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A Sociodemographic Review of Household Food Management Learning to Reduce Food Waste in Coastal Areas

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ABSTRACT

Food loss and waste have become a critical global concern, particularly in the context of ongoing hunger issues worldwide. It is estimated that nearly one-third of all food produced for human consumption is ultimately discarded. In Indonesia, food waste occurs across multiple sectors, with households contributing the largest share approximately 63.64%, or around 77 kg per capita annually. Sambas Regency, a coastal area in West Kalimantan, is also confronted with challenges related to waste disposal behavior and management systems. In Paloh District, the volume of waste entering coastal areas reaches approximately 963.60 tons per year, indicating a significant level. This study is essential as it seeks to examine socio-demographic characteristics and household behaviors related to food waste among coastal communities in Sambas Regency. Data were collected through surveys and structured questionnaire interviews involving 100 respondents in Paloh District. The analysis employed the Spearman rank correlation method. The findings reveal that socio-demographic variables such as education level, income, expenditure, and household size are associated with food waste behavior. Key drivers of food waste include excessive cooking practices, inadequate storage methods, poor meal planning, inaccurate estimation of food needs, and cultural practices during certain events that encourage food disposal behavior.

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1. INTRODUCTION

The problem of food waste has become a global issue that has received increasing attention in recent decades. Nearly a third of the food produced for human consumption ends up wasted unutilized It is estimated that the amount of waste is around 1.4 billion tons per year. Meanwhile, 795 million people around the world are still experiencing hunger (Sugiarto Mulyadi 2019). Indonesia ranks second in the world in terms of the amount of waste estimated at 300kg per capita per year. Based on the total waste in Indonesia, around 44% is food waste (Bappenas 2021).

Food waste not only impacts the waste of resources such as water, energy, and labor, but also contributes significantly to environmental damage through increased greenhouse gas emissions. The economic impact caused by food waste is in the form of economic losses of 213; 511 trillion rupiah per year. The social impact caused by food waste is that it has an impact on the loss of nutrient content (Bappenas 2021).

In Indonesia, the phenomenon of throwing away food is still often found in daily life, both in urban areas and in coastal areas. Coastal areas have distinctive social, economic, and cultural characteristics, which distinguish them from non-coastal regions. Coastal communities generally depend on the fisheries sector and marine natural resources as their main livelihoods. This dependence affects consumption patterns, food preferences, and how to manage food in the household. However, limited access to storage facilities, fluctuations in catches, and unstable economic conditions can contribute to the increased potential for food waste.

West Kalimantan has a waste pile of 555,868.04 tons per year. Food waste is the largest type of waste at 37.6% and the main source of waste in West Kalimantan comes from households, which is 80.57%. Sambas Regency ranks first in the composition of the samlah by type of waste (Sipsn 2022). Sambas Regency, which is one of the districts located on the coast of West Kalimantan, also faces problems in terms of waste disposal behavior and waste management. Coastal areas that are useful as an economic source for residents by utilizing marine products and beach tourism cannot be separated from waste, this is because activities carried out by residents around the coast will cause waste. The amount of waste entering the coastal area of Paloh district reached 963.60 tons/year, this is relatively high (Sipsn 2022).

The behavior of throwing away food at the household level is inseparable from various sociodemographic factors, such as age, income, number of family members, and spending for food. These factors affect an individual's mindset, consumption habits, and level of awareness of the importance of efficient food management. For example, income levels can also affect consumption behavior, where households with higher incomes have the potential to experience greater waste due to the ability to buy excess food.

Therefore, this study aims to analyze the relationship between sociodemographic factors and food waste behavior in households in coastal areas. By identifying influential factors, it is hoped that this research can contribute to the development of more effective policies and educational programs to reduce food waste at the household level In addition, the coastal area in Paloh district is a coastal area that has many tourist attractions and is also directly adjacent to Malaysia, this area needs research related to *food waste*. This research is expected to be able to provide more in-depth insights into the factors that affect food disposal behavior among households in the coastal area of Sambas Regency. As well as assisting in the development of more effective programs or policies to address the problem of food waste in this region.

