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Circular Economy Approach in Organic Waste Processing as an Effort to Implementation of Green Accounting

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Abstract—Application of circular economy and green accounting in organic waste management in Tegalalang Village, Gianyar, Bali. With the increasing amount of waste due to population growth and tourism, this village faces significant challenges in waste management, especially organic waste. The application of circular economy principles through the separation, processing, and utilization of organic waste into compost and biogas has succeeded in reducing the volume of waste and creating new economic value. In addition, green accounting is integrated to measure environmental impacts, record costs, and benefits, and increase transparency in resource management. The results of the study show that the combination of circular economy and green accounting not only increases public awareness of sustainability but also strengthens the competitiveness of local products and supports sustainable agriculture. Thus, Tegalalang Village becomes a model for the implementation of sustainable waste management practices in Indonesia.

Keywords: circular economy; environment; green accounting; organic waste; waste management

Introduction

In recent decades, rapid population growth and increasing consumption levels have resulted in a significant increase in waste production, especially organic waste. According to data from the Central Bureau of Statistics, organic waste accounts for almost 60-70% of the total waste produced in various regions. This situation has caused many problems, ranging from environmental pollution, public health impacts, to an increasingly heavy economic burden on the government and society (Saputra & Paranoan, 2024). Organic waste, consisting of food scraps, agricultural waste, and plant parts, can be a very valuable resource if managed properly. However, most of it still ends up in landfills (TPA), which not only take up space but also create greenhouse gas emissions such as methane. Methane is a gas that is much more harmful to the environment than carbon dioxide, so improper handling can worsen climate change. Therefore, a new, more sustainable approach to waste management is needed (Homayoun et al., 2023).

The circular economy approach has emerged as an innovative and sustainable solution to this problem. In the circular economy model, waste is not considered as the end of a process, but as a resource that can be reused (Pender et al., 2024). This principle encourages the reuse of materials and energy, and extends the useful life of products. In the context of organic waste, this means converting waste into useful products, such as compost that can be used for agriculture or biogas that can be used as an energy source. This approach not only reduces the volume of waste that must be managed, but also creates new economic value (Saputra et al., 2024).

The implementation of a circular economy requires a change in the way society and business actors view waste. Public education and awareness are key to encouraging active participation in waste management programs. In addition, collaboration between the government, private sector, and society is also very important to create a supportive ecosystem (Belaud et al., 2019). Policies and regulations that support circular economy initiatives must be implemented, including incentives for companies that implement sustainable practices. In this process, green accounting becomes a very important aspect. Green accounting is a reporting system that integrates environmental aspects into the management and reporting of a company's finances (P. A. Khan et al., 2021). With green accounting, companies can measure and report the environmental impact of their activities more transparently. This includes measuring carbon emissions, energy use, and waste management. Thus, companies not only focus on profitability, but also consider the social and environmental impacts of their operations (Saputra et al., 2021).

Implementing green accounting in organic waste management also helps companies make better decisions. For example, by knowing the costs associated with waste management, companies can find ways to reduce waste and improve operational efficiency (Saputra et al., 2023). This not only benefits the company in terms of costs but also contributes to broader sustainability goals. From an economic perspective, a circular economy approach can create new opportunities. By processing organic waste into valuable products, such as compost or renewable energy, companies can open new markets and increase competitiveness (Saputra & Laksmi, 2024). In addition, better waste management can reduce costs associated with waste disposal and minimize negative impacts on the environment.

Awareness of the importance of sustainable waste management is increasing, both at the individual and corporate level. People are increasingly realizing that small actions, such as sorting waste at home and participating in composting programs, can have a big impact (Ardini & Fahlevi, 2024). Companies are also starting to realize that sustainability is not just a trend, but a necessity for the future. Thus, the circular economy approach and green accounting can be key pillars in creating a cleaner and more sustainable environment (Hellmeister & Richins, 2019). Overall, the circular economy approach in organic waste management is an important step to address the increasingly complex waste problem. Through the implementation of green accounting, it is hoped that there will be a greater awareness of the importance of sustainability and social responsibility.

With strong collaboration between all stakeholders, we can create an ecosystem that is not only economically profitable, but also maintains environmental sustainability for future generations.

Literature Review

Circular Economy

A circular economy is an economic model that aims to reduce waste by retaining the value of products, materials, and resources in the economy for as long as possible. According to the Marsh et al. (2022), a circular economy can be achieved through better product design, efficient resource management, and innovation in production processes. Research by Ramírez-Agudelo et al. (2021) shows that implementing circular economy principles can reduce environmental impacts, increase resource efficiency, and create new economic opportunities.

