

An analysis of household waste generation in the Fomento 2 Public Housing Complex, Comoro Village, Dili, Timor Leste

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Abstract. Garbage can be defined as the residual material by humans in their daily activities. It is inevitable that the generation of waste will continue to increase in line with the continued interaction of humans in the real world. The purpose of this study is to analyze the generation of waste in the Fomento 2 housing complex and to identify the factors that influence it. The method applied in this scientific analysis is descriptive quantitative. There are several scientific articles that are used as reading material to support the study and strengthen data analyzes. The result of this study demonstrated that the quantity of waste generated was 177.1 kg, then sorted according to type, and found a total reduction of 93.2 kg, with an average reduction of up to 53.09%. The data demonstrate that the generation of waste in the Fomento 2 housing complex is a significant concern. The lack of access to waste sorting containers and the lack of community skills in processing waste properly and correctly. And it's require urgent attention to ensure the maintenance of a healthy life and a good environmental quality.

1 Introduction

Garbage is a substance or object left that is used by humans from daily life activities. As long as humans are still alive and interacting in real life, the productivity of waste will increase [1]. In the capital city of Dili, from time to time the growth and development of urbanization has become one of the factors for increasing waste generation. In addition to urbanization, skills in managing waste also affect waste generation. The reality of increasing waste generation indicates a serious problem in human life and the environment. The productivity of waste in the capital Dili with the lack of subscribers can have a negative impact on public health and reduce the quality of the environment.

One clear picture of the increasing waste generation in the capital Dili is the heavy rain that causes flooding. The phenomenon of flooding that occurred on April 4, 2021 [2] and

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December 8 [3] with the overflow of water to the surface was caused by piles of garbage that covered the water flow path or drainage. This situation also occurred in the Fomento 2 housing complex, Comoro village. The layout of the housing concept has changed since the conflict in 1999, making it difficult for the community to manage waste properly and ideally. The habit of indiscriminate garbage disposal, and the lack of skills in sorting waste increase the generation of waste in the complex.

Considering this phenomenon, the author tries to carry out a scientific analysis using quantitative descriptive methods which are strengthened by several scientific articles as secondary sources. The sampling of this research is located in the capital city of Dili using purposive sampling technique.

2 Materials And Methods

2.1 Study Area

The Fomento 2 housing complex is one of the 14 villages in the Comoro sub-district, Dom Aleixo sub-district, Dili Municipality, Timor Leste. Most of the residents living in the complex come from outside the Municipality of Dili. Some came from Manatuto District, Liquiça District, Ermera District, and Oe-Cusse District [4]. Even though they come from areas outside the Municipality of Dili, they have been living in the Fomento 2 complex for a long time. The residents of the Fomento 2 complex are classified into three social background classifications, namely entrepreneur-traders, civil servants, manual laborers, and some students.

The total population of the Fomento 2 housing complex is 1,283 people with 257 families [5]. Of the total heads of households, 50 families were taken as samples in the study. 25 families as research samples to answer the questionnaire. 10 families were invited to sort their waste, in order to find the total waste generation for one week. 15 households were interviewed about the waste management system and operational techniques that have been operating so far.

Table 1. Number of Population in Research Sample.

No	Total of Household	Total of People		
1.	50	Male	Female	Total
		110	125	235

2.2 Study Design

The design of this research is descriptive research with a quantitative approach. Descriptive method is a method of examining the status of human groups, an object, a condition, a thought or class of event in the present with the aim of making a systematic, factual and actual description, description or painting of facts, characteristics and the relationship between the phenomena investigated [6].

There are two data that form the basis of this research, namely primary data which includes non-participatory field observations and the distribution of questionnaires. The purpose of using these two data sources is to identify and measure community participation in managing household waste. Through the data collection method carried out by distributing questionnaires and observations, it is hoped that the pattern of waste management that is being applied by residents in the Fomento 2 housing complex will be found. As for the

activity of collecting data on waste generation using the method of taking and measuring waste generation and composition samples as written in SNI 19-3964-1995. The tools used in the measurement and sampling activity of waste generation include digital scales, meters, office stationery, plastic bags, 40 L measuring containers, gloves and masks. Secondary data which includes several scientific articles relevant to an analytical study on waste generation in the capital city of Dili.

