ANALYSIS OF THE IMPLEMENTATION OF THE CIRCULAR ECONOMY SYSTEM IN WASTE BANKS TO INCREASE ADDED VALUE FROM THE PERSPECTIVES OF ECONOMY, ENVIRONMENT, SOCIAL, AND GOVERNANCE (CASE STUDY: BINSIK PASER WASTE BANK)

Amalia Salwa Najwati[1]
Universitas Muhammadiyah Malang, Malang, Indonesia
amaliasalwa02@gmail.com

Masiyah Kholmi[2]
Universitas Muhammadiyah Malang, Malang, Indonesia
masiyah@umm.ac.id

Mursidi[3]
Universitas Muhammadiyah Malang, Malang, Indonesia
mursidi@umm.ac.id

Abstract

This study aims to analyze the implementation of the circular economy system at BINSIK Paser Waste Bank in enhancing added value from the perspectives of economy, environment, social, and governance (ESG). Using a qualitative case study approach, data were collected through observation, in-depth interviews, and documentation involving waste bank managers, the local community, and the Environmental Agency of Paser Regency. The results indicate that the application of circular economy principles based on the 5Rs (Reduce, Reuse, Recycle, Recovery, and Repair) can increase community income, reduce the volume of waste sent to the final disposal site (TPA), lower carbon emissions, and strengthen community literacy and participation in waste management. Furthermore, good governance of the waste bank is reflected in its clear organizational structure, transaction transparency, and accountable reporting. These findings demonstrate that the implementation of a circular economy in waste banks not only contributes to sustainable development but also simultaneously creates economic and social value through the principle of Creating Shared Value (CSV).

Keywords: Circular Economy, Waste Bank, ESG, Added Value, Creating Shared Value, Waste Management, Community Empowerment

INTRODUCTION

The problem of waste has become an increasingly complex environmental issue, especially in urban areas (Julia Lingga et al., 2024). Data from the Ministry of Environment and Forestry (2024) records that Indonesia produces around 68.5 million tons of waste per year, with the largest composition coming from households (37.3%) and traditional markets (16.4%). However, according to the Ministry, the national recycling rate remains very low, at only about 11% of the total waste generated. The rest ends up in final disposal sites (TPA), which causes environmental impacts such as groundwater contamination and public health risks. In Paser Regency, East Kalimantan Province, household waste management shows that around 70% of the total waste generated can be managed properly. This reflects the efforts of the local government in implementing more effective waste management strategies and adopting the circular economy.

The Ministry of Industry (Kemenperin) of Indonesia also claims that the main concept of the circular economy is based on the 5R principle, namely reduce, reuse, recycle, recovery, and repair. These five principles can be implemented by reducing the use of raw materials from nature, optimizing or increasing the use of reusable materials, and utilizing materials from the recycling process. On the other hand, the concept of the circular economy has begun to be adopted globally as an alternative approach to addressing waste problems. The circular economy emphasizes reuse, recycling, and redesign of products so that they no longer end up as waste (Ellen MacArthur Foundation, 2015). In Indonesia, one form of circular economy implementation that has grown from communities is the waste bank, a community-based waste management unit that treats waste as an asset with economic value.

Previous research has shown the potential of waste banks in reducing waste and creating social value. For example, a study by Sutrisno et al. (2021) revealed that waste banks are able to increase public awareness of waste sorting while providing direct economic benefits to their members. Another study by Rahmawati (2021) highlighted that the sustainability of waste banks is strongly influenced by governance and community participation. However, most of these studies only discuss environmental or social aspects separately and have not yet integrated the approach of economy, environment, social, and governance in a comprehensive manner. In addition, there has been little research analyzing the systematic application of the circular economy in the context of waste banks, particularly in terms of increasing added value economically and functionally.

This study offers a comprehensive and integrative approach by analyzing the implementation of the circular economy system in waste banks from the perspectives of economy (increasing income and added value of recycled products), environment (reducing the volume of waste to final disposal sites and reducing carbon emissions), social (community economic empowerment and environmental education and training), and governance (transaction transparency and institutional accountability). This approach provides a holistic picture of how waste banks can serve as a model of sustainable waste management as well as an instrument of community-based development.

