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# The Study of Food Loss and Waste According to an Islamic Economic Perspective

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## Abstract

*The occurrence of food loss and waste is closely related to less effective and efficient consumer behavior that causes a lot of food wasted and excessive food waste accumulation. Consumer behavior according to Islam encompasses a series of ethics and principles of consumption: simplicity, balance, hygiene, generosity, and responsibility. The study aims to understand the impact of simplicity, balance, hygiene, generosity, and responsibility on control of food loss and waste. This research uses quantitative methods with nonprobability sampling techniques as a sampler technique. The sample in this study is 100 communities that reside in Banda Aceh City. The data analysis technique in this study is a double linear regression analysis by spreading the questionnaire. The results showed that the variables of simplicity and generosity partially influenced the control of food loss and waste. The variables balance, hygiene and partial responsibility do not affect the control of food loss and waste. Variables of simplicity, balance, hygiene, generosity, and responsibility simultaneously have a positive and significant impact on the control of food loss and waste. In this way, people are expected to change consumer habits that can damage the environment. Governments and related agencies can deal with food loss and waste by educating the public and improving infrastructure to support efficient food production processes as well as developing regulations related to food losses and waste.*

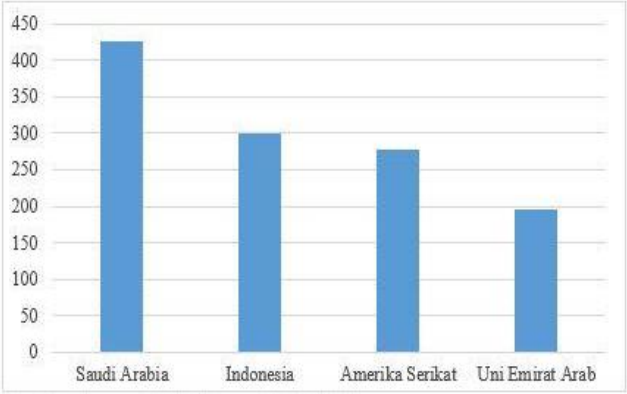
***Keywords**: Food Loss, Food Waste, Consumption*

## Introduction

Food wastage has become a serious problem in several developed and developing countries. Food wastage both at the retail level and at the consumption stage causes an expansion of gas emissions with the aim of having a negative impact on the climate, the environment and its inhabitants. The results of a previous study by Venkat showed that food wastage in 16 commodities considered to have increased gas emissions (CO2) annually in the United States by 13.12 million metric tons separately at the retail level and 16.11 million metric tons at the consumption stage[1].

[1] Kumar Venkat, 'The Climate Change and Economic Impacts of Food Waste in the United States', *International Journal on Food System Dynamics* 2, no. 4 (2011): 431–46, http://dx.doi.org/10.18461/ijfsd.v2i4.247.

Figure 1. The World's Largest Producer of Food Waste (2017)[2]




Source: EIU, *the World's Largest Producer of Food Waste* (2017)

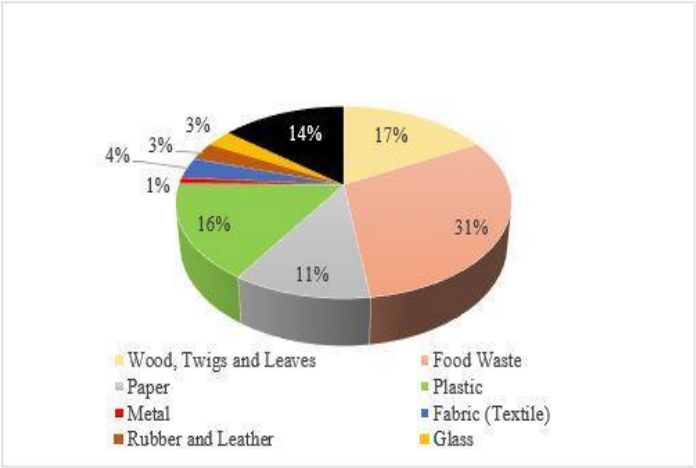
Based on the graph above, Indonesia is estimated to produce 300 kg of food waste each year per person (food loss and food waste). According to research, people's poor food consumption habits are the main reason for the large amount of food waste produced. Food waste here is the accumulation of food scraps which refers to all food products that are not consumed by consumers in the form of food scraps such as food stored in the refrigerator or cupboard for too long, food stored on the market for too long (until it expires), or food left unattended not running out on the plate has the opportunity to increase the amount of food wasted. Food loss in question is leftover food that is wasted before it reaches consumers due to agricultural failures, fish poisoning in the sea, and others.

