

Study of Waste Bank's Condition in Semarang City

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Abstract. The development of waste bank is the initial momentum to grow the collective awareness of the community to start sorting, recycling, and utilizing waste because waste has a good selling value, so that the management of environmentally friendly waste becomes Indonesia's new culture. There are several waste bank units in Semarang City, which has not been evenly distributed and the numbers are still relatively small. The purpose of this study is to determine the existing condition of waste banks in Semarang City and the response from the surrounding community. This study uses survey research methods. The technique of collecting data uses in-depth interviews, observation, questionnaires, and documentation. The analysis technique uses quantitative analysis and qualitative analysis. The results showed that in 2018 the number of active waste banks was 44 units spread over 15 sub-districts in Semarang City with an average number of customers of 120 households each waste bank. The main problem found in the management of waste banks is the lack of community interest to become customers of waste banks, as evidenced by only 35% of respondents interested in sorting waste and waste recycling is only carried out by 7% of respondents.

Keywords: **Waste Bank Condition; Community Response; Semarang.**

1 Introduction

The problem of waste and the increasing of environmental pollution from year to year are a result of the inability of solid waste infrastructure to provide containers for urban waste. The amount of urban waste continues to increase by around 2-4% every year, in line with the increasing population [1].

Data from the Semarang City Population Profile 2017 [2] states that in the last 5 years (2012-2017) the population of Semarang City experienced an average growth of around 0.3% per year. In 2012, the population of Semarang City amounted to 1.559.198 inhabitants, increasing in 2017 to 1.610.605 inhabitants. With such a large number, Semarang City is included in the top five districts/cities that have the largest population in Central Java. The number is spread in 16 sub-districts and 177 village, with waste production reaching 1.000 tons each day and only 850 tons entering the Jatibarang Landfill.

The limitations of the Jatibarang landfill to accommodate the total waste production in the city of Semarang must be anticipated immediately with a good and efficient waste management system with the support and participation of the community, in order to reduce the amount of waste that continues to be produced. Community participation is one of the important factors to solve waste problems because success in waste management is determined by the contribution of community participation. This fact still cannot be done consistently by the people in Indonesia, as evidenced by one of the findings of Herlianti (2012) research in Sukarame District, Bandar Lampung City, which states

that 70% of household waste management in this sub-district is managed by janitors, because of the lack of community participation, so that waste tends to accumulate in residential areas [3].

Public participation, in general, is only limited to disposal and not at the stage of waste management which can be beneficial for the community [4]. This is confirmed by the research findings of Rauf et al. (2016) who conducted observations on household waste management in Kudus Regency, found that from a total of 920 respondents, only 32.6% of respondents or 300 people carried out waste collection activities to be disposed to polling stations. The rest of the respondents tend to do waste burning [5].

In Law No.18 of 2008 [6] concerning Waste Management, it is written that the principle in managing waste is to reduce, reuse and recycle which means reducing, reusing and recycling. One simple way to manage waste is to sort. The development of waste bank is the initial momentum to grow the collective awareness of the community to start sorting, recycling, and utilizing waste because waste has a good selling value, so that the management of environmentally friendly waste becomes Indonesia's new culture [7]. So, the existence of a waste bank is one solution in answering the demands of the law.

There are several waste bank units in Semarang City, which has not been evenly distributed and the numbers are still relatively small. The unknown condition of existing waste banks in each sub-district and the response of the community to the existence of waste

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banks in their area, has encouraged researchers to conduct a more in-depth study of this matter.

The purpose of this study is to determine the existing condition of waste bank in Semarang City and the response from the surrounding community

2 Research method

This study uses survey research methods. The technique of collecting data uses in-depth interviews, observation, questionnaires, and documentation.

The sample used in this study is a number of Semarang City residents with the criteria that they have lived in Semarang City for at least 5 years and are at least 17 years old. This sample will be the respondent who will answer the questionnaire from the researcher. The number of samples of 100 respondents was determined by proportional sampling method using Slovin formula.

3 Result and discussion

3.1 Waste management condition in Semarang City

Semarang City is a metropolitan city with an area of 373,67 km² consisting of 16 sub-districts and 177 sub-districts. The district with the largest area is Mijen sub-district (57,55 km²), followed by Gunungpati sub-district with an area of 54,11 km². The sub-district with the smallest area is South Semarang District (5,93 km²).

Most of the waste is disposed to polling stations in each sub-district. The Semarang City Environment Agency employs a number of workers to transport waste from resident's houses to polling stations or from polling stations to landfill. During the trip from the source of waste generation to the landfill, there was a reduction in waste carried out by residents and scavengers. Residents who sort out their trash usually sell their waste to stalls or waste bank. A number of waste in the waste bank and scavenger are then sold to stalls or collectors. Small-scale stalls or collectors will sell to larger stalls or collectors. Furthermore, waste is sold to the recycling industry which processes waste into raw materials again.

