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ELABORATION FACTORS OF SUCCESS IN THE APPLICATION OF COMMUNITY-BASED SOLID WASTE MANAGEMENT AND COMPOSTING TECHNOLOGY

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Abstract, This study aims to describe the elaboration of success factors in community-based waste management in Waste Bank and composting technology in Flamboyan Indah RW 05 Kelurahan Rawa Badak Selatan, Koja in 2020. This study uses descriptive qualitative methods using primary data to become research objects in RW 05, Desa Rawa Badak Selatan and secondary data from sources and literature. We conduct field studies, including observations and interviews. Koja area is an area with a high population increase accompanied by an increase in organic and inorganic waste. This condition requires community involvement to help manage and reduce waste by processing waste directly from the source. The action taken is to divide the two forms of garbage, inorganic waste is processed by the Community-Based Waste Management System (CBSWM) or waste bank and organic waste with composting technology. Composting technology uses a fermentation process in it. The results of this study concluded that the successful implementation of the CBSWM system and composting technology invited active community involvement by providing economic benefits. But on the other hand this system has weaknesses such as limited land and economies of scale that have not made it possible for technology investments that require large funds.

Keywords: organic waste, inorganic waste, composting, CBSWM

1. INTRODUCTION

Jakarta as the capital of the country has a population density that is high enough. Residents must be accompanied by the number of waste/garbage. Solid waste is any solid unwanted or useless produced in the human population (Kaseva & Mbuligwe, 2003). It aggravate load of rubbish and cause environmental pollution if not followed by an adequate waste management. Moreover, Jakarta has not had a waste disposal (TPA) itself. Because it takes community involvement to help manage and reduce waste by garbage processing directly from the source. How to make organic and inorganic waste separation. In this research study site located in RW 05 residents, Rawa Badak, North Jakarta. The choice of location on Waste Bank flamboyant, based on the achievements in the form of an award from the government of Jakarta adipura and as the mascot of Jakarta in the race on the environment. Waste management is done by the system Sold Community-Based Waste Management (CBSWM) systems that involve public participation in the process of composting. This method aims to reduce waste from the axis point to the place of final disposal, as well as economic value because it can help the community in terms of economic and efficient.

CBSWM system is the concept of using a "garbage bank. Flamboyan Indah garbage Bank was established from 2012, using the Community-Based Method of Sold Waste Management (CBSWM) systems with an integrated system to manage all types of household waste with the concept of 3R (Reduce, Reuse, Recycle). These systems include participation by sorting the waste that is inorganic such as plastic waste, paper waste metal / aluminium cans, trash that is shard / glass and organic waste such as household garbage results.

Care and diligence in managing the RW 05 garbage not only in CBSMW system, but also in the management of waste into compost. Waste management in Rawa Badak RW 05 also uses composting technology is the process of managing waste into organic fertilizer using a simple technology which is the process of decomposition (fermentation). The fermentation process is basically the decomposition of organic waste that is left in place for two to three months in the barrel. Organic waste is collected residents, the household wastes that are biodegradable, such as the former vegetable and fruit peels. Waste processing technology household scale though done in small scale but very meaningful to address the problem of household waste.

According to Nisak et al (2019) CBSWM or community-based waste management has four characteristics namely: First Independent, not entirely dependent on local government services; Second, productive, produces several other benefits such as income for households and cost efficiency of waste management; Third is integrated, managing all types of household waste with the concept of 3R (Reduce, Reuse, Recycle), and Fourth, environmentally friendly, using safe and healthy both for humans and the environment.

In addition to DKI Jakarta, one of the provinces implementing the CBSWM or Community-Based Waste Management system is the Palu area. Based on the results of Gafur's analysis, Arya et.al (2017) of waste generation in South Palu District can be seen that the production of waste is quite large, while the capacity of the Palu City Government is very limited. Then it needs efforts from the community for the distribution process in the landfill. The waste generation reduction program is carried out by applying 3R (reuse, reduction and recycling) to the process from the source of waste and must involve community participation. In addition, the managers at TPS from the local community by recycling inorganic waste and environmental composting. This is similar to the conditions in Rawa Badak RW 05 North Jakarta. So that the contribution and role of Rawa Badak RW 05 residents in managing waste becomes a very important thing to do to help the government reduce waste in DKI Jakarta.

