Dinamika Pendidikan 20 (2) (2025) 193-204

Dinamika Pendidikan

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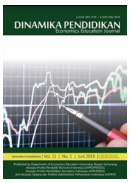

Development of Environmental Accounting Education through the Implementation of SAK EP-Based Green Accounting

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DOI: 10.15294/dp.v20i2.34111

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History Article

Submitted September 20, 2025
Revised November 25, 2025
Accepted December 12, 2025

Keywords

Green Accounting, SAK EP, BUMDes, Environmental Sustainability

Abstract

This study examines how the implementation of SAK EP-based Green Accounting at BUMDes Istambul Karya contributes to the advancement of environmental accounting education and sustainable village development. Using a descriptive qualitative design and a case study approach, data were obtained through interviews, observations, and document analysis. The findings reveal that although the application of Green Accounting in BUMDes' financial reporting is not yet fully optimized or standardized in accordance with SAK EP, it provides rich learning opportunities for understanding the integration of environmental costs and ecological responsibilities into accounting practices. Programs such as reforestation, waste management, and ecology-oriented infrastructure enhance environmental carrying capacity, illustrating practical cases for environmental accounting studies. Stakeholder engagement through Pentahelix collaboration—government, business actors, communities, academics, and the media—further supports the educational value of this initiative. Overall, the case demonstrates how community-based financial management can serve as a living laboratory for environmental accounting education.

How to Cite

Baswara, S. Y., & Amaliyah, D., Dewi, E. N., Niam, S. H., & Nuryanti, A. F. (2025). Development of Environmental Accounting Education through the Implementation of SAK EP-Based Green Accounting. *Dinamika Pendidikan,* 20(2), 193-204.

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p-ISSN 1907-3720
e-ISSN 2502-5074

INTRODUCTION

Environmental degradation in Indonesia has become increasingly alarming, raising serious concerns due to its potential long-term impact on future generations (Hakim, 2020). Pollution, deforestation, and other exploitative practices have placed significant pressure on ecosystems, triggering imbalances that may lead to severe consequences for environmental sustainability and human life. These ecological issues have negatively affected the quality of the environment, both directly and indirectly (Rochmani, 2015). One of the main contributing factors is short-term, profit-oriented business and economic activities that excessively exploit natural resources (Siregar & Nasution, 2020).

As the foundation of natural resource-based economic activities, villages play a strategic role in integrating economic growth and environmental conservation. The establishment of village-owned enterprises (BUMDes) as economic entities operating at the local level carries significant potential to impact surrounding ecosystems. As BUMDes activities intensify to increase profitability, the associated environmental consequences also escalate (Aja et al., 2025). This notion aligns with Wulandari et al. (2019), who emphasize that the economic growth generated through rural enterprises, such as asset leasing, tourism development, and home industries, while socially beneficial, can lead to adverse environmental outcomes if not accompanied by ecologically minded management. These conditions demand a systematic approach that balances economic development with sustainable environmental stewardship. The application of Green Accounting serves as a relevant solution to measure, record, and report the environmental impacts of financial activities, particularly at the village enterprise level, which holds substantial potential to support environmentally conscious rural development (Sukmono et al., 2023).

Most existing research on Green Accounting has focused on large-scale corporations, particularly those listed on the Indonesia Stock Exchange. Studies by Selpiyanti & Fakhroni (2020), Nabila (2021), and Trevanti & Yuliati (2023) Affirm that the disclosure of environmental costs in annual financial reports contributes significantly to achieving the Sustainable Development Goals (SDGs)—furthermore, Sarni et al. (2023) Demonstrate that such practices enhance long-term financial stability; however, Putri et al. (2024) Argue that the influence of Green Accounting on sustainability remains limited, primarily due to its voluntary nature and the absence of formal integration within standardized reporting frameworks.

In contrast, empirical studies on Green Accounting practices in village-owned enterprises (BUMDes) remain scarce, as noted in research by Suningsih et al. (2021) and Munir et al. (2021) Reveals that most BUMDes still rely on conventional bookkeeping systems and have yet to adopt established accounting standards such as the Financial Accounting Standards for Private Entities (SAK EP). Environmental sustainability has also not been positioned as a strategic element in their financial reporting. This study addresses that gap by exploring the integration of Green Accounting principles into SAK EP-based financial reporting, using BUMDes Istambul Karya as a case study.

Located in a coastal village vulnerable to tidal flooding, coastal abrasion, and tourism-related waste, this BUMDes provides a relevant microeconomic context for investigating how environmental accounting can be institutionalized at the village level. As Najah (2023) Highlights, such as ecological challenges, not only threaten environmental resilience but also affect the economic sustainability of rural enterprises. By situating Green Accounting within this local context, this study contributes novel insights into the alignment between environmental stewardship and standardized financial practices in rural development frameworks.