REVIEW OF LITERATURE

The circular economy is an alternative model to the traditional linear economy of "take make dispose," aiming to retain the value of products, materials, and resources for as long as possible while minimizing waste generation (MacArthur, 2013). This approach

emphasizes the principles of reduce, reuse, recycle, recovery, and repair, creating a more sustainable system of production and consumption. In waste management, the circular economy contributes to reducing dependency on natural resources, optimizing product lifecycles, and turning waste into economic value (Geissdoerfer et al., 2018). However, effective implementation requires systemic transformation through government policies, consumer behavior changes, and technological innovation (Kirchherr et al., 2023). One of the most prominent community-based applications of the circular economy in Indonesia is the waste bank (bank sampah). Waste banks adopt a banking mechanism where community members can "deposit" sorted inorganic waste and receive economic value based on its weight and type (Kementerian Lingkungan Hidup dan Kehutanan, 2021). Beyond functioning as waste collection centers, they serve as platforms for environmental education and community empowerment. The success of this model depends heavily on local participation and socio-economic conditions, as noted by Sujauddin et al. (2008), who emphasize that community involvement is critical in effective waste management practices.

Integrating Environmental, Social, and Governance (ESG) principles into waste bank operations strengthens their role in sustainable development. Environmentally, waste banks reduce landfill waste, encourage recycling, and mitigate greenhouse gas emissions (Morseletto, 2020; Geissdoerfer et al., 2018). Socially, they empower communities through job creation, environmental awareness, and household-level education (Sujauddin et al., 2008). In terms of governance, waste banks rely on transparent transactions, financial accountability, and institutional oversight to ensure operational continuity while aligning with local government waste management policies (Gillan et al., 2021). The link between the circular economy and Creating Shared Value (CSV) theory highlights how waste recycling initiatives can simultaneously generate economic, social, and environmental benefits. Porter and Kramer (2011) argue that embedding social issues into business strategies fosters competitive advantage while addressing societal challenges. In the context of waste banks, circular economy innovations such as turning recycled materials into new products enhance public awareness, generate new markets, and strengthen community welfare. This alignment demonstrates how CSV principles transform waste from a problem into a shared opportunity for value creation.

RESEARCH METHOD

This study employed a qualitative research method with a case study design to explore the implementation of a circular economy system at BINSIK Waste Bank in Paser Regency, East Kalimantan. The qualitative approach was chosen to gain a holistic understanding of the behaviors, perceptions, motivations, and actions of the research subjects in their natural context, using descriptive data in the form of words and language (Moleong, 2017). Primary data were collected through direct observation and in-depth interviews with five key informants, including the Director of BINSIK Waste Bank, staff members, representatives from the Paser Environmental Agency, and community members who act as depositors. Secondary data were obtained from documents, reports, journals, and visual records related to the implementation of the circular economy in economic, environmental, social, and governance perspectives. Additional techniques, such as documentation, were also applied to capture transaction records, recycling volumes, and community empowerment activities, providing a comprehensive view of the waste bank's operational model.

To ensure the credibility and reliability of the findings, data validation followed triangulation methods, including cross-checking information from multiple sources and perspectives at different times (Sugiyono, 2013). The process of data analysis followed Miles and Huberman's interactive model, which involves three main stages: data reduction, data display, and conclusion drawing (Sugiyono, 2016). Data reduction was conducted through coding, theme tracing, and memo writing, while data display was organized in narrative and tabular form to facilitate interpretation. Finally, conclusions were drawn to identify patterns, meanings, and implications of the circular economy practice at BINSIK Waste Bank. These methodological steps ensured the study's findings were both valid and contextually grounded, making it possible to analyze how the circular economy enhances added value across economic, environmental, social, and governance dimensions.