As an embodiment of RW 06 close attention to environmental awareness and reduce waste at the source, resident of RW 06, in collaboration with environmental agencies tribe has seven years has implemented a waste management process.

Scientific contribution from this study is the CBSWM has inherent risk of not being suistanable in long run, especially when the membership not longer offer economic benfits. Besides that, another contribution related to science is that it can help the community in the process of managing compost based on technology. In this day and age, especially in the city of Jakarta, it is very rare for people who manage and utilize waste to become compost

2. RESEARCH METHODS

This study aimed to describe / explain about community-based waste processing, (CBSWM) systems using the composting process, which will be useful for the community. Engineering research conducted open interviews along with some of the informant. The first guest speaker along with Mr. H. Purnomo as Director of Management of Waste Bank Structure Flamboyan Indah RW 05 Rawa Badak Selatan urban village. The second resource person along that Mr. Junaidi as representative of RW 05. The third resource persons namely Joseph Donner Dwiyantama Founder Stalls As Trash Indonesia. Data obtained in the form of waste management in the village of Rawa Badak, North Jakarta, using a system of

Community-Based Solid Waste Management (CBSWM) systems with the manifold garbage sorting inorganic and organic waste will be processed into compost using composting technology. The different thing in this research is the process of compost management in RW 05 Rawa Badak, is the process of compost management that uses sunlight energy in the sun so that compost management does not cause unpleasant odor.

2.1. RESEARCH DATA

Rawa Badak Selatan Urban Village has an area of 146.66 km ² or reaches 22.14% of the total area of Jakarta. Since it is located close to the sea, the area of North Jakarta City Administration has a higher temperature than other areas of Jakarta which is an average of 27oC. The population density Jakarta reached 15 938 inhabitants per square kilometer (sq km), the highest compared to other provinces in Indonesia. The density of population of the city is certainly accompanied the amount of waste / garbage both in terms of volume and type. This research data in the form of qualitative data from case studies conducted in Rawa Badak Selatan Urban Village RW 05 North Jakarta City District managed to establish a bank of garbage. During this time the city working with the city of Bekasi in landfills (TPA). However, not all waste can be transported to a waste disposal (TPA) Bantar Gebang in Bekasi. Therefore, to reduce the volume of waste discharged to the place erected Bank Waste landfills. Here are a number of production and the volume of waste from the Special Capital Region 2017-2018 as well as the amount of waste transported.

TABLE 1
Estimated Production and Waste Volume
Transported Per Day Jakarta City, 2017-2018

DKI Jakarta	Production Trash Per Day (m3)		Waste Volume Transported per day (m3)		percentage of Waste Transported (%)	
	2017	2018	2017	2018	2017	2018
	7 164.531	7 164.531	6 872.181	6 872.181	95.92	95.92

Source: CBS 2019

Meanwhile, the results of data reduction of inorganic waste in the garbage bank Flamboyan Indah Housing RW 05 Rawa Badak Selatan urban village of Koja Sub-district, North Jakarta Administration City in 2017 to 2019 showed an increase of the average amount of garbage from various kinds, ranging from paper, plastic and metal. Indeed, if viewed in passing the increase in waste paper from 2017 to 2019 did not increase significantly, but it menjukkan that an organic waste reduction showed no change. On one hand the number of customers increased, it is because there are economic advantages, from the public to deposit trash both organic and organic un. Because each litter were deposited would be appreciated by the bank in accordance garbage weight and type. Income from deposit the waste, can be used residents to pay PAM or electricity.

