



Community Participation in Managing Waste and Waste Reduction Models in Baumata and Penfui Housing

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Abstract: The aim of this study is to analyze the role and society in managing waste and reducing waste from households. This research is descriptive, describing the role and society in the management of household garbage, and further treating the role of the community in order to obtain the appropriate methods in reducing household waste. The subject of the study is a family member who has grown up one in each household of houses built by developers in the district of Naimata and Penfui of 72 houses. Role data collection and society, waste management, utilization and waste reduction by interviewing and observing, monthly waste data measured volume of waste referring to SNI 19-3964-1994 (2). The role as well as the society in the management of garbage which includes the category both 28% and not good 72%, the category of waste which includes 21% and is not good 79%, the society that exploits the waste 24% and does not exploit the waste 76%, which reduces the waste 22% and which does not reduce the waste 77%. The monthly amount of organic waste is 1 litre/day/house, and the monthly volume is 4 litres/house/day. From the results of FGD obtained waste management method is organic waste processed into compost, waste that has economic value given to the rulers and recycle. Results of crosstab roles as well as societies with waste management, waste utilization and waste reduction there is a correlation of roles and society in garbage management. The role as well as the society in managing garbage is still low, this affects the hygiene of the environment in which the waste is not properly managed can become a pathogen and become a source of infectious diseases and pollution to the environment.

Keywords: Community Participation; Managing Waste; Waste Reduction.

Introduction

Waste production in Kupang City increases every year, starting in 2020 waste production is 214 tons/day, in 2021 waste production is 218 tons/day, so waste management is required to be balanced with good handling (Nizetić et al., 2019; Viotti et al., 2020), otherwise it will become a problem for city cleanliness and environmental health. Efforts are made to raise awareness in handling environmental problems, especially waste and to create a quality residential environment that is clean and environmentally friendly by reducing the volume of waste from the source through selection, or processing with simple technology

such as composting on a household scale (JeyaSundar et al., 2020; Mostaghimi & Behnamian, 2023).

The results of observations in the field showed that poor waste management was visible along the roads, lots of piles of rubbish and rubbish were found scattered everywhere. Garbage is still piled up and scattered, especially in market areas, residential areas, public facilities and public roads. More and more residential housing is being built by developers in Kupang City, some land areas are 90 meters, 100 meters and some are 120 meters. There are no rubbish dumps in the Baumata and Penfui sub-districts so that the rubbish produced by residential communities is dumped in illegal places which can give the impression of being dirty, smelly, nesting places for vectors and disease transmitters.

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Garbage that is not managed properly will become a breeding ground for disease-transmitting vectors such as flies, rats, cockroaches, mosquitoes and other animals (Sayrani & Tamunu, 2020).

One way to deal with waste in housing is that the community can manage waste and reduce the waste produced by knowing the type of waste (Pardini et al., 2020; Zorpas, 2020), waste composition and characteristics of waste as well as the community's role in managing waste (Letcher & Vallero, 2019). The aim of this research is to analyze the role of the community in managing waste and reducing household waste using a survey method by collecting data through interviews and measuring the volume of waste generation and efforts to reduce waste. From collecting data, community participation is socialized to the community, sub-district officials and community leaders, problems obtained from the data collected will be discussed on how to solve problems using the FGD method, waste handling methods are implemented in accordance with the results of the FGD (Shinta, 2019). In the second year, the waste handling method desired by the community was through FGD with the aim of increasing community participation and reducing waste from households. In this way, the appropriate waste management model can be identified in the Naimata and Penfui housing complexes. Waste generated from residential areas can be handled so that the environment is clean, the environment is healthy, the community is also healthy and operational costs for city waste management can be saved.

Method

This research is descriptive in nature, namely describing the role of the community in managing household waste in terms of containing household waste (Zainal et al., 2021), utilization of waste, waste reduction, then treatment is carried out to increase community participation so that appropriate methods are obtained in reducing household waste. The research subjects were adult household members, one per household from 72 houses built by developers in Naimata and Penfui sub-districts. Collecting data on community participation, waste management, waste utilization and reduction by conducting interviews and observations, waste generation data was carried out by measuring the volume of waste generation referring to SNI 19-3964-1994.

Result and Discussion

Result

The results of research on community participation in managing household waste in residential areas in Naimata and Penfui Subdistricts are as follows.

Univariate Analysis

Community participation

Community participation is the participation of all community members in solving a community problem (Knickmeyer, 2020). Community participation in the health sector means the participation of all community members in solving every problem. In this case, the community itself is the one who actively thinks about, plans, implements and evaluates its public health programs (Martinawati et al., 2016). The role of the community in solving household waste problems is as shown in Table 1

Table 1. Distribution of Community Participation in Waste Management

Category	Frequency	Percentage (%)
Good	20	28
Not good	52	72
Total	72	100

Table 1 shows the role of the community in managing household waste which is in the good category at 28% and in the not good category at 72%.

