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Impact Of Management System On Household Waste Utilization Potential

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ABSTRACT
The increase in the volume of household waste is one of the pressing environmental issues, because poor management can cause air, soil, and water pollution, as well as cause various health problems. This study aims to optimize household waste processing in order to reduce the impact of environmental pollution. Which was carried out in Tugumulyo District, Musi Rawas Regency from October to December 2024. The study used a survey method with observation location points in 3 randomly selected areas (Random sampling) , each point was determined 3 hamlets or neighborhood units randomly. Respondents were determined by simple random sampling as much as 15% of the number of families in each hamlet and RT. The data collected consisted of: 1) Respondent identity, 2) Amount and type of waste produced, 3) Type of waste storage inside and outside the home, and 4) household waste processing. The research data were processed tabulated using Microsoft Excel.2010 Software. The processed data were then analyzed mathematically and presented in the form of tabulations which were explained descriptively. The conclusion of this research is based on the results of the research that has been conducted, the following conclusions can be drawn: The type of waste that is mostly produced by households is organic waste, with an average waste production of 340 grams per day. Households mostly use temporary shelters both inside and outside the house in the form of plastic bags or plastic sacks. The amount of waste processed by the community is very small, which is only 6% of the total waste produced. The potential for utilizing household waste is very high, because it has not been processed much by the community.

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INTRODUCTION

Garbage is the remains of daily activities human day or from natural processes in solid form (Hasibuan, 2016) . Waste production continues to increase along with population growth rate, increasing community consumption patterns, and lifestyle (Harimurti et al. , 2020). On the other hand, the waste management capacity carried out by the community and the government is not yet optimal (Putry, et.al , 2020) . Household waste is one of the causes of environmental imbalance. The amount of household waste generated in Indonesia in 2021 reached 21,872,092.95 tons with a population of 272,229,372 people (Yuniantari et al. , 2022) . Based on data from the Ministry of Environment and Forestry of the Republic of

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Indonesia (2023), the waste generated in Indonesia in 2023 was 68.5 million tons/year. As much as 68 percent of household waste consists of organic waste while the rest is inorganic waste (Rabbani, 2020).

Organic waste is waste produced by living things, such as humans, animals, and plants. Existing organic waste can be utilized if it is processed properly and correctly (Wahyuni et al ., 2019) Organic waste or what is also called organic waste is waste that comes from the remains of living things that can decompose naturally without going through an intervention process and does not yet have economic value. Household organic waste comes from vegetable scraps, leftover kitchen spices, leftover food or drinks, leaves around the yard and others (Salawati et al., 2019). Management of organic waste produced by households is very much needed because it has an impact on environmental cleanliness and prevents the emergence of disease (Anwar et al., 2022) . The organic waste produced is still largely unmanaged. The handling of organic waste is mostly just piled up in the yard, dumped into the water, and burned. According to Ngurah et al., (2020), the existence of organic waste if processed will provide many benefits.

Inorganic waste is waste produced from non-biological materials, either in the form of synthetic products or the results of mining technology processing processes. Inorganic waste can come from creative products that have economic value such as plastic bottles for drinks and food, food wrappers, food paper, clean used paper, cardboard and unused electronic waste (Dewi and Pradhana, 2022) . Inorganic waste is waste that comes from non-natural sources and has different characteristics from organic waste (Christiawan, and Citra, 2016). Inorganic waste has an impact on the environment, because organic waste in the soil is very slow to decompose (Sasria et al ., 2020). Various types of inorganic waste can be used to be processed into handicrafts into goods that have economic value so that they become a source of income for the community (Sunarsih et al., 2019).

Factors that can cause waste accumulation include increasing population, final disposal site (TPA) capacity, amount of waste, ineffective waste transportation time, limited fleet or equipment for waste removal so that it is unable to lift all the waste, remaining waste in the landfill (Sabu and Bala, 2024). Waste management technology that is not yet optimal can result in an increase in the capacity of rotting waste, the existence of an environment that does not have a waste disposal or storage location, and often littering (Rimantho and Tamba, 2021). Lack of socialization or socialization and government support regarding waste management, little awareness of self-management and education about proper waste management and inappropriate waste management (Rahman, 2021).

