

Waste Banks in Surakarta: Economic and Social Impacts on Sustainability

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Abstract. This research investigates the socio-economic functions of waste banks in Surakarta, Indonesia, where the perception of waste's economic value and environmental significance remains underdeveloped among some community members. Using a descriptive qualitative approach with 120 samples, the study aimed to map the social and economic roles of these banks and track their evolution. Results revealed that waste banks not only elevate community income but also introduce new communal activities, fortifying inter-resident relationships towards environmental conservation. Furthermore, through initiatives like sorting, recycling, and educational drives, waste banks have fostered heightened environmental cognizance, prompting a shift in waste management perspectives. Such interventions culminate in tangible reductions in waste generation and environmental preservation. These banks, therefore, serve dual roles: they reshape local waste perceptions while simultaneously providing economic incentives. For a holistic impact, governmental intervention through community empowerment programs supporting waste bank endeavors is recommended, underscoring the waste bank's pivotal role in Surakarta's sustainable development.

1 Introduction

In this modern era, environmental problems are increasingly urgent to be resolved. One of the most prominent issues is the waste crisis faced by the global community. Improper waste management poses significant risks, including environmental pollution and damage to ecosystems [1]. Additionally, it contributes to various health issues [2]. In Indonesia, the management of waste has emerged as a critical challenge confronting the nation. Population growth, rapid urbanization, socioeconomic status, and increased consumption patterns have led to an increase in the volume of waste [1,3]. To overcome this problem, the concept of a waste bank has been introduced as an innovative solution for sustainable development.

According to Regulation of the Minister of Environment No.14 of 2021 A waste bank is defined as a system that involves community participation in waste management. The basic

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principle is to collect, sort and process waste into goods that have economic value or 3R (Reduce, Reuse, Recycle). Based on statistical data from the [4] in Indonesia there are 221 Master Waste Banks (BSI), for Unit Waste Banks (BSU) there are 12,345 customers.

Based on [5] data on waste achievements in Indonesia amounted to 19,876,091.98 tons/year of waste heaps, the reduction of waste occurred by 17.34% or around 3,446,269.27 tons/year, the waste handled was 48.5% or around 9,639,303.50 tons/year. Managed waste is 65.84% or around 13,085,572.77 tons/year while the remaining 34.16% is not managed. Central Java province stands out as one of Indonesia's highly sought-after regions, characterized by a notable urbanization rate and rapid population expansion. Consequently, the province faces an escalating volume of waste, necessitating the implementation of effective waste management strategies. Figure 1 and Figure 2 below show the composition of waste based on waste sources and the achievements of waste management in Central Java.

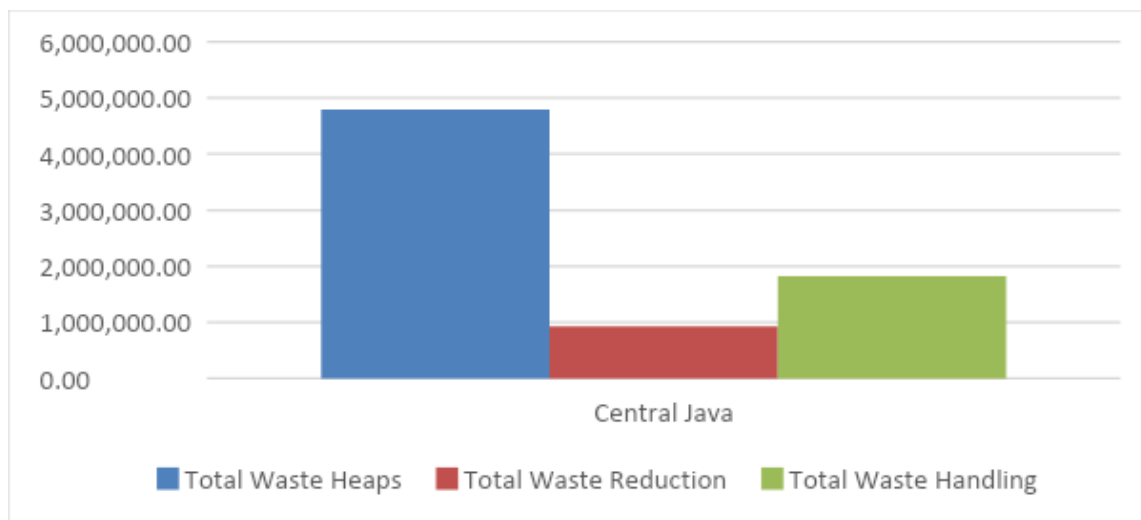


Fig.1. Central Java Waste Composition Based on The Waste Sources (2022)

