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Environmental awareness and intention to reduce food waste among urban people

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Abstract. Environmental issues and food waste are still crucial issues today. Indonesia, which is still facing problems of food security and stunting, is reported to be ranked second in the world as a contributor to food waste. This study aimed to measure the level of environmental awareness and intention to reduce food waste among urban people in Indonesia. One thousand ninety-eight samples were collected from five major provincial cities: Jakarta, Bandung, Semarang, Yogyakarta, and Surabaya. The results show that environmental awareness and intention to reduce food waste are already high. The results also prove that the effect of environmental awareness on the intention to reduce food waste is positive and significant. The limitation of the report in this paper does not include actual behavior to see whether high environmental awareness and intention to reduce food waste automatically creates actual behavior to reduce food waste. The actual behavior to reduce food waste in Indonesia is still concerning. So the recommendation for future research is to include actual behavior to reduce food waste in the research model.

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1. Introduction

Thomas Malthus once said that world population growth would be faster than the food supply, so it is feared that this could lead to reduced food availability [1]. But now, a third (1.3 million tonnes per year) of food for humans globally is wasted along supply chains [2]. So the behavior of increasing the amount of food waste is seen as a behavior that shows indifference to the sustainability of food resources. The development of sustainable food systems, according to Marangon et al. [3], depends on reducing food waste. Waste of food can contribute to the weakening of national food security, even globally.

In actuality, a significant quantity of food waste, including food waste and leftovers, is produced along the whole supply chain, from production to consumption. Harvesting, processing, packaging,

storing, distribution, and eventually end-user consumption follow the agricultural process [2] [4]. That is why Kim et al. [5] says Food wasting is a widespread issue.

Consumers generate most food waste in developed countries. In contrast, in developing countries, most food waste is generated because it is damaged in transit before reaching the hands of consumers [6]. Fruits and vegetables took first place in the composition of food waste globally in 2017, which is 30% compared to cereals at 24%, tubers at 19%, milk and eggs at 9%, meat at 5%, vegetable oil and nuts at 3%, fish and food sea 1% [7].

Food waste is a significant issue for Indonesia as well. Indonesia is the second-largest generator of food waste in the world, behind Saudi Arabia, with 300 kilograms per person annually [8] [9]. This extraordinary figure is believed to be a threat to food and nutrition security in Indonesia [9]. Moreover, food waste increases along with the behavior of food purchases and consumption behavior of the community [10]. Data from the Ministry of Environment and Forestry in 2020 states that food waste is the most common type of waste that arises, 39.8% of all types of waste produced by the people of Indonesia. Yet, unfortunately, around 8.34% of Indonesia's population is still experiencing food shortages. That fact is unfortunate [11].

Chun T'ing et al. [12] call Malaysia a food haven, but its people face the problem of excessive food waste that threatens the environment. According to Chun T'ing et al. [12] Malaysians may not be aware of this. Indonesia is also a food haven, but food security is still a problem. Indonesia is ranked second in the world as a producer of food waste. According to the Food Security Service, many Indonesians are unaware of the harmful effects that food waste has on the environment. The Food Security Service reminded us that that not only plastic waste, but the presence of food waste can also fully contribute to the environmental crisis. Therefore, there is a need to strengthen education about environmental awareness and intention to reduce food waste, especially for Indonesian people.

According to Sawasdee et al. [13] environmental awareness is the tendency to understand and participate in environmental protection behaviors that reflect an individual's awareness of environmental issues. Bhatti et al. [4] explained that environmental awareness is vital in encouraging people to reduce food waste. In addition, concern for the environment will encourage concerns that impact the intention to reduce food waste. Then Sawasdee et al. [13] also proved that environmental awareness significantly impacts the goal of reducing food waste.

In this paper, we share the findings of a test of the influence of environmental consciousness on the desire to decrease food waste among urban residents in Indonesia. This study concerned the intention and behavior to minimize food waste.

