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Comparative study of community treatment of household waste in Baubau City

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Abstract

Background: Bau-Bau City produces 80-100 tons of waste per day. The current waste problem has become a matter that requires special attention because waste that is left alone will have a negative impact on the environment. The above conditions are the basis for researchers to conduct research aimed at finding out the condition of waste in the household environment, the treatment of household waste, and waste sorting before disposal, as well as comparing the treatment of waste in the current research and previous research with the aim of finding out whether there has been a change in the treatment of household waste over the past 2 years

Objective: This study aims to determine the state of waste in the household environment, treatment of household waste, sorting of waste before disposal, and to compare the treatment of waste in current research and previous studies with the aim of knowing whether there has been a change in the treatment of household waste during this period two years running.

Methods: This type of research is a quantitative descriptive study with an observational approach. This research was conducted in all villages/kelurahan in Baubau City in 2021.

Results: it shows that there is still garbage scattered or piled up around the house environment, the presence of animals and disease vectors are also still found, causing a foul smell, and some are blocking the drainage. In general, there is an improvement in the treatment of household waste by the community in Baubau City compared to the previous year. Most of the people of Baubau City do not carry out the process of sorting waste by type.

Conclusion: The treatment of household waste by the community in Baubau City in general has improved for the better

Keywords: Study; Community Treatment; Household Waste; Indonesia

1. Introduction

Until now, the problem of waste has become something that requires special attention because waste that is left alone can have a negative impact on the environment and society. Waste is one of the national and even world problems because until now it has not been resolved. Waste is a problem that needs to be considered, besides the smell that disturbs the environment; it can also be dangerous to health because waste is a cause of disease [1].

The Earth we live on is estimated to be filled with 1.3 billion tons of plastic by 2040, and will fill both land and oceans if nothing is done to prevent it from happening. This figure is derived from a global model of the scale of the plastic problem over the next 20 years [2].

Indonesia is one of the developing countries producing waste reaching 64 million tons per year, even in 2019 it is estimated to reach 66-67 million tons per year. The types of waste produced are dominated by organic waste reaching

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60% and plastic waste reaching 15% [3]. In 2020, Indonesia produced 67.8 million tons of waste obtained from data from the Ministry of Environment and Forestry (KLHK). Of this amount, most of it was generated by household activities at 37.3%. When viewed from the type, 39.8% of the waste was in the form of food waste and followed by plastic-like waste at 17%. The waste that was successfully managed by the government was 55.87%, meaning that there was still 44.13% of unmanaged waste [4]. Keadaan di atas membutuhkan peran lebih aktif dari masyarakat terkait pengelolaan sampah khususnya sampah rumah tangga sehingga dapat membantu pemerintah mengurangi volume sampah.

Baubau City is one of the municipalities in Southeast Sulawesi Province. Acting Head of the Bau-Bau City Environmental Service Sumarti Lanae said that Bau-Bau City produces 80-100 tons of waste per day, this volume of waste can increase due to traders from outside the area entering Baubau [5].

The above conditions are the basis for researchers to conduct research aimed at finding out the condition of waste in the household environment, the treatment of household waste, and waste sorting before disposal, as well as comparing the treatment of waste in the current research and previous research with the aim of finding out whether there has been a change in the treatment of household waste over the past 2 years.

The study outputs provide practical alternatives for cities to determine compliance with regulations related to waste management, update understanding of waste accumulation patterns, and can be implemented as a decision support tool[6].

2. Material and methods

This type of research is quantitative descriptive research with an observational approach. This research was conducted in all villages/sub-districts in Baubau City in 2021, totaling 43 villages/sub-districts. Each village/sub-district is represented by 40 houses where the respondents are housewives aged 25-65 years, so that a sample of 1,720 respondents and observation targets was obtained. The sampling method for each village/sub-district was carried out by simple random sampling. Data recapitulation and analysis used the SPSS version 20.2 application. Assessment variables are limited to the condition of waste around the house, treatment of household waste, and whether waste is sorted before being disposed of in a temporary landfill. This research instrument uses a questionnaire and observation sheet.

