

Design of a Community-Based Waste Management System in Rengas Pulau, Medan Marelan District, Medan City

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Abstract

The national target for reducing waste in the community is 30% by 2025. This research aims to describe the design of a community-based waste management system and formulate an overview of household waste management policies and strategies in the Rengas Pulau Subdistrict. Based on identifying the affecting factors in waste management, a situation analysis is carried out using a SWOT analysis to formulate 19 (nineteen) strategies to optimize community-based waste management. The design of community-based waste management in Rengas Pulau Subdistrict starts from sorting and processing at the household, collecting and processing at TPS 3R. It is estimated that from the 46.20 m³/day, the volume of waste generation that is targeted to be reduced in the community can be processed and managed by the community in households at 19.52 m³/day (70.41%), and the residue is 8.20 m³/day. Meanwhile, household waste processed and managed by KSM at TPS 3R is 13.01 m³ per day (70.40%), and residue is 5.47 m³ per day. Furthermore, the residual waste is transported to TPS and TPA. Communities play a role, from the source of destruction to processing it on a regional scale. The government plays a role by holding a comprehensive waste management outreach and education program and improving the performance of solid waste services. The private sector plays a role by providing support through physical assistance or as an off taker of waste processing products from the community.

Keywords: waste management, household waste, policy, community, government, private

INTRODUCTION

Waste management in Indonesia is a problem that has not been resolved until today. An increase will also follow the rise in population of waste. It is estimated that 68.5 million tons of household and household-like waste will be generated in Indonesia in 2021 (Kementerian Lingkungan Hidup & Kehutanan Republik Indonesia, 2017). The National Policy and Strategy for Household Waste and Household-like Waste Management requires that national waste management incorporate all stakeholders in an integrated manner. The objective for community trash reduction is 30%, and the target for government waste management is 70% by

2025 (Republik Indonesia, 2017) (Republik Indonesia, 2006) (Republik Indonesia, 2008).

The community must be involved for waste management to have a beneficial effect on life rather than being handled only by the government (Halimah, Krisnani, & Fedryansyah, 2015) (Hapsari, 2014) (Saladié, 2016) (Pemerintah Kota Surabaya, 2007). Community Community-based home waste management can decrease the amount of waste produced and dumped in landfills. However, due to a lack of waste management infrastructure and facilities, this management has not been applied to its full potential (Artiningsih, Hadi, & Syafrudin, 2012). Waste management will be more efficient if the necessary

operational and technological facilities and infrastructure are provided (Paramita, D., Murtilaksono, K., 2018).

Rengas Pulau is one of the subdistricts in Medan City. It is located in the Medan Marelan District. The subdistrict now has 67,438 residents in 2022, making it the largest population in Medan. Prominent people will undoubtedly be able to generate large amounts of waste, and issues will arise if the waste is not managed effectively (IGES, 2019). The current state of the technical infrastructure and operational facilities for managing waste in Rengas Pulau Subdistrict is as follows: (1) there are no segregated waste containers in households; (2) waste collected at the source is taken directly to the final disposal site without any transfer or processing, and (3) the transportation process is inefficient because the compactor truck only makes two trips per day. This condition illustrates that the technical operation of waste management in Rengas Pulau Subdistrict is still not optimal due to limited facilities and infrastructure, both owned by the community and the government, which will affect waste management performance.

The involvement of the community as a waste producer might also have an impact on waste management processes (Darwati, S., Anggraini, 2012; Agustina, E., Gewe, R.S., dan Widyarsana, 2020; Maulina, 2012 Probosari, 2020). The community's involvement in garbage management in the Rengas Pulau subdistrict community is still poor. The community's input and aspirations are still only considered when making decisions. The community has not played a whole part in implementing waste management. The benefits of community empowerment have not been fully realized. The community has not been fully involved in the evaluation process. Communities frequently serve as exclusionary objects in the waste management process. The community should be a focus of the government's efforts, beginning with the planning, implementation, and monitoring phases. Based on the situation, Rengas Pulau Subdistrict waste management needs

to improve operational and technical activities, involve the community more, and get everyone involved to work together. This research aims to describe the design of a community-based waste management system in Rengas Pulau Subdistrict and provide an overview of policies, strategies, and community-based waste management programs in Rengas Pulau Subdistrict.

