Community Readiness on Non-Organic Waste Management of Hamlet 3, Kasomalang Kulon Village, Subang District, Indonesia

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Abstract

Waste management is a systematic, comprehensive and sustainable activity that includes the reduction and handling of waste. In Kasomalang Kulon Village precisely in Hamlet 3, waste management has not yet been carried out properly. Community education is conducted to gain more awareness of people in handling the waste properly. The purpose of this study is to identify non-organic waste that still has an economic value so that it can be recycled and reduce the amount of waste that enters the waste disposal site. The research also aims to know the readiness of the community in managing waste, and determine the processing needed. Prior to designing the management system, a sampling was conducted using sampling method based on SNI 19-3964- 1994 to identify quantity and type of wastes. The community readiness was investigated by distributing questionnaires following the community education. The survey shows that the solid waste generation is 0.193 kg/person/day for permanent houses and 0.182 kg/person/day for semi-permanent houses and the average weight of garbage generation per day is 68.80 kg. Non-organic waste data from Kasomalang Kulon Village which has an economic value of 32% of the total waste generation which is 3,761 L/d with potency of approximately IDR 425,000 per week. In general, the KAP survey shows that community has a high level of knowledge, positive attitudes and good behavior, which indicates the readiness of the community in managing non-organic waste.

Keywords: community education, non-organic waste, waste management

1. INTRODUCTION

The definition of waste according to Republic of Indonesian Law number 18 of 2008 is the residual daily activities of humans and/or natural processes. Waste is a consequence of life, which often and in many places has caused problems (Alfiah and Alviah, 2020). Along with the increase in the number of residents and their activities, the waste generation has naturally also increased. An increase in population means an increase in the amount or volume of waste generation, while an increase in the type of activity means more and more diverse types of waste generated (Ferronato et al, 2019). The amount or volume and type of waste that is allowed to accumulate is very dangerous for human life. Waste piles are not only aesthetically very unpleasant, but also require a small amount of land for their placement and can cause illness for humans and pollution for the environment (Yustiani et al. 2019a).

In Kasomalang Kulon Village precisely in Hamlet 3, good and proper waste management has not been done, with population growth and increased community needs that can cause increased generation of waste generated so that it will potentially lead to pollution and public unrest in the future due to not doing good waste management. Based on the head of the Kasomalang Kulon Village, the people also still do not understand about proper waste management so that there are still many people who burn their trash. Littering and burning rubbish can cause environmental pollution problems for example air pollution due to burning rubbish and contaminated ground water (Yustiani et al., 2019b). From the above background a problem, it can be drawn that a comprehensive and proper waste management system planning in accordance with the conditions of the community in Hamlet 3, Kasomalang Kulon Village, is needed. If the waste is managed well, the waste that has caused pollution can be useful and can open jobs for the surrounding community.

The purpose of this study is to identify the potential of non-organic waste that can be useful and has resale value. In addition, the community's readiness in managing waste is also investigated, as well as building planning for processing non-organic waste.

2. MATERIALS AND METHODS

2.1 Data Collecting

This data collection aims to complete the study needs in addition to the data obtained from the location survey that has been done before. Data collection includes primary data and secondary data. Primary data obtained directly from observations, calculations and analyzes conducted. Primary data collection is done by observing the condition of the planning area, questionnaires and interviews with parties involved in waste management in the planning area.

Primary data collected includes:

- Observe the cleanliness conditions of the planning area, the habits of the community in disposing of rubbish and the impact caused by the habits carried out.
- Direct observations of worship, collection.
- Measure the generation of waste using the sampling method.
- Distributing questionnaires to the community in the study area is carried out in order to obtain more accurate and objective data that supports the findings during the field observation process.

- Conduct interviews with government, community leaders, communities, and garbage transport operators to find out more deeply about all the information that has been and or is to be obtained.

