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Development of Visual Portion Sizes to Increase Housewives' Knowledge of Food Portions in an Effort to Reduce Food Waste

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A B S T R A C T

Food Waste (FW) is one of the most pressing social, economic, and environmental issues affecting environmental sustainability, by reducing FW, goal 12 of the SDGs, related to responsible food consumption and production can be achieved. The economic loss due to FW is equivalent to a loss of IDR 213-551 trillion per year. Based on wasted energy and protein, 61-125 million Indonesians could be fed if there was no food waste. Studies show that the amount of food wasted is equivalent to feeding 125 million people to alleviate poverty and address stunting in Indonesia. Most food waste is generated at the consumption stage. Eating food wisely and according to portions can help reduce food waste. Through Visual Portion Sizes (VPS), it is hoped that housewives' knowledge about food portions can increase, so that food waste can be minimized or zero waste can be achieved. Respondents in this study amounted to 30 people who are food managers in households. The results stated that there was a significant difference between the knowledge of household food managers before and after education ($p<0.05$). Respondents already understood the principles of balanced nutrition, but VPS using hand portions was new for respondents to understand food portions according to needs.

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INTRODUCTION

Most household consumption activities are influenced by certain factors such as income, household size, and various lifestyles. For example, a low-income young or old couple or a wealthy adult household with demographic factors from the overall population (e.g., the share of the household consisting of young or elderly couples). Such integration can contribute and be relevant to specific socio-economic and lifestyle factors and thus can change the entire household management as a means of sustainability (Kissinger & Damari 2020). Furthermore, Shabaz (2022) mentioned that households' daily consumption of food, energy and water has an impact on natural resource supplies, environmental quality and climate change. Households have significant potential to improve conservation measures for efficient use of natural resources and greenhouse gas emissions. Statistically, sustainable consumption practices are higher among women, households living in urban areas, more educated people, individuals with large family sizes, and households with high socioeconomic status.

Understanding the determinants of food provisioning is critical in efforts to reduce household food wastage. Various studies have identified a network of interrelated socio-demographic characteristics, values, attitudes and skills as drivers of food wastage in households that increase food waste (FW) (Elimelech et al. 2022). Food waste generated in homes accounts for the largest share of food waste generated along the food chain. The entire food supply chain generates about 300 kg of avoidable FW, of which waste comes from households (45% in per capita units per year). Therefore, adequate preventive measures based on the quantitative and qualitative dimensions of the problem need to be taken to reduce FW.

Swamilaksita, Baliwati, and Suryani (2022) mentioned ten factors that cause FW in households: individual characteristics, family characteristics, food expenditure, behavior, food selection, habits, shopping practices, waste minimization practices, materialistic values, and product attributes. More than 90% of studies state that behavior is the main factor in the occurrence of FW. Behavior refers to actions based on certain motivations such as food selection, food consumption habits or routines, food waste minimization practices both storage and recycling of food products, and shopping practices including the frequency and timing of shopping. It was further explained that preventive strategies were recommended in various study reviews. The most recommended strategy is to increase the knowledge of household food managers about FW through education and socialization activities. Another study also mentioned that attitudes-cognitive, affective and conative-affect food wastage behavior, but the conative component proved to be the most important. This underscores the importance of education and awareness-raising during childhood to establish routines and behavior patterns with the right messages and encouragement. However, poor household food management such as cooking too much food was identified as the most prominent pattern affecting FW. Therefore, socialization and education need to be done in the household as well (Szakos, Szabó-Bódi, & Kasza, 2021).