The people of Banda Aceh City are also known as people who like to eat, this is evident from the variety of culinary delights in Banda Aceh City, as well as the types of food that vary. In recent years in the City of Banda Aceh many new places to eat have opened and the visitors who come are always busy, this evidence that the people of Banda Aceh are very fond of eating. Not everyone who eats will finish their food without remaining, most people only spend a third of the food they take. So, the habit of throwing away or leaving food (food waste) triggers food scarcity and does not achieve the desired food security.

Wet or organic waste is waste that usually comes from homes and includes things like fruit and vegetable peels, food scraps, leaves, and other easily biodegradable waste. Based on data on the waste composition of the City of Banda Aceh in 2021 obtained from the National Waste Management Information System, it can be seen in the following diagram.

[2] Economist Intelligence Unit, 'Food Loss and Waste', 2017, https://eiu.com/.

Figure 2. Total Solid Waste Composition in Banda Aceh City Year 2021[3]




Source: SIPSN, *Total Solid Waste Composition in Banda Aceh City* (2021)

With the generation of food waste by 31 percent. The city of Banda Aceh is Inseparable as one of the largest contributors to food in Aceh Province.

Consumption basically has a positive connotation in the teachings of Islam. Islam advocates behavior that prioritizes the interests of others, especially consumers, and prohibitions and orders regarding food and drink should be seen as part of efforts to improve the nature of consumption behavior by avoiding unnecessary waste. The Islamic view of consumption behavior includes, according to Muhammad, namely consumption ethics. The main Islamic axioms for consumption ethics are monotheism, fairness, free will, lawful, moderation and accountability[4].

In previous research, Skaf stated in his research entitled *"Unfolding hidden environmental impacts of food waste: An assessment for fifteen countries of the world,"* namely food waste is a global problem because around one third of all food produced worldwide for human consumption is wasted every year. Along the food chain, while a large number of people (822 million) still do not have enough food for activities and a healthy life. In addition to the ethical aspects associated with wasting large amounts of food in a global context that remains food insecure, this phenomenon also implies hidden environmental costs and impacts that negatively impact the biosphere. Due to the huge consumption of renewable and non-renewable resources and the continuous release of emissions to produce food into waste[5].

[3] Sistem Informasi Pengelolaan Sampah Nasional., 'Total Solid Waste Composition in Banda Aceh City Year 2021', 2021, https://sipsn.menlhk.go.id/.

[4] Muhammad, *Ekonomi Mikro Dalam Perspektif Islam* (Yogyakarta: BPFE-Yogyakarta, 2005).

[5] L Skaf et al., 'Unfolding Hidden Environmental Impacts of Food Waste: An Assessment for Fifteen Countries of the World', *Journal of Cleaner Production* 310 (2021): 1–9, https://doi.org/10.1016/j.jclepro.2021.127523.

Based on the explanation that has been presented, changing food consumption behavior is very important to reduce food waste by building sustainable production and consumption behavior. Although people's consumption behavior changes from time to time and are influenced by changes in income, people's awareness of the importance of food and nutrition as well as changes in lifestyle. Seeing this phenomenon, the author intends to analyze the consumption behavior of the people of Banda Aceh City towards food loss and waste in an Islamic economic perspective.

## Methodology

This research is quantitative research which includes explanatory research. The data used in this study are primary data and secondary data. The primary data of this study were obtained by distributing questionnaires to respondents who are residents of Banda Aceh City. Secondary data was obtained from the Central Statistics Agency (BPS), FAO Data (Food Agriculture Organization), and other related agencies.

In this study, the population and sample were the people of Banda Aceh City. The sampling technique used in this study was a non-probability sampling technique with an incidental sampling approach. With a minimum number of research samples that are at least 10 times the total variables used in the study, then 10 x 6 = 60 samples. Based on the results of distributing the questionnaires, 100 respondents were obtained, which means that the number of research samples exceeded the minimum limit and was in line with the sampling technique used.

Table 1. Operational Research Variables

| Variable | Variable Concept | Indicator | Scale |
|---|---|---|---|
| Independent Variables | | | |
| Simplicity (X1) | Simplicity implies according to the needs and consumption behavior that are not excessive (Mannan, 1997). | 1. Preferences where to eat in consuming daily food<br>2. The ideal diet<br>3. Consume food as needed | Likert 1-5 |
| Balance (X2) | Pay attention to the balance between expenditure and income, so that they will live in economic balance (Muhammad, 2005) | 1. Make a shopping list as needed<br>2. Planning for the next few days<br>3. Evaluation of expenditure and income in food consumption | Likert 1-5 |

| | | | |
|---|---|---|---|
| Cleanliness (X3) | That what is consumed must be clean and healthy, good and clean consumption will benefit one's values and health (Mannan, 1997). | 1. Pay attention to food hygiene<br>2. Maintain food hygiene<br>3. Consume healthy and nutritious food | Likert 1-5 |
| Generosity (X4) | Acts of consumption that are sincere and not forced and consider social aspects such as sharing with those in need or those around them (Mannan, 1997). | 1. Share with others<br>2. Give to pets<br>3. Share with those in need | Likert 1-5 |
| Responsibility (X5) | It is the responsibility of humans as caliphs to manage natural resources in this world, also related to protecting the environment (Muhammad, 2005). | 1. Actions in placing leftovers<br>2. Processing into plant fertilizer<br>3. Processing into other food ingredients | Likert 1-5 |
| Dependent Variable | | | |
| Control of food loss and waste (Y) | Food loss and waste is the loss of a number of foods that are not used properly, both before, during and after consumption. | 1. Storage of food under suitable conditions<br>2. Habit of buying food/snacks<br>3. Accuracy in viewing the expired date | Likert 1-5 |