This study aims to give relevant parties an overview of the design of a community-based waste management system and recommendations for an overview of community-based waste management policies and strategies that can be used for waste management in the Rengas Pulau Subdistrict.

RESEARCH METHODS

The study was conducted in Rengas Pulau Subdistrict, Medan Marelan District, Medan City, and North Sumatra Province. Rengas Pulau Subdistrict has a population density of 6,707 people per km² and comprises 16155 households and 35 neighborhoods. Rengas Pulau Subdistrict has the potential to produce a large amount of waste because it has the most significant population among the 151 subdistricts in Medan City.

This research aims to assess the existing operational conditions and the community's participation in waste management and to design a community-based waste management system in Rengas Pulau Subdistrict. The design progresses from sources of household garbage through area-scale processing based on examining operational, technical aspects, community involvement, and stakeholder roles.

This study combines qualitative and quantitative descriptive methodologies (Nugrahani, 2014). This research employs a qualitative descriptive approach to characterize the state of the current waste management system and analyze the stakeholders' roles based on interviews with informants. Technical descriptions that are quantitative are provided using calculations that are based on SNI 3242:2008. A quantitative method is used to

analyze community participation and findings. Figure 1 shows the flowchart for summarize the questionnaire survey the study concept framework.

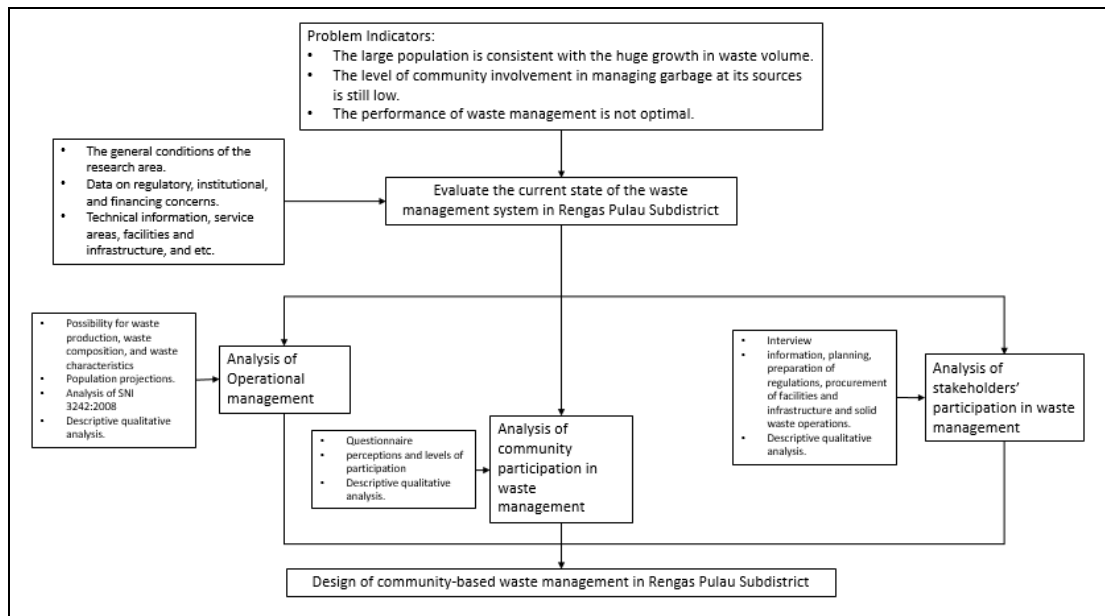


Figure 1. Research Framework

The type of data in this study consisted of secondary and primary data. Secondary data was gathered from records or archives belonging to the relevant Medan City Government departments or to the Rengas Pulau subdistrict's waste management. Preliminary data was collected directly from the primary source through field observations, interviews, news, and questionnaires with informants and respondents. The informants for this study were selected from the department responsible for waste management within the Medan City Government, the head of the environment, the cleaning crew, and the Rengas Pulau Subdistrict waste management community. The Slovin equation was used to determine the respondents. In this study, 390 respondents were required to complete the questionnaire.