METHODS

The study employed a qualitative approach, utilizing a case study strategy, to examine the implementation of Green Accounting in accordance with the Financial Accounting Standards for Private Entities (SAK EP) at BUMDes Istambul Karya in Tambakbulusan Village, Karangtengah Subdistrict, Demak Regency, Indonesia. The selection of this site was based on purposive sampling, considering the village's environmental vulnerability, specifically, frequent tidal flooding and coastal abrasion, which makes it a relevant case for assessing sustainable financial and ecological practices in rural enterprises. The study was conducted over five months, from January to May 2025.

Data collection involved three primary techniques: in-depth interviews, participatory observation, and document analysis. Observations were conducted across the BUMDes operational site, focusing on environmental conditions and daily practices. Document analysis was perfor-

med by examining internal financial records, activity reports, and supporting administrative documentation. Five informants were selected through purposive sampling based on their direct involvement in the BUMDes financial and environmental activities. These included the BUMDes Chairperson, Treasurer, daily operations officer, and two local residents engaged in microbusinesses near the Glagah Wangi Istambul Beach tourism area. To provide a clear overview of the information sources, this study includes a structured table listing the key informants. Each informant was selected based on their functional role and relevance to the research objectives, particularly in relation to environmental management and financial reporting within BUMDes Istambul Karya.

Table 1. Informant Profile and Relevance to the Study

Informan	Position	Relevance to Study
Moh. Fatkhullah	Chairperson	Policy decisions and environmental planning
Nur Faizin	Treasurer	Financial records and Green Accounting practices
Fauzi Haryanto	Daily Operations Officer	Day-to-day environmental and waste management
Siti Zulaichah	Local MSME Actor	Community engagement and eco-business perspective
Supardi	Local MSME Actor	

Source: Field Interviews and Observation, 2025

To strengthen the methodological justification of this study, the following clarification is provided regarding the use of a single–case design. Although this study examines only one BUMDes as its unit of analysis, the use of a single-case design is methodologically appropriate for exploratory qualitative research. Hollweck, (2015) A single instrumental case is justified when the case represents a unique, context-specific, or revelatory situation. BUMDes Istanbul Karya meets these criteria, due to its distinctive ecological challenges, coastal abrasion, tidal flooding, and tourism-based revenue dependency, which make it particularly relevant for investigating Green Accounting practices in vulnerable rural environments. Therefore, the objective of this research is depth rather than statistical generalization, and the insight generated should be interpreted as analytical generalization intended to strengthen the conceptual understanding of environmental accounting in village-owned enterprises.

To enhance data credibility, triangulation of sources and methods was applied. The analytical process followed the interactive model of Miles and Huberman (1994), comprising three continuous components: data reduction, data display, and conclusion drawing. The unit of analysis in this study was the institutional practice of BUMDes in integrating environmental accountability into its financial management framework.

The Green Accounting construct was operationalized through simplified indicators adapted from the International Federation of Accountants (IFAC, 2005). These indicators included: (1) material costs associated with product and non-product outputs, (2) costs related to waste and emission management, (3) expenses for environmental prevention and control efforts, (4) research and development costs linked to environmental initiatives, and (5) intangible costs such as stakeholder engagement and the entity's environmental reputation. These indicators served as benchmarks for assessing the extent to which environmental considerations are reflected in BUMDes' financial statements and daily operations.

RESULTS AND DISCUSSION

BUMDes Istambul Karya is a village-owned enterprise established through community deliberation and formalized under Village Regulation No. 08 of 2017 in Tambakbulusan Village, Demak Regency. Wholly owned by the local community, it operates as a collectively managed economic entity. Since its inception on November 15, 2018, with an initial capital of IDR 8,000,000 sourced from local tourism revenue, the BUMDes has focused on developing village-based enterprises, particularly the management of Glagah Wangi Beach. Its primary objective is to enhance community welfare through sustainable, environmentally driven economic activities.

Based on interview findings and a review of tourism management reports, BUMDes Istambul Karya is responsible for managing Glagah Wangi tourism, including the river area, mangrove tracking ecotourism, and the beach. The financial records indicate allocated expenditures for environmental preservation and tourism operations, reflecting the application of Green Ac-

counting principles. These environmental-related expenses are recorded as operational costs and reported in the income statement.