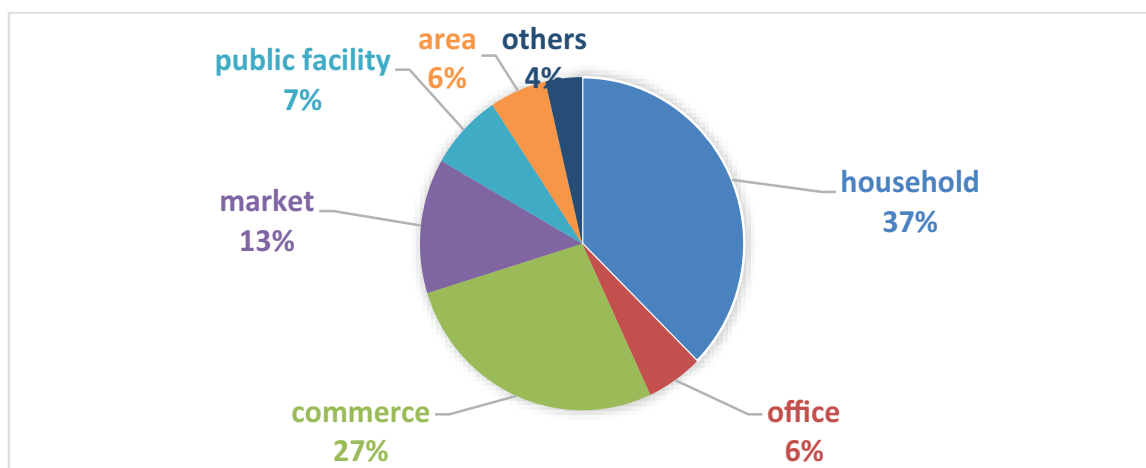


Fig.2. Achievement of Waste Management Performance in Central Java (2022)

The Surakarta City Environmental Service continues to improve waste management by improving waste handling infrastructure. In addition, a reduction in waste production is also carried out through activities aimed at implementing the 3R concept (Reduce, Reuse, Recycle) such as a waste bank [6]. In 2022, Surakarta City is recorded to have 70 waste banks (4). Apart from environmental benefits [7], waste banks also have positive social

impacts (8). Waste banks can provide new economic opportunities for communities by creating local jobs related to waste collection, sorting and processing [9]. In addition, the waste bank also plays a role in increasing social awareness and cooperation between residents in the community. In various parts of the world, waste banks have become a successful model for sustainable waste management. Many communities and local governments have adopted the waste bank system as a strategy for dealing with their waste problems.

Therefore, this research will discuss the mapping and development of social and economic functions of waste banks in Surakarta. Through a deeper understanding of the function of waste banks, the people of Surakarta can play an active role in maintaining environmental cleanliness and sustainably managing waste.

2 Methodology

The study was conducted in Surakarta, Central Java, utilizing an analysis descriptive research method that involved conducting in-depth interviews with waste bank managers and selected individuals residing in Surakarta. Surakarta has an area of around 44.04 km² with daily waste production of around 270 tons on weekdays, and increases to 293 tons during the holiday season [10]. This city has a landfill called Putri Cempo which covers 17 ha and has been operating since 1987 with a capacity of around 100,000 tons of waste. Every year, the amount of waste disposed of in the landfill has increased due to population growth, so that the volume of waste is increasing. This increase in waste has an impact on reducing the service life of the landfill [11]. The research was carried out in 2022, and data collection involved the use of a questionnaire administered directly to the respondents, focusing on waste management practices in their respective areas of residence. A total of 120 respondents were interviewed from 25 waste banks, and the study also involved the participation of 13 waste bank managers spread across the five subdistricts of the study area. The collected data were subjected to descriptive analysis for processing and further analysis.