The data analysis in this study is conducted in four stages. First, the analysis of waste management's technological and operational aspects is carried out by examining the current state of the waste management system. Then,

determine the projected population for the planning year and the potential production, composition, and waste characteristics. Moreover, technical calculations were conducted to obtain a waste management system design based on SNI 3242:2008. The second stage is analyzing community participation in waste management by looking at statistical data from a questionnaire survey that showed how people felt about it and how much they participated. This helped figure out the factors that affect community participation in waste management. The third stage is analyzing stakeholders' contributions to trash management. At this stage, informant interviews were analyzed to discover more about planning, drafting rules, purchasing facilities and infrastructure, and waste management. Furthermore, determine the factors influencing stakeholders' roles in waste management. The last stage is designing a system for managing waste in the community. At this phase, a community-based waste system was developed. An analysis was conducted to establish policies and

strategies for community-based waste management in the Rengas Pulau Subdistrict after conducting situational research using the SWOT approach to examine the previously identified components (Rangkuti, 2017). Following the intended priority scale, the system design will also give a general overview of the roles played by each stakeholder in the implementation of policies and strategies.

RESULTS AND DISCUSSION

Operational Technique Analysis of Rengas Pulau Subdistrict Waste Management

Operational waste management systems are chosen based on the topography and environment of the service area, the socioeconomic conditions, the level of community involvement, and the amount and type of waste produced.

The Rengas Pulau Subdistrict has numerous stores, rice farms, and residential areas. As a result of the high level of community activity, traffic congestion commonly occurs on the main road. The Rengas Pulau Subdistrict is 10.50 km², with 96% of the land comprising residential areas.

Medan Marelau District's topography and slope characteristics are often characterized by relatively flat ground with a 0-2% slope. The elevation of this area is 5 meters above sea level. People in Rengas Pulau Subdistrict generally work for private employers such as farmers, traders, public servants, and other professions. The education level of the Rengas Pulau Subdistrict community is still dominated by high school graduates, namely, 5,411 people.

The current state of waste management operational techniques in Rengas Pulau Subdistrict demonstrates how the institutions carrying out the waste service, the legal foundation for carrying out waste management, and the financing for carrying out waste management all impact the operational technique. The basis for implementing

waste management and the funding for waste management (Tchobanoglous, Theisen, & Vigil, 1993).

The institutional aspect shows that, based on Medan Mayor Regulation Number 01 of 2022, the Sanitation and Landscaping Service is the agency in charge of cleanliness, waste management, and landscaping. According to Medan Mayor Regulation Number 18 of 2021, the Mayor of Medan delegated a share of the authority for waste management to the District Head for the efficiency and effectiveness of waste services. Rengas Pulau Subdistrict has 21 cleaning staff members, including sub-district operational supervisors, road sweepers (Melati Team), compactor truck drivers and assistants, and garbage collectors (Bestari Team). According to SK SNI T-12-1991-03, the ideal number of cleaning workers in Rengas Pulau Subdistrict is 105, so the current cleaning personnel is still deficient. The capacity needs to be increased to optimize waste services. Additionally, there is a cleaning service in Neighborhood 17 of Rengas Pulau Subdistrict, run independently by community organizations, specifically the Community Self-Help Group (KSM Mahkota), which collects trash from some Neighborhood 17 residents and processes it at TPS 3R (Departemen Pekerjaan Umum, 2008; Kementerian Pekerjaan Umum, 2010).

The legal and regulatory aspect shows that the Medan City Government has set up regional regulations for waste management. These regulations are Medan City Regional Regulation Number 10 of 2012 concerning cleaning service charges and Medan City Regional Regulation Number 6 of 2015 regarding waste management. However, the regulations for taxation have existed for more than ten years, so they need to be reviewed. Also, the Medan Mayor Regulation Number 26 of 2019 about Medan City Regional Policies and Strategies in the Management of Household Waste and Household-like

Waste has been set up as a guideline for managing household waste.

