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Making Value of Household Waste through Waste Bank

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Abstract

This study examines the role of waste banks in enhancing the economic value of household waste while promoting environmental sustainability. Focusing on the waste bank implemented in Susukan Siroto, East Ungaran District, Semarang Regency, Indonesia, the research evaluates its impact on the community's waste management practices and economic potential. The descriptive qualitative method was employed, involving interviews with 30 participants from the Family Empowerment and Welfare Group. Findings reveal that waste banks effectively increase awareness about waste sorting and recycling. Through systematic waste management, including sorting and depositing waste, communities gained both financial benefits and environmental improvements. Data from two implementation phases (June and August 2024) show a significant increase in waste deposits and financial returns for participants. Inorganic waste, such as plastic bottles, used cooking oil, and boxes, were transformed into valuable commodities, demonstrating the circular economy concept. The study highlights the importance of community involvement and education in achieving sustainable waste management. Waste banks not only reduce waste volume at landfills but also contribute to economic resilience, environmental conservation, and social harmony. The findings suggest that waste banks serve as a practical model for waste valorization, aligning with sustainable development goals.

Keywords | Waste bank, value of waste, sorting waste.

INTRODUCTION

One of the most important environmental issues facing the globe today is waste. The World Bank report from 2018 states that the annual amount of solid waste produced worldwide is 2.01 billion tons, with 33% of that waste being unmanaged and harming the ecosystem. Waste generation has increased as a result of urbanization and population growth (Chen et al., 2020). According to World Bank estimates, waste would rise by 70% by 2050, or roughly 3.40 billion tons annually.

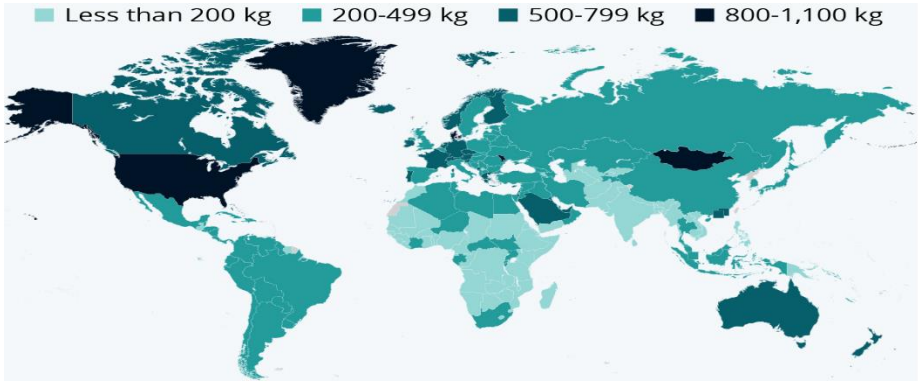

Figure 1. Global Waste Generation (kgs)
Source: World Bank, 2018

According to the Figure 1, Indonesia produces between 200 and 499 kilograms of waste annually. Data from the Ministry of Environment and Forestry (KLHK)'s National waste Management Information System (SIPSN) show that Indonesia generated 38,795,897.60 tons of waste in 2023. As one of the Java Island's areas, Central Java comes in second place to East Java Province in terms of waste generation in 2023. In 2023, the province of Central Java generated 5,372,159.82 tons of waste. This is a map showing the distribution of waste produced in Indonesia.