THEORETICAL REVIEW

FW can lead to nutrient losses which globally, an average of 65 kg of food is wasted per year, specifically 25% through vegetables, 24% through cereals, and 12% through fruits. In addition, 25 - 50% of the Dietary Recommendation Intake (DRI) of Vitamin C, Vitamin K, Zinc, Copper, Manganese and Selenium is wasted each day (Chen et al, 2020). Apart from nutrient loss, FW also has a serious impact on the socio-economic and environmental sides where this incident is exacerbated by the condition of the Indonesian population which still experiences hunger as much as 13.5% of the total population of Indonesia which is estimated at 269 million people (BPS 2019). FW also causes harmful pollution to the environment. Rezaei and Liu (2017) explained that the resources used to produce food contribute about 4.4 giga tons of greenhouse gas emissions. FAO also estimates that FW contributes an estimated 8% of GHG emissions worldwide due to anaerobic decay of food waste. In addition, the decay process also generates methane gas estimated at around 11% due to FW and if methane gas is mixed in the air together with carbon dioxide gas, it will make the air unhealthy (Spang et al, 2019).

Food waste in households is categorized into three, namely individual, family, and environmental characteristics. Individual characteristics consist of demographics, attitudes, and food processing behaviors. Demographic characteristics that are considered to have an impact on the generation of food waste in households include gender, monthly household income, monthly expenditure on food, education level, and the number of people living in the household (Chalak et al, 2019). Furthermore, for attitude characteristics, according to Ajzen (1991) in the research of Siqueira et al (2022), on the Theory of Planned Behaviour put forward by, states that attitude can be related to food waste, because attitudes will relate to the assessment of each individual towards something positively or negatively. The last characteristic of individual characteristics is the characteristic of food processing behavior whose implementation is still very strong as a determinant of producing the most food waste in households. This food processing behavior includes the practice of making shopping lists, proper storage practices, proper food preparation practices, and the practice of re-managing food waste is considered effective in reducing food waste in households (Chalak et al, 2019). Family characteristics consist of consumption patterns of family members which are influenced by food preferences, food selection, eating habits, and food portions of family members.

METHODOLOGY

This study uses a quasi-experimental design with one group pre-test and post-test with the media used is a module for delivering material assisted by Visual Portion Sizes in the form of a calendar so that it can be placed in a place that is often seen by housewives. Educational media development is carried out using the concept of nudge theory. Juanda (2021) in his book entitled Experimental Economics states that Nudge Theory utilizes the automatic human urge to choose or act. There are 2 observation points to see the increase in knowledge, namely on the day of education (pre-test and post-test 1) and the

7th day after education (post-test 2). The sample in this study were household food managers totaling 30 people. Data were collected in September-October 2023 using a questionnaire that included primary data questions regarding the characteristics of housewives (mother's age, family size, household socioeconomics), eating behavior, and knowledge about food portions. The secondary data used regarding the general description of the area was obtained from Tanah Sareal Dalam Angka (2021).

The stages of analysis included descriptive analysis and hypothesis testing. Descriptive analysis was used to examine all variables in the study such as household characteristics, eating behavior, and knowledge about food portions. While hypothesis testing uses Dependent T-test to see the difference in knowledge of housewives before and after education using VPS.

RESULTS

SIPSN data (2023) shows that the percentage of waste generation from the household sector in Indonesia is 44.6%. Meanwhile, the composition of the type of waste generated in this case food waste in Indonesia has a percentage of 39.4%. However, based on SIPSN data (2023), the percentage of waste generation from the household sector in Bogor City is 62% with daily waste generation reaching 779.81 tons. Meanwhile, the composition of the type of waste generated in this case food waste in Bogor City has a percentage of 41%. Thus, the location of this research was carried out in Tanah Sareal District, Bogor City, West Java Province. This is because the household sector in Bogor City contributes the 2nd highest food waste in West Java, after Cianjur Regency with a difference of 0.22%. Tanah Sareal sub-district has a population growth rate of 1.42% with a population of 218,094 people, ranking first in the growth rate in Bogor City (BPS, 2021).