The financial aspect explains that people in Medan City must pay for cleaning services. Technically, district officials are in charge of collecting fees for cleaning services. These fees are then sent to the Medan City Sanitation and Landscaping Service and identified as Medan City Regional Original Revenue. The annual revenue target for cleaning services in Rengas Pulau Subdistrict is Rp. 166,122,000. However, the estimated operational budget for cleaning is Rp. 1,549,058,282. This implies that the revenue target is only 10.72% of the operational costs of waste management. This shows that the money from user fees can only cover a small part of the cleaning services costs.

Households in Rengas Pulau Subdistrict store their waste in various containers. The community still does not have uniform containers for waste storage since they do not yet have a standard container in the form of iron barrels or bins, plastic or fiberglass barrels, plastic bags, bamboo or rattan baskets, or bricks.

The garbage collection and transportation system in Rengas Pulau Subdistrict consists of four activities: (1) direct individual waste collection, which is carried out throughout the neighborhood, particularly in houses or residential areas near main roads; (2) indirect individual collection, which is organized by KSM Mahkota in Neighborhood 17 using two units of motorized trishaws operating four trips per day; (3) waste collection by sweeping the streets, which is done by the Melati Team of nine cleaning workers; and (4) waste transportation via a direct individual collection system (door to door) using two compactor trucks and three Bestari garbage rickshaws.

Household waste collected is immediately transported to the Terjun Final Disposal Site without processing.

Household waste processing is only done at TPS 3R KSM Mahkota Lingkungan 17. Most of the waste from the people of Rengas Pulau Subdistrict is transported to the Terjun Final Disposal Site in the Terjun Subdistrict, Medan Marelan District. Every day, 24 m³ of waste is estimated to be disposed of at the Terjun Final Disposal Site.

Operational and technical planning is carried out for forecasts for the next four years or 2026. The possibility for waste generation is 140,072 liters per day, given the expected population of 75,186 in 2026. To be efficient and effective, the solid waste service area is divided into five blocks as follows: (1) Block 1 (neighborhoods 1, 2, 3, 4, 5, 6, and 33); (2) Block 2 (neighborhoods 7, 31, 32, 35, 11, 27 and 28); (3) Block 3 (neighborhoods 8, 9, 12, 13 and 14); (4) Block 4 (neighborhoods 24, 30, 15, 16, 17, 25 and 26); and (5) Block 5 (neighborhoods 23, 29, 34, 18, 22, 20). The following are the findings of the operational technical analysis of waste management:

- Waste segregation and storage using two plastic bags of 10 liters each. The containers are used for 2 to 3 days (SNI 19-2454-2002).
- Processing and managing waste in households, with about 60% of participating households processing waste. The recovery factor (factor of treated waste) for organic waste is 80% and 50% for inorganic waste. Using the Takakura composting method, biopori, and eco enzyme, households process 27.72 m³ of waste per day, with organic waste processing outputs of 15.09 m³ per day. 4.43 m³ of inorganic waste is managed daily in the community through the sale of waste, the production of recycling, and the waste bank (Fatmawati, Muhsin, & Taufik, 2019). Toxic and hazardous waste is delivered to outside parties, such as collectors and processors of poisonous

and dangerous waste. Unprocessed waste residue in households is 8.20 m³ per day and will be collected at a temporary dump (TPS) and then transported to the final disposal site (TPA). Three-unit waste banks will be established, along with one central waste bank unit run by the sub-district administration.

- Planned door-to-door garbage collection using trash carts and waste rickshaws. Garbage collection is done daily from 08.00 to 10.00 WIB and 16.00 to 18.00 WIB. Garbage collection is divided into two routines: collecting waste from households that do not participate in waste processing to TPS 3R and collecting waste residual from families processing waste to TPS. Table 1 lists the number of trips, waste carts, and waste rickshaws used for waste collection.
- TPS 3R handles waste processing and management for 40% of households that do not participate in waste processing. Waste management at TPS 3R totals 18.48 m³ daily, operated by self-help organizations (KSM). Inorganic waste is treated at TPS 3R using recycled materials and creations. In contrast, organic waste is processed using the

composting technique and Black Soldier Fly (BSF) or maggot larvae (Suciati, R., dan Faruq, 2017; Purnamasari, Sucipto, Muhlisson, & Pratiwi, 2019; Wardhana, 2016). It produces 10.06 m³ per day of organic waste, 2.95 m³ per day of inorganic garbage, and 5.47 m³ per day of residual, untreated waste in TPS 3R. The TPA will then receive the remaining debris.

