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Application of Green Accounting and Implementation of Circular Economy in Inorganic Waste Processing

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Abstract:

Purpose:
This study aims to analyze the application of green accounting and the implementation of a circular economy business model in inorganic waste processing in Tegal Tugu Village. Green accounting, which focuses on recording and managing environmental impacts, is expected to help measure and manage natural resources more sustainably. Meanwhile, the circular economy offers an approach to recycling and reusing inorganic waste to create economic value and reduce waste.

Methodology:
The research method used is a case study with a qualitative approach, involving interviews with stakeholders in the village and analysis of documents related to waste management.

Findings:
The results of the study indicate that the application of green accounting in inorganic waste processing can provide economic and environmental benefits. However, challenges related to public awareness and infrastructure availability still need to be overcome.

Implication:
In addition, the implementation of a circular economy business model has contributed to waste reduction and the creation of new economic opportunities at the village level. This study suggests increasing collaboration between the government, community, and private sector to strengthen the implementation of both concepts in order to create sustainability in waste management in the village.

INTRODUCTION

Effective waste management is one of the biggest challenges in environmental sustainability. One type of waste that is increasing in volume is inorganic waste, which requires special attention due to its long decomposition rate and its impact on the environment (Mikalef et al., 2019). Therefore, the application of the principles of circular economy and green accounting is very important in managing inorganic waste sustainably. In a circular economy, waste is not considered a problem but rather a resource that can be recycled and reused in the production process (Laksmi et al., 2024). Meanwhile, green accounting or environmental accounting focuses on measuring, recording, and reporting the environmental impact of economic activities, which helps companies or communities to make more environmentally friendly and sustainable decisions (Saputra et al., 2021).

Waste management is becoming a global issue that is increasingly urgent to solve, especially with the increasing amount of waste produced by a growing population (Oktaviari et al., 2023). One type of waste that is quite challenging to manage is inorganic waste, which consists of materials that are not easily decomposed naturally, such as plastic, glass, and metal (Sancaya & Saputra, 2024). Inorganic waste, if not managed properly, can cause serious environmental impacts, including soil, air, and water pollution. Therefore, sustainable inorganic waste management requires a more innovative and integrated approach (Saputra et al., 2021).

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One approach that can be applied to address the problem of inorganic waste is to use the concept of a circular economy. A circular economy is an economic model that focuses on more efficient resource circulation by reducing waste and optimizing the reuse of materials (Saputra & Paranoan, 2024). In the context of waste management, a circular economy offers solutions through the principles of reduce, reuse and recycle that allow inorganic waste to be processed and reused, thereby reducing dependence on limited natural resources (Saputra et al., 2024).

However, to ensure that the principles of the circular economy are implemented effectively, transparent monitoring and reporting of the environmental impacts of these economic activities are needed. It is where green accounting or environmental accounting plays an important role (Malihah & Magfiroh, 2024). Green accounting is an accounting method that measures and reports the economic impacts of decisions related to the environment, such as waste management (Saputra et al., 2023). By using green accounting, villages or communities can evaluate the extent to which the implementation of the circular economy can provide economic benefits while reducing negative impacts on the environment (Calderon-Monge & Ribeiro-Soriano, 2023).

In Tegal Tugu Village, located in an area with abundant natural resource potential, inorganic waste management is one of the issues that must be faced. In recent years, this village has tried to implement the concept of a circular economy as part of a sustainable development strategy. By involving the community in the waste processing process, this village aims to raise awareness of the importance of more environmentally friendly waste management and create new economic opportunities through the utilization of existing inorganic waste. The application of green accounting in this process allows related parties to assess the effectiveness of waste management from an environmental and economic aspect and helps in making better decisions for the sustainability of the village (Ben Arfi et al., 2018; Hou et al., 2019; Zubaidi, 2024; Khan & Gupta, 2023).

