



Jakarta's Readiness for the Waste Reduction Program at the Source

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Received: May 15, 2024

Revised: June 5, 2024

Accepted: August 25, 2024

Published: August 31, 2024

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DOI: [10.29303/jppipa.v10iSpecialIssue.7936](https://doi.org/10.29303/jppipa.v10iSpecialIssue.7936)

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Abstract: DKI Jakarta as the capital of Indonesia has a policy to manage waste (recycling) in a decentralized manner, namely that waste is managed as close as possible to its source, without relying on disposal in landfills anymore. This pro-environment policy targets reducing and handling waste by 30% and 70% respectively by 2030. Currently the program is being implemented, non-residual waste will be processed and recycled in decentralized processing or TPS 3R. In order to achieve this target, the community and government must work together to make changes and must have a sense of ownership, responsiveness, concern and responsibility for the waste produced. This research uses a qualitative approach with observations, questionnaires to 330 respondents and interviews with the community and local government. And this research found that TPS and TP3R public facilities still do not comply with existing regulations and do not meet the criteria for accommodating recycling activities. From 2018-2022, the reduction in waste generation was 9% from the target of 26% and the amount of waste handling was 1.66% from the target of 70%. People still don't recycle for various reasons and there is also a lack of consistency in implementing recycling behaviour due to rational attitudes such as just paying money for waste. The government is obliged to facilitate these recycling activities together with various stakeholders, by carrying out various innovations and outreach to the community, by implementing waste management based on community participation.

Keywords: Community participation; Recycle; TPS; 3R

Introduction

Nature provides humans with many things for the continuity and well-being of human life, but these natural resources have limits in their quantity and sustainability (Brundtland, 1987; Miller et al., 2016). Excessive use of natural resources, pollution and waste from human activities that cause degradation are some of the causes of natural damage that result in global climate change (Miller et al., 2016). The Intergovernmental Panel for Climate Change (IPCC) has declared a global warming red alert due to climate change. Global warming from climate change is largely

caused by the high levels of greenhouse gases produced. One of the contributors to greenhouse gases comes from waste produced by human activities.

The estimated amount of waste generated in the world reaches 2 billion tons per year, this amount does not include commercial and industrial waste, construction and demolition, if the total amount of waste generation reaches up to 7-10 billion tons per year (Modak et al., 2015). Problems will arise, if human population and economic growth and prosperity increase, then consumption to meet life's needs will also increase, which will result in increased waste generation. From these factors, it can be estimated that

How to Cite:

Ummamah, N., Martono, D. N., & Iskandar, K. (2024). Jakarta's Readiness for the Waste Reduction Program at the Source. *Jurnal Penelitian Pendidikan IPA*, 10(Special Issue), 127-138. <https://doi.org/10.29303/jppipa.v10iSpecialIssue.7936>

in 2050, municipal waste generation throughout the world will increase by 70%, namely to 3.4 billion tons (Tiseo, 2022). And in Indonesia, according to the Ministry of Environment and Forestry (KLHK), in 2021 the estimated waste produced will reach 68.5 million tons.

Increasing the production of the amount of waste every year cannot be avoided, but reducing the waste that has been produced is not impossible, namely by utilizing the waste, the waste is processed as much as possible to avoid environmental damage so that the principle of sustainable development is achieved (Brundtland, 1987). There is a need for pro-environmental actions such as independent waste management to reduce waste to landfill and save resources. As well as fast and precise action from various countries to manage waste so that it does not cause problems for future generations, namely by reprocessing it by mimicking the earth's cycles (Miller et al., 2016).

According to the Indonesian Ministry of Environment and Forestry, from early 2023 to mid-November 2023, there were 23 Final Processing Sites (TPA) in Indonesia that experienced fires, including the Bantar Gebang Bekasi TPA. Bantar Gebang TPA is a Regional Integrated Waste Management Site (IPST) to serve waste generated from the DKI Jakarta area, Bekasi City/Regency and Bogor Regency. This TPST has implemented various waste management methods to reduce the amount of waste, from open dumping/sanitary landfill to a landfill mining system, namely utilizing old waste into useful materials (Sukwika et al., 2020). However, because the incoming waste and the waste managed are not balanced, waste management at the source is necessary. For your information, waste management in Indonesia is ranked 69th out of 180 countries in the world with an Environmental Performance Index (EPI) score of 49.9 out of a total of 100, and in Asia Pacific it is ranked 7th (EPI, 2020).