3. Results and discussion

3.1. State of Garbage around the House

Tabel 1 Condition of Garbage Around Respondents' Houses in Baubau City in 2021

Parameter	Yes		No	
	n	%	n	%
Garbage is scattered or piled up around the environment	294	17.09	1,426	82.91
Many flies around the pile of garbage	156	9.07	1,564	90.93
Many rats roaming around	354	20.58	1,366	79.42
There are many mosquitoes around the pile of garbage	648	37.67	1,072	62.33
Many cats and dogs come to the pile of garbage	164	9.53	1,556	90.47
A disturbing stench	71	4.13	1,649	95.87
Clogging the drainage	19	1.10	1,701	98.90
There are children playing around it	27	1.57	1,693	98.43

Based on the table above, the condition of garbage around houses in Baubau City shows that there is still garbage scattered or piled up around the house environment, the presence of animals and disease vectors is still found, causing a bad smell, and some are clogging the drainage, but the number is not much. Most of the houses in Baubau City are free from garbage.

3.2. Treatment of Household Waste

The waste produced by each household in Baubau City is treated in various ways, starting from being collected by informal collectors who will later recycle it, to being dumped in empty land around the houses. The treatment of this waste is more detailed as in the following table.:

Table 2 Treatment of Household Waste in Baubau City in 2021

Treatment of Household Waste	n	%
Collected by informal collectors who recycle	11	0.64
Collected and disposed of in Temporary Waste Disposal Sites	1,202	69.88
Burned	349	20.29
Thrown into a hole and covered with soil	4	0.23
Thrown into a hole but not covered with soil	9	0.52
Thrown into a river/stream/sea/lake	30	1.74
Left to rot	3	0.17
Thrown into vacant land/gardens/forests and left to rot	54	3.14
Others	58	3.37
Total	1,720	100.00

Based on the table above, out of 1,720 respondents, most of the people throw their waste directly to the Temporary Disposal Site (TPS), which is 1,202 (69.88%) respondents. While the smallest is the community that lets the waste rot without being thrown away to the TPS, which is 3 (0.17%) respondents.

3.3. Comparison of Household Waste Treatment with the Previous 4 Years

The variable of waste treatment by the Baubau City community is compared with the results of previous research in 2019 by Jumakil, et.al. [7] Obtained comparative data as in the following table:

Table 3 Comparison of Household Waste Treatment in Baubau City in 2019 and 2021

Treatment of Household Waste	% Years		% Change	Caption
	2019	2021		
Collected by informal collectors who recycle	0,7	0,64	-0,06	Decrease
Collected and disposed of in Temporary Waste Disposal Sites	53,8	69,88	16,06	Getting better
Burned	32,9	20,29	-12,61	Getting better
Thrown into a hole and covered with soil	0,5	0,23	-0,27	Getting better
Thrown into a hole but not covered with soil	0,8	0,52	-0,28	Getting better
Thrown into a river/stream/sea/lake	5,9	1,74	-4,16	Getting better
Left to rot	0,2	0,17	-0,03	Getting better
Thrown into vacant land/gardens/forests and left to rot	5,2	3,14	-2,06	Getting better

Based on the data in the table above, the treatment of household waste by the community in Baubau City has generally improved for the better. A greater change is seen in waste disposal, where people who throw waste to TPS have increased. One of the bad treatments of waste by burning it around the house has also decreased. The reduction reached -12.61%, meaning that the volume of waste burned has decreased.

The increasing human needs will force humans to carry out the process of getting used to and surviving, when humans carry out new habits that are carried out to survive. In contrast to what is happening today, the process of urbanization or migration can be one of the problems related to population. The increase in population will certainly cause changes in patterns and lifestyles by humans, as a result the amount of waste will increase [8].

The waste produced by household activities is certainly very diverse, ranging from wet waste to dry waste. This waste needs special handling before being disposed of in a temporary waste bin to reduce the volume of waste that increases every year so that it can burden the environment. In Baubau City, most of the waste produced from household activities is disposed of in a Temporary Waste Disposal Site. This is good because it will reduce the amount of scattered waste and cause negative impacts such as odor and aesthetics. However, if viewed from the negative side, it will certainly add to the pile of waste at the Final Disposal Site (TPA).