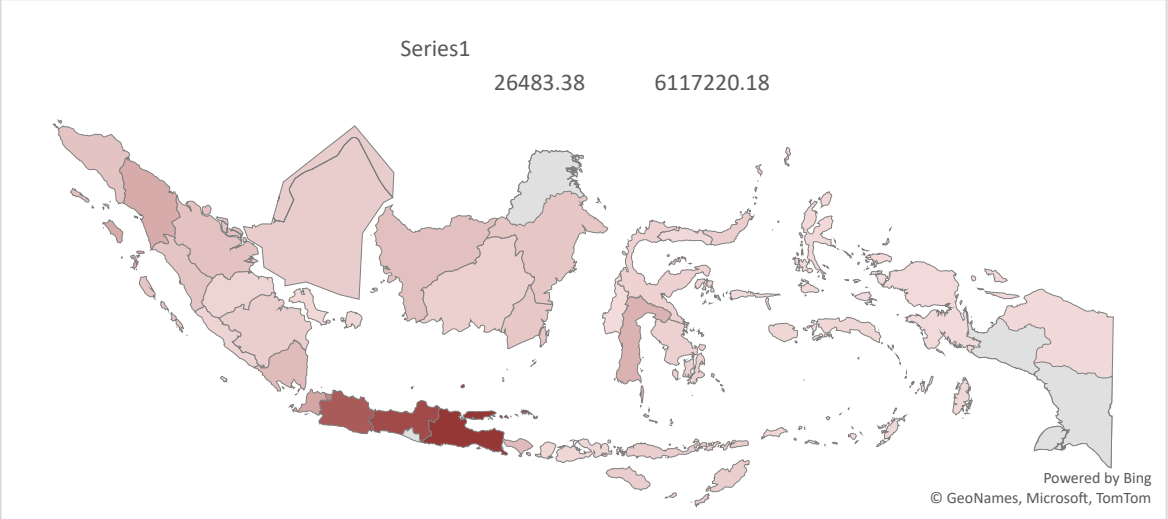

Figure 2. Map of Waste Generation Distribution Across All Provinces in Indonesia for the Year 2023 (ton)
Source: SIPSN- MENLHK (2024), processed

Often regarded as useless, waste actually has a lot of potential to be turned into something more valuable. When waste is managed properly, environmental issues can be transformed into social and economic opportunities. Most of Indonesia's waste is currently dumped in landfills. In Indonesia, the vast majority of people continue to follow the paradigm of gathering, moving, and discarding waste (Aprilia, 2021). Numerous landfills in Indonesia are unable to handle additional waste since their lifespan has come to an end due to the daily accumulation of waste that is collected and disposed of at these locations (Warlina dan Listyarini, 2022).

To reduce waste generation at the upstream level, or waste source, and at the downstream level, or end, the Indonesian government has undertaken a number of initiatives (Kurniawan et al., 2021). The government regulates waste management under Law No. 18 of 2008. Everyone must reduce and manage garbage in an environmentally friendly way, according to the law. Despite the government's waste management regulations, most citizens handle their waste in an environmentally harmful way. The majority of Indonesian families burn waste in an attempt to control their waste, according to BPS data from 2022. However, insufficient burning of waste leads to health and environmental issues (Chanana and others, 2023). The government therefore strongly advises the movement to cut waste at its source. According to Susanti (2024), sorting waste at the source can lower carbon emissions and the quantity of waste that ends up in landfills by 30% to 40% (Lian, Wang, dan Li, 2020).

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The public is frequently urged by the government to cut waste at its source. Waste sorting is an effort to cut waste at its source (Sidorstov and Lu, 2019). They are separated into organic waste that breaks down readily and inorganic waste that doesn't. waste can be sorted by the community and then deposited in a waste bank. There are currently waste banks all around Indonesia.

