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Evaluation of Household Waste Management Infrastructure in Bumi Kodya Asri Lombok Environment

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ABSTRACT: The volume of waste arises is the main variable to determine infrastructure needs in waste management system planning. The infrastructure referred to in this study is temporary landfill (TPS) from the source of waste (household) before being dumped into landfill. The purpose of this research is to evaluate the capacity of tps in East Jempong, Mataram city to expedite the process of handling environmental waste served. Research methods include; the first to conduct a survey of waste generation based on SNI-19-3964-1994, the second to calculate and evaluate tps capacity based on the results of the survey of waste generation. From the results of the field condition study it is known that the emergence of household waste from the environment: Kodya Asri, West Jempong, East Jempong, Geguntur, Taman Indah, Citra Mutiara, and the image of residents served by TPS Jempong Timur is 6,183 kg / day or 41,907 liters / day equal to 41,9 m^3 / day. The result of the interview with tps guard that the schedule of garbage transport one rate per day and the measurement of TPS capacity is 32 m^3. So that from the existing TPS capacity does not adequately accommodate the volume of waste produced per day if the garbage transport schedule is only one rate per day. Tps capacity should be greater than the volume of waste produced or the schedule of transport (ritasi scheduled) two rates per day.

KEYWORDS: Capacity of tps; Infrastructure; Ritasi; Waste arises**.**

I. INTRODUCTION

[1]. Waste generation in urban settlements comes from households, stalls, public buildings, and home industries. Data generation, composition, and characteristics of waste are very supportive in compiling a waste management system in an area [2]; [3]. The preparation of a good and correct waste management system can improve the beauty, cleanliness, health, comfort, and environmental sustainability of an area. Even if waste management with the 3R concept can be implemented properly, it will provide added value economically. For example, plastic waste that can be recycled and organic waste that can be composted can be sold to increase income [4]; [5]; [6].

Waste generation data is the main variable/component in designing a waste management system to be able to determine the facilities and infrastructure needed [7]. In the concept of a waste generation production system, inputs / raw materials that will be processed in infrastructure (transportation equipment, containers / TPS, landfill, etc.) to produce waste handling outputs [8]. When viewed from input-process-output, infrastructure is a tool to process waste generation in an area.

When infrastructure planning is not prepared based on data on waste generation to be served and management is not carried out properly, it will cause various problems. Incomplete collection systems, lack of waste transportation, limited capacity of temporary shelters (TPS), and landfills (TPA) are typical problems covering technical, social and cultural aspects [9]. In addition to infrastructure, public knowledge and concern for sorting waste is very low due to the pattern of habits and behavior of people who are accustomed to throwing waste without paying attention to the composition of the waste. The condition of mixed waste makes it very difficult for the government and the cleaning office to carry out the recycling process. Many materials should be recyclable but in the end they are only stockpiled at TPS or TPA.

The paradigm of waste management in Indonesia has changed since the enactment of Law number 18 of 2008 concerning "Waste Management" and supported by Government Regulation number 81 of 2012 concerning

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"Management of Family Waste and Similar Waste of Family Waste" from the paradigm of collection-transport-disposal to management that relies on waste reduction and waste handling [4];[9]. To support this paradigm, the government invites all levels of Indonesian people, both the government, business actors and the wider community to carry out activities to limit waste generation, reuse waste and recycle or better known as Reduce, Reuse and Recyle (3R) in an effective, efficient, and programmatic way.

To maintain the quality and sustainability of the environment so that the welfare and quality of life of future generations are more guaranteed and competitive, the Mataram City Government has made breakthroughs through various programs, one of which is the "Environment with Zero Waste" (LISAN) program together with related agencies such as; The Public Works Office, the Environment Agency (BLH), and the Hygiene Office try to invite the community to play an active role in managing/handling waste problems. LISAN is a community-based waste management program towards strengthening community capacity building in the field of waste management through socialization, training and support facilities. From social engineering (social engineering) is carried out through waste barter, waste sodaqoh, craft waste raw materials. So that this social engineering can sensitize the community, provide economic value, reduce the volume of waste at the TPS, cut off the waste line .

Departing from this situation, there is finally a presumption / thought whether the TPS built has considered the generation of waste from the surrounding environment that will be accommodated or whether the transportation schedule from the TPS to the TPA is not carried out as planned. Based on the results of research by [4] on the study of waste generation in Seleparang sub-district, Mataram City, there is a significant difference between waste generation data from the Hygiene Office and direct survey results, namely cleaning office data of 212 m^3 / day while the results of research are 291 m^3 / day. There are 42% of existing waste that is not taken into account in the planning of municipal waste management facilities. For this reason, it is necessary to study further related to the generation of existing waste so that urban waste planning and management becomes more precise and better.

The following is an overview and condition of polling stations in Jempong Baru sub-district located in the East Jempong neighborhood as shown in figure 1. This polling station is the only polling station in Jempong Baru sub-district that serves 12 neighborhoods, 72 RTs, 5,725 households, and 17,034 people.

Figure 1. Portrait of the study site (doc. 2020)

II. METHOD

Scope of Study

This study was conducted in Jempong Baru sub-district, Sekarbela sub-district, Mataram city in 2020 to obtain related data; (1) generation of household waste, (2) the number and capacity of polling stations.

Tools used in the study

The tools used to obtain data in this study are plastic bags to hold garbage, scales to weigh garbage, boxes measuring 20 x 20 x 50 cm and meters to measure the volume of waste, and stationery.