LAPORAN LABA RUGI
BUMDES ISTAMBUL KARYA
Untuk periode yang berakhir sampai dengan 31 Desember 2024
(dalam rupiah)

Pendapatan Usaha				
Pendapatan Jasa				
Pendapatan Wisata	Rp	294.040.000		
Pendapatan Parkir	Rp	10.923.000		
Pendapatan Sewa	Rp	4.005.000		
Jumlah Pendapatan Jasa			Rp 308.968.000	
Pendapatan Lain-Lain				
Pendapatan Hibah	Rp	500.000		
Jumlah Pendapatan Lain-Lain			Rp 500.000	
Jumlah Pendapatan Usaha				Rp 309.468.000
Beban Usaha				
Beban Administrasi Umum				
Beban Pegawai - Bag. Administrasi Umum	Rp	29.102.050		
Beban Sewa	Rp	5.121.000		
Beban Tunjangan	Rp	1.400.000		
Jumlah Beban Administrasi Umum			Rp 35.623.050	
Beban Operasional				
Beban Pegawai - Bag. Operasional	Rp	164.280.000		
Beban Pemeliharaan Aset Lingkungan	Rp	23.912.000		
Beban Pengelolaan Limbah	Rp	138.000		
Beban Kebersihan	Rp	1.523.000		
Beban Operasional Kendaraan	Rp	513.000		
Beban Jasa Keamanan	Rp	47.995.750		
Beban Kesiapsiagaan dan Penanggulangan Bencana	Rp	205.000		
Beban Pelatihan dan Edukasi Lingkungan	Rp	3.500.000		
Beban Tanggung Jawab Sosial	Rp	3.457.200		
Beban Operasional Lainnya	Rp	20.838.000		
Jumlah Beban Operasional			Rp 266.361.950	
Jumlah Beban Usaha				-Rp 301.985.000
Laba Bersih				Rp 7.483.000

Figure 1. Income Statement of BUMDes Istambul 2024

The identification of environmental costs at BUMDes was carried out by analyzing and summarizing all operational expenditures recorded throughout 2024, based on the income statement presented above. Financial data were categorized using the International Federation of Accountants (IFAC, 2005) environmental management accounting framework, and the results are presented in a Table to illustrate the distribution and composition of environmental-related expenditures.

The multi-year financial data provide deeper insight into the long–term economic and environmental performance of the BUMDes. To enhance the robustness of the analysis, this study incorporates a five-year comparative financial overview (202-2024), which provides a more precise representation of long-term performance trends. The inclusion of multiple years helps capture fluctuations caused by external shocks, such as the COVID-19 pandemic, as well as internal dynamics related to tourism activity, community involvement, and cost allocation. This multi-year approach enables a more accurate assessment of BUMDes' financial culture and environmental spending patterns, thereby reducing interpretive bias that might arise from relying on a single-year income statement. The extended dataset also strengthens the evaluation of Green Accounting practices by showing how environmental expenditures evolve across different operational periods.

Further analysis of the distribution cost reveals that salary and security-related expenses show a consistent upward trend across the years. The increase in employee and security-related expenses over the years is primarily driven by the operational characteristics of the coastal ecotourism area managed by the BUMDes. Interviews indicate that higher visitor traffic, expanded patrol zones, and the need for continuous monitoring of environmental assets require additional personnel. Security officers play a dual role in protecting ecological infrastructure, such as mangrove pathways and coastal bridges, and in managing visitor behavior to prevent littering and environmental degradation. To rationalize these expenditures, the BUMDes has implemented shift-based schedules, increased reliance on community volunteers, and strengthened coordination with village authorities. The measures are intended to maintain environmental safeguards while preventing excessive growth in payroll obligations.

The data indicate that the highest environmental expenditure was allocated to security services, which account for 59.39% of total environmental costs. While not classified explicitly under environmental protection in conventional terms, these expenditures serve essential functions in ensuring the security of natural assets, managing visitor behavior, and preventing environmental damage within the Glagah Wangi tourism area. This emphasizes the institutional priority on preserving the ecological integrity of the coastal tourism site.

Environmental asset maintenance represented the second-largest cost category at 29.62%, consisting of the repair and reinforcement of bridges, retaining walls, and public tourism facilities damaged by tidal flooding. These facilities are essential for ensuring safe and sustainable access to the mangrove conservation area. In addition, replanting of mangroves and periodic maintenance of access pathways, seating, and signage were all classified under this component, based on the financial report and supporting documentation.