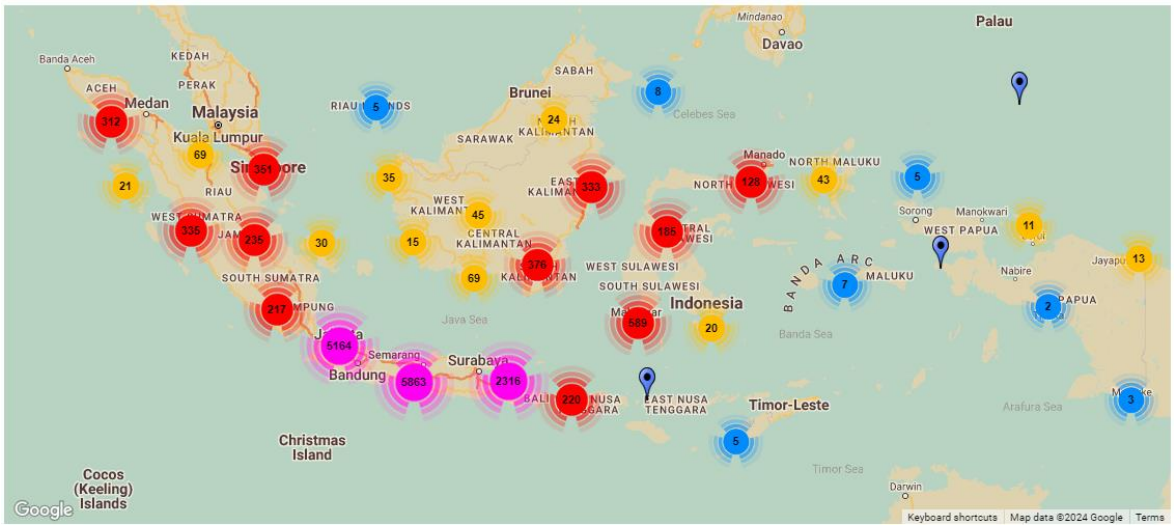

Figure 3: Waste Bank Distribution in Indonesia
Source: SIPSN-MENLHK (2024)

Waste banks as an approach to control waste and increase its value. In addition to managing waste, the waste bank generates economic benefit and encourages community members to be more ecologically responsible. Formerly worthless waste is now transformed into useful products, including valuable recycled materials (recycle) and reusable materials (reuse) (Kubota, Horita, and Tasaki, 2020).

Waste banks are an example of how the community is actively involved in preserving a sustainable and clean environment (Kamarudin, Dewantara, & Prasetiyo, 2019). Given the government's very little role in managing waste, community involvement is essential. (Lane and others, 2024).

The Susukan Siroto waste bank, located in the East Ungaran District of the Semarang Regency in the Central Java Province of Indonesia, is one of the recently constructed waste banks in that region. Waste has never been sorted by the local community in the study area. The old paradigm of collecting waste in the provided communal waste bins, which will then be transported by sanitation workers to the landfill. Regarding the definition of inorganic waste, 35% of respondents gave the wrong response. All remaining waste will be disposed of and wind up in a landfill since some responders are unable to discriminate between organic and inorganic waste. As a result, waste builds up at the Blondo dump in Semarang Regency, and any that is not picked up will be burned.

The study area was designed to highlight the significance of sorting waste and subsequently depositing it into the waste bank in light of these circumstances. The rise in

waste value through the waste bank built in the Susukan Siroto area, East Ungaran District, Semarang Regency, Central Java Province, will be evaluated in this study.

LITERATURE REVIEW

Waste Management

The management of waste, as defined by Law No. 18/2008 on Waste Management, is a methodical, all-encompassing, and ongoing activity that involves handling and reducing waste. Public health and environmental quality are impacted by waste management, which is a significant concern. Waste production is increasing, particularly in urban areas, as a result of rising consumption and fast population growth. Waste can lead to a number of concerns, including health problems and pollution of the air, soil, and water, if improperly managed.

According to Law No. 18/2008 on Waste Management, there are two main groups of waste management, namely:

a. Waste minimization, which consists of waste reduction (Reduce), Reuse, and Recycle.
b. Waste handling, which consists of:
    1) Sorting is the process of classifying and dividing garbage based on its nature, quantity, and/or kind.
    2) Collection: the act of removing and moving waste from its origin to a facility for integrated waste processing or temporary storage.
    3) Transporting waste from the point of origin, from the temporary storage location, or from the integrated waste processing plant to the final processing location is known as transportation.
    4) Processing is the process of altering the waste's properties, makeup, and amount. The safe return of waste and/or residues from earlier processing to the environmental media is known as final waste processing. (Padmi and Damanhuri, 2020).

Outdated paradigm and new paradigm of waste management

As people's understanding of the detrimental effects of waste on the environment and human health has grown, the paradigm of waste management has changed. The "collect-transport-dispose" method, which only involved collecting, transporting, and disposing of waste at landfills, dominated the waste management paradigm in the past. This strategy led to a number of issues, including greenhouse gas emissions, soil and water pollution, and waste buildup at landfills. Today's waste management paradigm is more centered on the ideas of sustainability and the circular economy, where waste is viewed as a resource that can be utilized rather than as waste. This new paradigm places a strong emphasis on recycling and reuse in order to maximize waste usage and reduce waste at its source ((Kurniawan et al., 2021).