In 2019, DKI Jakarta's waste disposed of at the Bantar Gebang landfill reached 7,702.07 tonnes/day. This number continues to increase from previous years. In 2018 it amounted to 7,452.6 tonnes/day, and in 2017 it amounted to 6,875.49 tonnes/day (UPST DLH DKI Jakarta, 2020). The factor for the increasing amount of waste is the increase in population and also public consumption as a result of changes in lifestyle (Supangkat et al., 2020).

In sustainable waste management, there are several stages required, namely reducing waste production, recycling and processing waste from the source to minimize waste disposal to landfill (Rahim, 2020). Or commonly known as 3R, in the waste management

hierarchy (Gharfalkar et al., 2015) prevention must be prioritized, namely rejecting and reducing the production of waste first by changing lifestyle behavior habits, namely not consuming food and buying excessive items and finishing the food purchased (Kaito et al., 2000).

According to Damanhuri et al. (2010) there are 5 aspects that influence waste management, namely legal/regulatory, institutional/organizational, operational techniques including containerization, collection, transfer, transportation, processing and disposal/final processing of waste, then financing/retribution aspects, and so on, finally the aspect of community participation. Without community participation, good waste processing will not work (Damanhuri et al., 2010). And there are also several things that must be considered in achieving sustainable waste management, namely the involvement of all parties; education from an early age about caring for waste; Awareness and concern for the importance of waste awareness culture and the zero waste movement; and strict implementation of government regulations (Agustina et al., 2023; Rahim, 2020).

Then another factor that must be considered in handling and managing waste is the availability of recycling facilities. The more trash facilities and types of processing available will influence the optimal waste sorting carried out by the community (Chifari et al., 2017; Limon et al., 2020). Waste processing facilities require high costs, so it is recommended to save these costs by consolidating processing facilities collectively to save costs and energy (Chifari et al., 2017).

Andina in Hakim (2014) states that the best handling and processing of waste is to start from the source, the closer to the source, the greater the person/community's sense of responsibility, and people who care about the environment will lead to managing their own waste (Andina, 2019). Waste sorting carried out at the source based on waste categories has a significant impact on increasing processing efficiency between processing facilities, but does not increase the efficiency of overall waste processing (Chifari et al., 2017).

To reduce and handle waste, DKI Jakarta has a regional policy and strategy (Jakstrada) for managing household waste and similar types of household waste and its implementation has been gradual. This is stated in the Governor of DKI Jakarta Regulation Number 108 of 2019 which is a derivative of the national policy and strategy (Jakstranas) contained in the Republic of Indonesia Presidential Regulation No. 97 of 2017. This policy contains a waste reduction target of 30% and a handling target of 70%, meaning that the amount of waste disposed of in the landfill can only be 30% of the

total amount of waste in 2030. And 70% of it must be handled and processed in the decentralized section, close to the source of the waste.

Based on these problems, this research aims to analyze the readiness of the waste reduction program from data on the amount of waste reduction from 2018-2022, TPS and TPS 3R facilities, the role of the community and the Government. With this data, the government can do the right things to reduce dependence on landfills. It is hoped that this research will become a reference in achieving a program to reduce waste disposed of in landfills to support Clean Indonesia 2030.

Method

This research will take place in 2023, located in Cempaka Putih sub-district, Central Jakarta. The data used is primary data and secondary data. Primary data is observation data on TPS and TPS 3R facilities, questionnaires to 330 respondents from residents of Cempaka Putih sub-district and interviews with

residents, cleaning officers and local government, namely the Central Jakarta City Administration Environment Agency. And secondary data is data on waste generation and data on the amount of waste reduction from 2018-2022. The year 2023 was not included due to the construction of TPS 3R so there is no place to process waste.

The method used in this research is a combined method, namely descriptive statistical analysis and descriptive qualitative analysis, with a qualitative approach. Descriptive analysis, namely providing descriptive information, a picture to explain the existing situation or circumstances, both numerical and non-numerical (Creswell, 2014; Sugiyono, 2016). Namely data on the amount of waste generated from 2018-2022, which was obtained from the Cempaka Putih sub-district Environmental Service Implementation Unit. The percentage results for the amount of waste reduction and handling compared with the target based on the DKI Jakarta Jakstrada in Waste Management, namely that by 2022 the waste reduction target is 26% from 2018 and waste handling is 70%.

