



THE IMPLEMENTATION OF ENVIRONMENTAL ACCOUNTING FOR WATER PRODUCTION RESIDUES (A CASE STUDY AT THE REGIONAL PUBLIC DRINKING WATER COMPANY PERUMDA MUARA TIRTA, GORONTALO CITY)

PENERAPAN AKUNTANSI LINGKUNGAN PADA SISA PRODUKSI AIR (STUDI KASUS PADA PERUMDA AIR MINUM MUARA TIRTA KOTA GORONTALO)

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Abstract

The objective of this study is to examine the management of water production residues and to analyze their implementation in environmental accounting at PERUMDA Air Minum Mutiara Tirta, Gorontalo City. This study employs a qualitative method with a case study approach. The research informants were selected using purposive sampling, consisting of individuals who were considered knowledgeable and directly involved in the issues under investigation, including the Production Coordinator, Maintenance Division, Laboratory Officer of Zone 1, Assistant Manager of Secretariat and Public Relations, and the Accounting and Budgeting Officer. Data were collected through interviews, observations, and documentation by applying data source triangulation to ensure data validity. The results indicate that the management of water production residues has been carried out in accordance with Standard Operating Procedures (SOPs); however, its effectiveness remains limited due to constraints in budget allocation, facilities, and waste treatment technology. In terms of environmental accounting implementation, the recognition, measurement, presentation, and disclosure of environmental costs have not been optimally integrated, as environmental costs are still recorded within general operational budgets without specific classification and detailed reporting. This condition reflects existing challenges in linking waste management practices with environmental accounting records. The main obstacles include limited technological capacity, insufficient human resources with expertise in environmental accounting, and the absence of specific regulations governing environmental cost recording. Therefore, clearer regulatory support, dedicated budget allocation, improved waste treatment technology, and employee training are required to ensure a more effective and sustainable implementation of environmental accounting.

Keywords : environmental accounting, water production residues, waste management, PERUMDA.



Abstrak

Tujuan penelitian ini adalah untuk mengetahui pengolahan sisa produksi air serta menganalisis penerapannya terhadap akuntansi lingkungan di PERUMDA Air Minum Mutiara Tirta Kota Gorontalo. Penelitian ini menggunakan metode kualitatif dengan pendekatan studi kasus. Informan penelitian dipilih secara purposive sampling, yaitu pihak-pihak yang dianggap mengetahui dan terlibat langsung dalam permasalahan yang diteliti, meliputi Koordinator Produksi, bagian Perawatan, Laboratorium Zona 1, Asisten Manajer Kesekretariatan dan Humas, serta Pelaksana Akuntansi dan Anggaran. Pengumpulan data dilakukan melalui wawancara, observasi, dan dokumentasi dengan menerapkan triangulasi sumber data untuk memperoleh data yang valid. Hasil penelitian menunjukkan bahwa pengelolaan sisa produksi air telah dilaksanakan berdasarkan Standar Operasional Prosedur (SOP), namun efektivitasnya masih terbatas akibat keterbatasan anggaran, fasilitas, dan teknologi pengolahan limbah. Dalam penerapan akuntansi lingkungan, pengakuan, pengukuran, penyajian, dan pengungkapan biaya lingkungan belum terintegrasi secara optimal karena biaya lingkungan masih dicatat dalam anggaran operasional umum tanpa klasifikasi dan pelaporan yang khusus. Kondisi ini menunjukkan adanya tantangan dalam menghubungkan pengelolaan limbah dengan pencatatan akuntansi lingkungan. Hambatan utama meliputi keterbatasan teknologi, kurangnya sumber daya manusia yang memahami akuntansi lingkungan, serta regulasi yang belum mengatur secara spesifik pencatatan biaya lingkungan. Oleh karena itu, diperlukan dukungan regulasi yang lebih jelas, alokasi anggaran khusus, peningkatan teknologi pengolahan limbah, serta pelatihan bagi pegawai agar penerapan akuntansi lingkungan dapat berjalan lebih efektif dan berkelanjutan.