Primary data obtained based on the results of the sampling, the total composition of the waste generation in Semarang City each day is as shown in the following table:

Table 1. Waste generation composition each day

Type of waste	Amount (kg/day)	Percentage (%)
Plastic	179.794,23	21,52
Paper	91.651,90	10,97
Metal	72.843,72	8,72
Organic	449.819,03	53,86
Others	41.214,66	4,93
Total	835.323,54	100,00

Table 1 shows the composition of waste generation in Semarang City. The largest amount is organic waste of 449,819.03 kg/day or 53.86% of the total waste generation in Semarang City. Organic waste consists of leaves, food scraps, tree branches, and so on. While the smallest composition of the waste generation in Semarang City is other types of waste, which is equal to 41,214.66 kg/day or 4.93%. Other types of waste consist of rubber, glass, wood and so on.

Waste Bank in Semarang City is one place for people to sell sorted waste. Based on 2018 data from the Semarang City Environmental Agency, the number of active waste bank in Semarang City is 44 units spread across sub-districts in Semarang City. Waste banks are managed independently by the community. Managers at waste banks are local residents who work voluntarily. Not all waste banks in Semarang City have their own buildings, most of the waste bank buildings are joined by resident's houses. The houses used as the location of the Waste Bank are usually the houses of officials in the village, RW, RT or the manager of waste bank.

When compared with the total number of residents of Semarang City, the number of Waste Bank customers in Semarang City is still very small at around 7.603 households. The type of waste that is usually sold in each Waste Bank, is plastic, paper, and cardboard, as well as metal types. The selling price of waste is different for each waste bank depending on the manager. Most customer deposits are made once or twice a month.

3.2 Waste bank operational system

The Waste Bank is managed independently by the community, with the Village Head or Lurah as a protector. In some waste banks that play the role of supervisors are The Working Group of Three Village PKK (Pokja 3 PKK Kelurahan), there are also waste banks that have no protectors or coaches. Whereas guidance at the city level is carried out by the Semarang City Environmental Agency. In order for the waste bank to be recorded or recognized by the government, it must have a decree from the local village.

The distribution of waste banks in Semarang City covers 15 sub-districts. There is no waste bank in North Semarang Subdistrict. Distribution of the waste bank in Semarang City can be seen in the following table and figure:

Table 2. The number of waste banks each sub-district in Semarang City

Sub District	Number of waste bank	Sub District	Number of waste bank
Mijen	4	Genuk	1
Gunungpati	8	Gayamsari	1
Banyumanik	4	East Semarang	1
Gajahmungkur	1	North Semarang	0
South Semarang	1	Middle Semarang	1
Candisari	8	West Semarang	2
Tembalang	3	Tugu	2
Pedurungan	5	Ngaliyan	2