Table 1. Components of Observation Indicators (Source: Minister of Public Works Regulation 03/PRT/M/2013)

TPS	TPS 3R
-	Area more than 200 m ²
Containers and facilities are available for at least 5 (five) categories of waste types, namely organic, inorganic, paper, B3, residue; non-permanent container type	Containers and facilities are available for at least 5 (five) groups of waste categories, namely organic, inorganic, paper, B3, residue
The location is easy to access and does not disturb comfort	The location is easy to access, as close as possible with a radius of no more than 1km and does not disturb comfort
Does not pollute the environment	Does not pollute the environment
have a collection and transportation schedule	have a collection and transportation schedule
Waste that has been collected and sorted must not be mixed again when transported	Community based and integrating it with the Waste Bank
-	Equipped with a sorting room, organic waste composting, and/or bio gas producer, warehouse, buffer zone

Then the researchers also carried out observations of TPS and TPS 3R facilities, questionnaires and interviews with the community and government. The data was processed descriptively qualitatively. Direct observation using purposive sampling to determine TPS and TPS 3R in Cempaka Putih sub-district, with the criteria being the existence of waste processing facilities, namely TPS 3R Rawasari and a temporary collection point with a permanent building and not a cart pool, namely TPS Supreme Court. Things that will be observed are in accordance with the Regulation of the Minister of Public Works Number 03/PRT/M/2013 concerning the Implementation of Waste Infrastructure and Facilities in Handling Household Waste and Waste Similar to Household Waste, which is seen in table 1. And this is also stated in the DKI Governor's Regulation Jakarta Number 95 of 2021 concerning Technical Standards for Waste Handling Infrastructure and

Facilities. Data collection was carried out by field observations with photo documentation. Questionnaires to residents as well as interviews with residents, cleaning officers and local government, namely the Central Jakarta Environment Agency.

Result and Discussion

Conditions of Waste Generation

The amount of waste generated in Cempaka Putih sub-district in 2018 - 2022 can be seen in table 2, in 2018 the amount of waste generated reached 28.2 million kg, with details of the amount of waste processed and recycled being organic as much as 96.41 kg and recycled waste amounted to 136 thousand kg so that the waste disposed of in landfill was 28.08 million kg.

In 2019 the amount of waste generated increased to 37.4 million kg, with details of the amount of waste processed and recycled, namely organic waste amounting to 5.5 thousand kg and recycled waste amounting to 80.7 kg so that the amount of waste disposed of in landfill was 37.3 million kg. In 2020, the amount of waste generated decreased from the previous year to 26.6 million kg, with details of the amount of waste processed and recycled, namely organic as much as 7.6 thousand kg and recycled waste as much as 235 thousand kg so that the waste was thrown into the landfill as much as 26.36 million kg. In 2021, the amount of waste generated decreased from the previous year to 26.5 million kg, with details of the amount of waste processed and recycled, namely organic as much as 153.2 thousand kg and recycled waste as much as 311.4 thousand kg so that the waste disposed of to landfill as much as 26.1 million kg. And in 2022, the amount of waste produced will decrease from the previous year to 25.6 million kg, with details of the amount of waste processed and recycled, namely organic as much as 172 thousand kg and recycled waste as much as 251.8 thousand kg so that the waste disposed of to landfill as much as 25.1 million kg.

From the waste generation data obtained, in 2021 compost processing will no longer be carried out, but will focus on processing using maggot bioconversion. Maggot bioconversion organic waste processing has been carried out from 2019 until now. There is an increase in organic waste processing from year to year, as well as inorganic waste. The amount of waste handled from 2018 - 2022, respectively, is 136,095 kg; 86,226 kg; 243,081 kg; 464,612 kg; and 423,802 kg. There has been an increase in the handling of processed waste in decentralized areas every year, but in 2019 there was a decline.

Based on previous research, it was found in South Jakarta that 8% of waste was not transported by waste trucks per day (Wulandhary et al., 2019). This shows the need for improvement in waste generation management efforts in DKI Jakarta. The limited number of transport trucks reinforces that waste regulations are not effective enough to make society responsible for sustainable waste management (He et al., 2020). The absence of compost facilities for organic waste from the government is one of the limitations of society in understanding waste management at the individual and community level (Widyatmika et al., 2023).