Source: Processed Data (2022)

Table 2. Likert Scale Instrument[6]

| Abbreviation | Information | Score |
|---|---|---|
| SS | Strongly agree | 5 |
| S | Agree | 4 |
| N | Neutral | 3 |
| TS | Don't agree | 2 |
| STS | Strongly Disagree | 1 |

Source: Sugiyono, *Metode Penelitian Kuantitatif, Kualitatif, R&D* (2013)

The analysis technique used is multiple linear regression analysis using the 26th edition of the SPSS data processing application.

## Discussion

### Food Loss and Waste

Food loss is the loss of some food during the production and distribution stages before consumption[7]. Food loss is a term used to describe the loss of food along the food production chain, including pre-harvest, post-harvest, storage, packaging and distribution stages[8].

Any good quality food that can be consumed by the public but not consumed and used is considered food waste[9]. ). FAO states that the cause of food waste is multifactorial[10]. Countries with moderate to high per capita income also have the same potential to cause food waste in their country, namely by throwing away food even though the food is actually still fit for consumption. There are several factor that cause food waste, including buying too much, preparing excessive portions of food, difficulties in understanding labels and errors that occur during storage[11].

These impacts can be categorized into three things:

1. Impact in the Field of Food and Nutrition

   Food and nutrition are issues that cannot be separated. Nutritional problems caused by food are still a problem of concern in the world. The problem of malnutrition and under nutrition arises due to a lack of consumption of food according to needs. The existence of food loss and

[6] Sugiyono, *Metode Penelitian Kuantitatif, Kualitatif, R&D* (Bandung: Alfabeta, 2013).

[7] Brian Lipinsk et al., 'Reducing Food Loss and Waste', *Installment 2 of "Creating a Sustainable Food Future*, 2013, 1–40.

[8] Food and Agriculture Organization of the United Nations., 'Food Wastage Footprint: Impacts on Natural Resources' (Food and Agriculture Organization of the United Nations., 2013), https://www.fao.org/3/i3347e/i3347e.pdf.

[9] Lipinsk et al., 'Reducing Food Loss and Waste'.

[10] Food and Agriculture Organization of the United Nations., 'Food Wastage Footprint: Impacts on Natural Resources'.

[11] Barilla Center for Food and Nutrition., 'Food Waste: Causes, Impact, and Proposals', 2012, https://foodtank.com/news/tag/barilla-center-for-food-and-nutrition/?gclid=CjwKCAjw38SoBhB6EiwA8EQVLnod7BSw4PucxbU3GRbdQGHsQt4tqeVQsCHAdNrCrKASZcrivmLIfhoCPLkQAvD_BwE.

food waste causes the loss of a number of certain nutrients, in this case the nutrients found in rice[12].

2. Impact in the Economic Sector

   Food loos and waste also has an impact on the economy. The existence of food loss and waste, besides causing loss or loss of a certain currency value, there are also other losses, namely economic losses due to the resources used to produce the food, for example water, seeds, fertilizers, transportation and so on[13].

3. Impact in the Environmental Sector

   *Food waste* also has a serious impact on the environment, including its contribution to the formation of greenhouse gas emissions, polluting clean water sources, soil degradation, and energy consumption[14].

   Hall in his research stated that food waste is one of the triggers for the phenomenon of excessive use of clean water and fossil fuels. This is associated with the negative impact of food waste which forms methane gas and other gases so that food waste is also mentioned as one of the causes of climate change which is currently taking place[15].

## Consumption of Islamic Economic Perspective

Rational consumers in the Islamic economy do not know the terms *israf* and *tabdzir*. Besides, the orientation of *lillah* worship also affects the behavior of Muslim consumer horns[16]. The Islamic view of consumption behavior includes, according to Muhammad, namely consumption ethics. The main Islamic axioms for consumption ethics are monotheism, fairness, free will, lawful, moderation and accountability[17]. And according to Mannan another Muslim economist offers five principles of consumption in Islam including the principles of justice, cleanliness, simplicity, generosity, and aspects of morality[18].