Kata Kunci : akuntansi lingkungan, sisa produksi air, pengelolaan limbah, PERUMDA.

1. INTRODUCTION

Environmental issues have become one of the major global concerns because they are closely related to the quality of human life and have frequently been debated in many countries, including Indonesia. Environmental degradation and the lack of attention to environmental management are considered the main causes of these problems. Indonesia faces complex and diverse environmental issues such as deforestation, air and water pollution, climate change, plastic waste problems, environmental and social conflicts, global warming, rising sea levels, and the sustainability of natural resources. Environmental damage does not only affect certain areas but also has serious impacts on society, both in the present and in the future. Therefore, public awareness of environmental preservation is essential, as regulated in Law Number 32 of 2009 concerning Environmental Protection and Management.

According to Article 59 of Law Number 32 of 2009, every individual or entity that generates hazardous and toxic waste (B3) is obligated to manage the waste produced. If the waste cannot be managed independently in accordance with statutory regulations, it must be handled by authorized third parties. Environmental damage can be caused by natural events such as volcanic eruptions, landslides, earthquakes, floods, and prolonged droughts, as well as by human activities, including environmental degradation and pollution (Ikhsan, 2008). To minimize environmental damage, efforts to reduce pollution and environmental degradation caused by human activities are necessary. As a response to these challenges, various fields have begun to seek solutions to environmental problems, one of which is environmental accounting (Susanti, 2021).



Business activities carried out by companies often generate negative environmental impacts, such as air, water, soil, and noise pollution, which can disturb surrounding communities. Therefore, environmental costs arising from waste management activities must be calculated carefully and wisely. This condition highlights the importance of implementing environmental accounting in both large and small companies (Anna & Suciati, 2019). Environmental accounting is a form of corporate social responsibility that functions to identify, measure, present, and disclose environmental costs related to environmental management activities. Its purpose is to ensure compliance with environmental regulations and to improve cost efficiency while reducing environmental damage (Sari et al., 2023).

In Indonesia, the implementation of environmental accounting has not been comprehensively regulated in the Statement of Financial Accounting Standards (PSAK). Although PSAK 33 (Revised 2011) previously regulated environmental management activities in the mining sector, it was officially revoked in 2013. Nevertheless, many companies still refer to PSAK 33 as guidance in environmental accounting reporting. This condition indicates the importance of environmental accounting as a form of corporate responsibility toward society.

One business sector with significant potential environmental impacts is the regional drinking water company (PDAM). PDAM plays a crucial role in providing clean water for the community through activities involving water extraction, treatment, distribution, and waste disposal. However, environmental cost allocation and waste management in this sector are often not optimal. Based on available data, in 2022 the chemical material expense reached IDR 4,224,415,000, while maintenance expenses amounted to IDR 878,329,730. This indicates the substantial environmental-related costs incurred in operational activities. Therefore, based on the above background, the researcher is interested in conducting a study entitled “Analysis of Water Production Residues in Business Activities (A Case Study at PERUMDA Air Minum Muara Tirta, Gorontalo City).”

2. RESEARCH METHOD

This research was conducted using a qualitative method with a case study approach. The study was carried out at the Regional Public Drinking Water Company (PERUMDA) Air Minum Muara Tirta, Gorontalo City, which is located at Jl. Drs. Achmad Nadjamuddin No. 9, Wumialo Village, Kota Tengah District, Gorontalo City. The focus of this research was on the implementation of environmental accounting in managing water production residues at PERUMDA Air Minum Muara Tirta.

The research procedure consisted of several stages. The first stage was the planning stage, which included determining the research topic, formulating research questions, explaining the research background, and selecting research informants. The second stage was data collection, which was conducted through observation, interviews, and documentation. The third stage involved analyzing the collected data, followed by the final stage of drawing conclusions based on the research findings.