This article aims to analyze the application of green accounting and the implementation of a circular economic business model in inorganic waste processing in Tegal Tugu Village. This study is expected to provide deeper insight into how the two concepts can be integrated in an effort to manage waste sustainably. Through this analysis, a waste management model can be found that is not only environmentally friendly but also provides optimal economic benefits for the village community (Antari et al., 2023).

Circular Economy. A circular economy is an economic approach that focuses on minimizing waste and maximizing the value of every resource used (Plastinina et al., 2019). In the context of your research, the implementation of a circular economy is relevant to improving the efficiency of inorganic waste management in Tegal Tugu Village while also supporting the implementation of green accounting as an effort to record the economic value of environmentally friendly practices (Hou et al., 2019).

Green Accounting. Green accounting is an accounting system that integrates environmental values into financial reports. In Tegal Tugu Village, the implementation of green accounting is carried out through (Díaz-Gil, 2024):

1. Calculation of Environmental Costs. Costs associated with waste collection, sorting, and processing are recorded in detail, including the investment costs for recycling equipment and community training.
2. Measurement of Economic and Environmental Benefits. Benefits such as reduced carbon emissions and improved soil quality due to waste reduction are calculated to demonstrate the positive impact of the waste management program.
3. Transparency Reporting. Financial reports that include environmental costs and benefits are published to the public as a form of accountability.

Inorganic Waste Management. Inorganic waste management is a systematic effort to manage non-biodegradable waste, such as plastic, glass, metal, and paper, so that it does not pollute the environment (Bagheri et al., 2021). This process involves sorting waste at the source level, collecting it, and processing it through various methods such as recycling, upcycling, or converting it into new products with economic value (Yang et al., 2023).

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For example, plastic can be processed into construction materials such as paving blocks or handicrafts, while glass and metal can be melted and reused in industry.

Inorganic waste processing aims to reduce the volume of waste that ends up in landfills (TPA), minimize environmental pollution, and save natural resources (Camilleri-Fenech et al., 2020). In addition to providing positive environmental impacts, this management also creates economic opportunities through recycling activities and community empowerment (Saputra, Manurung, et al., 2021). Thus, inorganic waste processing not only supports environmental sustainability but also contributes to social and economic development.

METHODS

This study uses a qualitative descriptive method to analyze the processing of inorganic waste at the Tegal Tugu Landfill, focusing on the implementation of management, environmental impacts, and economic potential. Data were collected through in-depth interviews with landfill managers, recycling workers, surrounding communities, and village government officials involved to understand the waste management process, the challenges faced, and the economic and environmental benefits generated. In addition, participatory observation was conducted by directly observing activities at the landfill, such as sorting, recycling, and making products from waste. Documentation in the form of activity reports, management records, and photos and videos were also used as supporting data. The data obtained were analyzed thematically to identify key patterns. They used simple descriptive analysis to measure economic and environmental impacts, such as the volume of waste managed and the amount of waste successfully recycled. Data validity was maintained through triangulation with various sources of information, as well as discussions with landfill managers and academics to strengthen the research results. This approach provides a comprehensive picture of inorganic waste management at the Tegal Tugu Landfill, including successes, challenges, and opportunities for future improvement.

RESULTS AND DISCUSSION

The results of the study indicate that the implementation of green accounting in Tegal Tugu Village has begun. However, it has not been fully integrated into the formal financial recording system (Khan & Gupta, 2023). The waste bank, as the main actor in inorganic waste management, has recorded operational costs, such as transportation and purchasing recycling equipment, as well as economic benefits from the sale of recycled products (Patwa et al., 2021). In addition, the environmental impact is measured by simple indicators, such as the reduction in the volume of waste disposed of in landfills (TPA), which reached 30% in the last six months. However, more structured measurements related to environmental impacts, such as carbon emissions that have been successfully reduced, still require further development (Bala et al., 2024; Pedersen et al., 2021).