The foundation of this contemporary worldview is the 3R principle: Reduce, Reuse, and Recycle. Reducing the amount of waste that ends up in landfills and turning waste into valuable products are the two main objectives. In addition to encouraging the industrial sector to create more easily recyclable and ecologically friendly products, 3R-based waste

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management also involves the community in waste sorting operations (Mohammed et al., 2020).

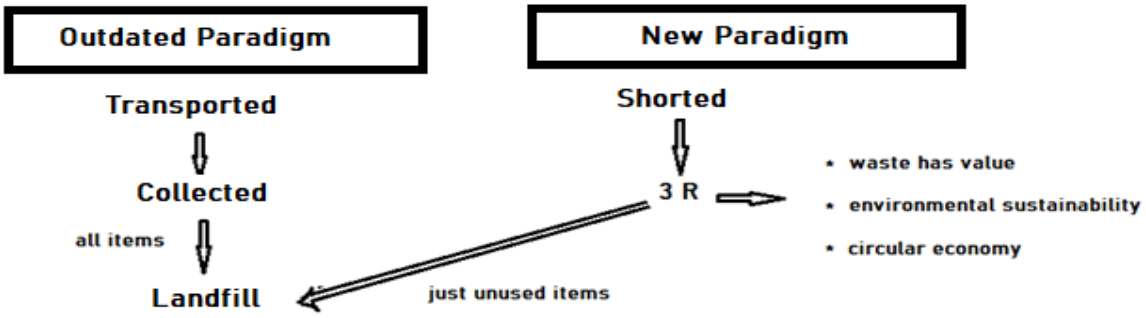

Figure 4. The Paradigm of Waste Management
Source: Indartik et al., 2018 with modifications

Waste Bank

One system that gives waste more value is waste banks (Riani et al., 2023). If waste is handled properly, it still has value (Maulida et al., 2022). As a result, it's important to first separate what can be recycled and what can be thrown away. In addition to promoting ecologically responsible behavior, waste banks help educate the public about the value of recycling and sustainable waste management. It's critical that households receive education about the significance of segregating organic and inorganic waste (Zambrano-Monserrate, Ruano and Yoong-Parraga, 2020). Waste will be processed more effectively at the landfill if it is separated at the source (Pluskal et al., 2021). The waste bank is one approach used for waste sorting that actively incorporates the community (Kubota, Horita and Tasaki, 2020).

Waste banks play an important role in the circular economy by helping to reduce waste, recycle resources, and raise environmental awareness. (Rachman, Komalasari and Hutagalung, 2021). The activities of the waste bank include:

1. Waste Collection: The community is invited by the waste bank to separate household waste into inorganic and organic categories. Paper, metal, and plastic garbage are all gathered for recycling.
2. Sorting and Categorization: Waste is collected and then classified according to its quality and type. The purpose of this procedure is to guarantee that the recycled material is in optimal condition for subsequent processing. (Budiyarto, Ross, and Clarke, 2024).

The waste bank contributes to the circular economy and has economic potential as a result of these operations because of the following:

1. Recycling and Processing: Sorted waste is subsequently delivered to recycling facilities for conversion into fresh raw materials. Plastic, for instance, can be used to create new goods like bottles or bags.
2. Recycled Product Sales: Items produced during the recycling process are resold to businesses or the community. This lowers the demand for new raw materials, increases

the market for recycled materials, and lessens the amount of waste that ends up in landfills.

3. Economic and Welfare Improvement: By collecting recyclable waste, waste banks enable the community to receive financial rewards, like money or savings. In addition to helping the environment, this raises revenue.
4. Waste Reduction and Pollution Reduction: Waste banks help reduce the amount of waste that ends up in landfills and the pollution that waste accumulation causes to the environment (Pratama et al., 2023).