The habit of people burning garbage directly has an impact that is not very visible, but if studied more deeply, the negative impacts will be found. One source of regional air pollution that is often overlooked is garbage burning. This is mostly related to many small, open, uncontrolled fires that burn a variety of fuels, making it difficult to measure activity and emissions. Waste burning emissions can increase PM2.5 concentrations by almost 30%, and can result in many premature deaths from chronic obstructive pulmonary disease [9].

Another habit of the community related to waste management is to bury waste in the ground. Waste will have a negative impact on the soil. Some metals in the soil such as N, P, K, Ca, Mg are recorded higher due to the disposal of household and agricultural waste. The high nutrient content at the disposal site, especially organic carbon and exchangeable bases, significantly impacts the soil bulk density, porosity and nutrient availability at the disposal site [10].

Other waste treatment that can have a negative impact is by throwing waste into rivers. Waste that cannot be processed by nature, for example plastic. Plastic waste in the water system is a major challenge for our ecosystem, because it is very persistent in the environment. Apart from the importance of reducing the amount of plastic entering the ocean, cleaning rivers from debris is important for social issues, such as flood risk. The accumulation of plastic waste in trash causes a rise in water levels upstream and can increase the risk of urban flooding [11]. The community should be involved in the waste management process, not just by throwing the waste in its place, but also in the sorting process, or the waste recycling process which of course can still be made into valuable items. The city government can contribute in this regard.

Municipalities will play a key role in waste management. Two municipal policy instruments, namely weight-based waste tariffs and special systems for food waste collection, reduce the volumes collected from different types of waste. A separate food waste collection system is more effective overall than imposing weight-based waste tariffs in terms of not only reducing the amount of waste destined for incineration, but also increasing material recycling and biological recovery, despite the fact that the direct incentive effects of the two systems should be similar. Separate food waste collection is associated with increased recycling of not only food waste but also other waste. Introducing separate food waste collection indirectly signals to households that recycling is important and desirable, and our results suggest that this signaling effect may be as important as the direct incentive effect [12].

Mandatory policies taken by the government in addressing waste problems have a positive effect on residents' attitudes and subjective norms towards waste sorting. Through the mediation of attitudes and subjective norms, mandatory policies positively influence residents' willingness to sort waste, and the new ecological paradigm moderates the above effects. For residents with a higher ecological paradigm, the positive effect of mandatory policies on attitudes and subjective norms is stronger, and the mediation effect of attitudes and subjective norms is also stronger [13].

The Baubau City Government certainly does not remain silent in dealing with this waste problem. Waste-related programs have been encouraged, starting from appeals to the community to providing equipment related to waste management in Baubau City. In order to increase participation in the cleanliness movement throughout the city of Baubau, the Baubau City Government appeals to collect waste in all corners of the city. Then this waste is collected at the GARBAGE BANK to become useful items and can be reused through a waste reduction program. So that Baubau City can be achieved as a city free of waste [14]. This program showed good results, and had a mandatory policy impact on residents' willingness to sort household waste [13]. Based on the research results, many improvements and a decrease in the number of bad treatments by the community towards waste were found. Bad treatments by the community such as burning waste, waste that is thrown into holes and covered with soil, waste that is thrown into rivers/streams/seas/lakes, waste that is left to rot, and waste that is thrown into empty land/gardens/forests and left to rot. All of these bad treatments decreased in number in 2021 compared to 2019. The research data shows a good sign of the success of the program that has been initiated by the Baubau City government.

4. Conclusion

Most of the houses in Baubau City are free from garbage because the garbage is disposed of at the TPS. However, there is still a small portion of the community who treats garbage in a way that can have a negative impact on both the environment and the surrounding community. Most people also do not carry out the process of sorting garbage based on its type before being disposed of at the TPS. The treatment of household waste by the community in Baubau City in general has improved to be better compared to the previous year

Compliance with ethical standards

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Disclosure of conflict of interest

All authors in the making of this scientific article have no conflict of interest.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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