

# The role of waste banks in reducing waste in Gunung Kidul Regency

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**Abstract.** The waste bank is an alternative waste management in Indonesia. The waste Bank in Gunung Kidul Regency, Yogyakarta is one of the waste banks that has been established and is active until now. The method used to determine the generation and composition of waste is SNI 19-3964-1994. In addition, research data are obtained by observing and interviewing directly in the field, then analyzed by quantitative descriptive. The results showed the average rate of waste generation in Gunung Kidul Regency was 0.48 kg / person / day. The highest composition of waste in Gunung Kidul Regency is organic waste, which is 77.61%, while non-organic waste is 22.39%. At present, the Waste Bank in Gunung Kidul Regency is able to reduce waste by 0.86% with a total of 6,423 m<sup>3</sup> / year reduced waste. The benefits of the existence of a waste bank, among others, are in the field of waste management, in terms of economic and social aspects. The potential for waste recycling is 17.49% from 22.39% of the total non-organic waste.

**Keywords:** Waste Bank, organic and anorganic waste, waste management.

## 1 Introduction

One of the big problems experienced by big cities in Indonesia is waste management. Waste is caused as a result of the activities of human life. It cannot be denied, and always be there as long as life activities are still ongoing. Every year, the volume of waste will always increase along with the level of public consumption. Based on data from the Ministry of Environment, the average population of Indonesia produces about 2.5 liters of waste per day or 625 million liters. This condition will continue to grow considering human behavior that is difficult to change. Indonesian waste statistics data (2012) states that the amount of waste that appears throughout Indonesia reaches 38.5 million tons per year and such waste is mostly concentrated in Java. Based on Law Number 18 of 2008 concerning Waste Management and

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Government Regulation Number 81 of 2012 which reads that there is a need for a fundamental composition change in terms of waste management, which is from the collection-transport-disposal model, to processing which results in the reduction of landfill waste and waste management. The waste management paradigm that relies on the final approach is the time to be abandoned and replaced with a new paradigm. The paradigm that considers waste as a resource that has economic value and can be used, for example, for energy, compost, fertilizer, and industrial raw materials. Waste management can be done with a comprehensive approach. Starting from upstream, that is, since a product that has the potential to become waste has not yet been produced. Continue to the downstream, which is the product phase has been used, so it becomes waste, which is then returned to the environment media safely. Waste reduction in this case has the aim that all elements of society can be involved, both from the government, the business community, and the wider community. These activities include limiting waste generation, recycling and reuse of waste or better known as the 3R principle (reduce, reuse and recycle). There are still many obstacles in implementing the 3R program, including the low awareness of the community in disposing and collecting waste. As one of the solutions to overcome this problem, the Ministry of Environment is making efforts to develop the Waste Bank. This activity is to educate the public to be more careful in sorting garbage, as well as to foster a sense of community sensitivity in processing waste properly. The activity is expected to reduce the amount of waste transported to the landfill site. The construction of a waste bank is the first step in building public awareness to start utilizing waste that can be utilized. This is important, because waste has a sale value and waste management with an environmental perspective can become a new culture of Indonesia. The role of the Waste Bank has become important with the issuance of Government Regulation (PP) Number 81 of 2012 concerning Management of Household Waste and Household Trash. The PP regulates the obligation of producers to carry out 3R activities by producing products that use packaging that is easily decomposed by natural processes, causing as little waste as possible, using production raw materials that can be recycled and reused and / or reclaiming waste from products and packaging product to be recycled and reused. With the existence of a Waste Bank, the producer can cooperate with the existing Waste Bank in order to be able to process the waste from the products it produces in accordance with the mandate of the PP. The waste bank in Gunung Kidul Regency began to be formed around 2012. Concerns with the large amount of waste that was not recycled made the Gunung Kidul community begin to form a waste bank. Another function of establishing a waste bank is as a forum for fostering, training, assisting, and buying and marketing the results of waste management activities from upstream / community sources in Gunung Kidul Regency. The goal is to be able to reduce waste in TPS / TPA and encourage community economic empowerment, through the use of waste with the 3R program.

## 2 Methodology

This research was conducted in Gunung Kidul Regency, Yogyakarta Special Province with case study locations in all the Waste Banks in Gunung Kidul Regency. In this study the data collected included:

- Primary Data Primary data is data obtained at the time of direct observation in the field such as data on generation and composition of waste and the existing conditions of waste management in Gunung Kidul Regency.
- Secondary Data Is data sourced from agencies to support primary data, namely the profile and demographic data of Gunung Kidul Regency.