Expenditures for environmental education and training, although accounting for only 4.34% of the total, are key to promoting long-term awareness among both local residents and visitors. These included community outreach events, printed educational materials, and signage promoting ecological preservation behavior. Similarly, sanitation and waste management services, although relatively modest in value, played

Table 2. Comparative Income Statement of BUMDes Istambul Karya 2020 – 2024

ca	2020 (IDR)	2021 (IDR)	2022 (IDR)	2023 (IDR)	2024 (IDR)
Revenue					
Tourism and Ticket Income	85,000,000	40,000,000	68,000,000	95,000,000	125,000,000
Rental and Service Income	12,000,000	6,500,000	10,000,000	14,500,000	18,000,000
Donations and CSR Support	5,000,000	3,000,000	8,500,000	6,000,000	7,500,000
Total Revenue	102,000,000	49,500,000	86,500,000	115,500,000	150,500,000
Operating Expenses					
Employee Salaries and Allowances	20,500,000	18,000,000	21,000,000	25,000,000	29,800,000
Security and Environmental Guard Services	25,000,000	28,000,000	35,000,000	42,000,000	47,995,750
Maintenance and Infrastructure Repair	15,000,000	10,000,000	18,500,000	20,000,000	23,912,000
Waste Management and Sanitation	1,000,000	1,200,000	1,400,000	1,600,000	1,661,000
Environmental Education & Training	2,500,000	1,500,000	2,000,000	3,000,000	3,500,000
Disaster Preparedness Activities	150,000	180,000	200,000	220,000	205,000
Social Responsibility Programs	2,000,000	2,200,000	3,000,000	3,200,000	3,457,200
Administrative and Miscellaneous Expenses	5,000,000	4,000,000	4,500,000	5,500,000	6,000,000
Total Operating Expenses	71,150,000	65,080,000	85,600,000	100,520,000	116,530,950
Net Surplus (Deficit)	30,850,000	(15,580,000)	900,000	14,980,000	33,969,050

Source: Processed Secondary Data and Field Reconstruction, 2025

Table 3. Environmental Costs Identified at BUMDes Istambul Karya 2024

Category IFAC	Cost Component	Amount (IDR)	% Total Environmental Cost
Prevention and Environmental Management	Environmental Asset Maintenance	23.912.000	29,62%
	Disaster Preparedness	205.000	0,25%
	Environmental Education and Training	3.500.000	4,34%
Waste and Emission Control	Waste Management	138.000	0,17%
	Sanitation	1.523.000	1,89%
Less Tangible Costs	Social Responsibility	3.457.200	4,28%
	Security Services	47.995.750	59,39%

Source: Processed Data from Financial Records of BUMDes Istambul Karya 2024

a crucial role in supporting daily operations and preserving the cleanliness of the tourist area.

The informal classification of these costs within the financial statements of BUMDes Istambul Karya reflects an early-stage adoption of environmental accounting practices. The accounting system of BUMDes remains cash-based and unaccrued, with limited use of environmental-specific ledger codes. Nevertheless, supporting documents, such as budget realization reports, meeting minutes, and receipts, indicate consistent allocations for environmental concerns. The environmental-related expenditures have been embedded across various budget lines, including operational costs, maintenance, and social services.

The financial report for fiscal year 2024 includes a specific allocation of IDR 23,912,000 for infrastructure repair and maintenance, primarily used for bridge reinforcement and mangrove pathway development. Disaster preparedness, amounting to IDR 205,000, covered early warning tools and first aid kits in response to tidal flood risks. Waste management and sanitation, amounting to IDR 1,661,000, were allocated for labor costs, waste bins, and disposal fees. The highest amount, IDR 47,995,750, allocated for security services, included the salaries of community guards, security equipment, and coordination with local authorities. Social responsibility costs, including organizing community environmental days and supporting local micro-enterprises, totaled IDR 3,457,200.

However, the recognition and presentation of these environmental expenditures have not yet been fully aligned with the Financial Accounting Standards for Private Entities (SAK-EP), indicating a gap between ecological accounting practices and standardized financial reporting requirements. The results suggest that environmental cost recording at BUMDes Istambul Karya is conducted using a single-entry and cash basis system, recorded manually in the general cash book based on physical transaction receipts. These records are generally labeled according to the activity rather than standardized account codes. As stated by Mr. Nur Faizin, the Treasurer of BUMDes Istambul Karya:

"Our financial recording is only based on cash in and out. So, expenditures are only recorded once the payment is made, based on the receipt. For example, if we pay for mangrove planting or trail repairs, the expenditure is recorded once the money is spent. Admittedly, our account naming is still simple, just enough so that people understand where the money goes and comes from." (Interview, 2024).