Characteristics of Food Managers in Households

The research was conducted on September 29, 2023 at Posyandu Merpati 1 and 2. Kedung Badak Village, Tanah Sareal District. The extension tools used are Visual Portion Sizes (VPS) that have been designed and balanced nutrition modules. Respondents in the study were food managers or managers in households aged 30-52 years with the following characteristics:

Table 1. Respondent Characteristics

No	Characteristics	n	%
1	**Respondent's Gender**		
	Woman	30	100,0,0
	Man	0	0,00
Total		**30**	**100,0**
2	**Respondent's Age**		
	30 – 37 years old	8	26,6
	38 – 43 years old	8	26,6
	44 – 52 years old	14	46,6
Total		**30**	**100,0**

No	Characteristics	n	%
3	**Respondent's Education**		
	No Education	1	3,3
	Elementary School	2	6,7
	Junior High School	2	6,7
	Senior High Shcool	15	50,0
	Associate Degree	4	13,3
	Bachelor Degree	5	16,7
	Master Degree	1	3,3
Total		**30**	**100,0**
4	**Respondent's Occupation**		
	Housewife	30	100,0
	Other	0	0,0
Total		**30**	**100,0**
5	**Household Income**		
	<UMR (4.6 million)	11	36,7
	UMR (4.6 million)	19	63,3
Total		**30**	**100,0**
6	**Food Expenditures Per Month**		
	<2.273.320	23	76,6
	2.273.320	7	23,3
Total		**30**	**100,0**
7	**Number of Family Members**		
	3 people	4	1,2
	4 people	12	40,0
	5 people	14	46,6
Total		**30**	**100,0**

Table 1 shows that food managers in households are generally women with almost half of them aged 44-52 years (46.6%). In terms of education level, 50% of respondents have a high school education. All respondents are not working so they focus on being household managers and are directly involved in the food management process. A total of 63.3% had a household income in accordance with the Bogor City minimum wage in 2023 of IDR 4,600,000 with household food expenditure per month < IDR 2,273,320 but still ranged between 48-49% of total household expenditure. The number of capita per household is between 4-5 people with a greater percentage of family members of 5 people (46.6%).

Household Eating Behavior

According to FAO, food waste is food discarded in the food supply chain (whether in the form of processed, semi-processed or raw food) intended for consumption by choice or left or discarded because it is damaged or expired as a result of human negligence, especially at the household level. Food waste behavior at the household level is influenced by several factors, including consumer behavior, food quality and safety, and psychological factors.

Consumer behavior related to household food waste includes planning, purchasing, storage, and eating behavior. Meanwhile, food quality and safety include expiration date, quality degradation, and food sensory (taste, rottenness, odor, unattractiveness). Psychological factors related to food waste behavior include knowledge, awareness, behavior, perception, norms, and feelings of responsibility or guilt (Diana R 2022).

Household eating behavior describes all food consumption behavior in the household which is reflected in the 21 statements below. Respondents rated the statements on a scale of 1-10 (never to always). Based on the household behavior scores, it can be seen that on average, respondents gave a moderate rating (score of 6) to all aspects of the statement. The highest aspect was related to the selection of healthy and diverse foods consumed by respondents (score > 8). The lowest aspects described wasted carbohydrate foods and unplanned food preferences and purchases (scores < 6). As a percentage, 83.3% (25 people) still have poor consumption behavior.

Table 2. Household Eating Behavior

No	Variable	n	Mean	Median	Min	Max
1	**Total Eating Behavior Score**	30	132,4	136,5	57	175
2	**Aspects of Eating Behavior:**					
	a. I leave food on my plate that is still suitable for consumption	30	6,2	7,0	1	10
	b. I eat food that is only available at home	30	7,00	7,5	3	10
	c. If there is family food that is not finished or left over, I choose to finish it	30	7,5	8,0	1	10
	d. I often reheat family food that is not finished and is still suitable for consumption	30	7,3	8,0	1	10
	e. I want to eat when there is only food I like	30	5,2	5,0	1	10
	f. My hunger level increases when I relax	30	7,1	8,0	1	10
	g. When food is available at home, I still buy food from outside	30	5,9	6,0	1	10
	h. I save unused food	30	6,7	7,0	1	10
	i. I prepare food according to the menu plan that has been prepared previously (meal plan)	30	7,3	8,0	1	10
	j. I consider food portions on weekdays and holidays	30	7,2	8,0	1	10