1. Simplicity

This principle contains a message that consumption must be based on simplicity, not excessive (excessive) and not extravagant. In the word of Allah SWT in surah Al-Maidah verse 87, namely:

يَٰٓأَيُّهَا ٱلَّذِينَ ءَامَنُواْ لَا تُحَرِّمُواْ طَيِّبَٰتِ مَآ أَحَلَّ ٱللَّهُ لَكُمْ وَلَا تَعْتَدُوٓاْۚ إِنَّ ٱللَّهَ لَا يُحِبُّ ٱلْمُعْتَدِينَ

Meaning: *"You who believe, do not forbid anything good that Allah has made lawful for you, and do not transgress."* (Al-Ma'idah: 87).

Islam attaches great importance to consuming everything that is effective and efficient. Because excess is harmful in the long run, even in

[12] Barilla Center for Food and Nutrition.

[13] Food and Agriculture Organization of the United Nations., 'Food Wastage Footprint: Impacts on Natural Resources'.

[14] Barilla Center for Food and Nutrition., 'Food Waste: Causes, Impact, and Proposals'.

[15] Kevin D. Hall et al., 'The Progressive Increase of Food Waste in America and Its Environmental Impact', *PLoS ONE* 4, no. 4 (2019), https://doi.org/10.1371/journal.pone.0007940.

[16] Suyoto Arief, 'Konsumen Rasional Dalam Perspektif Islam', *Islamic Economics Journal* 1, no. 1 (2012): 17–30, https://doi.org/10.21111/iej.v1i1.155.

[17] Muhammad, *Ekonomi Mikro Dalam Perspektif Islam*.

[18] Muhammad Abdul Mannan, *Teori Dan Praktek Ekonomi Islam* (Yogyakarta, 1997).

small quantities. Long-term waste can deplete or even damage natural resources and the environmental balance.

2. Balance

The principle of balance is to pay attention to the balance between income and expenses. A Muslim must be able to maintain a balance between his income and expenses in order to live with an economic balance. As in His words,

وَالَّذِينَ إِذَا أَنْفَقُوا لَمْ يُسْرِفُوا وَلَمْ يَقْتُرُوا وَكَانَ بَيْنَ ذَٰلِكَ قَوَامًا

Meaning: *"And those who, when spending (their wealth) are not extravagant nor stingy and keep a balance between the two"* (Surah Al-Furqan: 67).

3. Cleanliness

It is very important to focus on the principles of hygiene when carrying out food consumption activities. The Al-Qur'an and Hadith recommend the principle of cleanliness in all consumption, whether it be from food, drink, clothing, and others. A person's value and health will be obtained from good and clean consumption. In terms of tayyib consumption, this principle is included in the category of obedience principles. As Allah says:

وَكُلُواْ مِمَّا رَزَقَكُمُ ٱللَّهُ حَلَٰلًا طَيِّبًا ۖ وَٱتَّقُواْ ٱللَّهَ ٱلَّذِيٓ أَنتُم بِهِۦ مُؤۡمِنُونَ

Meaning: *"And eat food that is lawful and good from what Allah has provided for you, and fear Allah in whom you believe"* (QS An-Nahl: 114).

Because cleanliness is not only about beauty and purity but also about comfort and health, cleanliness is a fundamental component of all consumer activities. In order for the basic purpose of intended consumption to be fulfilled, the principle of cleanliness is an integral aspect of consumption activities.

4. Generosity

According to the principle of generosity, a Muslim must consider the needs of others besides his own when engaging in activities related to consumption. A man once asked Rasulullah SAW, *"What is the best deed in Islam?"* Rasulullah SAW replied, *"You feed others."* (HR. Bukhari and Muslim). This implies that the existence of this principle of generosity will realize the idea of unity and stability in society.

5. Responsibility

This consumption responsibility is meant to fall under the purview of humans as caliphs; it is related to our duty as caliphs to manage the world's natural resources and to protect the environment. As Allah says:

ظَهَرَ ٱلۡفَسَادُ فِي ٱلۡبَرِّ وَٱلۡبَحۡرِ بِمَا كَسَبَتۡ أَيۡدِي ٱلنَّاسِ لِيُذِيقَهُم بَعۡضَ ٱلَّذِي عَمِلُواْ لَعَلَّهُمۡ يَرۡجِعُونَ

Meaning: *"It has been seen that damage on land and at sea is caused by the actions of human hands, so that Allah will feel for them part of (the result of) their actions, so that they return (to the right path)."* (QS Ar-Rum: 41).

People should be held accountable for their actions because many believe that food waste is not harmful to the environment as it is an organic waste that easily decomposes. However, the sustainability of the food system is seriously harmed by this food waste. Food waste not only refers to wastage

of food but also waste of resources used in food production, such as agricultural land, minerals and fertilizers[19].