Table 2. Amount of Waste Generated in Cempaka Putih District (Source: Processed Data, 2023)

Year	Which is thrown into landfill	Amount of waste generation (kg)					Total
		Has been processed			Inorganic		
		Organic	Paper	Plastic	Metal		
		Maggot	Compost				
2018	28,081,840	0	96.41	64,244.20	62,034.20	9,720.50	28,217,935.31
2019	37,312,850	441.01	5,056.32	41,852.00	33,342.76	5,534.00	37,399,076.09
2020	26,367,530	2,299.24	5,303.71	76,309.57	138,200.19	20,968.65	26,610,611.36
2021	26,078,600	153,207.77	0	114,862.00	174,862.00	21,680.00	26,543,211.77
2022	25,177,640	171,998.27	0	116,362.00	119,250.00	16,192.00	25,601,442.27

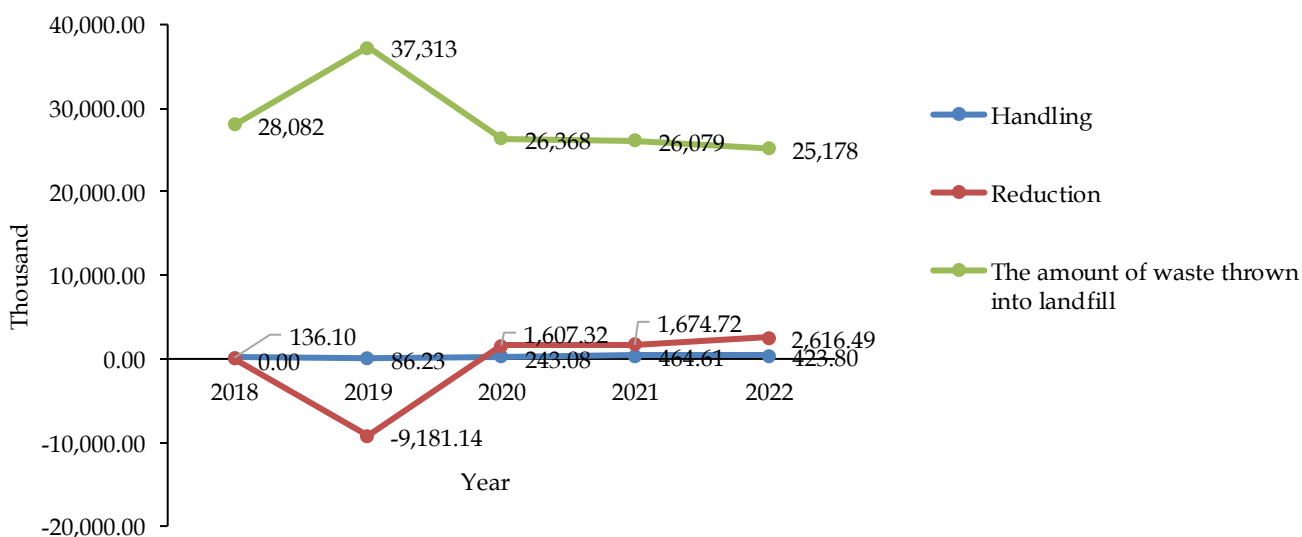


Figure 1. Amount of waste reduction and handling in Cempaka Putih District

And likewise, in data on the generation of waste disposed of at the Bantar Gebang TPA, as well as the total amount of waste generation as a whole, every year there is a decrease or reduction in waste generation, but there was an increase in 2019. Consecutively, the amount of reduction in overall waste generation from 2019-2022 compared to waste generation in 2018, namely -9,181,140 kg or -32.54%; 1,607,324 kg or 5.70%; 1,674,723 kg or 5.93%; and 2,616,493 or 9.27%. These data can be seen in Figure 1.



Figure 2. Condition of residents' rubbish piles

Figure 2 shows the condition of waste from residents' homes which is still thrown away mixedly. Various types of organic and inorganic waste are thrown away mixed together, proving that many residents do not sort it. In fact, sorting from sources carried out by residents is one of the keys to success in sustainable waste management (Chifari et al., 2017). There are various factors that influence the amount of waste generated, one of which is the amount of income and population (Mahmood et al., 2018; Supangkat et al., 2020).

Condition of TPS and TPS 3R Facilities

Cempaka Putih District has 1 decentralized waste processing facility, namely TPS 3R Rawasari, 1 TPS, namely TPA Mahkamah Agung, 1 Dipo Rawa Kerbau and 7 cart pools. Depots and cart pools actually have the same function as TPS, namely temporary shelters, only the physical form of the building is different. Cempaka Putih District has 49 waste banks spread across both offices and RT/RW, and 19 waste banks routinely collect waste every month, but as many as 30 waste banks do not routinely. The following are the conditions of TPS 3R Rawasari and TPS Mahkamah Agung.