No	Variable	n	Mean	Median	Min	Max
k.	I feel unhappy or uncomfortable when I see food left on the table	30	7,9	8,5	2	10
l.	If a dish fails, I immediately throw the food away	30	6,1	7,0	1	10
m.	I threw away leftover food that could still be consumed	30	4,2	4,0	1	10
n.	I took too much food and left food on my plate	30	4,1	3,0	1	10
o.	I enjoy eating healthy food	30	8,6	9,0	5	10
p.	I like eating packaged food	30	5,5	6,0	1	10
q.	I enjoy eating a variety of foods	30	8,2	8,5	5	10
r.	If there is family food that is not finished or left over, I choose to give it to someone else	30	6,5	8,0	1	10
s.	Carbohydrates are a type of food that is wasted more	30	5,7	6,5	1	10
t.	Protein is a type of food that is mostly wasted	30	3,5	3,0	1	7
u.	Fat is a type of food that is more often wasted	30	3,9	3,0	1	10

The distribution of respondents based on aspects of eating behavior is shown in Table 3, which shows in more detail how household eating behavior is. Food consumption behavior in households is very diverse. However, from this data it can be seen that there are still 20.0% of respondents who leave food on their plates, however, more respondents consume food available at home (26.6%). Respondents try to always finish off leftover food (30.0%), one of which is by reheating it the next day (23.3%). As many as 23.3% of respondents said they were hungry when relaxing, which sometimes led to unplanned food purchases even though food was available at home (23.3%). As many as 33.3% of respondents saved leftover food, but they did not always process food according to the meal plan. Planning the menu that will be prepared is usually done when cooking by considering holidays (>30.0%). More than half of respondents are not happy if there is leftover food (>50.0%), but there are still those who throw away leftover food, especially when food has failed processing (20.0%). There are still respondents who do not take portions according to their needs (>20%), even though more than half of respondents already have a preference for healthy and varied food (>50%). As many as >20% of respondents still like to eat packaged food and if there is a little food left they give it to other people. There tends to be more if it is not processed or heated, namely it is used to feed livestock. The types of food that are mostly

wasted are carbohydrate sources (> 40%) compared to food sources of protein and fat.