In addition, the anaerobic decomposition of food waste results in the production of methane gas (CH4), a form of greenhouse gas that has the potential to accelerate the destruction of the ozone layer. In the end, these leftovers will result in more greenhouse gas emissions that accelerate global warming, which will cause environmental problems[20].

## Result and Analysis

Banda Aceh City is the Capital of Aceh Province. The administrative area of Banda Aceh City is 61,359 Ha or around 61.36 Km2. The population data for the city of Banda Aceh from the June 2021 projection is 255,029 people with a male population of 128,532 and a female population of 126,497[21].

According to data from BPS City of Banda Aceh, it is known that the number of restaurants in Banda Aceh City in 2021 is 273 restaurants, where restaurants are one of the largest contributors to food waste after the household sector which produces the most food waste.

The characteristics of the respondents can be grouped on the basis of gender, age, education level and occupation. Respondents in this study were the people of Banda Aceh City. The description of the characteristics of the respondents in this study will be discussed as follows.

Respondents in this study were the people of Banda Aceh City. The average age ranges from 18-25 years, 26-30 years, 31-40 years, and over 40 years. The description of the age of the respondents as follows:

Table 3. Number of Respondents by Age

| Respondent Age | Amount | Percentage |
|---|---|---|
| 18-25 | 61 | 61% |
| 26-30 | 17 | 17% |
| 31-40 | 10 | 10% |
| >40 | 12 | 12% |

Source: Processed data (2022)

Respondents in this study were the people of Banda Aceh City. The respondents based on gender are as follows:

Table 4. Number of Respondents by Gender

| Gender | Amount | Percentage |
|---|---|---|
| Man | 27 | 27% |
| Woman | 73 | 73% |

Source: Processed data (2022).

The level of education of the respondents in this study were high school, diploma, undergraduate and postgraduate. For more details can be seen in the following table:

[19] Davide Tonini, Paola Federica Albizzati, and Thomas Fruergaard Astrup, 'Environmental Impacts of Food Waste: Learnings and Challenges from a Case Study on UK', *Waste Management* 76 (2018): 744–66, https://doi.org/10.1016/j.wasman.2018.03.032.

[20] Stephen D Porter et al., 'Avoidable Food Losses and Associated Production-Phase Greenhouse Gas Emissions Arising from Application of Cosmetic Standards to Fresh Fruit and Vegetables in Europe and the UK', *Journal of Cleaner Production* 201 (2018): 869–78, https://doi.org/10.1016/j.jclepro.2018.08.079.

[21] Badan Pusat Statistik, 'Jumlah Penduduk Provinsi Aceh', 2019, https://aceh.bps.go.id/.

Table 5. Number of Respondents by Education Level

| Level of education | Amount | Percentage |
|---|---|---|
| SMA/Equivalent | 57 | 57% |
| Diploma | 11 | 11% |
| Bachelor | 28 | 28% |
| Postgraduate | 4 | 4% |

Source: Processed data (2022)

The types of work of the respondents in this study were students, civil servants, entrepreneurs, housewives, and others. For more details can be seen in the following table:

Table 6. Number of Respondents by Type of Work

| Type of work | Amount | Percentage |
|---|---|---|
| Student / Student | 47 | 47% |
| civil servant | 10 | 10% |
| Self-employed | 9 | 9% |
| Housewife | 16 | 16% |
| Other | 18 | 18% |

Source: Processed data (2022)

This test is carried out using the correlation test, namely by correlating each item used in each variable with the variable itself, if r count > r table then the question is valid. With n = 100, where df = n-2 (100-2 = 98) and a significant level of 5%, then 0.197 is obtained. It can be concluded that each item of the 18 questions generated must be above 0.197 to state that the question items are valid.

Table 7. Validity Test Results

| Variable | r table n = 98 | Pearson Correlation (r count) | Information |
|---|---|---|---|
| Simplicity (X1) | | | |
| X1.1 | 0.197 | 0.844 | Valid |
| X1.2 | 0.197 | 0.774 | Valid |
| X1.3 | 0.197 | 0.830 | Valid |
| Balance (X2) | | | |
| X2.1 | 0.197 | 0.920 | Valid |
| X2.2 | 0.197 | 0.929 | Valid |
| X2.3 | 0.197 | 0.947 | Valid |
| Cleanliness (X3) | | | |
| X3.1 | 0.197 | 0.782 | Valid |
| X3.2 | 0.197 | 0.854 | Valid |
| X3.3 | 0.197 | 0.728 | Valid |
| Generosity (X4) | | | |
| X4.1 | 0.197 | 0.843 | Valid |
| X4.2 | 0.197 | 0.823 | Valid |
| X4.3 | 0.197 | 0.774 | Valid |
| Responsibility (X5) | | | |
| X5.1 | 0.197 | 0.856 | Valid |

| | | | |
|---|---|---|---|
| X5.2 | 0.197 | 0.847 | Valid |
| X5.3 | 0.197 | 0.883 | Valid |
| Control of Food Loss and Waste (Y) | | | |
| Y1.1 | 0.197 | 0.788 | Valid |
| Y1.2 | 0.197 | 0.805 | Valid |
| Y1.3 | 0.197 | 0.811 | Valid |

Source: Processed data (2022)

The results of the validity test on the variables using SPSS on 100 respondents, it can be concluded that all items in the tangible are declared valid. This can be seen from the r count which is greater than the r table (0.197).