2. METHODS

This research was conducted in Sambas Regency, Paloh District. This location was chosen for several reasons. First, Sambas Regency is the second highest district after the city of Pontianak and the producer of daily waste generation is 318.12 (Sipsn 2022). Second, Sambas regency is a district where the majority of the population is farmers so that foodstuffs in this area are quite abundant. Third, easy access to get groceries and ready-to-eat food because the majority of the population in this area are farmers. Fourth, the majority of people in this area tend to be consumptive. Fifth, most of the Sambas regency area, precisely Paloh District, is a coastal area that also has tourist attractions that can cause food waste so this research needs to be carried out. This location is determined intentionally or *purposive.*

This study uses a quantitative descriptive approach. The technique is carried out using the scoring technique. Then it was analyzed using SPSS with a Spearman Rank analysis test. The population of all households in Paloh District, which reached 9,080 households (Su'ud 2022). In this study, the sample

was selected using the *non-probability sampling* by the *accidental sampling*. The sample calculation was carried out using the Slovin formula and was obtained by 100 household respondents.

The variables used in this study were Socio-Demographic variables and household consumption behavior. The variables are described in the following table:

Table 1. Household Consumption Behavior Variables

Variable	Operational definition	Indicator	Measuring scale	Measurement	Source
Food storage	Respondents' habits in storing food	Utilization of refrigerators Food preservation practices	Nominal	1. Yes 2. No	(Porpino, Parente, and Wansink 2015)
Food handling	Respondents' ability to handle leftover food consumption, both in terms of storage and processing	Eating leftovers the next day Turn leftovers into new dishes by adding some additional ingredients Storing leftovers in the right condition so they can be reused	Nominal	1. Yes 2. No	(Stancu, Haugaard, and Lähteenmäki 2016)
Shopping habits	Shopping habits are expected to minimize food waste	Make a list of the foods you want to buy before shopping Checking food supplies/storage/refrigerator before shopping	Nominal	1. Yes 2. No	(Koivupuro et al. 2012)
Recycling behavior	Respondents' habits in recycling the waste produced	Recycle food waste into organic fertilizer Recycling food waste into animal feed Recycling food waste into other foods	Nominal	1. Yes 2. No	(Diaz-Ruiz, Costa-Font, and Gil 2017)

Table 2. Socio-Demographic Variables

Variabel	Operational Definition	Category	Scale
Age	Age is a measure or measurement of the number of years, months, and days that have passed since the birth of the food decision-maker in the household.		Ratio
Revenue	Income refers to the amount of money or economic value that an individual or family earns from various sources, such as employment, business, investments, and other sources.	Rupiah	Ratio

Expenses for meals	Spending on meals refers to the amount of money an individual, family, or household spends on food and drinks.	Rupiah	Ratio
Number of family members	The number of family members refers to the total number of individuals living together in a household or family.	People	Ratio

To test the relationship between variables, Spearman Rank analysis was used with sub-variable measurements using the following scoring method:

1. Preparation of respondents' answers
   Measurement of food loss sub-variables with scores in the form of a table. From the table, 15 indicators were obtained which will be used as questions to respondents. From these questions, 4 choices were obtained with a score of 1-4.
2. Calculation of the score of each variable
   Based on the results of the calculation from the determination of the sample using the purposive sampling technique, 100 household respondents in Paloh District were obtained. Therefore, the score calculation is carried out as follows:
   Interval $\frac{total\ skor\ tertinggi - total\ skor\ terendah}{jumlah\ kelas}$
   a. Food throwing behavior
      Interval = $2.5\frac{20-10}{4}$

Table 3. Categories of Research Variables Table

Score	Interval	Category
1	10-12.5	Highly influential
2	12.6-15	Influential
3	15.1-17.5	Quite influential
4	17.6-20	Has no effect

b. Age

Interval = 10.75 rounded to $10\frac{68-25}{4}$

Based on the interval count, there are 4 categories of scores as follows:

Table 4. Age

Category	Shoes
25-35	1
36-46	2
47-57	3
58-68	4

c. Expenses for Meals

Interva = $900000\frac{4000000-400000}{4}$

Based on the interval count, there are 4 categories of scores as follows:

Table 5. Categories Expenditure Score For Meals

Category	Shoes
400.000-1.300.000	1
1.400.000-2.300.000	2
2.400.000-3.300.000	3
3.400.000-4.300.000	4

d. Revenue

$$\text{Interva} = 900000\frac{15000000-700000}{4}$$

Based on the interval count, there are 4 categories of scores as follows:

Table 6. Revenue Score Categories

Category	Shoes
700000-3500000	1
3600000-7000000	2
7100000-10500000	3
10600000-15000000	4

e. Number of family members

$$\text{Interval= 1.75 rounded to } 2\frac{7-0}{4}$$

Based on the interval count, there are 4 categories of scores as follows

Table 7. Category Score Number of Family Members

Category	Shoes
0-2 orang	1
3-4 orang	2
5-6 orang	3
7 orang	4

Data processing in measuring the influence relationship between sociodemographic factors and food waste behavior was used the Spearman Rank Test using SPSS.