Household Waste Management

Community participation in managing waste starts from waste containerization and waste disposal to waste disposal sites as in Table 2.

Table 2. Household Waste Container.

Category	Amount	Percentage (%)
Good	15	21
Not good	57	79
Total	72	100

Table 2 shows the community's participation in waste storage which is in the good category 21% and 79% not good.

Utilization of household waste

There is still waste generated from households that can be utilized as shown in table 4 below:

Table 3. Utilization of Household Waste

Variable	Amount	Percentage (%)
Utilized	14	24
Not utilized	58	76
Total	72	100

Table 3 shows that community participation in utilizing household waste is the highest, namely people who do not use household waste as much as 76% and people who use household waste as much as 24%.

Reduction of Household Waste

Reducing waste from households by reducing waste such as carrying shopping baskets to the market, carrying

shopping bags to the mall, carrying drinking bottles when traveling and so on, can be seen in Table 4.

Table 4. Reducing Household Waste

Categories	Frequency	Percentage (%)
Reducing waste	16	22
Doesn't reduce waste	56	77
Amount	72	100

Table 4 shows that community participation in reducing waste is 22% and 77% of people who do not reduce waste.

Volume of household waste generation

The volume of household waste generated every day in housing is as shown in Table 5.

Table 5. Generation of organic and inorganic waste

Waste Composition	Waste volume/day (ltr)	Waste volume/house/day (ltr)
Organic	72	1
An organic	239	4

Table 5 shows that the generation of organic waste is 1 liter/house/day and inorganic waste is 4 liters/person/day.

Waste management methods according to agreement through FGD

Household waste management data was disseminated to the community, community leaders and village officials, and agreement was obtained through FGD that the waste management method was as shown in table 6.

Table 6. Waste management methods agreed upon through FGD

Description	Method	Place	Follow up plan
Organic trash	Processed into compost using a composter	In each other's homes	Composting Training
Waste that has economic value	Each family collects it and gives it to scavengers	Hang each one in front of the fence	1. A waste care organization is formed 2. Collaboration with scavengers.
Inorganic waste	Recycling	Group	Training in making handicrafts

Table 7. Cross tabulation of community participation in waste management and containerization household

Variable	Category	Waste management		
		Not good	Good	Total
Community participation	Not good	49	3	52
	Good	8	12	20
Total		57	15	72

Crosstab Analysis

Cross tabulation between community participation in waste management, waste utilization, household waste reduction is as follows Cross tabulation between

community participation and household waste management such as in Table 7.

Community participation in managing waste was not good as many as 52 respondents, 49 respondents had bad waste management and 3 respondents were good. Meanwhile, there were 20 respondents who had good community participation, 12 respondents had good waste containerization and 8 respondents who did not have good waste containerization.

Cross tabulation between community participation and waste utilization

Cross tabulation between community participation and household waste utilization is as in Table 8.

Table 8. Cross Tabulation of Community Participation in Waste Utilization

Community participation	Waste Utilization		Amount
	Not taking advantage	Utilise	
Not good	47	5	52
Good	11	9	20
Amount	58	14	72

In table 8, it is known that community participation in waste utilization is poor, 52 houses do not use waste, 47 houses do not use waste and 5 houses use waste. 20 houses had good community participation, 9 houses used waste and 11 houses did not use waste.

Cross tabulation of community participation with household waste reduction

Community participation in reducing household waste can be seen in Table 9.

Table 9. Cross Tabulation of Community Participation in Reducing Household Waste

Community participation	Waste Reduction		Amount
	Reduction	No reduction	
Not good	5	47	52
Good	11	9	20
Amount	16	56	72

Table 9 shows that the cross tabulation of community participation in reducing household waste is that community participation was not good in 52 houses, 47 houses did not reduce waste and 5 houses did not reduce waste. Good community participation was 20 houses which did not reduce waste by 9 and which reduced waste by 11 houses.

Discussion

Community participation in managing waste, starting from providing trash in households (Brotosusilo et al., 2020), is not yet a family necessity for people living in housing. This is in accordance with Martinawati's research in Palembang. The Head of RT, Mr. H. Najib Pradedy, said that "forming a society that is sensitive to each other and encouraging community participation is not easy. This requires struggle, sacrifice and a lot of time. Likewise, waste management is not easy so that people care" (Martinawati et al., 2016). The community participation in Naimata and Penfui housing complexes in managing household waste has not been done with their own awareness, has no initiative, and has not been independent in managing waste. If a household does not provide a trash can, it means that the waste produced in the household will be scattered around the house or thrown behind the house (Hasibuan, 2016; Rahmi & Ernawati, 2021) that the impact of waste on health is that it can cause disease (Amrina & others, 2021; Widjaja & Gunawan, 2022), the potential health hazards that can be caused are: diarrhea and rat disease, this disease occurs due to viruses originating from waste with improper management. Skin diseases such as scabies and ringworm.