TPS Mahkamah Agung

The TPS Mahkamah Agung (MA) is located on Jalan Cempaka Putih Timur 25, precisely next to the Supreme Court Secretariat building. The TPS MA building stands on a pedestrian and water channel, and next to the pedestrian is a 4.5 meter wide neighborhood

road with two car lanes. When transporting waste to trucks, only 1 car lane can be used on the road. The TPS MA is rectangular in shape with a length of around 4 meters, a width of 1.5 meters and a height of around 4 meters. The walls are walled and the top has iron bars, there is a gate or door to close the TPS, the condition of the TPS MA can be seen in Figure 3. And at the back, there is a storage area for recyclable goods which are wrapped in large plastic. There is some recyclable rubbish wrapped in plastic located under the pile of rubbish.



Figure 3. TPS Mahkamah Agung

The piled up rubbish is rubbish that residents throw directly into the TPS and rubbish that is thrown away in a mixed state. The rubbish in the carts is rubbish taken from residents' houses by rubbish cart officers. In the TPS there are no containers for sorting waste, whether organic or inorganic.

The activity of transporting waste from the TPS to trucks is carried out by cleaning officers and cart officers. Once completed, the TPS area and its surroundings were cleaned by cart officers using broom sticks, and to clean the leachate or water from the waste, water was carried out using water from the water channel/sewer near the TPS. All these activities are carried out in the morning starting from 6.30 to 8.30 am.

On the left side of the TPS building, there is a notice board containing a notification from the Central Jakarta City Administration Department of Cleanliness, namely Article 25 of PERDA DKI Jakarta No.3 of 2013 Paragraph 1: Every Household is Obligated to Provide Garbage Containers for Waste Sorting Activities; Paragraph 2: The container referred to is a bag made from recyclable materials.

TPS 3R Rawasari

TPS 3R Rawasari is located on Jalan Rawa Sari Selatan RT.16 RW.02, kel. East Cempaka Putih, precisely in front of the Cempaka Putih sub-district Environmental Service unit office. TPS 3R is located in the Rawa Buffalo government office complex, school, market and close to residential areas. The shape of TPS

3R is rectangular with an area of 500 m² and the building is a hangar. This TPS has maggot bioconversion waste processing, at the front there is an organic waste chopping machine and several sacks of organic waste that have been chopped up to supply maggot food. Maggots are maggots or larvae of large black flies (black soldier fly). Then next to the chopping machine there are the remaining maggots (kasgot) which are piled up to be used as fertilizer. At the back there is a cultivation of flies, which is a place to mate, lay eggs until they hatch. And next to the maggot cultivation area there is a B3 waste storage area in the form of a rectangular room, there are several large trash cans for storing B3 waste, but there are no contents. The location of the waste bank and recycling waste storage is behind the Cempaka Putih sub-district Environmental Service Unit Office. There are activities for sorting bottles and other recyclable waste.



(a)



(b)



(c)

Figure 4. Condition of TPS 3R Rewasari (a) Maggot Bioconversion Facility; (b) Waste Bank; (c) Storage of B3 Waste

Maggot enumeration and bioconversion processing activities are carried out every day. Garbage transported from residents will first be chopped in a chopping machine and then placed in sacks to drain the water so that the organic waste is not too wet. There is water from the organic waste that flows into the waterways during the chopping and draining process, causing an unpleasant odor and the presence of flies. TPS 3R Rawasari receives rubbish from residents, the rubbish is picked up by cleaning staff. And the trash that is picked up is only organic waste. At TPS 3R there is no sorting process, because it only accepts organic waste. There are no sorting containers, because there is a TPS, namely the Rawa Buffalo Dipo, next to TPS 3R. So, all waste collection is carried out at this Dipo. Even though the places are next to each other, the activities are not related to each other. And according to observations, only a few RWs have scheduled waste transportation facilities, the majority do not. Based on the research results, of the 5 component indicators, not even 1 was met at TPS MA, and for TPS 3R Rawasari, of the 8 component indicators, there were 4 indicators that were met. TPS MA and TPS 3 R Rawasari do not have sorting containers to place waste according to the characteristics and type of waste, and there is no scheduled transportation according to the type of waste, so residents feel they are not encouraged to sort it from the source. In fact, sorting from the source has a big influence on recycling results, because mixed and dirty waste is difficult to recycle (Heidari et al., 2018; Putri et al., 2018).