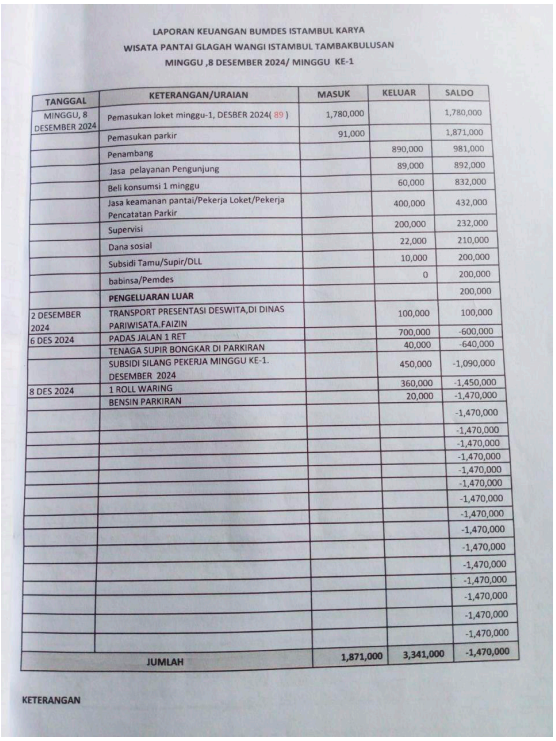
This practice is not fully aligned with the Financial Accounting Standards for Private Entities (SAK EP), which recommend accrual-based recording and double-entry bookkeeping, wherein each transaction impacts at least two accounts—debit and credit. Furthermore, environmental costs under SAK EP should be recorded in the general journal and classified by the nature of the expense, allowing for better transparency and presentation in the income statement. Regarding measurement, BUMDes Istambul Karya applies historical cost methods, where transactions are recognized based on the actual amount paid in rupiah. This is supported by the statement of Mr. Fatkhullah, the Chairman of BUMDes:

"Take social funds, for example. We only record them once the money is actually spent, even though it's often incidental. If it's urgent, we spend it and then record it, like when fixing the track after tidal flooding." (Interview, 2024)

Such practice aligns with the general measurement principle acknowledged in SAK EP, where liabilities and expenses are recorded based on the amount of cash or cash equivalents exchanged. However, the presentation of financial reports remains limited. Instead of preparing complete financial statements as recommended in SAK EP Chapter 3, Paragraph 17, which include the statement of financial position, income statement, statement of changes in equity, cash flow statement, and notes to the financial statements, BUMDes only maintains a general cash book (BKU). Environmental costs are not explicitly disclosed in either the income statement or the notes, but are only reported as part of cumulative operational expenditures. Mr. Nur Faizin further explained:

"We don't prepare full financial reports. I only keep the general cash book, or BKU as we call it. I'm not an accounting graduate, so I find it hard to understand the formats made by others. I prefer using a simpler, manual format that I created myself." (Interview, 2024)

Triangulation through interviews, document review (Figure 1), and direct field observations confirms that the current financial reporting practices at BUMDes Istambul Karya, while functionally effective, remain informal and fall short of the structured and standardized format required by SAK EP. Environmental expenses are recorded, but without classification, recognition timing, or financial disclosure in line with formal standards.



LAPORAN KEUANGAN BUMDES ISTAMBUL KARYA
WISATA PANTAI GLAGAH WANGI ISTAMBUL TAMBAKBULUSAN
MINGGU ,8 DESEMBER 2024/ MINGGU KE-1

TANGGAL	KETERANGAN/URAIAN	MASUK	KELUAR	SALDO
MINGGU, 8 DESEMBER 2024	Pemasukan loket minggu-1, DESBER 2024(89)	1,780,000		1,780,000
	Pemasukan parkir	91,000		1,871,000
	Penambang		890,000	981,000
	Jasa pelayanan Pengunjung		89,000	892,000
	Beli konsumsi 1 minggu		60,000	832,000
	Jasa keamanan pantai/Pekerja Loket/Pekerja Pencatatan Parkir		400,000	432,000
	Supervisi		200,000	232,000
	Dana sosial		22,000	210,000
	Subsidi Tamu/Supir/DLL		10,000	200,000
	babinsa/Pemdes		0	200,000
	PENGELUARAN LUAR			200,000
2 DESEMBER 2024	TRANSPORT PRESENTASI DESWITA,DI DINAS PARIWISATA.FAIZIN		100,000	100,000
6 DES 2024	PADAS JALAN 1 RET		700,000	-600,000
	TENAGA SUPIR BONGKAR DI PARKIRAN		40,000	-640,000
	SUBSIDI SILANG PEKERJA MINGGU KE-1. DESEMBER 2024		450,000	-1,090,000
8 DES 2024	1 ROLL WARING		360,000	-1,450,000
	BENSIN PARKIRAN		20,000	-1,470,000
				-1,470,000
				-1,470,000
				-1,470,000
				-1,470,000
				-1,470,000
				-1,470,000
				-1,470,000
				-1,470,000
				-1,470,000
				-1,470,000
				-1,470,000
				-1,470,000
	JUMLAH	1,871,000	3,341,000	-1,470,000

KETERANGAN

Figure 2. General Cash Book of BUMDes Istambul Karya 2024. Source: Field Documentation, 2024

Therefore, although environmental cost recognition at BUMDes Istambul Karya reflects a basic understanding of accountability, its alignment with SAK EP is still partial and limited. Capacity building and standardized reporting tools are necessary to enhance financial transparency and ensure that sustainability efforts are accurately reflected in the financial records of rural enterprises, such as BUMDes.