Tabel 3. Distribution of Respondents Based on Eating Behavior Aspects

No	Characteristics	N Scale (%)									
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
1	Leaving food on the plate	3(10,0)	3(10,0)	1(3,3)	2(6,7)	2(6,7)	2(6,7)	5(16,7)	5(16,7)	0(0,0)	**6(20,0)**
2	Eating food that is only available at home	0(0,0)	0(0,0)	2(6,7)	1(3,3)	6(20,0)	1(3,3)	5(16,7)	**8(26,6)**	4(13,3)	3(10,0)
3	Finish the remaining food	1(3,3)	1(3,3)	1(3,3)	0(0,0)	3(10,0)	3(10,0)	2(6,7)	7(23,3)	3(10,0)	**9(30,0)**
4	Reheat unfinished food	1(3,3)	1(3,3)	1(3,3)	2(6,7)	1(3,3)	1(3,3)	4(13,3)	**7(23,3)**	6(20,0)	5(16,7)
5	Eat when preferred foods are available	**7(23,3)**	2(6,7)	2(6,7)	2(6,7)	4(13,3)	2(6,7)	2(6,7)	2(6,7)	2(6,7)	5(16,7)
6	Hunger levels increase when relaxed	2(6,7)	1(3,3)	2(6,7)	2(6,7)	2(6,7)	2(6.7)	5(16,7)	5(16,7)	**7(23,3)**	4(13,3)
7	Buy food even though it is available at home	3(10,0)	2(6,7)	2(6,7)	1(3,3)	6(20,0)	2(6,7)	1(3,3)	**7(23,3)**	4(13,3)	2(6,7)
8	Store food that doesn't run out	2(6,7)	1(3,3)	0(0,0)	1(3,3)	3(10,0)	4(13,3)	5(16,7)	**10(33,3)**	1(3,3)	3(10,0)
9	Prepare food according to the meal plan	1(3,3)	0(0,0)	1(3,3)	3(10,0)	2(6,7)	1(3,3)	6(20,0)	4(13,3)	**7(23,3)**	5(16,7)
10	Consider the holiday and regular portions	2(6,7)	0(0,0)	0(0,0)	1(3,3)	2(6,7)	2(6,7)	5(16,7)	5(16,7)	6(20,0)	**7(13,3)**
11	Not happy to see leftover food on the table	0(0,0)	1(3,3)	1(3,3)	1(3,3)	0(0,0)	2(6,7)	6(20,0)	4(13,3)	6(20,0)	**9(30,0)**
12	Throw away failed dishes	2(6,7)	3(10,0)	1(3,3)	4(13,3)	3(10,0)	1(3,3)	4(13,3)	**6(20,0)**	1(3,3)	5(16,7)
13	Throw away leftovers	**10(30,0)**	1(3,3)	2(6,7)	3(10,0)	2(6,7)	2(6.7)	1(3,3)	5(16,7)	2(6,7)	2(6,7)
14	Taking too much	**9(30,0)**	2(6,7)	5(16,7)	3(10,0)	1(3,3)	3(10,0)	2(6,7)	2(6,7)	0(0,0)	3(10,0)
15	Enjoy consuming healthy food	0(0,0)	0(0,0)	0(0,0)	0(0,0)	1(3,3)	1(3,3)	7(23,3)	3(10,0)	6(20,0)	**12(40,0)**
16	Enjoys consuming packaged food	1(3,3)	3(10,0)	3(10,0)	0(0,0)	6(20,0)	**7(23,3)**	5(16,7)	3(10,0)	1(3,3)	1(3,3)
17	Enjoys eating a variety of foods	0(0,0)	0(0,0)	0(0,0)	0(0,0)	4(13,3)	0(0,0)	4(13,3)	7(23,3)	**8(26,7)**	7(23,3)

No	Characteristics	N Scale (%)									
		1	2	3	4	5	6	7	8	9	10
18	Giving leftover food to someone else	3(10,0)	2(6,7)	2(6,7)	1(3,3)	2(6,7)	0(0,0)	4(13,3)	8(26,7)	3(10,0)	**5(16,7)**
19	KH is food that is wasted a lot	4(23,3)	4(13,3)	2(6,7)	1(3,3)	2(6,7)	2(6,7)	1(3,3)	**8(26,7)**	3(10,0)	3(10,0)
20	Protein is what is wasted a lot	**8(26,7)**	4(13,3)	4(13,3)	2(6,7)	5(16,7)	5(16,7)	2(6,7)	0(0,0)	0(0,0)	0(0,0)
21	Fat is what is wasted a lot	5(16,7)	5(16,7)	**6(20,0)**	4(13,3)	3(10,0)	3(10,0)	0(0,0)	0(0,0)	0(0,0)	0(0,0)

Mother's Knowledge Regarding Food Portions

In this study, the mother's knowledge as a food manager in the household was also measured. The knowledge in question is about balanced nutrition, especially fulfilling the right portions for the family. The following is data on the mother's knowledge regarding food portions before and after the intervention:

Table 4. Mother's Knowledge Regarding Food Portions Before and After Education

Variabel	Mean	Min	Max	SD	p Value
Mother's Knowledge					
Before	26,7	11	34	5,9	0,0001
After	34,2	23	38	3,1	

Based on the data in Table 4, it is known that the average knowledge of mothers before education is 26.7, where the maximum value is 34. This figure shows that respondents' knowledge still tends to be lacking (<80%). The results of the increase obtained in the mother's knowledge after the balanced nutrition education were 34.2 with a maximum value of 38. These results show that the mother's knowledge after the education was relatively good (>80% answered correctly).