According to Riani et al. (2023), waste banks are a creative way to address social and environmental concerns while simultaneously increasing the value of waste. Waste banks are created to help the community understand the value of protecting the environment and to reap the financial rewards of effective waste management. (Shekdar, 2009). By prolonging the life cycle of products and minimizing the waste of natural resources, waste banks also contribute significantly to the introduction of a circular economy and the reduction of waste that ends up in landfills (Hajam, Kumar and Kumar, 2023). Waste banks should be implemented as part of the circular economy since they will have a major positive impact on the economy, the environment, and society in the future. Environmental resilience, social welfare, environmental damage reduction, the creation of new products with added value, and green economic growth in accordance with sustainable development goals can all be improved by implementing the circular economy (Ramadhani dan Imsar, 2023).

Therefore, waste banks are a practical step towards establishing a cleaner environment and a more successful living, rather than only a waste management concept.

METHOD

This study is descriptive and qualitative in nature, and it makes use of primary data. By gathering narrative and interpretive data, the descriptive qualitative research method is one of the research techniques used to gain a thorough understanding of social phenomena or human behavior (Nasution, 2023). Based on observations and interviews with moms who are involved in family empowerment and welfare in the Susukan Siroto area, East Ungaran District, Semarang Regency, this study focuses on how a scenario, event, or social interaction is described. In addition to a description of the waste bank's implementation in the research region, 30 respondents were interviewed.

RESULTS AND DISCUSSION

The mothers' group participating in the Family Empowerment and Welfare program in the Susukan Siroto neighborhood, East Ungaran District, Semarang Regency, is the focus of this study. The choice of housewives stems from the fact that in Indonesia, neighborhood leaders are in charge of handling waste.

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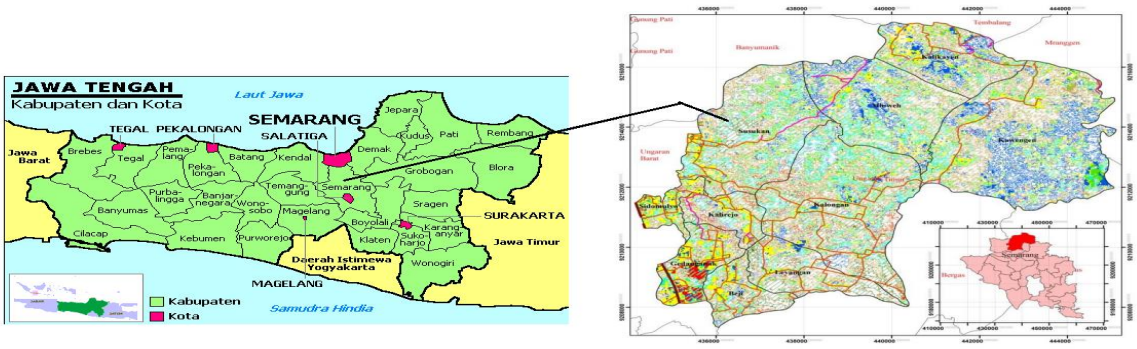

Figure 5. Map of the Study Area

Source: id.wikipedia.org (2024) and Muqodas (2015)

The mothers of the Family Empowerment and Welfare Group in the East Ungaran District's Siroto Susukan area were then informed that waste is more than just leftover and can be useful if handled appropriately in light of these circumstances. Prior to being informed of the significance of trash banks, 35% of respondents thought that the government had the right to build them, and 65% thought that waste banks needed a lot of area.

Making waste more valuable with Waste Bank

The FGD's findings have led the community to acknowledge that their actions thus far have not been consistent with Law No. 8/2018 on Waste Management. Starting waste sorting operations is the next action the community takes. The waste bank will receive inorganic waste, specifically that which comes from domestic sources.