2. Methodology

A sampling of this research was conducted in five provincial cities, namely Jakarta, Bandung, Yogyakarta, Semarang, and Surabaya. Because of the large population, the convenience sampling technique was used in determining the research sample. According to Hair et al. [14] for non-probability sampling technique can use the formula for the number of items multiplied by 10. The number of items in this study is 12. Therefore the minimum sample is 120. However, because the total population of the five cities where the study is extensive, then a larger sample is more representative of the population. The survey was collected via a google form link that was shared through a network of colleagues in Jakarta, Bandung, Semarang, Yogyakarta, and Surabaya. The total samples collected and analyzed amounted to 1098 samples.

Demographic data can be seen in Table 1. The data were then analyzed by descriptive analysis and simple linear regression with the help of IBM SPSS Statistics 21 software. The number of respondents is different for each city, and it is a consequence of the application of convenience sampling rather than quota sampling in this study.

Table 1. Demographics

	Frequency	%
Gender		
Male	472	43
Female	626	57
Age		
Baby Boomers	27	2
Gen X	157	14
Gen Y	261	24
Gen Z	653	60
Qualification		
High school	535	49
Diploma	69	6
Bachelor	411	38
Master	70	6
Doctor	13	1
Domicile		
Jakarta	122	11
Bandung	306	28
Semarang	127	12
Yogyakarta	335	30
Surabaya	208	19

3. Findings

The results of data analysis prove that all research indicators are valid, and all variables are proven reliable. In addition, the results of hypothesis testing are also proven. Finally, it shows how important it is to be aware of environmental safety and the willingness of the community to reduce food waste.

3.1. *Reliability and Validity Testing*

Table 2. Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.868	.875	7

Reliable is determined as a Cronbach's Alpha value of 0.60 to 0.80. Cronbach's Alpha is considered to be highly dependable if it is between 0.80 and 1.00. According to Table 2, the environmental awareness variable has a Cronbach's Alpha value of 0.868, which indicates that it is very reliable.

Table 3. Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
ENV1	25.747	10.643	.532	.320	.871
ENV2	25.535	10.891	.710	.529	.841
ENV3	25.464	11.060	.716	.559	.841
ENV4	25.420	11.150	.675	.499	.846
ENV5	25.694	10.798	.642	.449	.850
ENV6	25.469	11.041	.676	.468	.846
ENV7	25.699	11.022	.614	.425	.853

The r-table value of the sample above 1000 is 0.052. The item is valid if the Corrected Item-Total Correlation value is higher than the r-table [15]. For example, Table 3 shows that the value of Item 1 to Item7 has a value higher than 0.052. Thus each indicator of the environmental awareness variable is valid.

Table 4. Reliability Statistics

Cronbach's Alpha	N of Items
.727	5

The Cronbach's Alpha value in Table 4 is 0.727, demonstrating the reliability of the variable intention. The corrected item-total correlation of all items is then higher than 0.052 (r-table) as seen in Table 5. Therefore, each and every item in the variable intention is valid.

Table 5. Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
INT1	14.422	5.562	.412	.707
INT2	15.268	4.851	.459	.695
INT3	14.949	4.794	.569	.646
INT4	14.571	5.407	.441	.697
INT5	14.852	4.904	.562	.650

Table 6 shows that environmental awareness among the urban communities studied is very good. They have realized that food waste is terrible for the environment. They recognize the need for a food waste control mechanism and a disposal policy. They support the need for a recycling policy, reducing food waste by using biotechnology or changing food waste to become compost. And they are aware that food waste can be reduced with citizen participation.