Table 3. TPS Indicator Components

Indicator Components	TPS MA	TPS 3R Rawasari
**Area more than 200 m ²	-	√
*/**There are containers and facilities available for at least 5 categories of waste types, namely organic, inorganic, paper, B3, residue; non-permanent container type	×	×
*/**The location is easy to access and does not disturb comfort	×	√
*/**Does not pollute the environment	×	×
*/**Has a collection and transportation schedule	×	√
*/**Trash that has been collected and sorted must not be mixed again when transported	×	×
**Community based and integrated with the Waste Bank	-	√
**Equipped with sorting room, organic waste composting, and/or bio gas generator, warehouse, buffer zone	-	×

Information: * TPS; ** TPS 3R

According to existing waste regulations in Indonesia, the stages of waste until it is disposed of at the landfill are waste from residents collected at the TPS, whether collected directly or indirectly, then the waste is transported and processed first at TPS 3R. At both places, a minimum of 5 waste category containers must also be available for sorting. TPS and TPS 3R in Cempaka Putih need to imitate the city of Kamikatsu, Japan, by creating sorting container facilities according to type. Kamikatsu City is famous for implementing zero waste, there are more than 45 types of waste which are sorted according to type. The community collects recyclable waste at its own centralized recycling waste collection facility (Kizuna, 2021). Collective action based on the community itself has a higher sense of responsibility towards the environment. Collective action by its nature is providing public goods voluntarily (Chamberlin, 1976).

Questionnaire

The research took questionnaire data to see the obstacles felt by the community in not sorting waste. The majority of people do not sort waste because their houses are narrow so there is no place to temporarily accommodate recyclable waste, and there are no facilities to exchange their recyclable waste. In research, Sewak et al. (2021) stated that the facility factor is one of the factors that must be considered in waste management. And in research by Yau (2010) in Hong Kong, it was stated that the existence of recycling waste separation facilities greatly influenced the amount of recyclable waste collected in a segregated manner. The next obstacle is due to laziness and fussiness and the lack of cooperation between family members at home so that the waste gets mixed up again. Due to sustainable waste management, namely at the micro or individual community level, community attitudes and behavior factors such as negligence, laziness, lack of sense of responsibility, lack of concern, lack of self-awareness towards the environment (Sewak et al., 2021). Residents feel these reasons are why they don't sort waste from their homes. Because waste management requires community participation and collective action from various stakeholders to realize sustainable waste management.

The Cempaka Putih area is one of the pilot areas in DKI Jakarta in reducing waste from the source. And it has been facilitated by the regional government with scheduled waste transportation according to the type of waste. From the results of interviews with residents and RW administrators, there are several obstacles experienced in managing waste in the community, namely there is no land for a waste bank, waste bank activities, namely collecting recyclable waste, are carried

out on the side of the road; lack of system support from the regional government, including related SKPD, sub-district and sub-district parties in facilitating facilities and infrastructure or facilitating synchronized reinforcement for communities who do not participate in sorting waste from the source. Because there are residents who don't care and don't participate on the grounds that they have already paid rubbish fees to the cart officers, they are busy and lazy. Even though the RW officers there, especially the RW. 01 Rawasari is very pro-active in collecting organic waste from residents' homes to collection points for organic waste disposal, so that residents feel that it is not a waste to separate their organic waste.



Figure 5. The problem is that society does not sort waste

Citizen participation and community participation in waste management is very important and influential in achieving waste reduction, such as waste sorting activities based on waste categories for waste recycling activities (Santoso & Farizal, 2019; Heidari et al., 2018). Community behavior in waste management is influenced by socio-demographic factors such as age, gender, income, background, education, psychological factors such as attitudes, subjective norms, environmental values, environmental awareness; moral obligations, convenience, applicable laws and regulations, economic incentives, participatory communication and habitual factors (Nguyen et al., 2015; Wang et al., 2018; Yau, 2010). High community participation in waste sorting is influenced by the factor of having knowledge about protecting the environment (Cerasi et al., 2021). Community attitudes are significantly influenced by their satisfaction with government waste management policies and concern for the environment, while community behavior is influenced by the availability of waste collection facilities, environmental conditions and the willingness of each individual (Li et al., 2023).

Policy instruments have a strong influence on people's waste management behavior (Ma et al., 2020). Apart from policy instruments, control over community norms and attitudes towards waste is positively

correlated with behavior (Raghu et al., 2022). Environmental sustainability in developing countries can be achieved when attitudes, awareness and knowledge have been implemented since basic education supported by the creation of facilities (Debrah et al., 2021; Widyatmika et al., 2023).