- The construction of two TPS Type 2 units is planned. One for garbage collection for Blocks 1, 2, and 3, and another for waste collection for Blocks 4 and 5. Each TPS has a service capacity of 6,000 households.
- Five units of TPS 3R are required in the Rengas Pulau subdistrict. The projected building areas are as follows: 150 m² for Block 1, 250 m² for Block 2 and Block 3, 300 m² for Block 4, and 200 m² for Block 5.
- A compactor truck with an 8 m³ capacity will be used for waste transportation using the SCS method. One trip takes 1.2 hours (1 hour and 12 minutes) per day, while working hours are 8 hours. There are two compactor trucks: one for moving waste from blocks 1, 2, and 3; and another for carrying waste from blocks 4 and 5.

Table 1 Number of trips, waste carts, and waste rickshaws used for waste collection

Routine	Block	Trip	Waste rickshaws per Block	Trip	Waste carts per Block
Households to TPS	1				
	2	2	1	2	1
	3				
	4	2	1	2	1
	5	1	1	1	1
Households to TPS 3R	1				
	2	2	1	H2	1
	3				
	4	2	1	2	1
	5	1	1	1	1

Source: Research Result, 2022

Analysis of community participation in waste management in Rengas Pulau Subdistrict.

Several community roles were obtained based on a statistical analysis of questionnaire data processing to assess the current circumstances of community participation in waste management in the Rengas Pulau Subdistrict. First, the community is already aware of the various waste categories. However, most people are unaware of the regulations that national and local governments have set for waste management. The majority of people are aware that littering is against the law. Most people are also aware of the dangers to their health and the environment caused by burning trash and dumping it into ditches, rivers, lakes, and other locations. Most people continue to use containers that do not meet the guidelines. The number of community members supporting supplying at least two garbage cans per home is still minimal. Community involvement in sorting waste according to category is still relatively low.

The analysis of community participation was based on examining data from questionnaires issued to the public to evaluate perceptions and levels of community participation. In a study of public perception, it was determined that the majority of individuals believed it essential to reduce home waste. The community does not sort waste at the household level because it is assumed that waste would be mixed during collection and transportation. Regarding waste management, the community desires that trash be collected daily by trash collectors for a monthly fee of Rp 20,000. Improving the frequency of waste collection and transportation and increasing the number of TPS are facilities or services that require improvement. The community believes that

involvement in empowerment initiatives connected to household garbage management is crucial. To manage inorganic trash, most individuals prefer to sell inorganic garbage to local junkyards rather than use compost made from domestic waste. The community is willing to contribute to trash management by paying a fee to the waste manager.

In the analysis of the level of community participation, it was determined that most of the community had never made efforts to reduce waste or participated in socialization about waste management but were willing to participate in community organizations or waste management organizations. Some people are willing to pay a rubbish fee of Rp 15,000 to more than Rp 20,000 if waste officials collect home waste every day, but others are unwilling to contribute by paying a garbage cost.

Analysis of the role of stakeholders in waste management in Rengas Pulau Subdistrict.

The role of stakeholders in implementing the waste management system is to carry out their respective responsibilities. The government is responsible for planning, budgeting, executing services, acquiring facilities, guiding the community, monitoring, and evaluating, and enforcing the law. The private sector plays a role by offering support in the form of physical help and by accepting waste-processed products from the community.

Design of a community-based waste management system in Rengas Pulau Subdistrict

Based on the identification, the internal and external factors of waste management in the Rengas Pulau Subdistrict are shown in the table below.