Green Accounting serves as a strategic approach that integrates environmental cost considerations into financial reporting, enabling more transparent and accountable environmental responsibility management (Bela & Sisdianto, 2024). At the village level, its implementation by BUMDes Istambul Karya in Tambakbulusan Village has demonstrated meaningful contributions to local environmental preservation. Through the active allocation of funds toward infrastructure maintenance and green initiatives, such as mangrove planting, the BUMDes fosters ecological sustainability while promoting community awareness. Observations and interviews confirm that environmental initiatives are consistently implemented in response to pressing ecological challenges. The BUMDes, under the leadership of Mr. Fatkhullah, engages in regular reforestation, repair of coastal infrastructure, and maintenance of eco-tourism facilities. As he explained:

"We often conduct mangrove planting and environmental activities, especially with support from students and corporate partners. Most initiatives like beach cleaning or pathway construction are done together," explained Mr. Fatkhullah, the BUMDes Chairman. *(Interview, 2024)*

This commitment to environmental maintenance is illustrated through routine mangrove planting activities conducted by residents and volunteers, which aim to combat coastal erosion and improve the area's ecological integrity. The daily operations officer, Mr. Fauzi Haryanto, emphasized the BUMDes' responsiveness:

"Although we don't have a fixed environmental budget, if something urgent arises, like abrasion, we immediately plant mangroves. We also maintain coordination with external programs such as Telkom's infrastructure support, even if unpredictable weather damages what's built." (Interview, 2024)

Figure 3. Mangrove Replanting by the Local Community. *Source: Field Documentation, 2024*

Green Accounting practices are also evident in their spontaneous budgeting for community clean-ups, mangrove replanting, and the repair of eco-paths. The initiatives are supported through collective volunteer efforts and reflect the BUMDes' commitment to ecosystem resilience. One of the visible outputs of these efforts is the development of community-based mangrove ecotourism facilities, which serve not only as recreational spaces but also as platforms for environmental education and awareness.

Further testimony from Ms. Siti Zulaichah, a local vendor, illustrates community involvement:

"After peak tourist seasons, there's a lot of trash. The BUMDes regularly organizes collective clean-up events, and we, especially vendors around the beach, often participate." *(Interview, 2024)*

Figure 4. Ecotourism Spot for Environmental Education. *Source: Field Documentation, 2024*

These beach clean-up programs are typically conducted through collective community involvement, showcasing the integration of environmental responsibility into daily socio-economic routines.

Figure 5. Collective Beach Clean-Up Involving Local Vendors and Residents. *Source: Faizin, 2024*

Despite these initiatives, environmental funding remains conditional and largely dependent on tourism revenue. According to the Treasurer, Mr. Ahmad Nur Faizin, BUMDes once allocated a specific environmental budget (2019–2021), but post-pandemic declines in visitor numbers led to budget reductions. He explained:

"We used to allocate fixed funds for greening and cleaning, but it became difficult. Now we rely more on community and external support, like CSR programs from Telkom or universities like Undip." *(Interview, 2024)*

One innovative waste management initiative involved collaboration with Rumah Ilham, which provided residents with sacks for waste sorting and offered monetary incentives. However, the program failed due to low participation:

"We tried teaching residents about separating waste, even offered money, but people didn't care, so the program ended." *(Interview, 2024)*

The lack of consistent revenue, weak community awareness of waste, and absence of regulatory village mandates are key obstacles to the formalization of Green Accounting. Nonetheless, the BUMDes continues to adapt by promoting tourism, seeking policy support, and developing eco-products based on mangrove utilization. Social sustainability is another integral aspect. The BUMDes regularly allocates social funds for disadvantaged groups. Mr. Fatkhullah shared:

"We don't just care about the environment. Every year, we provide aid to about 120 people, widows, orphans, and the poor. It's part of our mission." *(Interview, 2024)*

Financial support is prioritized during key moments and depends on the BUMDes' monthly cash flow. Mr. Faizin confirmed:

"Even if revenue is unpredictable, we always set aside some amount each week for social aid." *(Interview, 2024)*

Observation, interviews, and document review suggest that Green Accounting at BUMDes Istambul Karya has a tangible impact. Programs related to reforestation, waste control, and environmental infrastructure reflect an institutional commitment to ecosystem protection and sustainable tourism. These align with Akib's (2014) ecological sustainability indicators: ecosystem integrity, carrying capacity, biodiversity, and global environmental responsiveness.