Following are several excerpts from interviews with residents regarding the obstacles faced in the field.

"Some residents in the RT are not active because they are lazy and busy, but the majority are already sorting their waste"

"What is very unfortunate is when there is a CSR that wants to enter our area here, it seems like that area lacks support. It is very unfortunate, on the one hand, in the region, we must continue to implement gubernatorial regulation 77, in Woro-Woro and so on. When we had tried our best, it turned out it looked like it was broken straight away, it was like it was stabbed, it was really stabbed, that's how it is, right?"

"RW 1 is really very reckless because we don't have a place but we can walk. When it rains, we use an umbrella to weigh the rubbish outside, so if there's a car, we move it first. Well, that's what the struggle looks like"

And the response from the Central Jakarta Environment Sub-Department regarding readiness to reduce waste at the source, namely from TPS and TPS 3R facilities, said that:

"Currently, it is still far from expectations, but in the future, TPS 3R facilities will be improved, namely in 2024 there will be new waste processing facilities to reduce waste thrown into landfill."

Efforts are also made to maximize sorting efforts at TPS and TPS 3R, so that the waste reduction target can be achieved. And we continue to carry out outreach and encouragement to the community to sort waste from their homes through RW assistants.

To confirm this in the field, researchers conducted interviews with waste crew officers at TPS MA and also made direct observations, that many people still throw their waste directly to the TPS in a mixed manner. When asked by waste crew officers, there are indeed many residents who don't care about separating their waste, when told to put their rubbish separately, they were just ignorant. For example, used building debris, large pieces of wood are placed on the side, because they can be reused, and usually someone takes them if they are separated, and can also damage the officers' shell equipment.

To achieve waste reduction, waste management activities must be carried out holistically and collectively, as is done in one of the regions in Indonesia which has successfully implemented the Zero waste concept, by not relying on landfills any more, namely in the Banyumas area, Banyumas has succeeded in implementing sustainable waste management, namely

by increasing recycling, managing organic and inorganic waste, socializing and educating the public regarding behavior and perspectives regarding waste and providing recycling and waste processing facilities (Chairani et al., 2023; Oktaviani et al., 2023; Pazqara, 2022). According to the Indonesian Ministry of Environment and Forestry, as conveyed by the Director General of PSLB3 (Trash and Hazardous and Toxic Waste Management) said that Banyumas is the region that has the best waste management in Indonesia and throughout ASEAN, because only 9% of the residue is disposed of in the landfill. The implementation of Zero waste to landfill was initially due to the landfill land crisis, the local government together with residents took action to manage their own waste based on community participation, by providing waste management facilities with various processing methods (Darmawan, 2023). Previous research suggested that the DKI Jakarta Provincial Government needs to carry out a 3R program, a waste bank, and provide good trash facilities so that people can sort waste (Supangkat et al., 2020). Based on this research, the DKI Jakarta government has started a program to minimize waste from the source and it requires commitment from all parties so that it can be implemented effectively. An effective waste management strategy can be achieved through a combination of increasing institutional capacity, infrastructure development, community participation, economic incentives, awareness raising campaigns, community-based programs, and investment in smart waste management systems and management in accordance with the cultural and socio-economic characteristics of the community (Ani et al., 2022; Fasihi et al., 2021; Suryawan et al., 2023).

Discussion

Based on research conducted in the 2018-2022 period, there are several interesting results. Reducing waste generation by 9% from the target of 26% and waste handling by 1.66% from the target of 70% shows that there are challenges in achieving the targets set in waste management. The existing facilities at TPS 3R Rawasari, such as maggot bioconversion waste processing, waste banks, and B3 waste storage, are positive first steps. However, the lack of containers for sorting waste according to the characteristics and types of waste shows the need for improved infrastructure and public awareness.

Providing segregated storage facilities at TPS and TPS 3R is the right step to get residents used to sorting waste when throwing it away. This will not only help reduce the amount of waste entering the Final Processing Site (TPA), but will also create better environmental awareness in the community. Apart from

that, diversification of waste processing facilities at TPS 3R is also needed to reduce dependence on TPA.