The increase in population will have an impact on the increase in the amount of waste in the community environment, and until now the management of household waste produced by the community has not been carried out optimally (Utari et al., 2022). The negative impacts that can arise from unmanaged waste can result in environmental pollution, decreased environmental health , decreased aesthetic value, economic losses, and disruption of the ecosystem. Another possible consequence is that waste interferes with health, including dengue fever (haemorhagic fever) which can develop rapidly in areas where waste management is inadequate. (Mulyati, 2020) . This study was conducted to explore the potential for utilizing household waste based on the reality of the waste management system.

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METHOD

The research was conducted in Tugumulyo District, Musi Rawas Regency, from October to December 2024. Using a survey method, because it is a field research that is carried out systematically, factually and accurately. Data and information were collected from respondents or institutions that were the source of data . The location of the study was determined intentionally (purposive sampling), considering that Tugumulyo District is one of the districts with a dense population in Musi Rawas Regency, household waste production is quite high. In addition, the management of waste produced by households has not been carried out optimally, so that the potential for utilizing household waste to produce products with economic value is quite high. The observation location points for the study were determined as many as 3 observation areas in the form of villages or sub-districts selected randomly (Random sampling). At each predetermined observation point, further determine as many as 3 hamlets or neighborhood units randomly. The selection of respondents in this study was carried out using simple random sampling . Respondents were taken from each hamlet or neighborhood unit based on the number of heads of families (KK). The number of respondents at each research location point was taken as much as 15% of the number of families in each hamlet or RT.

The data collected consists of primary data and secondary data. Primary data is obtained by conducting direct observation and interviews (oral survey) with respondents who are in accordance with the questions in the questionnaire (written survey). Furthermore, secondary data is obtained from articles, related agency services and literature related to this study. The data collected in this study are, 1) Respondent identity, 2) Household waste management, 3) Amount of household waste production, and 4) Household waste processing. The data obtained from the implementation of the study is processed in a tabulation manner using Microsoft Excel.2010 software. The data that has been processed is then analyzed mathematically and presented in the form of a tabulation that is explained descriptively.

DISCUSSION

Based on the research results, it is known that the respondents of the study were between the ages of 45 and 57 years, with an average age of 48 years (Table 1). This shows that the majority of respondents are in the adult age group that is quite stable socially and economically. The age group between 45 and 57 years will be more difficult to change their daily habits, especially in waste management. The average number of family members in one household is 4 people. This number of family members shows that the majority of households consist of nuclear families consisting of father, mother, and child. The number of family members in one household affects the amount of waste produced by the household each day. Households with more family members will produce more waste.

Table 1. Respondent Identity

No	Observation Location	Age (year)	Member Family	Yard Area (m2)	Average Monthly Income (Rp)
1	B Srikaton RT 11	49	4	155	3,300,000
2	B Srikaton RT 9	52	6	487	3,700,000

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3	B Srikaton RT 12	57	3	159	1,800,000
4	A Widodo Ds 1	45	4	64	3,000,000
5	A Widodo Ds 5	48	4	283	2,900,000
6	A Widodo Ds 6	45	4	266	2,500,000
7	D Tegalrejo Village 4	45	4	79	2,300,000
8	D Tegalrejo Village 3	48	3	81	2,000,000
9	D Tegalrejo Village I	45	4	72	2,600,000
	Average	48	4	183	2,700,000

Source: Processed Research Results Data, 2024

The size of the yard is one indicator of the availability of space by a household to be able to process waste such as making compost or separating waste. The average size of the yard owned by each household in Tugumulyo District is 183 m². The size of the yard owned by each household is quite large, so that there is enough open space to process waste produced by the household. The average income level of the community at the research location is IDR 2,700,000 per month. This amount of income shows that most people are in the lower middle economic group. The amount of income affects the amount of waste produced by the household, because it will determine the household consumption pattern which tends to produce more waste. In addition, the amount of household income also affects the ability of the household to prepare equipment and facilities for waste processing. According to the opinion put forward by Tolliver (2013), an effective waste management program must take into account the economic limitations of the community. In addition, the level of community income also affects the level of community attention to waste management. Households with higher incomes have the ability to invest in larger waste processing so that environmental conditions are cleaner and healthier.