Fig.3. Map of Research Locations
Source: Secondary Data, 2023

3 Results and Discussion

The issue of waste continues to be a global topic of ongoing concern. Countries worldwide are actively engaged in addressing this problem and striving to minimize waste generation through various efforts and initiatives. Same as the previous studies [9] wrote about the impact of waste banks on the economy, environment, and education for the community. Then, [12] analyzed the socioeconomic relationship between waste banks using religious sentiment. In Indonesia, one of the methods implemented in accordance with Law No. 18 of 2008 is the establishment of waste banks. These waste banks are designed to gather household waste that has been sorted and selected, with the sorted materials used to create innovative products of economic value [13]. The activities carried out are based on the implementation of 3R (Reduce, Reuse, Recycle) so that in its implementation the functions of the waste bank can be mapped socially and economically.

3.1 Waste Bank Social Functions

Waste banks not only function to protect the environment, but also have other functions such as social and economic functions [14]. In addition to these environmental functions, problems also arise in social functions where the public's view of waste is still inadequate because concern for a clean environment has not been built. Some of the social functions that waste banks in Surakarta are trying to build are:

3.1.1 *Creating a Society That is Sensitive to Cleanliness and Protecting the Surrounding Environment.*

Environmental cleanliness is needed to make the environment greener and healthier. The existence of public concern for protecting the environment can change the habits of people who litter, burn it, or even throw it directly into the river, to change the habit of sorting waste from their respective households.

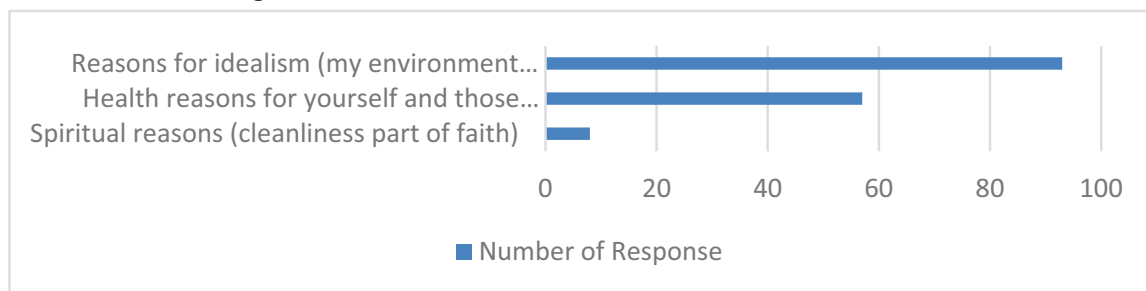


Fig.4. The Reasons community need to clean up trash

Based on the research results in Figure 4, it is explained that there are three reasons and motivations for the people in Surakarta who are members of the waste bank to carry out environmental cleaning activities.

Table 1 shows community activities that can reduce the burden of waste around or accumulate in the final disposal site. Awareness of reducing waste is due to a waste bank that routinely holds socialization in the form of seminars, community gatherings, as well as focus group discussions. Dissemination of the importance of waste management because the community is the leading actor in waste management [15]

Table 1. Questionnaire in measuring waste management

No	Variable	SD	D	N	A	SA
1	Buy minimally packaged products	22	15	28	49	6
2	Repairing damaged goods instead of buying	5	5	26	50	34
3	Using a bag when shopping	37	12	15	32	24
4	Buy products that can be reused instead of disposable	14	13	28	49	16
5	Buy unpackaged fruit/vegetables	8	3	14	44	49

SD: Strongly disagree; D; disagree; N: Neutral; A: Agree; SA: Strongly Agree

3.1.2 Changing the Thinking or Mindset of The Community Towards Waste

The existence of waste bank socialization activities can change people's thinking from those who originally thought that waste was useless goods to goods with sale value. Figure 5 is the response from respondents to the waste sorting activity whose implementation is escorted by the waste bank. There were 80.8% or around 97 respondents doing waste sorting activities, while the rest did not.