Reliability test is a tool to measure a questionnaire which is an indicator of the variable. A questionnaire is said to be reliable or reliable if one's answers to statements are consistent or stable from time to time. Questionnaire items are said to be reliable (feasible) if Cronbach's alpha > 0.60 and are said to be unreliable if Cronbach's alpha < 0.60[22].

Table 8. Reliability Test Results

| Variable | Number of items | Cronbach Alpha | Information |
|---|---|---|---|
| Simplicity (X1) | 3 | 0.750 | Reliable |
| Balance (X2) | 3 | 0.923 | Reliable |
| Cleanliness (X3) | 3 | 0.695 | Reliable |
| Generosity (X4) | 3 | 0.740 | Reliable |
| Responsibility (X5) | 3 | 0.827 | Reliable |
| Control of Food Loss and Waste (Y) | 3 | 0.722 | Reliable |

Source: Processed data (2022)

Based on the table above, it is known that the variable Cronbach Alpha value is greater than 0.60, meaning that all the variables studied are reliable.

According to Ghozali[23] this analysis aims to provide an overview or description of data in variables seen from the average (mean), minimum, maximum and standard deviation values. The following results of descriptive statistical analysis research can be seen in the table below:

Table 9. Descriptive Statistics

| | N | Minimum | Maximum | Means | std. Dev |
|---|---|---|---|---|---|
| X1 | 100 | 2.00 | 5.00 | 4.0602 | .61486 |
| X2 | 100 | 1.00 | 5.00 | 3.5565 | .94486 |
| X3 | 100 | 2.67 | 5.00 | 4.2670 | .53824 |
| X4 | 100 | 2.67 | 5.00 | 3.9166 | .58084 |
| X5 | 100 | 2.00 | 5.00 | 3.3335 | .71353 |

[22] I Ghazali, *Aplikasi Analisis Multivariate Dengan Program IBM SPSS* (Yogyakarta: Universitas Diponegoro, 2012).

[23] Ghazali.

| | | | | | |
|---|---|---|---|---|---|
| Y | 100 | 3.00 | 5.00 | 4.3970 | .48705 |
| Valid N | 100 | | | | |

Source: Data Processed by SPSS (2022)

The normality test is carried out to see whether the dependent variable or independent variable has a normal distribution or not. In this study, the normality test was carried out using the Kolmogrov-Smirnov test.

Table 10. Normality Test Results

**One-Sample Kolmogorov-Smirnov Test**

| | | Unstandardized Residuals |
|---|---|---|
| N | | 100 |
| Normal Parameters, b | Means | ,0000000 |
| | std. Deviation | ,39032468 |
| Most Extreme Differences | absolute | ,078 |
| | Positive | ,074 |
| | Negative | -.078 |
| Test Statistics | | ,078 |
| asymp. Sig. (2-tailed) | | , 139c |

a. Test distribution is Normal.

b. Calculated from data.

c. Lilliefors Significance Correction.

Source: Data processed by SPSS version

Based on the table above, it can be seen that the table shows the Kolmogorov-Smirnov value of 0.078 > 0.05 and the Asym sig value of 0.139 > 0.05. From these results, it can be concluded that the research data with a sample size of 100 has normally distributed data and has fulfilled data normality.

The multicollinearity test aims to determine whether there are similarities in a model. If there is a similarity between the independent variables it will cause a very strong correlation. To find out whether there is multicollinearity, it can be seen from the tolerance value and Variance Inflation Factor (VIF). It is said that multicollinearity occurs if there is a tolerance value > 0.10 and a VIF value < 10[24].

Table 11. Multicollinearity Test Results

| Model | Collinearity Statistics | |
|---|---|---|
| | tolerance | VIF |
| Simplicity (X1) | 0.812 | 1,232 |
| Balance (X2) | 0.907 | 1.103 |
| Cleanliness (X3) | 0.801 | 1,248 |
| Generosity (X4) | 0.855 | 1,169 |
| Responsibility (X5) | 0.925 | 1,082 |

Source: Data processed by SPSS version 26 (2022)

[24] Ghazali.

Based on the results of the multicollinearity test in the table above, it shows that all Variance Inflation Factor (VIF) values are less than 10 and the tolerance value is greater than 0.1, so it can be concluded that there is no multicollinearity.

The test method used is the Glejser method. This method is carried out by regressing the independent variables with their residual absolute values.