Table 2. Gender and Education Level of Respondents

No	Location Observation	Gender (%)		Education (%)				
		Man	Woman	SD	JUNIOR HIGH SCHOOL	SENIOR HIGH SCHOOL	D3	S1
1	B Srikaton RT 11	30	70	-	-	100	-	-
2	B Srikaton RT 9	33	67	-	11	78	-	11
3	B Srikaton RT 12	73	27	33	20	27	-	20
4	A Widodo Ds 1	31	69	21	24	41	-	24
5	A Widodo Ds 5	32	68	4	7	57	7	25
6	A Widodo Ds 6	52	48	8	24	56	-	12
7	D Tegalrejo Village 4	45	55	5	9	59		27
8	D Tegalrejo Village 3	35	65	16	27	41	-	16

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No	Location Observation	Gender (%)		Education (%)				
		Man	Woman	SD	JUNIOR HIGH SCHOOL	SENIOR HIGH SCHOOL	D3	S1
9	D Tegalrejo Village I	59	41	24	18	44	-	14
	Average	43	57	12	16	55	1	16

Source: Processed Research Results Data, 2024

The respondents of the study were male as many as 43% and female as many as 57% (Table 2). Based on Table 2, it is known that the number of women is greater than men with a difference of 14%. Concerning the issue of household waste management, the role of women is often more dominant because women are more involved in household activities and are more concerned about cleanliness in the household environment, but the role of men is no less important in supporting waste management . This is supported by Davis et al ., (2009); and; Wilson et al ., (2012), which explains that women tend to be more active in participating in waste management than men.

The level of education of respondents varies greatly, most respondents have a high school education, which is 55%. People with higher education (D3, S1) are only 17 percent, namely D3 as much as 1%, and S1 as much as 16%. The level of education is closely related to the understanding of the importance of household waste management. Respondents with a higher level of education will better understand the importance of waste management and have more knowledge about waste processing techniques so as not to pollute the environment. Most respondents have a high school education, so they have a great opportunity to conduct socialization and training on waste management.

Table 3. Types of Work of Research Respondents

No	Type of work (%)	Observation Location*									Flat Flat (%)
		1	2	3	4	5	6	7	8	9	
1	Housewife	60	44	-	38	4	16	45	27	21	28.33
2	Trader	20	33	13	17	36	24	9	14	12	19.78
3	Driver	10	-	7	-	-	4	-	-	-	2.33
4	Farmer	10	11	7	-	7	-	23	27	12	10.78
5	Midwife	-	11	-	-	4	-	-	-	-	1.67
6	Retired	-	-	20	7	-	4	-	5	-	4.00
7	Laborer	-	-	40	24	11	36	5	11	26	17.00
8	civil servant	-	-	7	-	13	-	18	8	14	6.68
9	Honorary	-	-	6	10	-	-	-	-	-	1.78
10	Private	-	-	-	4	25	16	-	8	15	7.56

Source: Processed Research Results Data, 2024

Description: * Numbers 1-9 indicate research locations as in Table 1.

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The job as a housewife is the largest type of job of the respondents, which is 28.33%, while the type of job with the least is as a midwife, which is only 1.67% (Table 3). This shows that most of the households involved in this study are households that have housewives as the main managers of household affairs, including household waste management. Traders are the second largest job group, with an average percentage of 19.78%, who are people working in the informal sector as traders, both in traditional markets and home businesses. Drivers are only represented very little, with an average percentage of 2.33%. This shows that the job as a driver is not too much found in the respondent sample, Farmer jobs appear in several locations, with an average contribution of 10.78%. This shows that there is variation in the type of work based on location, especially in more rural areas, Midwives are a job that is rarely found in respondents, with an average contribution of 1.67%. Most of them are present in locations closer to health facilities or urban areas, Retired jobs contributed 4% in some locations. These respondents are likely to be older and no longer actively working, Laborers are a significant occupational group with an average contribution of 17%. They work in the informal sector or factories and tend to have irregular incomes, Civil Servants (PNS) have a contribution of 6.68%, indicating that although there are some respondents who work in the formal sector, the number is not dominant, Honorary jobs are recorded with a low contribution (1.78%), indicating that this group is not large in the respondent sample, Private jobs contribute an average percentage of 7.56%. Respondents who work in the private sector have jobs in companies or privately owned businesses. Waste management is closely related to jobs that support the achievement of a clean and healthy environment and have a positive impact on the economy through job creation and resource reuse (Sari and Haryanto, 2018).