DISCUSSION

Based on statistical tests (Table 4), the results showed that there was a significant difference ($p<0.05$) between mothers' knowledge before and after education. Based on further studies, it was found that the aspect of knowledge that had the highest score from respondents was that respondents understood the role of nutrients, namely when a person is in the womb and the role of breakfast. However, respondents do not yet understand how balanced nutritional composition and food portions are according to needs. This is illustrated by the lowest scores from respondents, namely:

1. Principles of balanced nutrition (balancing incoming and outgoing nutrients)
2. Fulfillment of carbohydrates can be fulfilled with 1 palm
3. Daily portion size can also be determined from the size of your palm

4. Fat is limited to 4 tablespoons a day, if using your hands then the size of 1 thumb joint is the same as 1 tablespoon

Meanwhile, after education, respondents experienced an increase in knowledge, especially the principles and composition of balanced nutrition to meet daily nutritional needs as well as the role of breakfast and the role of nutrients for growth and development. However, there are still the lowest knowledge scores, namely:

1. Portion size of protein (1 palm of fish can meet animal protein needs for 1 meal)
2. Limit fat and portions (the size of 1 thumb joint is the same as 1 tablespoon)
3. Carbohydrate portion size (1 palm)

Based on this explanation, it is clear that respondents already understand the principles of balanced nutrition, but VPS which uses hand portions is something new for respondents to understand food portions according to their needs. The education carried out increased the knowledge of several respondents, but further outreach activities need to be carried out to introduce hand portions so that it is easier for mothers to estimate the right portions for each family member.

This is in line with research conducted by Swamilaksita, Baliwati, and Suryani (2022) which states that there are ten factors that cause FW in the household, namely individual characteristics, family characteristics, food expenditure, behavior, food choices, habits, shopping practices, practice. waste minimization, materialistic values, and product attributes. More than 90% of studies state that behavior is the main factor in the occurrence of FW. The behavior in question is action based on certain motivations such as food choices, food consumption habits or routines, food waste reduction practices both storing and recycling food products, and shopping practices including the frequency and timing of shopping.

It was further explained that preventive strategies were recommended in various study reviews. The most frequently recommended strategy is increasing the knowledge of household food managers regarding FW through education and outreach activities. This research is also in line with the food management target of reducing FW stated by Bunditsakulchai and Liu (2021) who said that in food processing, skills and knowledge in preparing food are very important in cooking.

CONCLUSIONS AND RECOMMENDATIONS

Based on research, it can be concluded that the respondents in this study are food managers in households aged 30-52 years. All respondents do not work so they focus on being household managers and are directly involved in the food management process. Based on 21 questions regarding household eating behavior, the results showed that 83.3% (25 people) still had bad consumption behavior. This is in line with the average score of mothers' knowledge regarding food portions, which shows that respondents' knowledge still tends to be lacking (<80%). Therefore, an intervention on this consumption behavior was carried out.

The results of the increase obtained in the mother's knowledge after the balanced nutrition education were 34.2 with a maximum value of 38. These results show that the mother's knowledge after the education was relatively good (>80% answered correctly). This shows that there is an increase in respondents' knowledge of the education that has been carried out.

FURTHER STUDY

Further research can provide education regarding hand portions using VPS on an ongoing basis to maximize the goal of minimizing FW to achieve zero waste.

REFERENCES

Ajzen, I. (1991). The theory of planned behavior. Organizational Behavior and Human Decision Processes, 50(2), 179–211. https://doi.org/10.1016/0749-5978(91)90020-T

BPS. (2019). Statistik Indonesia 2019 (Indonesian statistics). Statistik Indonesia 2019 (Indonesian Statistics).

BPS. (2023). Istilah Sosial dan Kependudukan. Www.Bps.Go.Id.