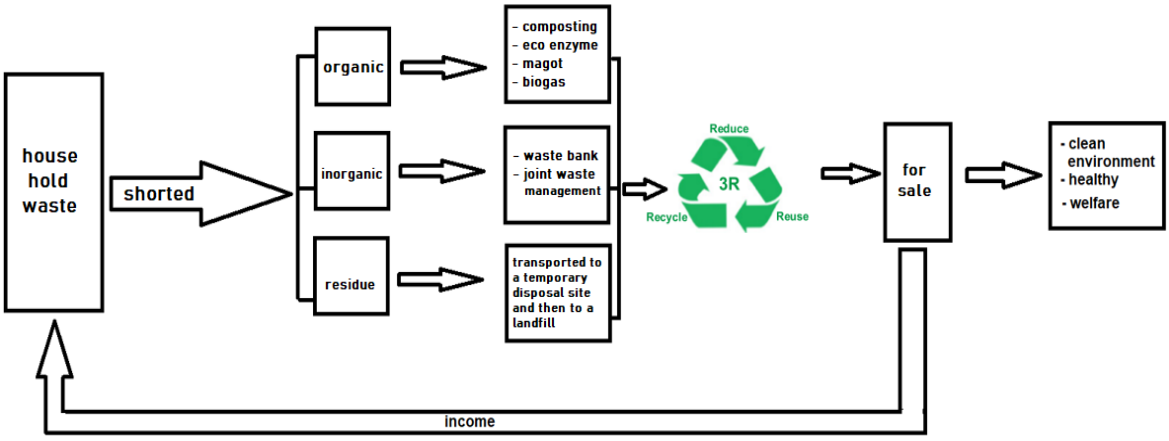

Figure 6: Circular Economy from Household Waste Sorting at the Source

Figure 6 illustrates how the new waste management paradigm might raise the waste's intrinsic worth. Waste bank give advantages to the environment, but they also assist the community economically. Each piece of waste that is placed has an economic value that can be changed for cash, products, or even specific services. This encourages the development

of knowledge regarding the significance of waste segregation and offers financial incentives for the community to actively engage in the waste management process.

Waste bank is being implemented in the study area

Following the briefing, the community in the study area implemented the findings the following month, in June 2024. Two implementations were conducted in June and August of 2024. The following is a description of the waste bank's implementation in the research area:

1. Sort waste and inorganic waste is deposited at the waste bank.
   The community sorts waste and after sorting, inorganic waste is deposited at the waste bank.

Figure 7. Sorted Waste Placed in the Waste Bank

2. Weighing of waste.
   After that, the dumped waste is weighed using the specified criteria.

Figure 8: Weighing the Waste That Was Delivered

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3. Weighed waste is entered into the savings book.
   Each member's book has a record of the weighted waste. Every member receives a varied amount of money because they all have varying waste weights.

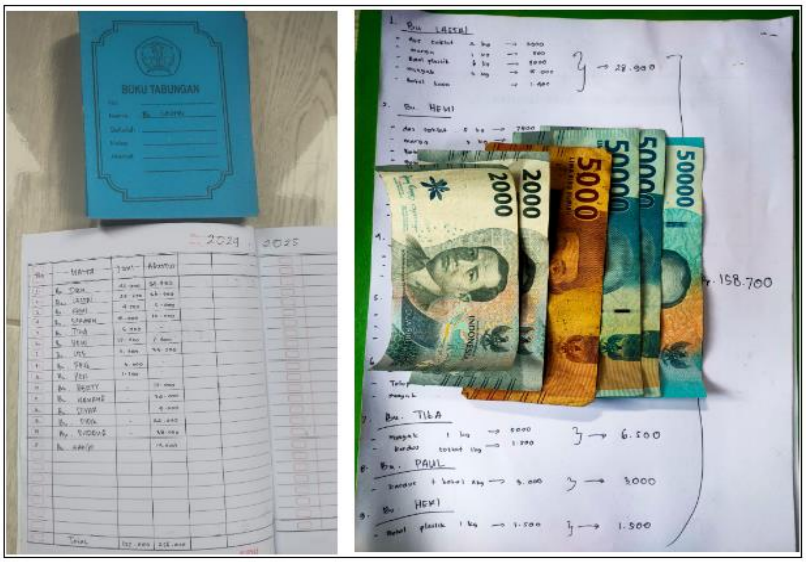

Figure 9. Recording of Waste Deposited by Customers

4. The waste collector then gathers the weighed, documented waste and delivers it to the recycling enterprise.

Figure 10. Transporting waste to the recycling enterprise

The waste collectors will pick up the waste and deliver it to the recycling provider after the recording and weighing are finished.