Table 4. Amount and Type of Household Waste

No	Household Waste Production (g/day)	Observation Location									Flat flat
		1	2	3	4	5	6	7	8	9	
1	Organic Waste	335	345	398	292	372	335	279	353	362	340
2	Inorganic Waste	170	262	144	197	172	174	134	161	160	175

Source: Processed Research Results Data, 2024

Based on Table 4. shows that household waste produced by households in the research location is mostly organic waste. The average amount of organic waste produced is 340 grams/day. While the amount of inorganic waste produced on average per day is only 175 grams.

Table 5. Type of Household Waste Collection and Frequency of Transportation.

No	Location	TPS in Home (%)		Outdoor Polling Station (%)				Transport
		Plastic/ bag	Box	Plastic/ bag	Bucket	Box	Hole	
1	B Srikaton RT 11	100	-	100	-	-	-	7
2	B Srikaton RT 9	89	11	78	11	11	-	6
3	B Srikaton RT 12	47	53	67	20	-	13	3
4	A Widodo Ds 1	55	45	49	9	-	32	3
5	A Widodo Ds 5	100	-	96	-	-	4	2
6	A Widodo Ds 6	88	12	96	4	-	-	2

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No	Location	TPS in Home (%)		Outdoor Polling Station (%)				Transport
		Plastic/ bag	Box	Plastic/ bag	Bucket	Box	Hole	
7	D Tegalrejo Village 4	41	59	54	23	23	-	5
8	D Tegalrejo Village 3	59	41	52	2	46	-	3
9	D Tegalrejo Village I	29	71	55	19	26	-	3
	Average	77	33	72	10	12	6	4

Source: Processed Research Results Data, 2024

The use of various trash bins in the home needs to be encouraged so that more households sort their waste from the start. Counseling programs and distribution of easily accessible trash bins can help increase the use of Temporary Shelters (TPS) in the home. Households in the research location mostly used plastic or sacks to temporarily store waste generated inside the home, which was 77% (Table 5). Meanwhile, only 33% used boxes. The use of more environmentally friendly and easily accessible containers can help improve more effective waste management. Temporary storage places for waste generated by households outside the home also mostly used containers in the form of plastic or plastic sacks, which was 72%. Meanwhile, TPS outside the home that used buckets, boxes, or holes were 12%, 6%, and 4%, respectively. The amount of waste generated by the community was transported by waste collectors to be disposed of at the Final Shelter (TPA). The average frequency of waste transportation by waste officers was four times a week, or once every two days.

Table 6. Types of Household Waste Management

No	Types of management			
	Location	Transported to landfill (%)	Burned (%)	Processed (%)
1	B Srikaton RT 11	50	40	10
2	B Srikaton RT 9	67	33	-
3	B Srikaton RT 12	67	33	-
4	A Widodo Ds 1	66	44	-
5	A Widodo Ds 5	89	11	-
6	A Widodo Ds 6	92	8	-
7	D Tegalrejo Village 4	64	9	27
8	D Tegalrejo Village 3	94	6	-
9	D Tegalrejo Village I	62	6	32
	Average	73	21	6

Source: Processed Research Results Data, 2024

Waste produced by the community is further managed, either by the community or by waste collectors. Most of the waste produced by households is transported by waste collectors to the TPA, which is 73% of the total household waste produced (Table 6). The rest of the waste is burned by the community, which is 21%. Only 6% of the total waste produced is processed by the community. This shows that most of the waste produced by households is not processed. Waste processed by the community (6%) is organic waste, which is processed into compost and animal feed.

Based on the research results obtained, it is known that it is important to conduct an education program on how to process and utilize waste so that it is more useful and does not pollute the environment. The types of waste utilization that can be done include processing organic waste into compost, making animal feed, and recycling so that other more useful products are obtained. The main purpose of processing household waste is to reduce the impact of environmental pollution, maintain public health, and increase community income.

CONCLUSION

Based on the results of the research that has been conducted, the following conclusions can be drawn: The type of waste that is mostly produced by households is organic waste, with an average waste production of 340 grams per day. Households increasingly use temporary shelters both inside and outside the home in the form of plastic bags or plastic sacks. The amount of waste processed by the community is very small, namely only 6% of the total waste produced. The potential for utilizing household waste is very high, because it has not been widely processed by the community.

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