RESULTS AND DISCUSSION

Background of the Study

BINSIK Paser Waste Bank, established on August 20, 2020, in Paser Regency, East Kalimantan, represents a community-driven innovation in waste management. The initiative was founded by Muchammad Rifai Rodi (also known as Achmad Zidan) in response to the growing environmental challenges caused by the increasing volume of unmanaged waste, particularly plastic. Guided by principles of industrial ecology and the circular economy, the waste bank was designed to transform waste into sustainable economic resources. It provides a platform for local residents to sort and collect inorganic waste, especially plastic bottles, which are valued at IDR 2,000 per kilogram. Collected materials are then processed through sorting, compacting with machinery, and labeling, thereby reducing landfill burden while generating added value through recycled products such as mobile phone soft cases, plastic paving blocks, and coconut shell charcoal briquettes. Beyond its waste management function, BINSIK Paser also serves as a vehicle for community empowerment by creating employment opportunities and expanding market access for recycled products. The waste bank currently has 26 active members and 22 passive members who participate in its programs. To better understand its operations and impacts, this study collected data through direct interviews with five selected informants, highlighting both the environmental and socio-economic contributions of the initiative to local communities.

Circular Economy from the Economic Perspective

The application of circular economy principles at BINSIK Paser Waste Bank has significantly impacted the increase in community income, particularly among low-income households, housewives, and micro-entrepreneurs involved in the program. The waste bank, functioning as a community-based waste management entity, not only promotes waste sorting at the source but also transforms it into productive economic activities. This was emphasized by AZ, the Director of BINSIK Paser Waste Bank:

"*By implementing the circular economy, it is true that income has increased, and this has also become an opportunity for the surrounding community who work in our waste bank*" (February 21, 2025).

This statement was reinforced by WI, a customer of BINSIK Paser Waste Bank:

"*I am pleased with the program organized by the Environmental Agency because it makes us aware of the importance of the environment and also benefits me and others since we can start getting used to sorting waste and selling inorganic waste*" (April 17, 2025). From an

economic perspective, the waste bank does not only serve as a collection and storage point for waste to generate income, but it has also developed into a production unit capable of processing waste into high-value recycled products. This transformation is a direct implementation of the circular economy principle, which emphasizes extending the life cycle of products through reuse and recycling. The added value generated from recycled products directly strengthens the local economy. BINSIK Paser Waste Bank recorded an increase in monthly turnover ranging from IDR 3–5 million after producing and selling recycled products. As stated by AZ:

"*The waste we purchase from the community is processed into new products that can be sold, creating added value. What was once just waste can be transformed into usable products, and the income we generate at the waste bank is around 3–5 million per month depending on the production*" (February 21, 2025).

Table 1.
Sales Details of Products at BINSIK Paser Waste Bank

No	Type of Product/Waste	Volume/Weight (kg/unit)	Unit Selling Price (IDR)	Estimated Income (IDR)
1	Recycled Product (Paving Block)	80 units	20,000/unit	1,600,000
2	Charcoal Briquettes (Coconut Shell)	200 units	10,000/unit	2,000,000
3	Recycled Phone Softcase	30 units	10,000/unit	300,000
4	Planting Media from Compost	100 kg	5,000/kg	500,000
	Total Estimated Income			**4,400,000**

Circular Economy from the Environmental Perspective

The implementation of circular economy principles at BINSIK Paser Waste Bank has made a tangible contribution to sustainable environmental management. The operational system is based on the five principles of Reduce, Reuse, Recycle, Recovery, and Repair, applied to waste collection, sorting, and processing. The principle of Reduce is realized through community education and outreach activities emphasizing the importance of reducing waste at the source, such as avoiding single-use products and choosing durable goods. People are also encouraged to practice more responsible and sustainable consumption. This was confirmed by DA, an official from the Environmental Agency:

"*We are currently conducting outreach to the community in Paser Regency to reduce the use of single-use products, especially plastic, and we have firmly urged people to change their purchasing habits*" (April 12, 2025).