Even though the waste reduction program towards a Clean Indonesia is in progress, there are several obstacles that need to be overcome. One of them is the lack of collective system support from local government. Full support from all regional officials and the provision of adequate facilities and infrastructure will be very helpful in achieving the goal of being clean from waste. More intensive outreach and moral support for residents is also needed to encourage active participation in waste management programs. Thus, through appropriate discussion and action, we can accelerate progress towards a cleaner and more sustainable environment. From the results of the research and interviews presented, it appears that the obstacles in waste management in the Cempaka Putih area, DKI Jakarta, show that there are various factors that influence community participation in waste management programs, such as limited facilities, lack of system support, and community attitudes and behavior. From research by Sewak et al. (2021) and Yau (2010), we see that facility factors, such as the existence of good waste banks and waste bins, play an important role in improving waste sorting and reducing discarded waste.

Apart from that, community attitudes and behavioral factors also have a significant impact. Laziness, lack of sense of responsibility, and indifference to the environment are the main obstacles to sustainable waste management efforts (Sewak et al., 2021). However, it is important to note that community participation in waste management can be influenced by various socio-demographic, psychological, and economic factors, as well as by existing policy instruments and control norms (Nguyen et al., 2015; Ma et al., 2020; Raghu & Rodrigues, 2022). On the other hand, the Cempaka Putih area has become an example in efforts to reduce waste from the source by transporting waste according to its type. However, there are still obstacles such as a lack of land for waste banks and a lack of system support from local governments in providing facilities and facilitating community participation (Supangkat & Herdiansyah, 2020). Full support from local governments in providing adequate facilities and strengthening cooperation with residents and community groups will be very helpful in increasing the effectiveness of waste management programs.

One example of success in waste management is the Banyumas region, which has succeeded in implementing the Zero Waste concept by involving community participation and providing complete waste management facilities (Chairani et al., 2023). This shows that an effective waste management strategy requires a

combination of factors, including infrastructure development, community participation, and investment in smart waste management systems.

People still do not recycle for various reasons, including lack of awareness of the importance of recycling, limited access to recycling facilities, and lack of incentives to engage in recycling practices. Apart from that, the lack of consistency in implementing recycling behavior can also be caused by an attitude of rationality where individuals tend to choose to just pay money for waste as a short solution rather than engaging in recycling efforts that require more time and effort.

The government has an important role in facilitating recycling activities together with various stakeholders. One effective approach is to innovate waste management programs that involve active community participation. The government can carry out intensive outreach about the importance of recycling, provide incentives for individuals or groups who participate in recycling activities, and provide recycling facilities that are easily accessible to the public.

Apart from that, the government can also implement waste management based on community participation, where the community is actively involved in the waste management process from sorting to processing. This can be done through approaches such as waste bank programs, where people are given incentives or rewards for the waste they recycle. In addition, the government can form community groups responsible for collecting, sorting and processing waste at the local level.

Thus, through collaboration between the government, community and various other stakeholders, as well as by implementing appropriate innovation and outreach, it can be hoped that community participation in recycling practices will increase, which will ultimately contribute to more sustainable waste management and a better environment cleaner.

Overall, to achieve significant and sustainable waste reduction, commitment is needed from all parties, including government, society and the private sector. Full support from local governments in providing adequate facilities, increasing public awareness, and strengthening active citizen participation will be the key to achieving the goal of being clean from waste.

Conclusion

Based on a summary of the research and analysis carried out, it can be concluded that waste management in the Cempaka Putih area, DKI Jakarta, faces various challenges that need to be addressed immediately. Even though several positive steps have been taken, such as

reducing waste generation and providing segregated storage facilities at Waste Disposal Sites (TPS) and 3R TPS, there is still a gap between actual achievements and the targets that have been set. Lack of adequate infrastructure, collective system support from local governments, and lack of community awareness and participation are the main obstacles in achieving the goal of clean and sustainable waste management. Factors such as community attitudes and behavior also have a significant impact on the effectiveness of waste management programs. However, there are opportunities for improvement. Examples of success from the Banyumas region in implementing the Zero Waste concept show that a combination of active community participation, infrastructure development, and investment in smart waste management systems can produce positive results. Overall, to achieve significant and sustainable waste reduction, commitment and cooperation from all parties is needed, including government, society and the private sector. Full support from the local government in providing adequate facilities, increasing public awareness, and strengthening active citizen participation is the key to achieving the goal of clean waste in the Cempaka Putih region and throughout Indonesia.

Acknowledgments

Thank you to the residents of Cempaka Putih sub-district and the Central Jakarta Environmental Service for providing information to the author.

Author Contributions

Conceptualization, writing—original draft preparation, methodology, formal analysis, and investigation, N. U.; Validation, writing—review and editing, and supervision, D. N. M., and K. I.

Funding

This research received no external funding.

Conflicts of Interest

The authors declare no conflict of interest.

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