3. FINDINGS AND DISCUSSION

In this study, the respondents were households in Paloh District as many as 100 respondents spread across eight villages in Paloh District. The results of the interview data are known that the largest distribution of respondents is in Sebubus Village at 31% and the smallest is in Temajuk Village at 7%. Based on gender, it is known that as many as 76% of respondents are female and 24% are male. The characteristics of respondents based on sociodemographics are described in the following table:

Table 8. Age of respondents

characteristic	quantity	Percentage
25-35	15	15%
36-46	41	41%
47-57	32	32%
58-68	12	12%
total	**100**	**100%**

Source: Primary Data Processing 2024

Based on age characteristics, it can be seen that the most frequency in the age range of 36-46 is 41 people. Respondents in vulnerable age 58-68 years are respondents with the least number of frequencies, namely 12 people. It can be seen that the age distribution of the respondents is quite wide and overall the respondents are of adult age.

Table 9. Respondents' household expenditure

Features	quantity	Frequency
400.000-1.300.000	24	24%
1.400.000-2.300.000	56	56%
2.400.000-3.300.000	19	19%
3.400.000-4.300.000	1	1%
total	**100**	**100%**

Source: Primary Data Processing 2024

From table 13, it can be seen that the range of expenditure of IDR 1,400,000-2,300,000 has the most frequency, which is 56. The spending range of IDR 3,400,000-4,300,000 has the smallest frequency, which is 1%.

Table 10. Respondent's household income

Category	quantity	Percentage
700000-3500000	77	77%
3600000-7000000	20	20%
7100000-10500000	2	2%
10600000-15000000	1	1%
quantity	**100**	**100%**

Source: Primary Data Processing 2024

From table 14, it can be seen that the highest frequency is 77% in the income range of IDR 700,000-3,500,000 and the income range of IDR 10,600,000-15,000,000 has the least frequency, which is 1%.

Table 11. Number of respondents' family members

Features	Quantity	Frequency
1-2 orang	6	6%
3-4 orang	45	45%
5-6 orang	47	47%
7 orang	2	2%
total	**100**	**100%**

Source: Primary Data Processing 2024

From table 15, it can be seen that the number of family members ranging from 5 to 6 people has the highest frequency value of 47% and the number of family members as many as 7 people has the least frequency of 2%.

Next, a simple descriptive statistical analysis was carried out to Provide a simple summary of the mean value, mode, standard deviation, and percentage distribution of respondent answers on the questionnaire instrument for each variable indicator in the study. The statistics of each measurement are presented in the following table:

Table 12. Statistics Descriptive

Variabel	Mean	median	STD Deviation	Frequency (%) Ya	No
Food storage					
Utilization of refrigerators	1.7	2	0.46	30	70
Food preservation practices	1.56	2	0.49	44	66
Food handling					
Eating leftovers the next day	1.48	1	0.5	52	48
Turn leftovers into new dishes by adding some additional ingredients	1.25	1	0.43	75	25
Storing leftovers in the right condition so they can be reused	1.79	2	0.4	21	79
Shopping Habits					

Make a list of foods you want to buy before shopping	1.35	1	0.47	65	35
Checking your food supply/storage/fridge before shopping?	1.49	1	0.5	51	49
Recycling Behavior					
Recycle food waste into organic fertilizer	1.82	1	0.38	18	82
Recycling food waste into animal feed	1.4	2	0.49	60	40
Recycling food waste into other foods	1.85	1	0.35	15	85