Secondary data is data obtained from several literature and related agencies and authorities in the planning area. Secondary data collection is intended to obtain supporting data in conducting studies so as to facilitate the analysis. The secondary data include:

- General description of Kasomalang Kulon Village and Hamlet 3
- Total Population and Number of Households
- Number and type of houses per RW
- waste management structure

2.2 Waste Generation Measurment

Waste generation sampling is conducted at the waste source and at the temporary waste disposal site. The frequency of sampling was carried out for 8 days (SNI 19-3964-1994). The composition of waste really determines the handling system that can be carried out on waste. The composition determines the type and capacity of equipment, systems, and handling programs. Waste composition is every component of waste that forms a unit, in percentage (%). The composition of waste that will be examined in this sampling are plastic, paper, cardboard, styrofoam, tissue, glass bottles/ glass bottles, plastic bottles, tin bottles, sanitary napkins, diapers, and hazardous waste. This composition of non-organic waste is very common found from domestic sources (Wardiha et.al, 2013), (Zahra and Damanhuri, 2011), (Aprilia et.al, 2013).

Determination of the number of samples is by using the Solvin Formula (Sevilla et.al, 2007) using a 90% confidence level, then the error rate (error) is 10%. the minimum limit of samples that can meet the 10% margin of error requirement by entering the error margin into the Solvin formula.

Total population of Hamlet 3 of Kasonmalang Kulon Vilage is approximately 3146 with around 910 households. The number of sample was determined to be 95 households. The sample selection is done randomly, each member of the population has the same opportunity to become a sample.

2.3 Public Kap (Knowledge, Attitude, Practice) Method For Waste Management

The KAP method was chosen because the KAP method focuses specifically on people's attitudes of knowledge, and practices (behavior) towards waste management (Yustiani et al., 2019c). The method is commonly used in study involving the community (Laor et.al, 2018), (Barloa et.al, 2016), (Desa et.al, 2011).

- Knowledge: refers to people's understanding of waste management.
- Attitude: refers to the feelings and attitudes of the community towards waste management.
- Practice: refers to the way in which the community shows their knowledge and attitudes through the actions the community takes.

3. RESULTS AND DISCUSION

3.1 Data Processing

The sampling location was carried out in Hamlet 3 of Kasomalang Kulon Village with a sampling time of 8 consecutive days so that fluctuations in the amount of waste generated every day in a week can be known. Samples were chosen based on the type of house, which is divided into permanent houses and semi-permanent houses. From 95 households sampled, it was found that total residents were 360 persons (Table 1).

Table 1. Samples of Each House Type

House Type	Number of sample (person)	Waste Generated (kg/day)	Waste Generated (kg/person/day)
Permanent	302	58.27	0.193
Semi Permanent	58	10.53	0.182
Total	360	68.80	0.191

Table 1 shows that the generation of permanent house waste is 0.193 kg/person/day, which is heavier than the generation of semi-permanent house waste of 0.182 kg/person/day. It happens because the generation of permanent home waste is more diverse and more in quantity than semi-permanent houses. The amount of waste generation standard per person per day in Indonesia is 0.61 kg (Purwanta, 2009). Non-permanent house was not found at the location; therefore the sampling was taken only for permanent and semi-permanent houses. In average, waste generated from the community of Hamlet 3 of Kasonmalang Kulon is 0.191 kg/person/day.

3.2 Solid Waste Composition

The composition of waste at the source varies greatly. The composition of waste at the source is influenced by the way of life and economic conditions of the community, how to handle food, and the level of life and economic conditions of the community. Waste composition can be seen in the table 2.

Table 2. Waste Composition

No	Waste Type	Waste Type in Detail	Weight (Kg)	Percentage (%)
1		Food	159.84	29.4
2	Organic	Wood, twigs and leaves	46.27	8.5
3		Paper	58.51	10.8
4		Plastic	49.38	9.1
5	Non-Organic	Iron	48.67	9.0
6		Broken glass	15.27	2.8
7		Others	88.72	16.3
19		Battery	8.77	1.6
20		Lamp	6.86	1.3
21	Hazardous	Expired Medicine	0.2	0.0
22		Spray/aerosol	4.13	0.8
23		Sponge	0.26	0.0
24	Others	Styrofoam	3.54	0.7
25		Diaper	53.24	9.8
	Total		**543.66**	**100**

From the table above, it can be seen the characteristics of the generation of waste for 8 days in Hamlet 3 Kasomalang Village, Kulon Subang Regency. Non organic waste the percentage is 47.9% or 260.55 kg for 8 days.