The variables in this study include the independent variable, namely the waste management system and the dependent variable, namely the observation of waste generation. The number of samples for filling out the questionnaire was 50 families. The data obtained from the questionnaire results were determined in three measurement categories based on the answers given.

Table 2. Category measurement of the percentage of community involvement in household waste management.

Answer	Percentage	Criteria
Yes	66-100	Very Good
Neutral	36-65	Good
No	0.01-35	Not Good

3 Result and Discussion

3.1 Waste Generation and Type of Waste in Fomento 2 housing complex

Fomento 2 Housing Complex until now there has been no waste selection activity. Most of the population still collects all types of waste in one container such as used sacks, without sorting. The recapitulation of the questionnaires distributed explains that 99% of the population in the study area, the Fomento 2 housing complex, has never done waste sorting (Fig. 1). The factors that influence the lack of waste sorting activities in the Fomento 2 housing complex are as follows: (i) there has been no socialization regarding proper waste management (ii) the tendency to only expect the government to prepare waste containers according to their type (Fig. 1). This phenomenon indicates that the community has not prioritized waste management.

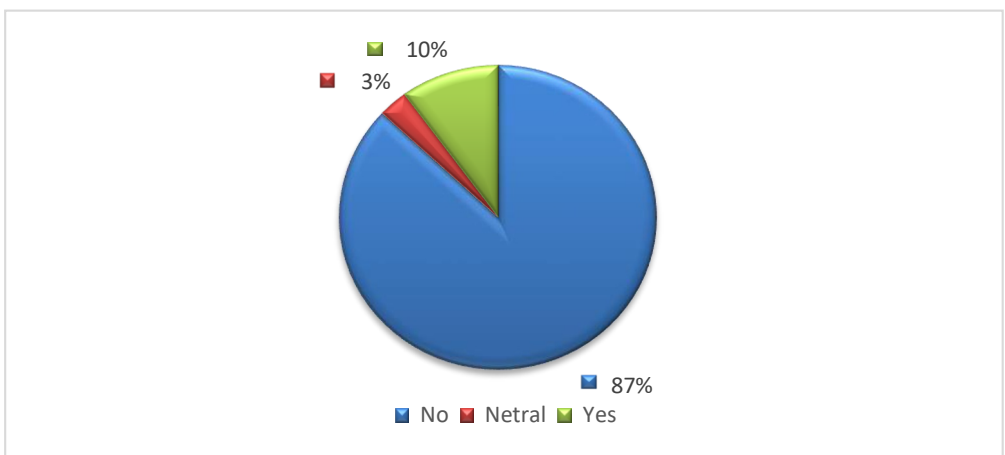


Fig. 1. The rate of community participation in sorting waste.

From the facts above, one effort was then carried out to invite residents in the research area to carry out the process of measuring waste generation. The generation measurement process runs for one week. From the process of measuring waste generation, the following results were found:

Table 3. The process of measuring waste generation.

Day	Garbage Generation before Sorting (kg/hr)	Garbage Generation after Sorting (kg/hr)	Total waste reduction	% Waste Reduction
Monday	19.8	9.4	10.4	52.53%
Tuesday	24.4	13.8	10.6	43.44%
Wednesday	30.3	12.6	17.7	58.42%
Thursday	26.4	10.6	15.8	59.85%
Friday	28.8	16.6	12.2	42.36%
Saturday	18.6	6.5	12.1	65.05%
Sunday	28.8	14.4	14.4	50.00%
Total	177.1	83.9	93.2	53.09%

Based on the waste generation data above, we find two conditions of a heavy load of waste generation in the Fomento 2 housing complex. First, a heavy burden of waste generation prior to adequate sorting or management activities. The second is the heavy burden of waste generation after adequate sorting or management activities are carried out. From these two conditions, a significant reduction in waste generation was found; 93.2 kg/one week or an average of 53.09% for one week.