Organic Waste Processing

Organic waste processing is one of the main focuses in the circular economy. According to Awasthi and Li (2017), processing organic waste through methods such as composting and biogas production not only reduces the volume of waste but also produces useful products. Research by Omune et al. (2021) shows that composting can reduce greenhouse gas emissions and improve soil quality.

Green Accounting

Green accounting is a practice that integrates environmental aspects into financial reporting and corporate governance. According to Saputra et al. (2021), green accounting helps companies measure the environmental impact of their operations, as well as encourage transparency in reporting. Research by Ardini and Fahlevi (2024) shows that companies that implement green accounting have better environmental performance and improve their reputation in the eyes of stakeholders.

Integration of Circular Economy and Green Accounting

The integration of circular economy and green accounting has become the focus of recent research. According to Arruda et al. (2021), the application of green accounting in the context of a circular economy can increase corporate awareness of environmental impacts and encourage more sustainable resource management practices. This study shows that companies that implement both approaches can achieve competitive advantages and contribute to long-term sustainability (Marsh et al., 2022).

Method

The research method used in this study is a literature study, which aims to collect, analyze, and interpret relevant information from various literature sources related to the circular economy approach in organic waste processing and the implementation of green accounting. The following are the steps taken in this method: identification of topics and formulation of problems, consisting of 1) determining the focus of the research, namely the application of a circular economy in organic waste processing and its relevance to green accounting. 2) formulating research questions to be answered through literature analysis. Collection of literature sources, consisting of 1) collecting literature from various sources, including books, academic journals, research reports, and relevant policy documents. 2) using academic databases such as Google Scholar, JSTOR, and ScienceDirect to find articles and journals related to the topic. 3) ensuring that the selected sources are the most recent and have high credibility. Classification and categorization of sources consists of 1) grouping literature sources based on certain themes, such as the concept of a circular

economy, organic waste processing, green accounting, integration of a circular economy and green accounting, and challenges and opportunities in implementation. 2) Make a summary of each source to facilitate further analysis.

Results And Discussion

Organic Waste Management System

Tegalalang Village has an organic waste management system that includes sorting at the household level, processing at the TPS, and distribution of products such as compost. This system has succeeded in reducing waste to the TPA by 30%. The Village Head leads this initiative with the support of the community who actively supervise the implementation in the field (Saputra & Paranoan, 2024). Organic waste management in this village involves several main stages. First, the community is directed to sort waste from the household. The collected organic waste is then taken to the TPS to be processed into compost using traditional methods. In addition, biogas is also produced as an additional product that supports the community's energy needs. According to the village head, one of the waste managers in this village, this system is successful because of community involvement in every stage of management (Schindler & Demaria, 2020).

The management system begins with the collection of waste from households and agricultural areas. Communities are encouraged to sort their waste, separating organic waste from non-organic waste (Omune et al., 2021). Collection is carried out routinely by village officers, using special vehicles to transport organic waste to the processing location. One of the keys to the success of the waste management system in Tegalalang is the education program and public awareness campaign. The village government works with non-governmental organizations to educate residents about the importance of good waste management, especially the separation of organic waste. The program includes training on how to make compost and its benefits for agriculture. The village head stated that:

> *"The collected organic waste is then taken to an organic waste processing facility managed by the village. Here, organic waste is processed into compost through a composting process. This process is carried out using environmentally friendly methods, using aeration techniques to accelerate decomposition. The compost is then used by local farmers to improve soil fertility and support organic farming."*

In addition to compost, Tegalalang Village has also developed a system for processing organic waste into biogas. Organic waste that cannot be composted is processed using a biogas reactor. The biogas produced is used as an energy source for cooking and lighting, reducing dependence on fossil fuels. Tegalalang Village conducts regular monitoring and evaluation to assess the effectiveness of the organic waste management system (Díaz-Gil, 2024). Data on the volume of waste managed, the amount of compost produced, and the use of biogas are recorded for continuous system improvement. Active community participation is an important factor in the success of this system. The village government continues to encourage the community to be involved in the waste management program, either through volunteers or farmer groups that manage compost (Seo & Kim, 2020). With this involvement, it is hoped that awareness of the importance of waste management and environmental sustainability can continue to grow.