Bunditsakulchai, P., & Liu, C. (2021). Integrated Strategies for Household Food Waste Reduction in Bangkok. Sustainability, 13(14), 7651. https://doi.org/10.3390/su13147651

Chalak, A., Abiad, M. G., Diab, M., & Nasreddine, L. (2019). The determinants of household food waste generation and its associated caloric and nutrient losses: The case of Lebanon. PLoS ONE, 14(12). https://doi.org/10.1371/journal.pone.0225789

Chen, C., Chaudhary, A., & Mathys, A. (2020). Nutritional and environmental losses embedded in global food waste. Resources, Conservation and Recycling, 160(April), 104912. https://doi.org/10.1016/j.resconrec.2020.104912

Diana, R. 2022. https://unair.ac.id/perilaku-food-waste-rumah-tangga-di-asia-tenggara/

Di Donato, M., & Carpintero, Ó. (2021). Household food metabolism: Losses, waste and environmental pressures of food consumption at the regional level in spain. Foods, 10(6), 1–22. https://doi.org/10.3390/foods10061166

Economist Intelligence Unit. (2017). Food Loss and Waste. Https://Foodsustainability.Eiu.Com/Food-Loss-and-Waste/. https://foodsustainability.eiu.com/food-loss-and-waste/

FAO, F. and A. O. of the U. (2011). Why Is Flw Important ?

FAO. (2016). Global initiative on food loss and waste reduction Key facts on food loss and waste you should know.

FAO. (2017). Global initiative on Food Loss and Waste. Fao, 6. www.fao.org/publications%0Awww.fao.org/platform-food-loss-waste

Juanda, B. (n.d.). Eksperimen Penerapan Nudge Theory dalam Masalah Publik. https://bambangjuanda.com/wp-content/uploads/2021/12/Eksperimen-Penerapan-Nudge-Theory-dalam-Masalah-Publik.pdf

Quested, T. E., Marsh, E., Stunell, D., & Parry, A. D. (2013). Spaghetti soup: The complex world of food waste behaviours. Resources, Conservation and Recycling, 79. https://doi.org/10.1016/j.resconrec.2013.04.011

Saputra, D., & Sriasih, A. M. (2018). Perilaku Rumah Tangga Perkotaan dalam Menghasilkan Sampah Makanan di Kecamatan Pakualaman Kota Yogyakarta.

Shahbaz, P., & Haq, S. ul. (2022). Food-Energy-and-Water-Nexus-at-Household-Level-Do-Sustainable-Household-Consumption-Practices-Promote-Cleaner-EnvironmentInternational-Journal-of-Environmental-Research-and-Public-Health.pdf.

SIPSN. (2020a). Capaian Kinerja Pengelolaan Sampah. https://sipsn.menlhk.go.id/sipsn/. (Diakses 2 Maret 2023).

SIPSN. (2020b). data Sampah Bogor dan Tanah Sareal. https://sipsn.menlhk.go.id/sipsn/public/data/sumber. (Diakses 2 Maret 2023)

Siregar, S. (2017). Statistik parametrik untuk penelitian kuantitatif : dilengkapi dengan perhitungan manual dan aplikasi SPSS versi 17 (1st ed.). Bumi Aksara.

Spang, E. S., Moreno, L. C., Pace, S. A., Achmon, Y., Donis-Gonzalez, I., Gosliner, W. A., Jablonski-Sheffield, M. P., Abdul Momin, M., Quested, T. E., Winans, K. S., & Tomich, T. P. (2019). Food Loss and Waste: Measurement, Drivers, and Solutions. Annual Review of Environment and Resources, 44(October), 117–156. https://doi.org/10.1146/annurev-environ-101718-033228

Swamilaksita, P., Suryani, F., Sapang, M., & Angeliana Kusumaningtiar, D. (2023). Sosialisasi untuk Mengurangi Food Waste Rumah Tangga. https://doi.org/https://doi.org/10.53690/ipm.v3i022023.193

Swamilaksita, P. D., Baliwati, Y. F., & Suryani, F. (2022). Determinants and Preventive Strategies to Reduce Food Waste in Households. International Journal of Current Science Research and Review, 05(10), 3960–3972. https://doi.org/10.47191/ijcsrr/v5-i10-19

Szakos, D., Szabó-Bódi, B., & Kasza, G. (2021). Consumer awareness campaign to reduce household food waste based on structural equation behavior modeling in Hungary. Environmental Science and Pollution Research, 28(19), 24580–24589. https://doi.org/10.1007/s11356-020-09047-x Tanah Sareal dalam Angka. 2021