3.3 KAP Level

Questionnaire data processing method used is data processing with KAP Survey (Knolewdge Attitude Practice) to obtain qualitative information about residents around the study site. This survey aims to measure the level of knowledge, attitudes, and practices / habits of residents in Hamlet 3 Kasomalang Kulon Village in waste management. KAP data processing is done by giving scoring using the Guttman and Lekers methods in each aspect, namely knowledge, attitudes and practices / habits.

Rating categories for knowledge based on Notoatmojo (2012):

- High, if the answer score is 76% - 100%
- Enough, if the answer score is 56% - 75%
- Low, if the answer score is 40% - 55%

For the assessment of attitude assessment criteria based on Azwar (2011):

- A positive attitude, if the total score $\geq$ 66.7%
- Negative attitude, if the total score <66.7%

For behavior:

- Good, if the total score is 66.3% - 100%
- Enough, if the total score is 33.3% - 66.2%
- Poor, if the total score is 0% - 33.2%

This KAP survey is also intended to determine the readiness of the community for non- organic waste management in Hamlet 3 of Kasomalang Kulon Village. The following are the results of the questionnaire assessment on knowledge, attitudes, and practices in the Table 3.

Table 3. KAP Result

	Knowledge	**Attitude**	**Practice**
Percentage	97	84.13	71.60
Category	High	Positive	Good

From the above table it can be concluded that the knowledge of the community in Hamlet 3 is fairly high about waste management, this is due to the good social factors of the Hamlet 3 community so information is easily spread. From the attitude aspect it is also Positive so that the attitude of the people of Hamlet 3 towards waste management. This positivity is very important to support the planning of non-organic waste management that will be planned. In the behavioral aspect of Hamlet 3 community has a good attitude towards the management of waste and rubbish, but the value obtained is 71.60% this is caused by the people who still have the behavior to burn their garbage even though they know of the dangers generated due to the absence of waste management or transportation.

3.4 Non-Organic Waste Management Planning

The weight of waste in Hamlet 3 Kasomalang Kulon Village is approximately 601.24 kg/day. From the survey, the weight of the non-organic waste to be managed is a reduction of the

total amount of garbage generated to the intermediate waste disposal. Waste types that can be traded in waste bank include paper, platic, iron and glass. By considering the percentage and waste generation per person per day, it can be calculated for paper, plastic, glass and iron are 64.93, 54.71, 16.83, and 54.11 kg/day, respectively.

3.5 Management And Treatment

Non-organic waste management and processing is by way of the management and processing of the collector system but there is also a waste bank which means that people who want to exchange waste that has a sale value can also be sold to the processing site, the way it works is by sorting non-organic waste then plastic chopped by chopper machines to be sold to receptors/ recycle industries and made into crafts of economical value.

Other non-organic waste such as coffee wrappers, noodle wrappers and others that have no sale value are made as handicrafts so they can have a use value/ sale value. Examples of craft in question are making tablecloths from coffee/ noodle wrappers, making a fitting flower from a straw and so on. For non-organic waste that cannot be sold and reused, such as plastic and other residual waste is immediately handed over to the intermediate waste disposal which will then be continued to the landfill. For non-organic waste that can be sold and has a sale value can be seen in the Table 4. Price of each type of waste was obtained from local waste collector.

Table 4. Economic Value of Waste

No.	Waste Type	Weight (Kg)	Price/Kg (IDR)	Value (IDR)
1	Paper	64.93	1500	97,395
2	Plastic	54.71	3000	164,130
3	Glass	16.83	500	8,415
4	Iron	54.11	700	37,877
	Total (IDR)			307,817

From the above table, the results obtained from the sale of non-organic waste have a sale value of IDR 307,817/ day in waste bank transaction. It can give approximately IDR 10,000 per household every month. Waste transportation is carried out by the public selling goods directly to the place of waste management and partly doing sorting from the generation of waste generated at the temporary disposal site.

4. CONCLUSION

From the results of the research that has been done it can be concluded that the amount of non-organic waste that can be reduced that has an economic value is 32% of the total waste generation. Total weight of non-organic waste generation is 601.24 kg/day. The potency of non-organic waste sale is IDR 307,817/ week in waste bank. The KAP survey shows that community has a high level of knowledge, positive attitudes and good behavior, which indicates the readiness of the community in managing non-organic waste

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