The principle of Reuse is implemented by reusing items that are still functional, such as plastic bottles, glass containers, clothing, and household furniture. These items can be sorted and distributed to those in need or resold with economic value. WI supported this by stating:

"*The existence of the waste bank is very helpful, especially for items that I personally consider no longer useful. I can send them to the waste bank to be processed and given to*

those in need" (April 17, 2025). The principle of Recycle refers to processing waste into new products. Inorganic waste such as plastic, metal, and paper is sorted and reprocessed into recyclable raw materials. Recycling not only helps reduce waste but also creates new economic opportunities through products such as household items, handicrafts, and construction materials. AZ highlighted this by stating:

"*At our waste bank, we accept all kinds of waste or unused items to be processed into new products. So far, many people have brought their unused goods to us*" (February 21, 2025).

The principle of Recovery involves utilizing organic waste for compost production and, in some cases, alternative energy sources such as biogas. Thus, the energy potential of waste can be optimized instead of wasted. MS explained:

"*Our waste bank has also produced planting media from organic waste. Typically, organic waste is sourced from workers here*" (February 21, 2025).

This was supported by BA, who added:

"*For organic waste, we from the Environmental Agency recommend and provide solutions for the community to manage it themselves, either by burying it or making compost, because it is more challenging for waste banks to process. Although, some waste banks still accept organic waste for processing*" (April 12, 2025).

The principle of Repair is applied by fixing damaged items such as electronic devices and furniture to extend their usability. AZ noted:

"*When it comes to repairing broken electronics, our waste bank may not be very effective since we rely only on workers here who have the skills to fix those items*" (February 21, 2025).

Through these five principles, BINSIK Paser Waste Bank actively minimizes waste that ends up in landfills, thereby reducing groundwater contamination, methane emissions from organic decay, and air pollution from burning inorganic waste. The bank has successfully managed inorganic waste, especially plastic, by transforming it into economically valuable products such as paving blocks, recycled phone cases, coconut shell briquettes, and plastic-based furniture. These practices extend the material life cycle, reduce the exploitation of natural resources, and strengthen zero-waste-based resource management systems.

Additionally, the system reduces carbon emissions typically generated by waste burning. Unmanaged waste in landfills, particularly organic waste, produces greenhouse gases such as methane (CH_4) and carbon dioxide (CO_2). By diverting significant amounts of waste from landfills to the waste bank for sorting and recycling, harmful emissions are substantially reduced. BA from the Environmental Agency emphasized this:

"*The presence of waste banks in every region we supervise is one of the ways we reduce carbon emissions caused by illegal waste burning, which can have severe environmental impacts*" (April 12, 2025).

Circular Economy from the Social Perspective

From a social standpoint, the circular economy system at BINSIK Paser Waste Bank has broad benefits, particularly in empowering communities and improving local quality of life. The existence of the waste bank creates new economic opportunities for surrounding residents. Community involvement is central to the system's success since waste management is not solely the responsibility of institutions or the government but a shared duty. Every household is encouraged to sort waste based on type and characteristics organic, inorganic, and hazardous (B3). DA explained:

"*The Environmental Agency has advised the people of Paser Regency to sort waste by type, such as organic and inorganic waste, and we have been firm in urging them to comply*" (April 12, 2025).

Sorted waste is then deposited in waste bank units across various areas, including BINSIK Paser Waste Bank. In this system, community members act as depositors. Regular training and mentoring are provided to ensure that sorting is done correctly and in line with standards, preserving the quality of recyclable materials. BA supported this by stating:
"*Every month, we conduct regular observations and mentoring at each waste bank to ensure that sorting is being carried out according to standards*" (April 12, 2025).

Educational and outreach activities conducted by the Environmental Agency further enhance environmental literacy within communities. These programs encourage sustainable consumption behavior, such as sorting waste at home, avoiding single-use plastics, and reusing functional items. Beyond economic and educational benefits, the waste bank also fosters an inclusive social space where residents collaborate and organize for shared goals. In this sense, the waste bank functions as a social enterprise that pursues not only profit but also social and environmental values, aligned with the principles of sustainable development.