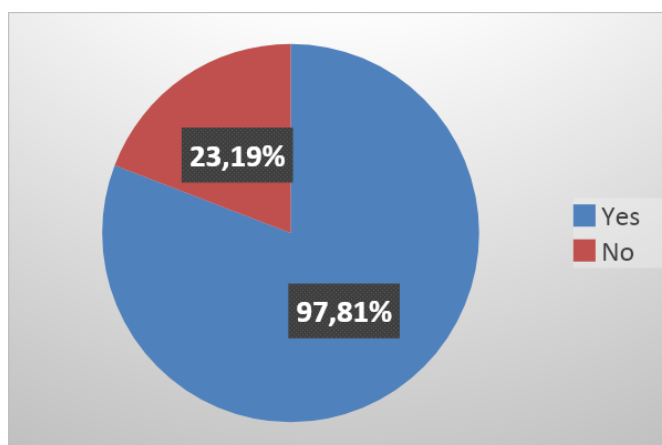


Fig.5. Waste sorting Activities
 Source: Primary Data, 2022

Table 2. Questionnaire on littering behavior

No	Variable	Yes (%)	No (%)
1	Burning trash	0.8	99.2
2	Rubbish bin near the house	0.8	99.2
3	Throwing trash on the riverbank	0	100
4	Turning waste into compost	24.2	75.8
5	Dispose of waste to landfills	0	100
6	Dispose of waste through the waste bank	100	0

Source: Primary Data, 2022

Table 2 describes the behavior of the community in disposing of garbage in the city of Surakarta, which are customers of the waste bank. Community participation in waste bank activities can provide education and change people's mindset in handling waste. Communities who have been educated by the waste bank prefer to collect inorganic waste and then sell it to the waste bank and process organic waste into compost. This is in line

with the study by (16) which states that people's mindsets are influenced by education conducted by waste banks.

3.1.3 Adding New Activities and Active Interaction Between Members of the Waste Bank

Participating in the waste bank has led to the emergence of a new activity aimed at mitigating the adverse environmental impact of waste and promoting recycling practices. Within the waste bank, the community actively engages in the recycling process by collecting, segregating and selling recyclable materials. This involvement fosters a heightened awareness of the significance of responsible waste management. The community learns to classify waste based on its composition, distinguishing between paper, plastic, metal and organic materials. Recycling constitutes a primary focus, as the collected waste is processed to produce reusable raw materials.

There are several examples of agendas in the waste bank, namely the "Japungsa" Waste collection walk and the "Goyang Sapu" activity. This activity functions to make the environment clean and to be able to collect trash scattered around the environment so that it can be recycled to increase savings or cash. Stimulating creativity and innovation due to new activities carried out to fill time, creating a clean, comfortable and healthy environment (14). In addition to this, waste bank activities that focus on the community level in Surakarta require members of the waste bank to be able to have good relations between members (17). The existence of a Waste bank group can be a forum for friendship from the surrounding community, there are also administrators who work together. So, there is social interaction to support each other so that awareness is created to protect the environment together, then we can exchange ideas and learn together related to waste management skills and others.

3.2 Waste Bank Economic Function

In addition to these social functions, problems also arise in the economic function where many people still perceive waste as something that has no economic value (12). Even if it is managed properly, waste has economic value. This is what is trying to be encouraged by innovation in waste exchange at several waste banks in urban and sub-urban areas, especially in Surakarta.

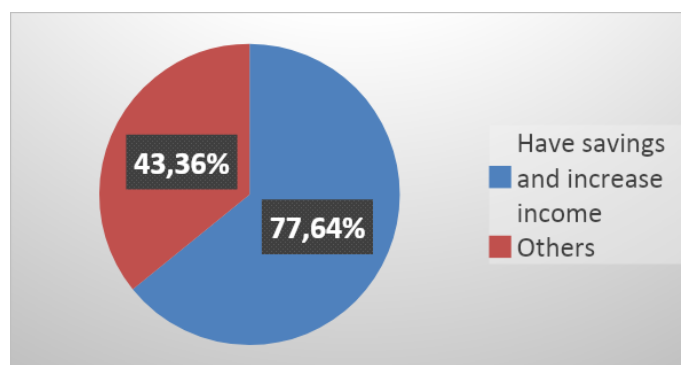


Fig.6. The economic benefits of having a waste bank
Source: Primary Data, 2022

Based on the results of the research in Figure 6, there were 64% of respondents who felt that there was an economic function of the waste bank, that is, with the existence of a Waste

bank, people have savings and also experience an increase in income. This is obtained from the results of sorting waste and exchanging it to the waste bank so that it can be used as direct savings or income. Respondents have savings ranging from IDR 4,000.00 to IDR 1,500,000.00. The disparity in savings can be attributed to the duration of participation in the waste bank. Additionally, an economic factor contributing to this variation is the profit-sharing arrangement with the waste bank management. Furthermore, the economic value of waste creation is realized through learning innovative ways to transform waste into creative items such as flower vases, bags, tissue containers, and more. These endeavors enable the waste bank community to generate economic benefits from their involvement in waste management practices.