Table 2. SWOT analysis of Waste Management System in Rengas Pulau Subdistrict

Internal Factor	External Factor
<p>Strength-S:</p> <ol style="list-style-type: none"> 1. The KSM institution that manages TPS 3R. 2. The community is aware of the 	<p>Opportunity-O:</p> <ol style="list-style-type: none"> 1. There is a regional waste management regulation.

<p>consequences of improper waste management.</p> <ol style="list-style-type: none"> 3. The community is familiar with the many types of waste. 4. Some households sort garbage in their homes. 5. Some people are willing to carry out independent waste management. 6. The community is willing to pay if services are improved. 7. The community is eager to participate in social or educational activities. 8. There are community self-help activities in the neighborhood. 	<ol style="list-style-type: none"> 2. Handling cleanliness is one of the city government's most important programs. 3. Medan's Planning Regional Expenditure Budget (APBD) continues to account for waste management expenses. 4. The Medan City Environment Service has a 3R education program for garbage management. 5. The city of Medan has a program for waste-free areas. 6. There is already a waste management institution for implementation. 7. Cleaning services are performed following the standard operating procedure. 8. The waste management capacity must be increased. 9. There are environmentalists and environmental communities.
<p><u>Weakness-W:</u></p> <ol style="list-style-type: none"> 1. The majority of individuals are unaware of the rules regulating garbage management. 2. The level of public knowledge on waste reduction remains low. 3. The level of community participation in waste sorting remains relatively low. 4. The majority of individuals have never reused or recycled garbage. 5. People sometimes dispose of garbage in an improper location. 6. The community's container system is still inappropriate and does not fulfill the standards. 7. TPS 3R's performance is still not good enough because it has little land, workers, and working tools, and the community is involved. 8. Some people sell waste to junk collectors. 9. Waste is still viewed as having no economic advantages. 10. There is still a lack of public awareness about compost products. 11. The community considers the collection and delivery frequency to be still insufficient. 12. Some people are unwilling to pay a fee for waste. 	<p><u>Threat-T:</u></p> <ol style="list-style-type: none"> 1. Annual population growth 2. Increased economic growth. 3. The cost of waste management has not been considered in various aspects. 4. The waste management budget accommodated in the budget is still low. 5. The Medan City Government has not implemented cost recovery in determining fees. 6. Regional regulations for cleaning service fees were issued ten years ago. 7. The number of cleaning staff and infrastructure is still lacking. 8. There is no TPS. 9. Collection and vehicles are still inadequate. 10. The procurement of waste management facilities is constrained. 11. The distribution of waste management products at TPS 3R is not guaranteed. 12. Socialization activities related to waste management are still rare. 13. There is no law enforcement against violators of waste management.

Source: [Data Analysis \(2022\)](#).

The 3R (reduce, reuse, and recycle) concepts were used to build a community-based waste management system in the Rengas Pulau Subdistrict (Puspawati & Besral, 2008). The focus is on efforts to reduce household waste by 30%, which is the national waste reduction objective for 2025. The community at the household level is the principal actor in implementing this waste

management system's design into practice. The government still plays a part in its execution, and so do businesses and other entities. Table 3 describes the roles played by each stakeholder in the prioritized approach for creating a community-based waste management system in Rengas Pulau Subdistrict.

Table 3. The role of stakeholders in the priority strategy for designing community-based waste management systems

No	Priority Strategies	Community	Stakeholders' Role Government	Private Sector
1.	Human resource capacity building	Participate in waste management training held by the government or other parties.	Raise awareness of waste management regulations. Provide 3R waste management training. Encourage the public to live a waste-free lifestyle and warn them of the environmental consequences of unmanaged waste.	Conduct community-based waste management training by collaborating with the government or environmental activists.
2.	Strengthening community involvement in waste management through communication, education, and practice	Provide the government with recommendations and ideas for waste management planning. Place waste in its place. Reducing waste originates at the source. Household separation of organic, inorganic, toxic, and hazardous waste. Provide a minimum of two garbage cans per residence. To break down organic waste at home, compost with Takakura, bio pores, or eco enzymes. We are reusing and recycling inorganic garbage by selling it to junkyards, recycling	Develop a work plan that integrates community-based waste management with waste service operations. Incorporates the budget for community-based waste management operations into the regional Expenditure Budget for Medan.	Conduct neighborhood clean-up activities with the community and government.