Circular Economy in the Governance Perspective

Based on the findings of research conducted at BINSIK Paser Waste Bank, it was discovered that governance plays a strategic role in maintaining operational sustainability, ensuring transaction transparency, and strengthening institutional accountability. BINSIK Paser Waste Bank has a relatively formal and functional organizational structure, with clearly distributed roles ranging from advisors, supervisors, director, secretary, treasurer, public relations officer, and weighing section. This was confirmed by the Environmental Agency informant, DA:

"As the Environmental Agency, we serve as supervisors. The managers at BINSIK each have their respective roles such as director, secretary, treasurer, weighing staff, and public relations. This division of roles makes the activities more structured and easier to monitor" (April 14, 2025).

This structure demonstrates a proportional distribution of duties and responsibilities, directly supporting efficiency in institutional functions. Furthermore, the presence of supervisors from the Paser Regency Environmental Agency creates a linkage between the informal sector and public policy. In terms of transparency, the institution applies an open transaction recording system for all members. Each waste deposit by a member is recorded in detail in their savings book and accompanied by a weighing receipt. The applicable waste prices are also publicly displayed at the waste bank so that all members have equal access to information. This practice reflects the principle of transparency and fairness in governance. As stated by the director, AZ:

"At BINSIK, we implement a transaction recording system that includes savings books, weighing receipts, and an open price board" (February 21, 2025).

Accountability is implemented through financial reporting and waste volume records. These reports serve as the basis for both internal and external evaluations and are periodically submitted to the Paser Regency Environmental Agency. The existence of transaction documentation and financial reports demonstrates that the managers have awareness and capacity to establish a sound internal control system. This was highlighted by BA:

"Every month, we receive a recap of incoming waste volume, outgoing waste, and operational cash balances from each waste bank under our supervision. We also conduct field visits for verification. This is important so that waste banks are not only active but also have measurable indicators of success" (April 14, 2025). This aspect forms an important foundation for the success of the circular economy system, which is not only oriented towards waste management but also towards creating shared value at the community level.

Table 2.
Waste Deposit Transactions in February 2025

No	Date	Type of Waste	Weight (kg)	Price/kg (IDR)	Total Value (IDR)	Final Balance (IDR)
1	01/02/2025	PET Plastic Bottles	5.0	2,000	10,000	10,000
2	07/02/2025	Cardboard	2.5	1,500	3,750	13,750
3	15/02/2025	Aluminum Cans	1.0	4,000	4,000	17,750
4	25/02/2025	Mixed Plastic	2.0	1,000	2,000	19,750

From the waste deposit transactions in February 2025, the distribution to the Environmental Agency is as follows: PET Plastic Bottles 47.62%, Cardboard 23.81%, Aluminum Cans 9.52%, and Mixed Plastic 19.05%. The application of circular economy principles at BINSIK Paser Waste Bank from an economic perspective has been proven to increase community income, particularly for low-income households, housewives, and micro-business actors. The waste bank not only promotes waste separation at the source but also processes it into recycled products with economic value. This transformation strengthens the local economy with a monthly turnover increase of IDR 3–5 million, serving as an example of a sustainable, community-based economic model.

From the environmental perspective, the waste bank has implemented the 5R principles (Reduce, Reuse, Recycle, Recovery, and Repair). Educational programs on reducing waste (reduce) encourage sustainable consumption; reuse and recycle generate new products from plastic and organic waste; recovery is manifested through compost production; while repair is carried out on a limited scale for damaged electronics. Circular economy practices also help reduce carbon emissions, as uncontrolled burning of waste contributes to severe air pollution. From the social perspective, the waste bank serves as an instrument of community empowerment through environmental education, alternative income generation, and citizen involvement in the waste savings system. Residents are encouraged to sort and deposit their waste, gaining direct financial benefits. The Environmental Agency also provides regular training and assistance to maintain recycling quality. Moreover, the waste bank creates a collaborative social space that strengthens social capital and raises awareness among local communities.