## 3 Result and discussion

### 3.1 Existing condition of waste management in gunung kidul regency

Waste management in Gunung kidul Regency especially in operational technical aspects refers to the applicable waste management regulations. Waste management in Gunung kidul Regency is carried out in several stages including: street sweeping, collection, transfer, transportation and management at the final processing site. The waste management system implemented in Gunung kidul Regency is distinguished according to the source of the waste, namely residential and non-domestic waste and road waste. For handling residential and non-domestic rubbish cleaners UPT Cleanliness and Parks Department of Environment of Gunung kidul Regency to take waste from house to house or public facilities using a waste motor and then transported to the TPS. Furthermore, the TPS is discharged to the TPA. As for the handling of road waste, especially along the protocol road, road collection and sweeping is done twice a day. Where the collected waste is transported by the Gunung kidul Regency Environmental Service truck. Population projections are very necessary in determining waste management planning and evaluating the results of waste management performance that have been carried out [2]. This is because waste productivity will increase in line with population growth each year.

**Table 1.** Projected population of gunung kidul regency in 2016 - 2025

No	Year	Total Population
1	2016	719,997
2	2017	720,336
3	2018	720,676
4	2019	721,015
5	2020	721,355
6	2021	721,695
7	2022	722,035
8	2023	722,375
9	2024	722,716
10	2025	723,056
Total		7,215,256

### 3.2 Waste composition

Waste composition is needed to determine the type of waste handling treatment which is oriented to the utilization, recycling, and composting. The composition of waste in Gunung kidul Regency consists of 6 types of waste, including: organic waste, paper, plastic, textile / rubber, metal / glass, and building fragments. The following is the composition of the waste in Gunung kidul Regency:

**Table 2.** Waste composition in gunung kidul regency

No	Type of waste	Percentage	Total Waste (kg/day)
1	Organic	77.61%	268,219.04
2	Paper	9.85%	34,041.46
3	Plastic	7.64%	26,403.73
4	Textile/rubber	1.26%	4,354.54
5	Metal/glass	2.25%	7,775.97
6	Etc	1.39%	4,803.82
	Total	100%	345,598.56

Based on Table 2 shows that organic waste is the most dominant type of waste among other types of waste, with a percentage of 77.61%. Organic waste usually comes from food scraps and leaves. The high type of organic waste among other waste compositions is caused every day by people consuming foods that generally come from organic materials such as vegetables, fruits and others. Paper is the second largest type of waste after organic waste with a percentage of 9.85%. Paper waste is produced from people's consumption patterns which makes paper a practical and instant packaging material. In a study conducted by Ruslinda (2011), it states that the composition of organic waste in Bukit tinggi is 51%, plastic waste is 17% and paper waste is 15%.

Whereas in the results of Pratama's research (2017), it was revealed that the composition of household waste in Kulon Progo Regency was dominated by organic waste by 82% followed by plastic waste by 12%, paper waste by 7%, metal waste by 1%, glass waste and others. others did not reach 1%. Based on comparative data on the results of research in some of these areas, it is known that the type of organic waste has a percentage of more than 50% of the amount of waste generation. This is in accordance with the composition of waste in Gunung kidul Regency where organic waste is the highest type of waste with a percentage of 77.66%. From some of the results of these studies it can be concluded that each city can produce a different percentage of waste composition which is influenced by several factors including, social, economic, cultural and seasonal levels in the area.

### 3.3 Waste bank in gunung kidul regency

The waste bank in Gunung kidul Regency began to be formed around 2012. Concerns with the large amount of waste that was not recycled made the Gunung kidul community begin to form a waste bank. Gunung kidul Regency has 19 waste bank units. Wonosari Subdistrict is the area with the most waste banks, which is 10 units with customers of 892 households. In developing a waste bank and the production of recycled products, people's knowledge about the types of waste and how to manage it, especially plastic waste, is important. The presence of a waste bank is one alternative in overcoming the problem of waste in urban areas which is currently still experiencing obstacles in its application [1].