Source: Primary Data Processing 2024

From table 14, it is known that the food storage variable of the two indicators obtained an average result of 1.63 which shows that the average respondent gave an answer of "no" to the food storage variable. The results show that the average respondent does not store food properly. Furthermore, the food handling variable has an average of 1.5 which indicates a neutral value. But of the three indicators, two indicators of the average respondent answered Yes, it means that the two indicators of the average respondent perform food handling behavior by consuming leftovers the next day and processing them into new dishes by adding some additional ingredients. The shopping habits variable has an average value of 1.42 which states that the average respondent answers Yes, it means that from the two indicators of average spending habits, the average respondent performs spending habits such as shopping habits such as Make a list of foods you want to buy before shopping and checking food supplies before shopping. Meanwhile, the recycling behavior indicator has an average value of 1.69, which indicates that the average respondent answers "no," meaning that the average respondent does not engage in recycling behaviors such as recycling food scraps into other foods and turning them into organic fertilizers.

Furthermore, a questionnaire instrument test was carried out consisting of a validity test and a reliability test. The results of the validity test showed that 15 question items were declared valid, with the following description:

Table 13. Validity Test Results

Question Item	R-calculate value	><	R-table values	Remarks
1	0.729	>	0.1966	Valid
2	0.74	>	0.1966	Valid
3	0.609	>	0.1966	Valid
4	0.598	>	0.1966	Valid
5	0.735	>	0.1966	Valid
6	0.544	>	0.1966	Valid
7	0.585	>	0.1966	Valid
8	0.558	>	0.1966	Valid
9	0.25	>	0.1966	Valid
10	0.661	>	0.1966	Valid
11	0.487	>	0.1966	Valid
12	0.739	>	0.1966	Valid
13	0.518	>	0.1966	Valid
14	0.639	>	0.1966	Valid
15	0.314	>	0.1966	Valid

Source: Primary Data Processed, 2024

Based on the instrument tested, with a significance level of 5% and degree of freedom (df) = n-2, the r table value used in this study is 0.1966. An item is considered valid if the calculated r-value is greater than the r-table value. Next, a reliability test was carried out using SPSS and the results were obtained as follows:

Table 14. Reliability Test Results

Reliability Statistics

Cronbach's Alpha	N of Items
.604	15

Source: Primary Data Processed, 2024

Based on Cronbach's Alpha's cohesive value, it can be concluded that the results of the reliability test on the instrument are Acceptable reliability because the test results carried out state the Cronbach's Alpha value of 0.604. So that the instrument or question in this study is reliable.

To determine the relationship between sociodemographic factors and food throwing behavior, Spearman Rank analysis was carried out. An analysis of the relationship between age and behavior was used to determine whether there was a relationship between a person's age and the tendency to throw away food. This test was conducted using Spearman rank relationship analysis to measure the strength and direction of the relationship between age and food throwing behavior.

Table 15. The relationship between age and behavior

Correlations

			Behavior	Age
Spearman's rho	Behavior	Correlation Coefficient	1.000	.137
		Sig. (2-tailed)	.	.173
		N	100	100
	Age	Correlation Coefficient	.137	1.000
		Sig. (2-tailed)	.173	.
		N	100	100

Source: Primary Data Processed, 2024

The results of the Spearman Rank test showed a value of p = 0.173, which is greater than 0.05, proving that there is no relationship between age and behavior. When viewed from the coefficient (r), a value of 0.137 is obtained, which means that the relationship between the influence of age on behavior has a very weak relationship.

In this study, there was no relationship between age and behavioral variables due to low habits and awareness of the environment in Paloh District. A person who is used to being taught to respect his or her surroundings since childhood tends to continue to do so even as an adult. People who are more aware of environmental issues may be more cautious about throwing away food regardless of their age.

These results are in agreement with research from (Stefan 2013) It shows that factors such as income, education, and environmental awareness have a greater influence than age on food throwing behavior. For example, in studies conducted in several developed and developing countries, it was found that people who were more environmentally conscious and had higher education tended to throw away food less, regardless of their age.

The analysis of the relationship between the level of expenditure on food throwing behavior was carried out to find out if there is a relationship between a person's spending level and the tendency of food throwing behavior. This test was conducted using the Spearman rank analysis tool to measure the strength and direction of the relationship between the level of expenditure and food waste behavior.