No	Priority Strategies	Stakeholders' Role		
		Community	Government	Private Sector
		<p>home inventions, and storing it in unit waste banks.</p> <p>Organic waste processing at TPS 3R via composting and Black Soldier Fly (BSF)</p> <p>Using recycled material products and recycled innovations, TPS 3R manages inorganic waste.</p> <p>Carry out community self-help activities in the neighborhood.</p> <p>They pay fees to the government and membership dues to KSM, which manages TPS 3R.</p>		
3	They are strengthening government or community institutional commitment to implementing waste management.	<p>Forming unit waste bank management and being actively involved in unit waste bank management, either as a customer or manager.</p> <p>Establish TPS 3R KSM management and be actively involved in the management of TPS 3R, either as members or administrators of KSM.</p>	<p>Establish local institutions with the responsibility and role of waste management.</p> <p>Establish the management of the primary waste bank.</p> <p>Conduct training and monitoring of the management/manager of the unit waste bank and KSM managing TPS 3R.</p>	<p>Conduct coaching and strengthening the role of the community in developing community-based waste processing products.</p>
4	Improving the performance of waste management services	<p>Transporting unprocessed and managed household and unit waste banks to TPS</p> <p>KSM will collect a 40% reduction in unprocessed or managed waste from households and deliver it to TPS 3R.</p>	<p>I am calculating waste service costs and amending Medan City Regional Regulation No. 10 of 2012 about Cleaning Service Remuneration.</p> <p>We are studying the requirement for cleaning workers and the necessity for waste management infrastructure and facilities.</p> <p>Purchase collection equipment consisting of five garbage cart units and five garbage</p>	<p>Assisting (CSR) for waste management infrastructure and facilities to the government and the community</p>

No	Priority Strategies	Community	Stakeholders' Role Government	Private Sector
			tricycles. Purchase of two compaction truck vehicles. We are assisting in constructing two waste bank units and one central waste bank, each with a service capacity of 200 households per day. Facilitating the construction of five TPS 3R units. Transportation of residual waste from households to TPS. Provide two units of TPS Type 2. Conduct the transportation of waste residue from TPS/TPS 3R to TPA. Carry out the procurement of equipment and facilitate the implementation of community self-help. Applying sanctions to violators of waste management activities. Monitor the implementation of solid waste services	
5	We are strengthening the business community's commitment to supporting waste management programs.	We are establishing agreements between waste bank community managers, the government, and the business sector over selling waste processing goods derived from community-based operations. Establishing marketing agreements between KSM Management, the government, and the private sector for community-based	We are facilitating agreements for collaboration on the marketing of community-based waste processing products between waste banks and community administrators, the government, and the private sector. Assist the community in developing community-based waste processing products.	Accommodate the results of waste processing products from households. The community or the public guides and promotes waste processing results at every event or activity.

No	Priority Strategies	Community	Stakeholders' Role Government	Private Sector
		waste processing	Incorporate community-based waste processing products into all events and activities.	

Source: Data Analysis, 2022

CONCLUSION

Based on the findings of this study, to accomplish the goal of a 30% reduction in household waste, it is necessary to build a community-based waste management system in Rengas Pulau Subdistrict. The current state of waste management in the Rengas Pulau Subdistrict is represented by the inadequate performance of the government's waste management services, which continue to employ the collect-transport-dispose approach. It is expected that the design of this system will reduce the amount of garbage processed and managed by households by 19,52 m³ per day, or 70.41 percent of the total waste generation. Meanwhile, the waste managed at TPS 3R is predicted to be reduced by 13,01 m³ daily, or 70.40 percent of the absolute garbage produced. The optimal implementation of the priority strategy required formulating nineteen programs and derivatives in the form of activity plans that stakeholders could implement. The primary actors in implementing these programs and activities are the community at the household level, but government and business/private actors also play a role. It is expected that stakeholders will consider this system's design while developing and implementing a community-based waste management action plan for Rengas Pulau Subdistrict.

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