately accepting, with the condition of strict environmental management and transparency of information. This study recommends strengthening the environmental monitoring system and enhancing community participation to ensure the sustainability of TPA operations.

Keywords: TPA, environmental impact, social impact, sanitary landfill.

INTRODUCTION

Waste management is one of the key challenges for sustainable development in urban and peri-urban areas. In Ponorogo Regency, the existing Mrican TPA has exceeded its capacity and still applies the open dumping system, which has led to environmental pollution and the emergence of social conflicts. The Ponorogo Regency Government plans to develop a new Mrican TPA with a sanitary landfill approach as an improvement to the waste management system. However, the establishment of the new TPA still requires a scientific study of the potential environmental and social impacts. This research is crucial to provide an empirical basis for environmentally sound and sustainable waste management policy-making.

2. METHOD

This study uses a quantitative method with a descriptive-analytic approach. The research location is around the planned site for the new Mrican TPA, in Mrican Village, Jenangan District, Ponorogo Regency. Primary data is obtained through environmental quality measurements (water and air) and community perception questionnaires using a Likert scale. Secondary data is collected from UKL-UPL documents, TPA operational reports, and population data from relevant agencies. Data analysis is performed using descriptive statistics and comparison against applicable environmental quality standards.

3. RESULT AND DISCUSSION

This section presents quantitative research results and an analytical discussion linking field findings to theory, regulations, and practices for sustainable landfill management. The discussion is conducted in stages, covering both physical and chemical environmental and social aspects.

3.1 Existing Environmental Conditions

The environmental conditions around the planned Mrican Baru landfill site were analyzed by measuring surface water and ambient air quality parameters. These measurements aimed to obtain a baseline picture of the environment before landfill construction activities began.

Surface water quality measurements showed that the pH was within the neutral range, while the BOD, COD, and TSS parameters remained below environmental quality standards. This indicates that the water bodies surrounding the study site have not experienced significant pollution. However, future waste management activities have the potential to increase the pollution load, particularly if the leachate management system is not optimally designed and operated.

Table 1. Results of Surface Water Quality Measurements Around the Landfill Location

Parameter	Measurement results	Quality standards	Information
pH	6.8	6–9	Fulfil
BOD (mg/L)	2.1	3	Fulfil
COD (mg/L)	18	25	Fulfil
TSS (mg/L)	22	50	Fulfil

Source: Primary research data

Ecologically, this condition is a crucial starting point for landfill development planning. The favorable environmental conditions provide an opportunity to maintain environmental quality through the implementation of sanitary landfill technology that meets standards.

3.2 Analysis of Potential Environmental Impacts Due to Landfill Operations

Although the existing environmental conditions are still considered good, a comprehensive analysis of the potential environmental impacts still requires consideration. Potential impacts include leachate pollution, landfill gas emissions, increased noise, and aesthetic disturbances.

Leachate management is a key issue in landfill management. Without an adequate treatment system, leachate has the potential to contaminate groundwater and surface water. Therefore, the implementation of an impermeable layer, a leachate drainage system, and multi-level treatment ponds are key prerequisites for the operation of the Mrican Baru landfill.

Furthermore, landfill gas emissions, such as methane and carbon dioxide, have the potential to impact air quality and environmental safety. Gas control through ventilation and gas capture systems is a critical component of sustainable sanitary landfill design.

3.3 Social Perception and Level of Community Acceptance

Social aspects are a key factor in the successful construction and operation of the landfill. A social perception analysis was conducted on 60 respondents living near the planned Mrican Baru landfill site using a Likert scale instrument.

Table 2. Results of Community Perception Scores on Landfill Construction

Rated aspect	Average Score	Category
Knowledge about landfill	3.6	Good
Environmental Risk Perception	3.2	Currently

Rated aspect	Average Score	Category
Acceptance Rate	3.8	Accept
Trust in Management	3.5	Enough

Source: Primary data from research results

This indicates that the public generally has a relatively good level of acceptance of the landfill development plan. However, this acceptance is conditional, depending on the local government's commitment to environmental management and information transparency.

3.4 Discussion from the Perspective of Sustainable Development

The findings of this study align with the concept of sustainable development, which emphasizes a balance between environmental, social, and economic aspects. The implementation of a sanitary landfill system serves not only as a technical solution for waste management but also as an environmental policy instrument to protect the community's quality of life.

Community involvement in the landfill planning and monitoring process is a crucial factor in enhancing the project's social legitimacy. Therefore, the management of the Mrican Baru Landfill needs to be directed towards a participatory approach that involves the community as partners, not simply as objects of development.

3.5 Implications for Environmental Policy and Management

Based on the research results, there are several policy implications that local governments need to consider. First, strengthening the environmental monitoring system on a regular basis is essential to ensure that landfill operations do not exceed the environmental carrying capacity. Second, information transparency and community involvement need to be institutionalized through formal mechanisms such as environmental communication forums.

With this approach, the construction of the Mrican Baru TPA is expected to not only solve the waste problem, but also become a model for sustainable and socially just environmental management.

4. CONCLUSION

The construction of the Mrican Baru landfill is generally environmentally sound and socially acceptable, provided that a consistent sanitary landfill system is implemented and environmental management and monitoring are ongoing. Community involvement and information transparency are key factors in increasing social acceptance of the landfill.

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