3.2. Descriptive analysis

Table 6. Frequency Table of Environmental Awareness Items

Items	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. I am aware that food waste is terrible for the environment.	0.7 %	6.3 %	13.1 %	42.9 %	37 %
2. I recognize the need for a food waste control mechanism.	0.3 %	0.9 %	8.6 %	48.7 %	41.5 %
3. I recognize the need for a final disposal policy.	0.1 %	0.6 %	6.9 %	46.4 %	45.9 %
4. I realize the need for a recycling policy in Indonesia.	0.2 %	9.5 %	7.3 %	41.5 %	50.5 %
5. I realize that food waste can be reduced by using biotechnology	0.2 %	2.1 %	15.2 %	48.3 %	34.3 %
6. I am aware that food waste can be reduced with citizen participation.	0.3 %	0.9 %	7.3 %	44.7 %	46.8 %
7. I realized that food waste could be used by making compost.	0.3 %	1.5 %	14.9 %	50.5 %	32.7 %

Table 7 reveals the respondents' strong desire to cut down on food waste. Most people want to use food as efficiently as possible without wasting any, recycle food scraps to cut down on waste, persuade others to do the same, ensure that leftovers are used up, and turn food scraps into compost.

Table 7. Frequency Table of Intention Items

Items	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. I will make the best use of food without wasting anything.	0.5 %	1 %	15.6 %	54.6 %	28.3 %
2. I will make compost from food waste.	3.3 %	13. %	47.3 %	28.5 %	7.9 %
3. I will reprocess food waste to reduce food waste.	1.3 %	6.6. %	36.2 %	46.0 %	9.9 %
4. I will convince others to reduce food waste.	0.1 %	3.6 %	18.7 %	56.9 %	20.7 %
5. I will make sure the leftovers are reused.	1 %	4 %	35.1 %	47.5 %	12.4 %

Table 8 shows that the simple linear regression carried out here has fulfilled the requirements, which is indicated by the value of Sig. 0.000 < 0.05.

3.3. Hypothesis test results

Table 8. ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1781.269	1	1781.269	304.711	.000[b]
	Residual	6406.968	1096	5.846		
	Total	8188.237	1097			
a. Dependent Variable: INT						
b. Predictors: (Constant), ENV						

Table 9 demonstrates a favorable and large impact of environmental awareness on urban residents' intentions to reduce food waste. The P-value of 0.000 0.05 indicates it.

Table 9. Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	8.556	.575		14.876	.000
	ENV	.334	.019	.466	17.456	.000
a. Dependent Variable: INT						

4. Discussion

This study examined how environmental consciousness affected urban residents' intentions to reduce food waste in five important provincial cities in Indonesia: Jakarta, Bandung, Semarang, Yogyakarta, and Surabaya. The results of this study showed that a positive and significant impact of environmental awareness on the intention to reduce food waste was noted. This finding is in line with and confirms the study of Sawasdee et al. [13] which also proved that environmental awareness significantly influences the intention to reduce food waste. The higher the environmental awareness of urban people, the bigger the intention to reduce food waste they have. Thus, we can recommend that the education or community empowerment to increase environmental awareness is key to initiate the behavior of reducing food waste among people in big/major cities in Indonesia.

Additionally, the study also reveals that environmental awareness and intention to reduce food waste among the urban communities in Indonesia is already quite high. This means that Indonesians living in the urban regions already have the awareness and intention needed, which is vital according to Bhatti et al. [4], to showcase an actual behavior of reducing food waste in their daily lives and living environments. However, measuring this actual behavior was out of the scope of this study. We have no knowledge yet so far on whether or not the high awareness and intention have created food waste reduction behavior in Indonesian urban people, which calls for future research. Once this behavior exists

when measured, then we have the boldness to argue that Indonesian urban people are capable in practicing behavior of reducing food waste towards developing a sustainable food system as proposed by Marangon et al. [3].

5. Conclusions

The findings indicate that there is already a high level of environmental consciousness and desire to reduce food waste. The results demonstrated that awareness has a favorable and significant impact on the desire to reduce food waste. However, of course, there are limitations to the report in this paper. In this paper, we have not included actual behavior to see whether high environmental awareness and intention to reduce food waste automatically create actual behavior to reduce food waste. The actual behavior to reduce food waste in Indonesia is still concerning. So the next report or recommendation for future research is to include actual behavior to reduce food waste in the research model.

6. Acknowledgment

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