In this context, the BUMDes particularly strengthen local carrying capacity; their infrastructure and ecological resilience help mitigate risks such as tidal flooding. Mangrove diversity (e.g., *Avicennia* and *Rhizophora*) also supports local biodiversity. While financial reporting is still conditional and lacks standardization, the essence of Green Accounting is clearly embedded in both environmental and social governance. Thus, BUMDes Istambul Karya exemplifies how Green Accounting can function as more than a technical tool, it serves as a framework for sustainable village-based development.

The implementation of Green Accounting at BUMDes Istambul Karya is not solely the result of internal financial reforms but is deeply rooted in the active involvement of multiple stakeholders. These stakeholders contribute through policy support, economic and technical assistance, social advocacy, educational outreach, and media amplification. Their collective engagement is essential for sustaining the environmental governance of rural enterprises and aligns with the Pentahelix model of collaboration, which encompasses government, academia, business, media, and community.

Based on triangulated data from inter-

views, observations, and document analysis, each stakeholder group plays a unique yet complementary role in reinforcing environmental sustainability. Their contributions range from regulating and funding infrastructure to mangrove planting campaigns and waste education programs. Such multi-stakeholder synergy highlights that Green Accounting at the village level is not merely a financial mechanism, but a co-created environmental innovation. This collaborative dynamic enables BUMDes to transform its green initiatives into tangible social and ecological impacts, even in the face of limited fiscal resources and fluctuating tourism income.

The following table presents a synthesis of stakeholder contributions based on the Pentahelix framework in Table 4.

The culmination of these roles demonstrates that the environmental initiatives of BUMDes Istambul Karya are not solely dependent on internal budgeting but are significantly strengthened through synergistic collaboration across sectors. Such multi-stakeholder engagement underscores that Green Accounting at the village level is not merely a technical financial mechanism, but a co-created, community-driven environmental innovation. As noted by the BUMDes Chairperson:

"We may not have perfect accounting records, but we try to make our environment better, and everyone, government, students, companies, even villagers are involved." (Interview, 2024)

Figure 6. CSR-based Mangrove Planting by PT Telkom Indonesia. Source: Fatkhullah, 2024

This collaborative dynamic enables BUMDes to translate its green initiatives into tangible social and ecological outcomes, despite limited financial resources and fluctuating tourism revenues. It further validates the relevance of the Pentahelix model in rural Green Accounting implementation, affirming that shared responsibility and cross-sector partnerships are essential to achieving sustainable environmental governance.

The results of this study show that BUMDes Istambul Karya has made genuine efforts to integrate environmental values into its financial and operational practices. This is evident through routine budget allocations for mangrove replanting, infrastructure repair, waste management, and environmental education. However, these

Table 4. Stakeholder Roles in Supporting Green Accounting Implementation (Pentahelix Approach)

Pentahelix Element	Stakeholders	Role and Contribution
Government	Tambakbulusan Village Government	Facilitates institutional support and allocates village budget for tourism, greening infrastructure, and administrative integration with environmental goals.
	Demak Tourism Office	Provides training, masterplan development, and promotes eco-tourism initiatives led by BUMDes.
	Environmental Office (DLH)	Supports mangrove planting, waste management education, and environmental awareness campaigns.
Academic Institution	Universitas Diponegoro	Conducts research, provides environmental education, and assists in designing community-based sustainability strategies.
Business Sector	PT Telkom Indonesia	Delivers CSR-based support, including mangrove seedlings and eco-infrastructure, to aid coastal preservation efforts.
Community	MSMes, Fisherfolk, Fishpond farmer	Supports mangrove planting, waste management education, and environmental awareness campaigns.
Media	Kompas, Liputan6, Viva Jateng, Jateng Report, Pojok Baca, RRI	Promote BUMDes environmental activities, shape public perception, and increase program legitimacy through wide dissemination.

Source: Field Interviews, Observations, and Documentation, 2024

initiatives are carried out informally and have not yet aligned fully with the Financial Accounting Standards for Private Entities (SAK EP). Environmental expenditures are recorded manually under general operational expenses without standardized account codes or accrual-based documentation. This finding aligns with Biduri et al. (2021), who observed that most BUMDes still apply conventional, cash-based accounting systems that hinder systematic classification and disclosure of environmental costs.

The prioritization of environmental safeguarding through security services comprising 59.39% of total environmental spending demonstrates a unique interpretation of ecological protection by local institutions. Kurniasih and Setyawan (2023) similarly emphasize that securing ecotourism areas is crucial to sustainability, particularly in rural coastal contexts. Yet, such categorization remains outside formal environmental cost indicators as stipulated in the SAK EP, as noted by Mardiasmo (2018) and Heriyanto et al. (2022). It has been argued that the absence of environmental cost classification hampers financial transparency and limits strategic decision-making.