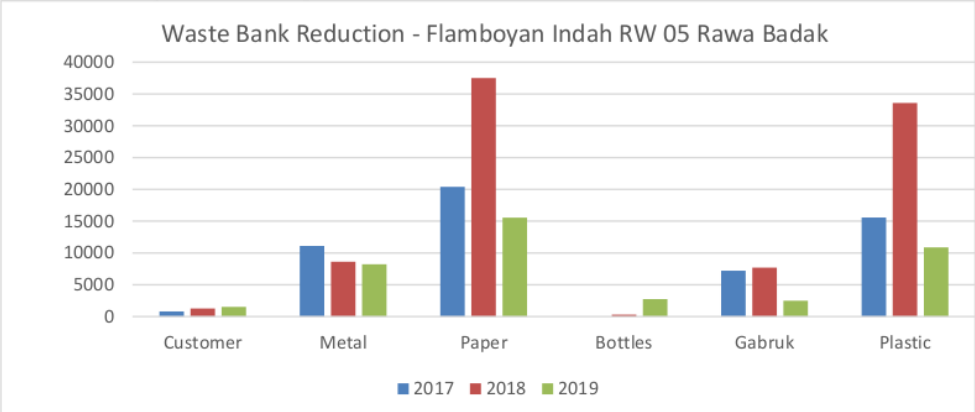
TABLE 2
***Un-organic* Waste Reduction in Waste Bank Flamboyan Indah**
RW 05 Rawa Badak Selatan Urban Village District of Koja
North Jakarta

Year	customer	metal	Paper	bottle	*Gabruk*	Plastic
2017	812	11120	20 408	0	7208	15 579

2018	1272	8635	37 503	310	7708	33583
2019	1516	8235	15 550	2750	2505	10870

Source: Data Informant 2020

Figure 1 . Development of Waste Reduction Process From 2017-2019



2.2 STAGE RESEARCH

Data obtained from the existing problems in the field about the importance of community-based waste management, through interviews, observation and documentation study. Waste management here in addition to involving the community is also a special institution that receives garbage from the public through the clerk PSR (Household Waste Picker). Data were then verified, before it was analysed using descriptive method by describing the state of the subject or object in the research can be a person, institution, community and others which are now based on the facts that appear or what it is. The people here are involved from planning to implementation. The results are expected will increase the awareness of the importance of healthy concern for the environment.

3. RESULTS AND DISCUSSION

Public participation in waste management from year to year has increased, judging from the amount of garbage bank customers is growing. Public participation in waste management, starting from the selection of organic and inorganic. For the organic waste that is biodegradable garbage such as waste vegetable former will be broken down into compost. 05 diligence and accuracy of citizens in waste management has disuport by the Environment Agency in the form of organizing training and socialization. Meanwhile, the garbage that is inorganic such as plastic, bottles, iron, aluminum, tin, Cans Garbage will be collected to Bank Flamboyan Indah RW 05.

3.1 .System Community Based Solid Waste Management (CBSWM) Systems

Community-based waste management (Community Based Solid Waste Management/ CBSWM) systems is an approach to the needs and demands of society, planned, executed, controlled, and evaluated with the community (Environmental Services Program (ESP) Establishments, 2006). The approach in question include social approach, economic, technical and environmental. Based society as the main producer is the public so that people should be responsible for the production of public garbage. This CBSWM goal is self-reliance in

maintaining the cleanliness of the environment through eco-friendly waste management basis with rubbish bank aims to sort garbage. The garbage sorting process is a very important first, before the garbage is processed to the next stage.

In conducting the approach above course must involve all components of society such as non-governmental organizations engaged in environmental management or waste management, working with the community components such as assemblies *Taklim,* PKK, RT, RW and conducting reforestation, race hygiene between RT and the important to disseminate culture of a clean environment. Form of participation of residents of RW 05, manage the process of Community Based Solid Waste Management / CBSWM starting from garbage collection is an organic (such as paper comprising (newspapers, magazines, cardboard, duplex,) Plastics (clear plastic, plastic bottles, hard plastic) and metal (iron, aluminum, zinc, tin). The rubbish was originally collected by the house holds in RW 05 up until one month before being taken by officers Household Waste Picker (PSR). The rubbish that is collected will later be taken by officers PSR numbering 10 to 20 people who are ready to pick up household garbage. Trash unorganik already disaggregated in terms of the type, nature and number, is then placed in a garbage bank. After that bank staff will be sent to trash-plant used for stomach contents doll, after plastics is destroyed by thrasher. Plastic enumeration is not carried out by residents of RW 05, but by the factory. RW 05 only perform garbage collection an organic phase. Limited land and the high investment amount needed for modern machine hinder modern waste treatment.