The research informants were individuals who were considered to have sufficient knowledge of the research problem, were directly involved in the operational and accounting processes, and were willing to provide information. The informants included the Production Coordinator, Maintenance Officer, Laboratory Officer of Zone 1, Assistant Manager of Secretariat and Public Relations, and the Accounting and Budgeting Officer. In selecting the informants, this study applied a non-probability sampling technique using purposive sampling. The sampling criteria included employees of PERUMDA Muara Tirta who had expertise and direct involvement in water production processes and environmental cost recording.

The data used in this research consisted of primary and secondary data. Primary data were obtained from interviews with the informants and financial report data related to environmental cost management. Secondary data were collected from literature sources such as journals, books, and relevant documents from institutions related to this research topic. In addition, this study utilized time series secondary data covering a three-year period, from 2020 to 2022. The collected data were analyzed qualitatively through data reduction, data presentation, and conclusion drawing to provide a comprehensive understanding of the implementation of environmental accounting at PERUMDA Air Minum Muara Tirta, Gorontalo City.

3. RESULT AND DISCUSSION

Table 1. Research Findings

Dimension	Domain	Preliminary Conclusion
PERUMDA operational waste	1) Environmental impact	Waste management has not been optimal, with limited facilities identified as the main constraint.
Waste management and operational procedures	1) Standard Operating Procedures (SOP) 2) Treatment methods 3) Environmental responsibility	Waste management processes have been implemented in accordance with SOPs; however, budget and facility limitations hinder more effective management, particularly for liquid waste.
Recognition, measurement, presentation, and disclosure of environmental costs	1) Environmental accounting records 2) Environmental accounting reporting	The implementation of environmental accounting has not been fully integrated. Environmental costs are recorded generally within the operational budget without specific classification or detailed disclosure.
Challenges in waste management and environmental accounting implementation	1) Technical constraints 2) Regulations 3) Resources	The main challenges include limited technology, a lack of skilled personnel, and the absence of regulations that require detailed implementation of environmental accounting.



Based on Table 1, the findings indicate that the management of operational waste at PERUMDA has not yet been carried out optimally, primarily due to limitations in facilities and supporting infrastructure. Although waste management procedures have been implemented in accordance with established Standard Operating Procedures (SOPs), constraints related to budget availability and inadequate treatment facilities hinder the effectiveness of waste processing, particularly for liquid waste. Furthermore, the implementation of environmental accounting remains insufficiently integrated, as environmental costs are still recorded as part of general operational expenses without clear classification, systematic measurement, or detailed disclosure in financial reports. In addition, several challenges were identified in linking waste management practices with environmental accounting, including limited technological capacity, a shortage of human resources with expertise in environmental accounting, and the absence of specific regulations mandating comprehensive environmental cost reporting. These conditions demonstrate that improvements are needed in both waste management systems and environmental accounting practices to enhance transparency, accountability, and environmental responsibility within the organization.

b. Discussion

1) Operational Waste of PERUMDA Air Minum Mutiara Tirta, Gorontalo City

Based on the research findings at PERUMDA Air Minum Mutiara Tirta, Gorontalo City, it is evident that the operational waste generated by the company has an impact on the surrounding environment. The waste management practices implemented by the company have not yet reached an optimal level, with limited facilities identified as the main constraint. This condition indicates that the existing waste management system has not been fully capable of reducing negative environmental impacts effectively.

The lack of adequate waste treatment facilities is a major factor contributing to suboptimal waste management. The available facilities do not fully meet the standards stipulated by government regulations, resulting in inefficient waste treatment processes. In addition, insufficient periodic monitoring of waste disposal and treatment activities may further exacerbate environmental impacts. If not properly managed, operational waste may contaminate water sources and cause various ecological problems in the surrounding environment.