The reliance on a cash-based, single-entry system also echoes findings by Niar et al. (2021), who note that technical and structural limitations are key barriers for rural enterprises in adopting formal Green Accounting practices. Nevertheless, BUMDes Istambul Karya applies historical cost principles consistent with SAK EP, allowing expenditures to be recognized based on actual disbursement, thus retaining an element of accountability in the absence of full compliance.

Conceptually, this study introduces a localized Green Accounting model that integrates environmental, financial, and social responsibility within a rural governance framework. The institutional practice of BUMDes Istambul Karya illustrates how informal accounting, if supported by substantial social capital, can still serve sustainability goals. This contribution to the literature offers empirical evidence from village-owned enterprises in coastal Indonesia, a perspective often overlooked in Green Accounting scholarship (Chairia et al., 2022).

From an ecological perspective, the initiatives undertaken, such as mangrove restoration, waste education, and climate-adaptive infrastructure, reflect the four sustainability indicators described by Akib (2014): ecosystem integrity, carrying capacity, biodiversity, and global environmental responsiveness. These outcomes highlight how environmental practices, even when informally implemented, can enhance local ecological resilience and improve community well-being.

Stakeholder collaboration plays a central role in enabling the successful implementation of Green Accounting at the village level. Through the application of the Pentahelix model, which integrates the contributions of village government, academic institutions, CSR-oriented businesses, media, and the community, BUMDes Istambul Karya has been able to enhance institutional legitimacy and build adaptive capacity in addressing sustainability challenges. (Suherlan et al., 2020). Nevertheless, the institutionalization of Green Accounting still faces structural barriers, including the absence of formal village regulations mandating environmental contributions, irregular tourism revenue streams, and limited public participation in structured waste management programs. (Astawa et al., 2025). Despite these constraints, BUMDes Istambul Karya demonstrates resilience through strategic partnerships with corporate entities, mobilization of voluntary community labor, and the incorporation of ecological awareness into daily operations.

This adaptive approach reflects the findings of Komalasari & Ramadhan (2011), who emphasize that grassroots ecological knowledge remains essential for sustaining conservation initiatives in contexts where technical and financial resources are scarce. It also affirms Suwarno et al. (2022), who argue that local ecological wisdom can compensate for the absence of formalized accounting systems and support the advancement of environmental accountability in rural areas. Therefore, this study reinforces the notion that Green Accounting, when localized and supported by participatory governance, transcends its function as a mere financial mechanism. It evolves into a transformative instrument of social and ecological stewardship. Even in the absence of full compliance with SAK EP standards, the experience of BUMDes Istambul Karya offers a pragmatic and inclusive model of environmental governance that is highly relevant to the sustainability agendas of rural coastal communities in Indonesia.

Based on the identified cost dynamics, several managerial implications can be proposed to ensure proportional and sustainable cost allocation. To prevent a disproportionate increase in operating expenses, particularly in salary and security accounts, this study recommends the adoption of structured cost-control mechanisms. These include establishing budget ceilings for en-

vironmental and security-related expenditures, conducting periodic internal performance audits, and integrating simple digital financial tools to support real-time monitoring. Furthermore, the BUMDes may benefit from diversifying its environmental management strategy by optimizing community-based initiatives and formalizing partnerships under CSR programs, which can reduce direct expenditure burdens. Strengthening cost governance not only aligns with SAK EP financial principles but also ensures that environmental commitments remain sustainable and financially accountable.

CONCLUSION

This study concludes that the implementation of Green Accounting at BUMDes Istambul Karya remains normative and has yet to fully align with the Financial Accounting Standards for Private Entities (SAK EP) or international environmental accounting frameworks, such as those established by the International Federation of Accountants (IFAC, 2005). Environmental-related expenditures, though consistently incurred for mangrove planting, conservation-based tourism infrastructure, and environmental education, are not systematically classified or measured within the financial statements. The current accounting treatment still relies on a cash basis and single-entry system, limiting transparency and the ability to evaluate environmental contributions in a standardized manner. Nevertheless, the adoption of Green Accounting has had a positive influence on environmental sustainability in Tambakbulusan Village, supported through collaborative efforts with stakeholders under the Pentahelix model. These findings affirm the importance of stakeholder synergy in promoting ecological accountability at the village level. However, this study is limited by its single-case approach, which may not fully capture the broader variability of Green Accounting practices among rural enterprises in Indonesia.

This study is limited by its focus on a single case, which may not fully represent broader practices among BUMDes in Indonesia. Future research could explore comparative case studies or quantitative assessments to measure the effectiveness of various Green Accounting approaches in different village contexts. It is recommended that capacity-building programs and digital accounting tools be developed for BUMDes to enhance the standardization, transparency, and environmental disclosure of their financial reports. Local governments should also consider enacting supportive regulations to institutionalize environmental accountability in rural enterprises.

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