Table 16. The relationship between spending levels and food throwing behaviors

Correlations

			Behavior	Production
Spearman's rho	Behavior	Correlation Coefficient	1.000	.186*
		Sig. (2-tailed)	.	.020
		N	156	156
	Production	Correlation Coefficient	.186*	1.000
		Sig. (2-tailed)	.020	.
		N	156	156

Source: Primary Data Processed, 2024

The results of the Spearman Rank Test showed that the value p = 0.020 was less than 0.05 which proved that there was a relationship between spending and behavior. When viewed from the coefficient (r), a value of 0.186 is obtained, which means that the relationship between the influence of expenditure on behavior has a very weak and one-way relationship. Directional means that if behavioral variables increase, expenses will also increase.

There is a relationship between expenditure and food waste behavior in Paloh District because the behavior of people who have high expenses tend to buy food in large quantities more often so that in the end it is not eaten and thrown away for free.

These results are in agreement with research from (Mayasari and Satria 2018) found that the level of expenditure affects consumption patterns and food waste behavior.

An analysis of the relationship between income and food throwing behavior was performed to evaluate whether there is a relationship between a person's income and food throwing behavior tendencies. This test uses the Spearman rank analysis tool to measure the strength and direction of the relationship between income and food waste behavior.

Table 17. The relationship between income and food throwing behavior

Correlations

			Behavior	Revenue
Spearman's rho	Behavior	Correlation Coefficient	1.000	-.212*
		Sig. (2-tailed)	.	.034
		N	100	100
	Revenue	Correlation Coefficient	-.212*	1.000
		Sig. (2-tailed)	.034	.
		N	100	100

Source: Primary Data Processed, 2024

The results of the Spearman Rank Test showed that the value p = 0.034 was smaller than 0.05 which proved that there was an influence of the relationship between income and behavior. When viewed from the coefficient (r), a value of -0.212 is obtained, which means that the relationship between the influence of income and behavior has a very weak and non-directional relationship. Not in the same direction means that if the behavioral variable increases, income will decrease.

From the research that has been conducted, it is known that some respondents with high incomes value food very much and try not to throw it away, while others may be less concerned because they feel that they have easy access to food.

These results agree with (Andreanto 2022) which shows that income has a significant effect on food consumption and disposal behavior.

Analysis of the relationship between the number of family members and food throwing behavior was performed to determine whether there was a relationship between the number of family members and the tendency of food throwing behavior. This test uses the Spearman rank analysis tool to measure the strength and direction of the association between the number of family members and food throwing behavior.

Table 18. The relationship between the number of family members and the behavior of throwing food

Correlations

			Behavior	Number of family members
Spearman's rho	Behavior	Correlation Coefficient	1.000	.263**
		Sig. (2-tailed)	.	.008
		N	100	100
	Number of family members	Correlation Coefficient	.263**	1.000
		Sig. (2-tailed)	.008	.
		N	100	100

Source: Primary Data Processed, 2024

The results of the Spearman Rank Test showed that the value p = 0.008 was less than 0.05 which proved that there was an influence relationship between the number of family members on behavior. When viewed from the coefficient (r), a value of 0.263 is obtained, which means that the relationship between the influence of the number of family members on behavior has a sufficient and one-way relationship. Directional means that if the behavior variable increases, the number of family members will also increase.

The relationship between the behavior of throwing away food and the number of family members in Paloh District is caused by the larger the number of members in a family, the higher the frequency of cooking, and food cooked in large quantities often leaves food residues. If the food is not managed properly, a lot of food will be thrown away.

These results are in agreement with research from (Afifah 2018) which shows that the more family members, the higher the rate of food waste produced. Conversely, the fewer family members, the lower the rate of food waste produced.

Sociodemographic factors such as age, income, expenses, and the number of family members also indirectly affect food throwing behavior in households. Research results from (Ozanne, Ballantine, and McMaster 2022) found that income levels were closely related to food throwing behavior. This is due to access and the ability to buy food in bulk without having to worry about costs. Therefore, reducing food waste requires a holistic approach that takes these factors into account and involves education and policies that support better food management

4. CONCLUSION

Based on the results of the above analysis, it is known that the socio-demographic variables that have a relationship with food throwing behavior in Paloh District are expenses, income, and the number of family members. For the age variable, there is no relationship with the impact on food throwing behavior in Paloh District. Meanwhile, the number of family members shows a sufficient relationship, while the variables of expenditure and income have a very weak relationship.

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