From this phenomenon or research result, it can be concluded that the problem of the management system greatly affects the productivity of waste generation in the Fomento 2 housing complex. As additional material and basis to strengthens this argument, is the recap of the result of the questionnaire in order to determine the public's understanding of good, correct and efficient waste management. The system is oriented towards minimizing waste generation in the capital city of Dili, especially in the Fomento 2 housing complex.

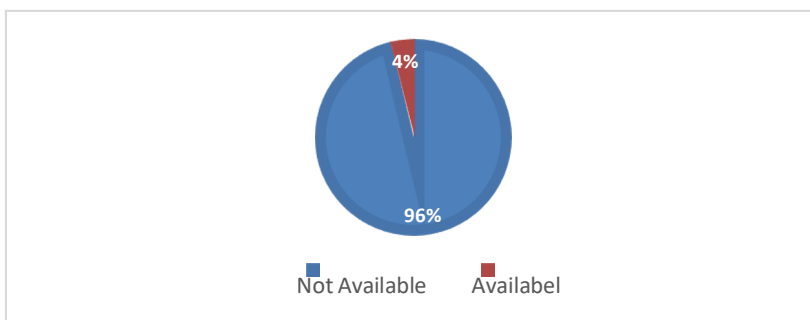


Fig. 2. Availability of waste sorting sites in the research area.

Based on Fig. 1 and Fig. 2, we can conclude that the phenomenon of waste generation that occurs in the capital city of Dili, especially in the Fomento 2 housing complex is strongly influenced by the skills of the community in managing waste. The unavailability of containers to sort waste according to type is a factor in waste generation.

Lack of understanding of the ideal waste management system can lead to increased waste generation. From the lack of understanding, it has an impact on the attitude of not providing a proper sorting place or container to sort waste according to its type.

3.2 Solid Waste Management di Fomento 2 housing complex

In general, the waste management system in Timor Leste is technically, regulatory and institutionally inadequate [7]. As in a report from the Asian Development Bank, it is explained that Timor Leste, especially the Municipality of Dili, still uses the classic governance, namely collecting, transporting and disposing. In fact, the landfill or final processing for waste is still open dumping [8]. The Government of Timor Leste has disbursed substantial funds to several relevant ministries (Ministry of Home Affairs, Ministry of Public Works, State Secretariat of the Environment, and Ministry of Culture and Trade) for waste management. The budget for waste management annually reaches \$700,000.00 to \$800,000.00 US Dollar [9]. However, until now the waste management system in Dili Municipality is still relatively poor.

Based on field observation data in the research area, it was found that the practice of indiscriminate waste disposal. We often find local residents throwing garbage in the wrong place (see Fig. 3). In addition to this phenomenon, waste disposal is not previously sorted according to the type of waste (Fig. 2). In addition to the budget implementation process that is not right on target, regulatory aspects are still a big obstacle to managing waste management.



Fig. 3. One of the waste disposal activities is not in place.

From the results of the questionnaire recapitulation regarding the implementation and government sanctions regarding waste management, it is illustrated how weak the regulations in the waste management process are (Fig. 4). People who dispose of their waste improperly, and without segregation clearly do not feel burdened both morally and financially. This fact was also found in the Fomento 2 housing complex. The residents in the research area were not familiar with proper and efficient waste management. They only know and understand how to collect, transport, and then dispose of them in temporary garbage dumps. Even worse, some people burn it.



Fig. 4. Up-to-date waste regulation from the government so far.

4 Conclusion

The phenomenon of waste generation is a serious problem in human life and environmental degradation. Human health is threatened by increased waste productivity. Through the analysis in this study, the authors realized that the biggest factor in productivity is the lack of understanding in sorting waste. For this reason, the right step that needs to be prioritized in efforts to handle waste is to disseminate information about proper and ideal waste sorting. After the socialization, a container and a sorting place are provided according to its type. However, it is also necessary to have a responsible party present, in the case of a village head or complex, to unify and disaggregate the process and dynamics. Through monitoring and evaluation, we find deficiencies to be corrected, and appreciate the good steps that have been taken for a good environmental quality.

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