Implementation of Circular Economy

The implementation of a circular economy begins with educating the community about the importance of waste separation. Communities are encouraged to separate organic and non-organic waste at the household level (Pender et al., 2024). The organic waste collected is then managed systematically, reducing the volume that goes to landfill. This initiative not only reduces pollution but also creates awareness of the value of the waste produced. One real example of the implementation of a circular economy is the processing of organic waste into compost (S. Khan & Haleem, 2021). With a composting facility managed by the village, organic waste is processed into

quality fertilizer. This compost is used by local farmers to increase soil fertility, which in turn supports sustainable agriculture (Omune et al., 2021). By utilizing organic waste, the village not only reduces waste but also creates products that are of high value to the community. The village secretary said that:

> *"Tegalalang Village also implements a biogas system to process organic waste that cannot be composted. The waste is fed into a biogas reactor, which converts it into renewable energy. This biogas is used for cooking and lighting, reducing dependence on fossil fuels. This initiative creates a sustainable cycle where organic waste is converted into an energy source."*

One of the important pillars of the circular economy is increasing public awareness. The village government works with non-governmental organizations to educate the community about the benefits of good waste management. Training programs and workshops are held to increase knowledge about composting techniques, biogas utilization, and the importance of sustainability (Lanzutti & Marin, 2024). This awareness encourages active community participation in existing programs. The implementation of the circular economy in Tegalalang not only has a positive impact on the environment but also provides economic benefits. By producing compost and biogas, the village creates new economic opportunities for the community. Farmers who use compost can increase their agricultural yields, while biogas suppliers reduce energy costs. This also increases the competitiveness of local products in the market. Despite the many benefits obtained, the implementation of the circular economy in Tegalalang also faces challenges (Atmadja et al., 2021). Limited infrastructure and funding for the development of processing facilities are obstacles. However, with government support and collaboration with the private sector, the village has the opportunity to develop a more efficient and sustainable system.

Green Accounting in Waste Management

Green accounting is a practice that integrates environmental considerations into the financial statements and management of a company or organization. In Tegalalang Village, Gianyar, the concept of green accounting is applied in waste management to support sustainability and transparency in resource management (Qorri et al., 2018). The following is an explanation of how green accounting is implemented in the context of waste management in this village. One community leader stated that:

> *"One of the first steps in green accounting is the separation and recording of the types of waste produced by the community. In Tegalalang, residents are encouraged to sort organic and non-organic waste. With a good recording system, the village can measure the volume of waste produced and collected. This data is important for further analysis of environmental impacts and waste management efficiency."*

Green accounting allows villages to measure the environmental impact of waste management activities. By collecting data, such as greenhouse gas emissions resulting from waste processing, villages can evaluate the effectiveness of processing programs (Atmadja et al., 2019). With this information, the village government can identify areas for improvement and develop better strategies to reduce negative impacts on the environment (Saputra et al., 2019). Tegalalang Village is committed to transparency in resource and environmental management. Through green accounting, the village can prepare a sustainability report that includes information on waste management, compost use, and biogas energy. This report is not only useful for the village government but also for the community and other stakeholders. Clear and open information about the environmental impact of waste management can increase public trust in the government. One accounting practitioner stated that:

> *"Green accounting also helps in managing the costs and benefits of waste processing. By recording the operational costs of the processing facility, including labor, maintenance, and infrastructure costs, the village can conduct a cost-benefit analysis. This allows the village government to evaluate whether the investment in waste processing provides comparable economic and environmental value."*

One of the goals of green accounting is to increase public awareness and participation in environmental management. By involving the community in the recording and reporting process, villages can create a sense of collective responsibility for the environment (Ivancsóné Horváth et al., 2023). Education about the importance of waste management and its impact on sustainability can increase participation in existing programs. Data and information obtained from green accounting practices can be the basis for developing better waste management policies and strategies (Purnomo et al., 2022). With in-depth analysis, village governments can formulate more effective policies in waste management, including infrastructure development and improving processing technology.

Conclusion

The organic waste management system in Tegalalang Village, Gianyar, is a good example of a sustainable approach to dealing with waste. Through education, efficient processing, and utilization of processed products, the village has not only succeeded in reducing the environmental impact of organic waste, but also improving community welfare through more productive and sustainable agriculture. The circular economy in Tegalalang Village, Gianyar, is a successful example of the application of sustainability principles in resource and waste management. By involving the community in separating and processing organic waste, the village not only reduces environmental impact but also creates economic value that benefits the community. Through education and innovation, Tegalalang can continue to strengthen its circular economy system and become a model for other regions in Indonesia. Green accounting in waste management in Tegalalang Village, Gianyar, is an important step towards environmental sustainability and transparency in resource management. By integrating environmental aspects into recording and reporting, the village can improve waste management efficiency, measure environmental impact, and encourage community participation. The application of green accounting not only provides benefits for the environment but also for the economic and social welfare of the community.

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