Household waste generation study

The waste generation study was carried out based on SNI 19-3964-1994 concerning "Method of Taking and Measuring Waste Generation Examples". The stages are as follows [10] :

a.The number of manexsamples is calculated by the equation:

$$S = C_D \sqrt{P_s} \quad (1)$$

where,

S is the number of samples (man),

Cd is the coefficient of change,

Ps is the population (man).

c. The number of examples of waste generation from housing with economic levels is as follows:

Permanen = S1 x K

Semi permanen = S2 x K

Non permanen = S3 x K

(S1, S2, S3 are 10%, 40%, 50% respectively).

d. Determination of waste generation

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The determination of the total waste generation can be determined by the following equation:

QT = Qd (3)

Qd= BS (qd) x total family (kk) (4)

where,

QT, Total waste generation

Qd, Household waste

$$\text{BS family (qd)} = \frac{\left(\frac{Bs1}{h} + \frac{Bs2}{h} + \cdots + \frac{Bs_{ni}}{h}\right)}{ni} \quad (5)$$

where,

BS, unit weight of waste generation (kg/kk/h);

BSni, weight of waste sample up to the th (kg);

H, the number of days of garbage pickup;

Ni, the number of waste samples (KK or units).

TPS capacity assessment

The TPS study is adjusted to the Minister of Public Works of the Republic of Indonesia No. 03/PRT/M/2013: calculating the waste management infrastructure needs plan as follows [7]:

a. Collection/transport equipment requirements:

$$\text{total equipment} = \frac{\text{vol .timbulan sampah}}{\text{kapasitas alat x fp x rt}} \quad (6)$$

b. TPS equipment:

$$\text{TPS total} = \frac{\text{vol .timbulan sampah}}{\text{vol .kontainer}} \quad (7)$$

III. RESULTS AND DISCUSSION

Garbage generation calculation

Based on data from the head of family (KK) and the number of residents in Jempong Baru sub-district which is used as the basis for determining waste generation, the total waste generation (QT) equal to household waste (Qd) is 6,183 kg / day or 41,907 liters / day. The results are based on the number of 65 soul samples, 15 family head samples, and sampling of 2 permanent houses, 6 semi-permanent houses, 7 non-permanent houses for 8 consecutive days. The total waste generation consists of household organic waste 3,779 kg / day, plastic waste 572.5 kg / day, and other non-organic waste 1,775 kg / day. The complete measurement data as shown in tables 1-3.

Table 1. Number of samples and measurementresults of waste weight and volume

Source of waste	Total weight of waste sample(kg/8day)	Average weight of waste(kg/day)	Volume of waste (liter/8day)	Average volume of waste(liter/day)
15 households	128,98	16,12	878,12	109,77

Table 2. Number of garbage samples and total weight of garbage samples based on their composition.

No.	Source of waste	Organic (kg/kk/dy)	Plastic waste (kg/kk/dy)	Non organic (kg/kk/dy)
1	family	0,66	0,1	0,31

Table 3. The average weight of waste generation per day is based on composition.

No.	Source of waste	Number of sample(ni)	Organic (kg/8day)	Plastic (kg/8day)	Non Organic (others plastic)(kg/8day)
1	family	15	78,9	12,38	37,7

TPS capacity calculation

Based on research, observations, measurements in the field, it is known that the garbage shelter at the TPS has a capacity of 32 m^3, the means of transporting waste from the TPS to the landfill uses a dump truck with a capacity of 6 m^3 with a rhythm 1 time a day. So that with the volume of waste generation in Jempong Baru sub-district of 41,907 m^3 / day, it can be determined the needs of transportation / collection equipment and TPS needs using equations 10 and 11 as follows:

a. The need for a collection device with a wholesale of 1.5 m^3 ritasi 1 time a day is 23.3 rounded up to 23 units.
b. The need for transportation equipment with a dump truck capacity of 6 m^3 with a rhythm 1 time a day is 5.8 rounded up to 6 units of dump trucks.
c. The need for TPS in accordance with the existing capacity of 32 m^3 is 1.31 shelter units.

The calculation of the need for transportation equipment needed to handle waste at the Jempong Baru TPS is 6 units of dump trucks. Based on field data, the fleet allocated for TPS is only one unit of dump truck with a rhythm 1 time a day, so it is natural that the condition of the TPS garbage is scattered outside the TPS. Likewise, the existing TPS

capacity of 32 m^3 is not enough to accommodate household waste production of 41.9 m^3 / day. From the results of this study, it shows that waste management planning in the city of Mataram, especially in Jempong Baru sub-district, has not been well planned and takes into account the generation of waste produced.

To respond to this condition there are several alternatives that can still be done, including; First, to overcome the shortage of transportation fleets, it can be done by increasing the transportation rhythm (RT) to 6 ritasi / day with one fleet. Second, maximize the 3R concept both at polling stations and in each household. So that the waste that will be accommodated at the TPS is only other non-organic waste while organic waste is composted and plastic waste is sold for recycling [4]; [9]; [10]. From organic waste 3,779 kg / day, plastic waste 572.5 kg / day, and other non-organic waste 1,775 kg / day so that if this alternative can be implemented, the waste disposed of at the TPS / TPA is only 1,775 kg / day.

IV. CONCLUSION

From the results of the study, it can be concluded that the generation of household waste in Jempong Baru village is 6,183 kg / day or 41,907 liters / day equal to 41.9 m^3 / day. The results of the evaluation of TPS capacity are not enough to accommodate the volume of waste every day which only has a capacity of 32 m^3. It isrecommended to rearrange waste management infrastructure needs related to transportation equipment needs, daily ritation, and TPS volume.

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