Apart from facility-related issues, internal awareness and company policies also play a crucial role in waste management. Without strong commitment from management to improve waste treatment systems, environmental impact mitigation efforts will be difficult to achieve. Therefore, more effective waste management strategies are required, including investment in modern waste treatment technologies and the implementation of stricter environmental policies.

According to Sudarmadji (2018), effective waste management must consider technical aspects, regulatory compliance, and the participation of various stakeholders, including companies and local communities. Similarly, Putri and Hidayat (2020) emphasize that the success of waste management depends on the availability of adequate facilities and policies



that support sustainable management practices. These theories reinforce the finding that limited facilities are a major barrier to effective operational waste management at PERUMDA.

Previous studies support these findings. Rahman et al. (2019) reported that technological limitations in waste management increase environmental pollution around water treatment industries. Wijaya (2021) found that companies with adequate waste treatment facilities can reduce negative environmental impacts by up to 40%. In line with this, Ananda and Prasetyo (2022) demonstrated that strict waste management policies significantly enhance waste treatment effectiveness. Therefore, improving waste management facilities and strengthening internal regulations are essential steps to minimize environmental impacts more effectively.

2) Waste Management and Operational Procedures at PERUMDA Air Minum Mutiara Tirta, Gorontalo City

The research findings indicate that waste management and operational procedures at PERUMDA Air Minum Mutiara Tirta have been implemented in accordance with established Standard Operating Procedures (SOPs). However, significant challenges remain in applying more effective treatment methods due to budgetary and facility limitations. These constraints particularly affect liquid waste treatment, which requires more advanced technology to prevent environmental pollution.

Budget limitations restrict the company's ability to invest in modern waste treatment equipment. In addition, inadequate facilities hinder the implementation of optimal treatment methods. Although SOPs are in place, operational efficiency still needs improvement to ensure that waste generated does not negatively affect the surrounding environment. Effective waste management depends not only on procedures but also on sufficient infrastructure to support their implementation.

Environmental responsibility is another critical aspect of waste management. Companies are obligated to ensure that their waste does not harm the environment and has undergone appropriate treatment. However, due to limitations in treatment methods and facilities, this responsibility has not been fully fulfilled. Therefore, further efforts are required to enhance the effectiveness of the waste management system.

Hidayat (2019) argues that waste management effectiveness depends on internal company policies, available infrastructure, and government regulatory support. Prasetyo (2020) further emphasizes that sustainable waste management relies not only on SOP implementation but also on technological innovation to improve treatment efficiency. These perspectives confirm that budget and facility limitations are major obstacles to achieving effective waste management at PERUMDA.

Supporting this argument, Santoso et al. (2021) found that budget constraints significantly reduce the effectiveness of industrial waste management. Rahmawati and Yusuf (2022) reported that inadequate treatment facilities increase the risk of environmental pollution due to non-compliant waste disposal. Wijayanti (2023) also revealed that companies investing in modern waste treatment technologies tend to have more efficient and environmentally



friendly waste management systems. Thus, increasing budget allocation and adopting innovative treatment methods are essential for improving waste management performance.

3) Recognition, Measurement, Presentation, and Disclosure of Environmental Costs at PERUMDA Air Minum Mutiara Tirta, Gorontalo City

The research results show that the implementation of environmental accounting at PERUMDA Air Minum Mutiara Tirta has not been well integrated. Environmental costs are currently recorded as part of the general operational budget without specific classification or detailed disclosure. This practice results in a lack of transparency, making it difficult to assess the company's financial contribution to environmental management.

Several factors contribute to this condition, including limited awareness of the importance of environmental accounting, inadequate regulations mandating detailed environmental cost reporting, and insufficient human resources with expertise in environmental accounting. In the absence of standardized guidelines, environmental costs tend to be merged into general expenses without systematic classification.