**Tabel 3.** List of waste banks in gunung kidul regency

No	Group name	Amount Served	Trash Managed (m <sup>3</sup> /day)	Address
1	BS Muda Karya	130	0,5	Trimulyo 2, Kepek, Wonosari
2	BS Sapie Bersolek	100	0,5	Siyono, Wetan, Playen
3	BS Asri	76	0,5	Madusari, Wonosari
4	BS Melati 13	32	3	Jeruksari, Wonosari
5	BS Maju Mulyo	92	3	Gading 1, Gading, Playen
6	BS Ben Sehat	10	0,1	Kranon, Kepek, Wonosari
7	BS Purwo Lestari	200	5	Purwosari, Baleharjo, Wonosari
8	BS Shodaqoh	154	0	Kepek 1, Kepek, Wonosari
	Heksa Muda			
9	BS Catur Taruna	130	0	Selang 4, Selang, Wonosari
	Bakti			
10	BS Rejosari	90	0	Rejosari, Baleharjo, Wonosari
11	BS Logandeng	140	0	Plembon Lor, Logandeng, Playen
12	BS Selang 5	40	0	Selang 5, Selang, Wonosari
13	KT Dusun	20	0,5	Tanggung, Girimulyo, Panggang
	Tanggung			
14	BS Ngudi Makmur	20	0,5	Gumbeng, Giripurwo, Purwosari
15	BS Amrih Widodo	30	0,5	Selang, Bendungan, Karangmojo
16	BS Laskar Serut	30	0,5	Logandeng, Playen
	Jajar			
17	BS Sumringah	14	0	Tompok, Giritirto, Purwosari
18	BS Winong	30	0,5	Winong, Siraman, Wonosari
	Barokah			
19	BS DKS	20	0	Gading 4, Gading, Playen

### 3.4 The performance of waste banks in gunung kidul regency

For the reduction of waste carried out by the Garungkidul Regency Waste Bank in 2016, it reached 0.86%, with a total reduced waste of 6423 m<sup>3</sup> / year. The number of customers participating in the waste bank program is 1358 families. This shows the active role of the people of Gunung kidul Regency in efforts to reduce waste. The following is a calculation of the achievement of the performance of the Waste Bank in Gunung kidul Regency:

**Table 4.** The performance of waste banks in gunung kidul regency

No	The name of the Trash Bank	Sub-district	Amount (KK)	Waste generation (m <sup>3</sup> /year)	Reduced waste (m <sup>3</sup> /year)	Percentage (%)
1	KT Dusun Tanggung	Panggung	20	744.472,82	182,5	0,02
2	BS Keluarga Ngudi Makmur	Purwosari	20		182,5	0,02
	3		BS Sumringah		14	21,71
4	BS Muda Karya	Wonosari	130		182,5	0,02
5	BS Asri		76		182,5	0,02
6	BS Melati 13		32		1095	0,15
7	BS Ben Sehat		10		36,5	0,005
8	BS Purwo Lestari		200		1825	0,24
9	BS Shodaqoh Heksa Muda		154		238,85	0,03
	10		BS Catur Taruna Bakti		130	201,63
11	BS Rejosari	90	139,59		0,02	
12	BS Selang 5	40	62,04		0,01	
13	BS Winong Barokah	30	182,5		0,02	
14	BS Amrih Widodo	Karangmojo	30		182,5	0,02
15	BS Sapie Bersolek	Playen	100		182,5	0,02
16	BS Maju Mulyo		92		1095	0,15
17	BS Logandeng		140		217,14	0,03
18	BS Laskar Serut Jajar		30		182,5	0,02
19	BS DKS		20		31,02	0,004
<b>Gunung kidul Regency</b>			<b>1.358</b>		<b>6,423</b>	<b>0,86</b>

### 3.5 Potential for waste recycling

The potential for waste recycling is the large potential of waste generated by the community to be able to produce the amount of waste that is discharged to the Final Processing Site (TPA). Not all of the waste can be received by the Waste Bank, so there is a big potential for waste recycling from the total non-organic waste. Types of waste received among plastic, paper, metal / metal, and other glass / glass waste. The percentage of non-organic waste is 22.39% and that can be recycled is 17.49%. In the current condition, total waste generation in Gunung kidul Regency is 0.48 kg / person / day with waste entering the Waste Bank of 1,960.8 kg // day. Gunung kidul Regency has considerable waste recycling potential. The

biggest waste is organic waste, which is 77.61% of the total waste generation. The amount of organic waste can be calculated by processing such as composting. The choice of composting method is based on the characteristics of the waste to be processed (Moirera and Wanda., 2012). For example in the Waste Bank in Gunung kidul Regency, organic waste is more than leaf and food waste. The method used is composting in an open space such as a windrow system.

## 4 Conclusion

1. The composition of waste in Gunung kidul Regency is organic waste at 77.61% and non-organic waste at 22.39%.
2. The waste bank in Gunung kidul Regency has 1,358 households. Every year it is able to reduce waste by 0.86% with a total waste of 6,423 m<sup>3</sup> / year.
3. Recycling potential of non-organic waste is 17.49% which can be combined with a waste bank.

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