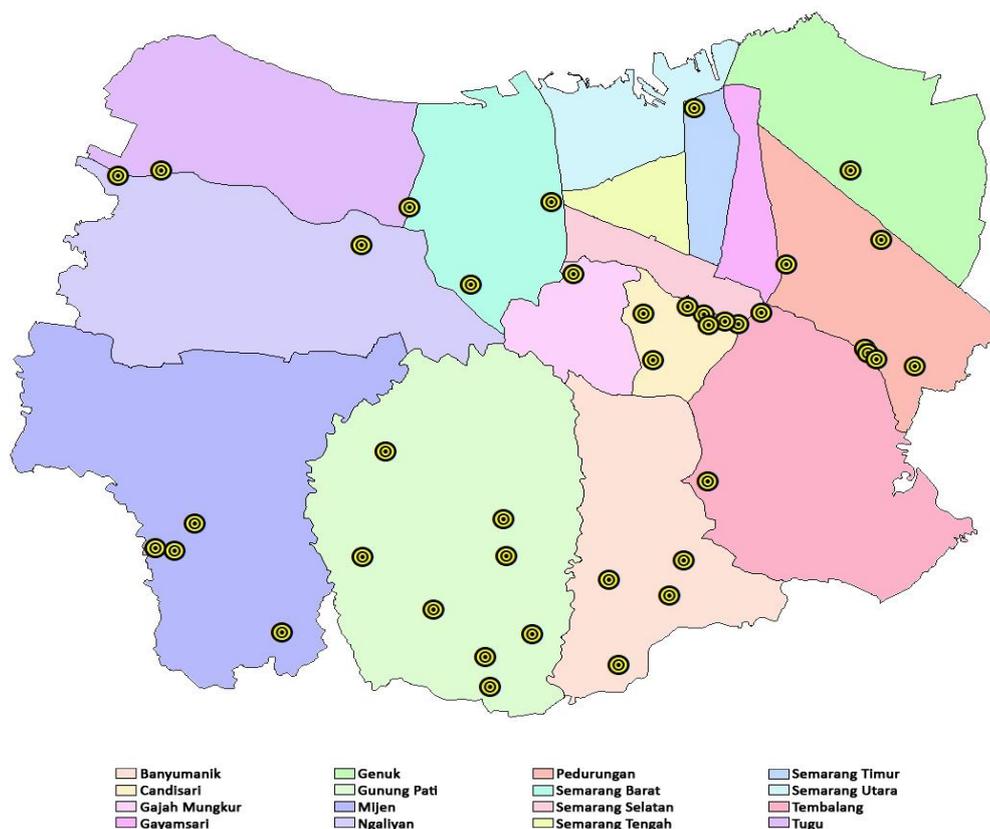


Fig. 1. Map of Waste Bank Distribution in Semarang City

Based on Table 2 and Figure 1, it can be seen that the distribution of Waste Banks in Semarang City is in 15 Districts. The sub-districts with the largest number of waste banks are Gunungpati and Candisari sub-districts with 8 units each. There is 1 sub-district that does not have a Waste Bank unit, namely North Semarang District. This was due to the fact based on interview and observation that in North Semarang Subdistrict there were many trash-selling stalls. The price of rubbish in trash selling stalls is usually higher than the selling price of rubbish in the Waste Bank because the Waste Bank will also sell garbage that has been collected into trash selling stalls. With these conditions, the existence of a Waste Bank will be defeated by a waste selling stall, so that the Waste Bank cannot survive because it does not have customers. The cause of the number of Waste Banks in an area is a different level because of community concern. Based on interview, some aspect that affects the level of public awareness is the level of education, employment, and income.

The difference between a Waste Bank and a stall or collector is in the operational system. Collectors or stalls work by means of individuals or groups to buy trash from the community. The system is carried out by collectors or stalls like a general trading system. Whereas the Waste Bank has a management structure in its operations. People who sell garbage to the Waste Bank are referred to as customers. The way to sell garbage to the Waste Bank is done by "saving" garbage.

What is meant by saving is saving money obtained from the waste carried by each customer. The savings can be taken at any time in the Waste Bank manager. Waste Bank customers will get an account book containing the amount of garbage and money they have saved. In its operations, waste banks also carry out other activities besides buying and selling garbage, for example, training in making crafts, compost, liquid fertilizer and so on.

One of the facilities that must be owned by a Waste Bank is a building. However, most of The Waste Banks in Semarang City do not have their own buildings. There are two types of Waste Bank buildings in Semarang City, namely buildings that come from the assistance of the Environmental Agency and buildings originating from self-help communities. There are a total of 13 waste banks that have buildings. There are 7 garbage banks whose buildings are assistance from the Semarang City Environmental Agency, and 6 garbage banks were established by community self-help. Here is the pictures of a waste banks building:



Fig. 2. Waste bank building assistance from the Semarang City Environmental Agency



Fig. 3. Waste bank building established by community self-help

In the waste bank activity, good management is needed so that the waste bank operations can run well too. The following is a mechanism for selling trash by customers starting from the source:

1. Sorting Garbage at the Source
2. Submission of Trash
3. Weighing waste
4. Records in the Savings Book
5. Waste management and processing

Some common activities carried out by Waste Banks in Semarang City are as follows:

1. Sorting waste
2. Handicrafts from garbage
3. Ecobricks
4. Composting

3.3 Community response to waste bank

Waste Banks in Semarang City have several obstacles that cause the Waste Bank to run less effectively. The primary problem is the lack of interest of the community to participate in Waste Bank and become customer of the Waste Bank. Based on the results of the questionnaire, only 27% of respondents were customers of the waste bank. In addition, some of the people who have become customers of the Waste Bank are not active in saving waste, only when they first become customers that some people actively save their waste, but in the long run, do not save the waste again so they become passive customers. This is in line with the research of Widiyanto and Rahab, who found that the development of the existing waste bank in the society is unstable that there is a need to support from various parties so that the waste bank continues to progress and develop [8].

The second problem is about managing a Waste Bank. Based on the results of in-depth interview, most of management of The Waste Banks work without being given a fixed salary. This causes a lack of responsibility for the management of the Waste Bank because they are not bound by any contract. In fact, the existence of a waste bank should have an impact on local economy by increasing the income of housewives around the waste bank [9].

Another obstacle that makes waste bank operations not optimal is due to the absence of Waste Bank facilities. Some waste banks that do not have their own buildings causes difficulties in storing waste.

Based on the data from the questionnaire and interviews regarding the behavior in waste management, it can be seen that most of the respondents every day will

produce garbage up to a maximum of 2-5 bags of waste each day.

Based on the results of the questionnaire, it is known that 60% of the people are quite interested in sorting waste which still has economic value (sold), such as paper, metal, and plastic. And 35% of the people were interested and 5% were not interested in sorting waste. These results indicate that there is considerable interest from the people of Semarang City to sort waste.

Based on the results of the questionnaire, it is known that 56% of the people have not made waste recycling efforts, 37% of the community sometimes recycle waste and only 7% of the people in Semarang have recycled garbage. These results indicate that the community's efforts to recycle waste produced are still very low.

4 Conclusion

The existing condition of waste banks in Semarang City can still be improved because the number of active waste banks in Semarang City is still 44 units spread across sub-districts in Semarang City and the public response to waste banks, in general, is still very lacking. More active and persistent efforts from the government are needed to provide building assistance or a movement to educate the importance of waste banks for the general environment and the economy of the community in particular

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