The implementation of a circular economy in this village has been quite effective through initiatives such as waste banks, recycling, and community education. Around 70% of households are actively involved in waste bank activities, where inorganic waste is exchanged for incentives in the form of money or necessities. Plastic waste is processed into handicraft products, while glass and metal are sold to recycling factories, resulting in an increase in income of up to 40% for waste bank managers and local business actors (Li et al., 2020; Pender et al., 2024). The economic impact is also felt by the community, with the average household income from waste bank activities reaching IDR 250,000 per month.

In terms of the environment, the implementation of the circular economy model has succeeded in reducing the volume of waste disposed of in landfills by up to 2 tons per month while reducing the risk of environmental pollution (Alkaraan et al., 2023). However, some challenges must be overcome, such as the limitations of recycling infrastructure, which is still simple and public awareness that is not evenly distributed. Continuous education and investment in recycling facilities are needed to increase the effectiveness of inorganic waste management. In

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addition, government support in the form of incentive policies and funding can accelerate the transition of this village towards sustainable waste management (Marsh et al., 2022).

Overall, the implementation of green accounting and the implementation of a circular economy in Tegal Tugu Village has had a positive impact both economically and environmentally. With further development and active community participation, this village has the potential to become a model of a sustainable village that is able to utilize waste as an economic resource while preserving the environment (Belaud et al., 2019; Plastinina et al., 2019).

Green accounting is an approach that integrates environmental aspects into financial reporting, aiming to create transparency regarding the impact of economic activities on the environment (Ardini & Fahlevi, 2024). In the context of inorganic waste processing, the application of green accounting can help companies identify environmental costs associated with waste management, such as cleaning costs, processing costs, and other negative impacts (Khan & Gupta, 2023).

The circular economy model, on the other hand, focuses on waste reduction through reuse, recycling, and re-utilization of resources. Implementing this model in inorganic waste processing can increase resource efficiency and reduce dependence on new raw materials (Velenturf & Purnell, 2021). In practice, companies can adopt environmentally friendly technologies to process inorganic waste into value-added products (Patwa et al., 2021).

The collaboration between green accounting and the circular economy creates positive synergies (Calderon-Monge & Ribeiro-Soriano, 2023). By properly recording environmental costs and benefits, companies can evaluate the effectiveness of recycling and waste reduction strategies (Díaz-Gil, 2024). In addition, transparency in financial reports can attract environmentally conscious investors.

CONCLUSION

In conclusion, the processing of inorganic waste at the Tegal Tugu landfill is a strategic step in managing waste that is difficult to decompose to create a cleaner and more sustainable environment. Through initiatives such as waste sorting, recycling, and making products with economic value, this management has succeeded in reducing the volume of waste entering the landfill, reducing environmental pollution, and creating economic opportunities for the local community. Although it has had a positive impact, optimizing waste management at the Tegal Tugu landfill still requires infrastructure improvements, a green accounting-based recording system, and more massive public education. With collaboration between the government, managers, and the community, the Tegal Tugu landfill can be an example of effective and sustainable circular economy-based inorganic waste management.

Suggestions. To support the sustainability of inorganic waste management in Tegal Tugu Village, several strategic steps are needed. First, investment in infrastructure, such as more sophisticated recycling machines and waste sorting facilities, needs to be increased to optimize waste processing. In addition, the green accounting system must be strengthened by including more structured environmental impact measurements, such as reduced carbon emissions and waste reduction. Continuous community education is also important to increase awareness and participation in circular economy programs, for example through waste sorting training and making recycled products. The village government is also advised to establish partnerships with the private sector and non-profit organizations to support funding and training and expand the marketing of recycled products to a wider market. On the other hand, providing incentives, such as subsidies or awards for residents and business actors who are active in waste management, can increase community motivation and participation.

The development of more innovative and economically valuable recycled products, such as furniture or construction materials from waste, can also be a priority to expand economic benefits. Finally, regular monitoring and evaluation are needed to assess the effectiveness of ongoing programs and identify obstacles faced so that strategic steps can be adjusted to the needs of the village. These steps are expected to strengthen the success of Tegal Tugu Village in becoming a model of a sustainable and environmentally friendly village.

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