From the governance perspective, BINSIK Paser Waste Bank has a clear organizational structure, encompassing director, secretary, treasurer, weighing staff, and public relations. Transparency is realized through open transaction records, member savings books, and publicly displayed price boards. Accountability is enforced through waste volume

and financial reports submitted to the Environmental Agency. These governance practices illustrate the integration of informal institutions with public policies, supporting sustainable waste management.

Discussion

The discussion in this study highlights the successful implementation of the circular economy system at BINSIK Paser Waste Bank from the perspectives of Economy, Environment, Social, and Governance (ESG). The findings reveal that the application of circular economy principles at BINSIK Paser Waste Bank has increased community income, particularly among low-income groups. Waste is sorted and processed into recycled products with market value, stimulating a sustainable, community-based local economy. The waste bank has already applied the 5R-based circular economy (Reduce, Reuse, Recycle, Recovery, and Repair), which not only reduces the volume of waste ending up in landfills but also generates added value through waste-derived products such as plastic paving blocks, mobile phone soft cases, and coconut shell briquettes. This aligns with the concept of the circular economy as articulated by MacArthur (2013) and Geissdoerfer et al. (2018), which emphasize the importance of retaining material value within the economic cycle and avoiding the linear model. Moreover, circular economy practices at BINSIK Paser Waste Bank contribute to reducing carbon emissions, as sorting and recycling waste before reaching landfills suppresses the release of greenhouse gases such as methane (CH_4) and carbon dioxide (CO_2) from decomposing organic matter. This was confirmed by an informant from the Environmental Agency.

From a social dimension, the waste bank enhances community involvement in waste management while simultaneously generating economic impact through the waste savings system and local workforce empowerment. This approach aligns with the findings of Ramadani and Imsar (2023), who emphasize the importance of empowerment in building community-based circular economies. Furthermore, institutional support from the Paser Regency Environmental Agency, in the form of education, mentoring, and regular verification, illustrates the significance of synergy between communities and government, as highlighted by Aji et al. (2024), who identify collaboration as a key success factor in circular economy implementation. From a governance standpoint, BINSIK Paser Waste Bank demonstrates transparency, accountability, and clear role distribution within its organizational structure. Open transaction recording, waste volume reporting, and regular monitoring reflect strong governance practices. This is consistent with the governance principles in ESG outlined by Gillan et al. (2021). The findings also confirm the relevance of Porter and Kramer's (2011) theory of Creating Shared Value (CSV), which asserts that generating economic and social value simultaneously produces competitive advantages while supporting sustainable development

CONCLUSION

Based on the research conducted at BINSIK Paser Waste Bank, it can be concluded that the implementation of the circular economy system is capable of increasing the added value of waste in four main dimensions: economy, environmental, social, and governance. From an economic perspective, the application of the circular economy has a positive impact on increasing community income, particularly for housewives and micro-entrepreneurs. The recycled products produced not only possess market value but also create new business

opportunities. From the environmental perspective, the circular economy principles implemented through the 5R approach (reduce, reuse, recycle, recovery, repair) have proven effective in reducing the volume of waste that ends up in the final disposal site (TPA), while simultaneously creating economically valuable products from both inorganic and organic waste. The implementation of the circular economy also reduces carbon emissions resulting from the uncontrolled burning of waste. From the social perspective, the waste bank functions as an instrument of community empowerment that encourages active participation in household waste management and opens access to alternative sources of income. Educational activities, training, and the waste savings system further strengthen environmental literacy and collective community awareness of the importance of sustainable consumption.

From the governance perspective, BINSIK Paser Waste Bank demonstrates a functional organizational structure, a transparent transaction recording system, and accountable operational reporting. The active involvement of the Environmental Agency of Paser Regency as a supervisory body highlights the importance of synergy between the informal sector and government institutions in realizing good governance. Thus, the circular economy system implemented by BINSIK Paser Waste Bank not only contributes to reducing environmental impacts but also simultaneously delivers economic and social value. This model is worthy of being used as a reference in the development of community-based waste management policies that are sustainable and integrated with ESG principles.

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