This is supported by data on the 10 most common diseases in Kupang City, namely ISPA, skin disease, diarrhea, which are diseases that can be caused by a dirty environment. Axmalia & Mulasari (2020) research results show that the diseases suffered by waste managers include details of the health symptoms that are often experienced, namely diarrhea, skin health problems, worm health symptoms, malaria health symptoms and ISPA health symptoms (Windraswara & Prihastuti, 2017).

Throwing rubbish in rivers or on empty land will cause the rubbish to become a problem for the environment (Karjoko et al., 2022; Rachna & Sharma, 2022). The rubbish will not be transported by rubbish trucks, so it will be scattered by the wind, picked up by chickens and other animals and become a breeding ground for disease vectors. The stages of household waste management in reducing waste are using household materials (Nanda & Berruti,

2021) that do not cause waste (prevention), reducing waste generation (reduce) such as using a shopping basket, traveling/work/school bringing a drinking bottle, buying food so bring a food container. etc. Utilize waste (reuse) that is still useful, for example suitable clothes given to less fortunate people, leaking buckets can be used as flower pots, etc. Processing waste (recycling) such as processing organic waste into compost, making handicrafts, etc.

Reducing household waste is an important step in solving the waste problem (Fahy & Davies, 2007; Pasang et al., 2007). According to Tchobanoglous & Kreith (2002), recovery factors are typical of source components for recyclable materials collected in recycling programs with waste source sorting (Pluskal et al., 2021; Tsimnadis et al., 2023). Communities in Penfui and Naimata housing complexes do not sort waste, utilize, process and dispose of waste in sunagi and empty land. Participation is still low, so community participation needs to be increased through counseling, training in compost processing and training in making handicrafts from waste materials. The generation of organic waste can be reduced by making household compost (Sayara et al., 2020; Sujatna & Hastomo, 2021; Takahashi et al., 2019). The generation of organic waste in households is 1 liter/house/day with the population of Kupang city being 5,387,738 people according to BPS NTT. So the daily amount of organic waste of 3,388 m3 can be reduced if organic waste is processed into household compost. Increasing community participation in managing and reducing waste by involving community institutions by providing sanctions, rewards, raising awareness and combinations.

Reduction by using waste that is still useful, such as leaky buckets that can be used as flower pots, cooking oil jerry cans used to store liquids, and so on. If this is done, it can reduce household waste, so that the amount of waste thrown into landfills will decrease. Reduction means reducing waste generation to prevent waste from accumulating in landfills. Crushing waste into smaller pieces and processing the results into the same goods or other forms. Composting activities can reduce as much as 100 kg of wet waste from an initial weight of 184 kg to 84 kg. The percentage of wet waste in Madiun City is 81%. so that composting activities are appropriate when used to handle Madiun City's wet waste.

One of the reduction activities is processing waste into compost. Reducing organic waste can be done by processing waste into compost such as food scraps, vegetable scraps, leaves from the yard. The results of measuring the volume

of organic waste mean that the average organic waste produced every day is 72 liters, so that if organic waste is processed into compost communally or individually, it can reduce waste by 72 liters every day. Processing organic waste in households can reduce the amount of waste that will be disposed of at TPSS, thereby reducing the volume of waste that will be disposed of at TPA. Processing household waste, especially organic waste, can reduce the impact of pollution or breeding places for disease vectors. Organic waste is very popular with flies, cockroaches, mice and other animals. If waste disposal is not carried out every day, it will cause an unpleasant odor and attract disease vectors.

Low community participation in reducing waste needs to be encouraged to be responsible for the waste produced. Encouragement or motivation can be given in the form of involving the community in solving waste management problems in the community. Strategy to increase community participation by conveying research results to the community regarding community participation in managing waste. Dissemination of research results by involving sub-district officials, village officials, field assistants and community representatives. As a result of discussions on waste management data, an agreement was obtained that organic waste was processed in each household using a composting system using a composter. Inorganic waste that can be sold is collected at each home and then given to scavengers. Inorganic waste such as drink sachets or other materials can be used as handicraft materials. As a result of the agreement in the FGD activities, there will be handicraft training for housewives in the second year.

Guidance and monitoring in composting and handicraft activities as well as waste management in the Naimata and Penfui sub-districts is provided by the sub-district, community leaders and researchers.

Conclusion

The highest community participation in household waste management is in the bad category. The highest community participation in reducing waste is in the non-reducing community category. The largest amount of waste generated by households is inorganic waste. The composition of the waste produced is organic and inorganic waste. The waste management model agreed upon by the community is reduction by composting, recycling and selling which still has economic value.

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Author Contributions

The role of this research is that the corresponding author E.R.S plays the role of designing and compiling, the second author A.B.T is data processing and data analysis and the third author S.S is data processing and data analysis.

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Conflicts of Interest

There is no conflict of interest, this research is solely to improve public health.

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