

ASSESSING KNOWLEDGE AND ATTITUDE OF CONSUMERS TOWARDS FOOD WASTE PREVENTION

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Abstract: *In today's world of sustainability, it is undeniable that food waste has become a major source of concern for many countries. One of the most significant sources of food waste is consumers. Thus, this study aimed to identify the level of consumers' food waste knowledge and attitude towards food waste prevention. This study is structured through a self-administered survey with the consumers of foodservice establishments in Kuala Terengganu. With 175 respondents, the data were analysed using SPSS version 24. Descriptive analysis and correlation analysis were used to analyse the results. The findings show that knowledge and attitude have a substantial impact on a consumer's ability to prevent food waste. More research should be conducted to determine the best practices that may be implemented. Overall, when the consumer's degree of understanding rises, they will adopt a more positive attitude.*

Keywords: *food waste, food waste prevention, knowledge, attitude, consumer.*

Introduction

Food waste is a global and complicated issue that impacts all three pillars of sustainable development: the environment, the economy, and society (FAO, 2018)(Principato et al., 2021). According to the (FAO, 2019) nearly one-third of all food produced for human use is lost or wasted worldwide. This equates to 1.4 billion tonnes of food that is thrown away each year (Wan et al., 2017). Global food waste by consumers ranges from 95-115 kg per year in Europe and North America, to 6-11 kg per year in South/Southeast Asia and Sub-Saharan Africa (Alsawah et al., 1961). According to surveys, roughly 30–40 percent of the food supply in the United States goes uneaten and wasted, resulting in nearly \$160 billion in economic losses (Yu et al., 2020). While in United Kingdom, the estimation made has stated that the household produces 7.2 million tonnes of food waste a year, which most of it actually avoidable (Jeswani et al., 2021).

Malaysia is not an exception to the available data on food waste around the world. Food waste is becoming more of a problem in Malaysia. Malaysians generate about 16,688 tonnes of food waste per day and food waste accounted for 44.5 percent of solid waste created. In addition, 70% of it was disposed of in landfills and chronically Malaysia currently has 170 trash disposal sites, but space is running out (SWCorp, 2019). Additionally, Municipal Solid Waste (MSW) is made up of 20 different categories, including food waste, which accounts for 50% of total waste composition (Sundaram et al., 2015). As the amount of waste produced grows, landfill space becomes more limited, necessitating rising costs to manage the waste. Food waste will decompose and disintegrate in landfills, releasing methane gases, which have a significant impact on local weather change and global warming (Talwar et al., 2021)(Papargyropoulou et al., 2019).

In addition to the aforementioned concerns, food waste prevention is critical in addressing global food security. The loss of food access, such as food prices and purchasing power, causes food security issues (F G et al., 2021). Most importantly, food waste impacts social perspectives whereby it cannot be accepted as there are still many people who live in hungry and starving, there are people who are unethical and responsible for wasting food. There is enough food being wasted and abandoned by consumers to feed all of the world's needy people. In fact, one-third of the world's food is wasted, despite the fact that at least 805 million people are food insecure and one billion are malnourished (FAO et al., 2021).

In line with the above notion, the consumption stage accounts for the majority of food waste generation (Viachaslau et al., 2022)(Reynolds et al., 2019). Furthermore, majority of food waste comes from foodservice sectors, particularly restaurants, as the number of people eating out has increased (Zeineddine et al., 2021). Considering people are eating out more these days, reducing and preventing food waste in the foodservice industry is critical (Filimonau et al., 2020)(Dhir et al., 2020). Despite the fact that the amount of food-related waste produced in this industry is constantly reported in the media, it has yet to receive adequate scholarly attention (Zeineddine et al., 2021).

The irresponsible consumer represents one of the key drivers of restaurant food waste highlighting the importance of studying their knowledge and attitudes towards food waste prevention (Principato et al., 2021) Consumers' attitude of food waste prevention efficacy were found to be linked to their level of knowledge (Naim & Rahman, 2020)(Alattar et al., 2020). To our best knowledge , several authors have stressed the importance of the determinants of

consumer food waste prevention and reduction behavior in the food service sector (Talwar et al., 2021)(Papargyropoulou et al., 2019)(Viachaslau et al., 2022)(Zeineddine et al., 2021)(Blešić et al., 2021). However, there is currently lesser-known literature in the field of study that addressing consumers' knowledge and attitude particularly in Malaysia foodservice industry. Therefore, in order to contribute to this research area, this study aimed to identify the level of consumers' food waste knowledge and attitude towards food waste prevention.