The lack of integration in environmental accounting also limits the company's ability to evaluate the environmental impacts of its operations. Poorly recorded environmental costs hinder strategic decision-making related to investments in environmentally friendly technologies or waste management improvements. Moreover, limited transparency may negatively affect the company's image among stakeholders, including investors, customers, and the public.

Gray et al. (2021) assert that environmental accounting is part of social accounting aimed at measuring, recording, and reporting the environmental impacts of economic activities. Deegan (2022) highlights the role of legitimacy, emphasizing that companies must demonstrate environmental compliance to gain societal and regulatory support. These theories suggest that systematic environmental cost accounting enhances transparency and corporate legitimacy.

Empirical evidence supports this view. Suwardi (2018) found that many Indonesian companies still record environmental costs within general budgets without clear classification. Handayani and Siregar (2020) showed that firms implementing detailed environmental accounting tend to achieve better environmental performance. Pratama (2021) further identified weak regulation as a key factor behind the low implementation of environmental accounting in the industrial sector. Consequently, stronger regulations and improved awareness are needed to enhance environmental accounting practices.

4) Challenges in Waste Management and Environmental Accounting Implementation at PERUMDA Air Minum Mutiara Tirta, Gorontalo City

The study reveals that the main challenges in waste management and environmental accounting implementation at PERUMDA Air Minum Mutiara Tirta include technical constraints, inadequate regulations, and limited resources. These challenges hinder the optimal and detailed implementation of environmental accounting, as companies often struggle to record and report environmental costs without clear regulatory obligations.



Technical constraints are closely related to the lack of appropriate technology and integrated accounting information systems capable of incorporating environmental data into financial reports. Many organizations still rely on manual methods, and the shortage of professionals with expertise in environmental accounting further exacerbates this issue.

From a regulatory perspective, existing policies governing environmental cost reporting remain general and non-binding, resulting in weak enforcement. Additionally, limited financial and human resources restrict companies' ability to implement systematic environmental accounting practices aligned with applicable standards.

According to legitimacy theory (Deegan, 2022), companies disclose environmental information to gain legitimacy from society and stakeholders. Stricter regulations would encourage better environmental accounting implementation. Stakeholder theory (Freeman, 2024) also emphasizes corporate responsibility toward various stakeholders, making transparency in environmental reporting a crucial element of corporate accountability.

Previous studies align with these findings. Suwardi (2019) reported that many Indonesian companies face difficulties in environmental accounting implementation due to insufficient technological and regulatory support. Handayani and Siregar (2021) found that companies with environmental accounting expertise produce more accurate environmental cost reports. Pratama (2022) demonstrated that stricter regulations promote greater transparency in environmental cost reporting. Therefore, improving regulations, technological adoption, and human resource capacity is essential to achieving integrated and transparent environmental accounting practices.

4. CONCLUSION

Based on the results of the study on the implementation of environmental accounting for water production waste at PERUMDA Air Minum Mutiara Tirta, Gorontalo City, it can be concluded that operational waste management has been carried out in accordance with Standard Operating Procedures (SOP). However, its effectiveness remains limited. Constraints related to budget availability, facilities, and waste treatment technology have caused the waste management system to be unable to fully reduce negative environmental impacts.

In terms of environmental accounting, the recognition, measurement, presentation, and disclosure of environmental costs have not been optimally integrated. Environmental costs are still recorded as part of the general operational budget without specific classification or transparent reporting. This condition indicates that the company continues to face challenges in linking waste management practices with environmental accounting records.

The main obstacles identified include limited technological capacity, a lack of human resources with adequate understanding of environmental accounting, and regulations that do not specifically mandate the detailed recording and reporting of environmental costs. Therefore, to ensure more effective implementation of environmental accounting, clearer regulatory support, dedicated budget allocation, improvements in waste treatment technology, and employee training are required.



Through these measures, waste management and the implementation of environmental accounting at PERUMDA are expected to enhance financial transparency, improve cost efficiency, and strengthen the company's commitment to environmental responsibility in a more sustainable manner.

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