3.2 Composting Technology

Trash manifold is organic waste from household wastes that are biodegradable, such as vegetables, cassava skins, fruit skins and others. Organic waste that has been collected will later be made into compost, liquid and solid compost. Each of these types of organic waste will be produce a measure of weight that varies between compost and liquid compost, depending on the type of organic waste, as described in Table 3.1 below.

The decomposition of organic waste into compost through several stages. First of organic waste that has been collected in advance will be weighed to determine how much waste is used for composting. The compost produced in the organic waste can be composted solid and liquid compost. Waste to be used for compost used up to 5 Kg, but after the fermentation process it will shrink to 2-3 Kg. After that the next stage is the drying process prior to entry into the vat. Garbage that has been rather dry inserted into the barrel for settling for 2-3 months. Within the deposition of garbage in the cans is a process of fermentation. The technology used in the management of organic waste into compost using simple technology, namely the process of decomposition (fermentation). The fermentation process is basically the decomposition of organic waste are let stand for two to three months in the barrel. After settling for two to three months ago, the waste will be dried in the drying process of 2-3 days depending on the weather, because the drying process requires a very hot weather. After the new Drying go to the packing stage. One pack compost weigh nearly 1 kg. because the drying process requires a very hot weather. After the new Drying go to the packing stage. One pack compost weigh nearly 1 kg. because the drying process requires a very hot weather. After the new Drying go to the packing stage. One pack compost weigh nearly 1 kg.

In all residents of RW 05 produces compost can produce as many as 40 packs of compost is ready for sale. The usual result of this compost will be sold-selling to school nearby, there are also buyers who come directly and partly compost is used for hydroponic cultivation. The results of the compost sales results will be used for the treatment or maintenance tool.

TABLE 3
Organic Waste Reduction Report 2019

No.	Organic garbage is processed per month	Kg	Compost produced	
			Solid (Kg)	Liquid (Kg)
1.	Protective plant leaves	270	251.1	18.9
2.	Productive plant leaves	450	418.5	31.5
3.	vegetable	20.250	10 125	10 125
4.	Leftovers	10 125	7.593.75	2,531
5.	Sawdust	75	68.25	6.75
6.	Rice husk	0	0	0
7.	Whey liquid waste	62.34	61 093	1,246
	Amount	825 375	496 875	69 806

Source: Data from informants, 2020

3.3 Suistainability

Table 2 clearly indicate that growing number of customer caused by economic benefits offered by membership as customer. However, this number will not exceed population in RW 5, while amount of unorganic waste continues to decline. Meaning revenue from sale of these waste should also decline and shall impact to the benefit, unless modern waste treatment implemented. We were unable to collect nominal value of the revenue, due to the informant reluctant to diclose it.

4. CONCLUSION

Waste management with community-based (Community Based Solid Waste Management) and the composting process is very potential to be the cutting edge of waste reduction, especially in RW 05 Rawa Badak, and in general, if done thoroughly integrated throughout the city of Jakarta, in addition to reduce waste going to create clean environment and reduce pollution. The number of residents who participate and become a garbage bank customers in Rawa Badak Selatan RT 05 North Jakarta showed perseverance and thoroughness of citizens in helping to make the environment clean and healthy. This waste management been proven motivate other residents around to do the same so they can provide benefits both economically and help environmental preservation. However, community involvement in waste management needs to be improved, and should be done continuously, and need modern approach. Modern unorganic waste treatment is hinder by the availability of land and the high price of the machine. So it is not economical to be done independently. It is suggested that the Government to actively find solutions to both of these, such as grants. It is suggested for next researchers to conduct feasibility studies to recommend best scheme of the grant, including but not limited to equipment, and training.

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