According to the collective agreement, waste deposits from each household are carried out every two months. This condition makes it possible that there is no need for a large waste bank to be established in the study area. The community in the study area has also decided on a location for gathering waste before it is picked up by the collectors. In order to prevent inhabitants from keeping waste in their homes for an extended period of time. The collectors will carry the gathered waste right away after it has been weighed and recorded. Collectors who typically function as waste collectors are the ones that show up during the execution of the waste bank activities; they have already been invited to participate. The community's agreement in the research area is another factor used to choose the collectors.

The waste deposited at the waste bank has economic potential. Economic potential means that the deposited waste will be valued at a certain amount in Rupiah. The economic potential when the waste is deposited at the waste bank in June and August 2024 is listed in Table 1 below.

Table 1. Economic Potential of Waste Deposited at the Waste Bank

No	Waste Category	Price per kgs (Rp)	Amount of Waste Disposited (kgs)		Member Income (Rp)	
			June	August	June	August
1	Used cooking oil	5,000	10.5	19.5	52,500	97,500
2	Box	1,500	21	54	31,500	81,000
3	Plastic bottle	1,500	15.5	47	23,250	70,500
4	Glass bottle (depend on size and shape)				7,700	0
5	Gallon cap	4,000	10		40,000	0
6	Marga	500	7.5	14	3,750	7,000
Total Income of Waste Bank					158,700	256,000

The quantity of waste dumped has increased, which has raised the waste's economic potential, according to the figures in Table 1. In August 2024, there were more members depositing waste at the waste bank than in June 2024 (Figure 9). In August 2024, more community members saved than in June 2024. This is because, at the start of the waste bank's operation, other community members who had not yet deposited their waste noticed that members who did so were making money off of the waste they placed.

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Other community members are now interested in preserving the waste that has been placed in the waste bank as a result of this. In the upcoming months, it is envisaged that the quantity of waste deposited, community savings, and the number of waste bank members will all rise.

The waste that is placed in the waste bank has the potential to be profitable (Kubota, Horita and Tasaki, 2020). Waste will also gain value after it is collected and delivered to a recycling facility. The process of recycling involves turning waste materials into new or functional goods.We refer to this as a circular economy.

The community in the study area has decided to use the money collected to fund joint tourism. This is intended to strengthen the sense of community among the inhabitants in order to foster harmony and comradery.

The benefits of the waste bank

As the waste bank operates in the study area, the local community feels its benefits. The benefits of waste banks according to Fatmawati et al. (2024) are:

1. Raising Environmental Awareness in the Community
   Waste banks urge people in the community to be more conscious of the waste they generate. Sorting organic and inorganic waste is what they are learning.
2. An Extra Revenue Stream for the Community
   Inorganic waste including plastic, paper, and metal have economic value from the waste bank. Waste that is typically disposed of carelessly by the community can now be used to generate revenue or other advantages. Particularly for low-income neighborhoods, the waste bank opens up new economic prospects by providing an extra revenue stream.
3. Reducing Waste Volume at the Landfill.
   One of the main problems in waste management is the limited capacity of landfills. Waste that is not properly processed ends up in landfills and causes various environmental issues, such as groundwater pollution and greenhouse gas emissions. Waste banks play an important role in reducing the volume of waste sent to landfills, as the waste collected in these banks is processed and recycled.
4. Encouraging the Circular Economy.
   Waste banks are a sign that the circular economy idea is beginning to take shape. By recycling and cutting waste, the circular economy makes use of things till the end of their useful lives. waste banks convert garbage into raw materials or new goods, enabling the economic cycle to continue without increasing environmental stress.

CONCLUSION

The waste bank operations in the study area to improve economic potential, strengthen a sense of community, and teach the locals how to take care of the environment. One way to lessen the quantity of waste that ends up in landfills is to sort it at the source. Only genuinely useless goods will wind up in the waste. In order to preserve the value of waste, additional products that can be recycled or reused will be placed in the waste bank. The study area's residents who deposit their waste at the waste bank will receive additional

revenue due to the waste's value. In the end, the value of the waste that is deposited at the waste bank will enhance the well-being of the local population in the study area.

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