Table 12 Heteroscedasticity Test Results

| Model | Significance |
|---|---|
| Simplicity (X1) | 0.207 |
| Balance (X2) | 0.265 |
| Cleanliness (X3) | 0.655 |
| Generosity (X4) | 0.318 |
| Responsibility (X5) | 0.523 |

Source: Data processed by SPSS version 26 (2022)

The table above shows that the significant value of each variable is greater than 0.05. So it can be concluded that there are no symptoms of heteroscedasticity, so that a good and ideal regression model can be fulfilled.

This multiple linear regression is used to measure the direction and magnitude of the influence between the independent variable and the dependent variable.

Table 13. Multiple Linear Regression Analysis

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | std. Error | Betas | | |
| 1 | Constant | 3,082 | ,435 | | 7,091 | ,000 |
| | X1 | ,403 | ,073 | ,509 | 5,547 | ,000 |
| | X2 | .084 | .045 | , 163 | 1,883 | ,063 |
| | X3 | ,106 | .084 | , 117 | 1.265 | ,209 |
| | X4 | -,191 | .075 | -,228 | -2,547 | ,012 |
| | X5 | -.097 | .059 | -,143 | -1,659 | ,101 |

Based on the table above, the multiple regression analysis equation is obtained, namely, Y = 3.082 + 0.403 X1 + 0.084 X2 + 0.106 X3 – 0.191 X4 – 0.097 X5 + e

The regression equation above can be explained as follows.

1. The constant value (a) is 3.082. That is, if the coefficient values of Simplicity (X1), Balance (X2), Cleanliness (X3), Generosity (X4), and Responsibility (X5) do not increase or stay the same, then the coefficient value for Control of food loss and waste (Y) is 3.082.
2. The multiple linear regression coefficient of the Simplicity variable (X1) has a positive value of 0.403. This shows that every change of 1 unit of simplicity (X1) will increase the control of food loss and waste (Y) by 0.403 units.
3. The multiple linear regression coefficient of the Balance variable (X2) has

a positive value of 0.084. This shows that every change of 1 unit of balance (X2) will increase the control of food loss and waste (Y) by 0.084 units.

4. The multiple linear regression coefficient of the Cleanliness variable (X3) has a positive value of 0.106. This shows that every change of 1 unit of cleanliness (X3) will increase the control of food loss and waste (Y) by 0.106 units.
5. The multiple linear regression coefficient of the Generosity variable (X4) has a negative value of 0.191. This shows that every change of 1 unit of Generosity (X4) will reduce food loss and waste (Y) control by 0.191 units.
6. The multiple linear regression coefficient of the Responsibility variable (X5) has a negative value of 0.097. This shows that every change of 1 unit of responsibility (X5) will reduce food loss and waste (Y) control by 0.097 units.

The t test was conducted to partially test the effect of the independent variables namely simplicity, balance, cleanliness, generosity, and responsibility on the dependent variable controlling food loss and waste.

Table 14. Test Results t

| VARIABLES | T TABLE | T COUNT | SIG. | INFORMATION |
|---|---|---|---|---|
| **SIMPLICITY (X1)** | 1,985 | 5,547 | 0.000 | H1 accepted |
| **BALANCE (X2)** | 1,985 | 1,883 | 0.063 | H0 accepted |
| **CLEANLINESS (X3)** | 1,985 | 1.265 | 0.209 | H0 accepted |
| **GENEROSITY (X4)** | 1,985 | -2,547 | 0.012 | H1 accepted |
| **RESPONSIBILITY (X5)** | 1,985 | -1,659 | 0.101 | H0 accepted |

Source: Data processed by SPSS version

Based on the table above, it can be seen that only the variables of simplicity and generosity have a significant effect on controlling food loss and waste. While the variables of balance, cleanliness and responsibility have no significant effect on controlling food loss and waste.

The F test is used to determine whether the independent variable (X) simultaneously (simultaneously) affects the dependent variable (Y). If it is significant below 0.05 then the regression model can be used to predict the dependent variable. Here are the results below.

Table 15. F Test

**ANOVAa**

| Model | | Sum of Squares | df | MeanSquare | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 8,401 | 5 | 1,680 | 10.471 | ,000 b |
| | residual | 15,083 | 94 | ,160 | | |
| | Total | 23,484 | 99 | | | |

a. Dependent Variable: Y

b. Predictors: (Constant), X5 , X3 , X2 , X4 , X1

Based on the table above, it shows that the calculated F value is 10.471 and the F table is 2.311. So that the calculated F value is greater than the F table (10.471 > 2.311) and a significant value of 0.000. This states that the significant value is less than 0.05 (0.000 <0.05) so that H1 is accepted and

H0 is rejected. So it can be concluded that all the independent variables simultaneously have a significant positive effect on the dependent variable.