3.3 Development of Social Functions and Economic Functions of Waste Banks

Since 2019 to 2023, the Environmental Service has launched several Community Voluntary Group (CVG) such as Waste Management Group with the 3R principle. This group was created to manage waste, not only sorting it but also giving advice on how to reuse the waste generated so that the waste can produce creations. Figure 7 shows that the majority of respondents stated that there was no CVG for Waste Management in their area's waste bank.

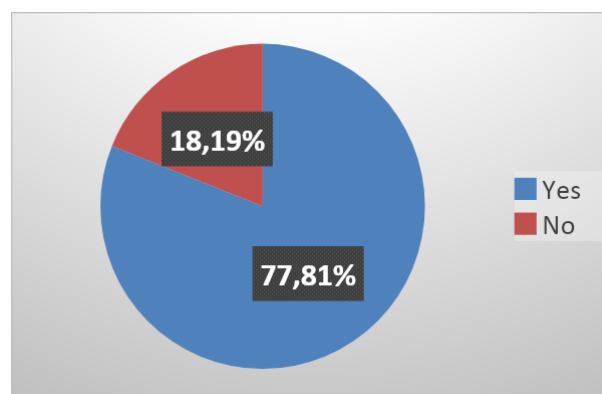


Fig.7. The Existence of a Waste Management Non-Governmental Organization
Source: Primary Data, 2022

The role of the waste management group is expected with the 3R principle, this group can remove as little waste as possible or that cannot be recycled anymore. Because with the increase in population, the thing that is difficult to control is the accumulation of waste, as happened in Surakarta, to be precise Putri Cempo landfill. Based on the research results which can be seen in Figure 8, as many as 81 respondents will be involved if a CVG is formed in their respective regional waste banks, the community is very enthusiastic about supporting the existence of the CVG Waste Management for better environmental sustainability. According to the study (18) the development of the waste bank function is necessary for the sustainability of waste management in the future.

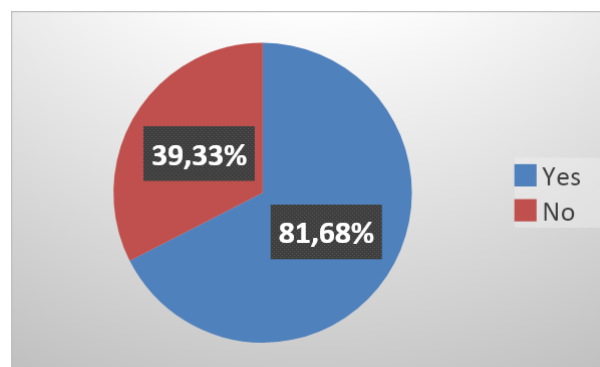


Fig.8. Involvement in CVG in the future

Source: Primary Data, 2022

Waste banks in Surakarta have considerable economic potential, by selling the collected waste, people can earn additional income. The existence of support from the government and environmental services is very important for the sustainability of waste banks. The government is expected to have a program that allows for community economic empowerment, especially for those who are less well off financially. In addition, skills training in waste management and recycling processes can improve the qualifications of the local workforce. According to (14) Environmental preservation must start from an individual scale by taking small actions. Continuous synergy between the waste bank community and the government is expected to be established for a sustainable environment in the future.

4 Conclusion

An increase in community environmental awareness can be had because of the role of the waste bank. Through sorting, recycling and educational activities, the waste bank helps change people's mindset about waste management. This brings positive benefits in reducing the amount of waste generated and protecting the environment. In addition, the waste bank also provides an opportunity for the community to actively participate in waste management. Overall, waste banks in Surakarta have an important role both socially and economically. In addition to helping change people's mindset and behavior towards waste, waste banks also provide economic benefits for the community and contribute to sustainable development in Surakarta. The government is expected to be able to provide community empowerment programs that can support waste bank activities.

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