The coefficient of determination states the percentage contribution of the independent variable to the dependent variable. The closer to 1, the stronger the contribution percentage. The test results for the coefficient of determination (R2) are as follows.

Table 16. Test of the Coefficient of Determination (R2)

| Model | R | R Square | Adjusted R Square | std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .598a | .358 | .324 | .40057 |

Source: Data processed by SPSS (2022)

Based on the table above it can be seen that the results of the R2 test (coefficient of determination) were obtained at 0.358. This shows that the control of food loss and waste is influenced by Simplicity (X1), Balance (X2), Cleanliness (X3), Generosity (X4), and Responsibility (X5) of 35.8% and 64.2% again influenced by other factors not included in this research model.

The results showed that there was an influence on the variable controlling food loss and waste, so the hypothesis which stated that there was no effect on controlling food loss and waste was rejected. This principle contains a message that consumption must be based on simplicity, not excessive (excessive) and not extravagant. A wasteful attitude in the long term will reduce or even damage the balance and natural resources. In this study the people of Banda Aceh City have a high level of simplicity. This means that simplicity indicators such as a lifestyle of consuming food as needed and not excessive, an ideal diet.

The results showed that there was no influence on the variable controlling food loss and waste, so the hypothesis which stated that there was an effect on controlling food loss and waste was rejected. Balance means paying attention to the balance between expenditure and income. A Muslim should be able to balance his income and expenses, so that a Muslim will live in economic balance. In this study, balance is not a driving force for the people of Banda Aceh City in controlling food loss and waste. But it could be based on other factors or reasons from the respondent himself in controlling food loss and waste.

The results showed that there was no influence on the variable controlling food loss and waste, so the hypothesis which stated that there was an effect on controlling food loss and waste was rejected. Cleanliness implies that what is consumed must be clean and healthy, good and clean consumption will benefit one's values and health. In this study, cleanliness is not a driving force for the people of Banda Aceh City in controlling food loss and waste. This means that the people of Banda Aceh City still pay little attention to aspects of cleanliness in consuming food and food raw materials to be processed.

The results showed that there was an influence on the variable controlling food loss and waste, so the hypothesis which stated that there was no effect on controlling food loss and waste was rejected. Generosity implies that one's consumption action must be sincere and not forced and

consider social aspects such as sharing with those in need or the people around them. In this study generosity has an influence on controlling food loss and waste. This means that the people of Banda Aceh City have high social souls towards fellow humans and are conscientious towards animals. So the higher the generosity, the better the control of food loss and waste.

The results showed that there was no influence on the variable controlling food loss and waste, so the hypothesis which stated that there was an effect on controlling food loss and waste was rejected. The responsibility in consuming this is meant to be the responsibility of humans as caliphs to manage natural resources in this world, also related to protecting the environment. In this study, responsibility has no effect on controlling food loss and waste. This means that the people of Banda Aceh City still pay little attention to environmental preservation. In fact, the result of excess food waste piling up in the TPA will result in environmental pollution.

Based on the test results indicate that all the independent variables simultaneously have a significant positive effect on the dependent variable. Control of food loss and waste can be defined as a series of activities from consumption activities to reduce food wastage so as to reduce the occurrence of food waste and losses that occur due to food loss and waste itself. Based on the test results above, it can be concluded that the existence of these five factors simultaneously will add to the control of food loss and waste. So that this study can answer the hypothesis put forward, namely that there is an influence of simplicity, balance, cleanliness, generosity, and responsibility towards controlling food loss and waste.

## Conclusion

The conclusions that can be drawn from this research are as follows:

1. Simplicity (X1) partially has a significant effect on the control variable for food loss and waste (Y).
2. Balance (X2) partially has no significant effect on the control variable for food loss and waste (Y).
3. Cleanliness (X3) partially has no significant effect on the variable Control of food loss and waste (Y).
4. Generosity (X4) partially has a significant influence on the variable Control of food loss and waste (Y).
5. Responsibility (X5) partially has no significant effect on the variable Control of food loss and waste (Y).
6. Simplicity (X1), balance (X2), cleanliness (X3), generosity (X4), and responsibility (X5) simultaneously have a positive and significant effect on the control variable for food loss and waste (Y).

The Suggestions from the results of this study are; It is hoped that the public will pay more attention to their consumption behavior so that they can comply with the true principles of Islamic teachings. As well as changing consumption habits that can harm the environment. Also, the government and various related institutions must start promoting education to the public regarding the problem of waste, especially food, which is caused by wastage

of food because it is often underestimated and ignored. Optimizing appropriate funding for improving food infrastructure, providing infrastructure to support efficient food production processes and developing regulations related to food loss and waste. Furthermore, suggestions for further research are expected to be able to add respondents and several different variables from this study such as income levels, lifestyles/trends in order to produce a better picture of the research problem to be studied.

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