Literature Review

Knowledge of Consumers

Knowledge can be defined as a consequence of procuring and enhancing learning, whereby it is discrete until the individual actualizes the knowledge to perform some task, make a decision or solve a problem (Alattar et al., 2020). Consumers' food management knowledge is closely tied to planning and shopping routines, having or missing a stock overview, and not knowing whether or not food can still be consumed (Alattar et al., 2020). There are 36% of consumers still confuse with the date labelling which is 'best before' date amid the 'use-by date which with this confusion, it could lead to food being disposed of unnecessarily (Jarjusey et al., 2017). Furthermore, consumers with good knowledge about the problems that will arise related to food waste are more likely will avoid wasting the food (Ramli et al., 2020). In line with that, when consumers have high knowledge regarding the problem arise, they tend to process the information using complex schematic processing instead of the step by step processing which is less efficient (Abd et al., 2018). Hence, having higher knowledge have contributed to a better information to be processing and it is a good preparation in make sure that the food waste issues will immediately be address in tackling the such problem form arise (Aktas et al., 2018)(Ajzen et al., 1991). As a result, according to with a good information and knowledge, consumers become more responsible with their action which in term of storing, preparing and handling the food that can prevent the food from being wasted (Naim & Rahman, 2020)(Alattar et al., 2020)(Ramli et al., 2020).

Attitude of Consumers

Attitudes are the "learned predispositions to behave in a consistently favorable or unfavorable way toward a given object" (Viachaslau et al., 2022). Consumers' attitude of food waste prevention efficacy were found to be linked to their level of knowledge (Ramli et al., 2020). People's attitudes do not change or improve to desirable attitudes if education fails to improve their knowledge level. On the other hand, attitude is an evaluation of psychology that prevents the reduction of food waste and that if any of the consumers have a good attitude, the intention to reduce food wastage may arise (Aktas et al., 2018). Aligned with the above notion, The theory of Planned Behaviour assumes that attitudes have a causal impact on behaviors through the mediation of behavioral intention. As in food waste context, people's attitudes and individual behavior may influence the amount of food waste (Ajzen et al., 1991).

Food Waste Prevention

Prevention is the first and most likely method to reduce food waste in order to give the best overall environmental outcome (Papargyropoulou et al., 2019)(Ciccullo et al., 2021). The environmental implications of production, storage, and transportation; economic losses; food insecurity; and the environmental impacts of food waste disposal are the four key drivers for studying and investing in food waste prevention (Thyberg & Tonjes, 2016). Although minimizing food waste is unattainable because it is inevitable, preventative approaches such as

legislation, programmes, campaigns, and changes in human behaviour can significantly reduce food waste (Nayak & Bhushan, 2019)(Joshi et al., 2019). Food waste prevention in the foodservice industry has the potential to benefit the environment, resource conservation, food security, social and economic costs (Reynolds et al., 2019)(Zeineddine et al., 2021)(Thyberg & Tonjes, 2016).

In fact, several authors has highlighted the food waste prevention strategies. Reference (L V et al., 2020)(Moraes et al., 2021) was highlighted that the food waste prevention strategies including education and awareness; policy, donations and reuse; research and support; and storage, demand control, logistics and selling. Additionally, the existing literature on food waste in the foodservice industry has covered a wide range of topics, including food waste quantification, waste composition, waste handling, doggy bags, consumer attitudes, demographic factors, government regulations, interventions, and nudges, composting, and landfills (Bleši'c et al., 2021). In Malaysia context, various ways of food waste prevention strategies are being done by the Malaysian government such as radio broadcast, media, local articles, magazine, journal research, media education that to delivered awareness as well to increase knowledge of Malaysian on the importance of reduction of food waste (Zamri et al., 2019). Several strategies were developed in focusing on recyclable programme such as 3Rs Activities and awareness on waste minimisation by National Waste Minimization Master Plan and Action Plan, as well as National Strategic Plan (NSP) (Zain et al., 2021).

Methodology

1. Research Design and Sampling

This quantitative study was conducted by distributing questionnaires to the respondents of ten (10) casual-dining restaurants in Terengganu particularly Kuala Nerus area. Terengganu was selected because restaurants & hotels was the top four major components of consumers' expenditure and food & non-alcoholic beverages was the highest contributor to the overall consumption expenditure. To be specific, Kuala Nerus had been chosen since it was recorded as the highest mean monthly consumption expenditure among all districts in Terengganu (Department Of Statistics, 2019). In the context of this study, the casual-dining restaurant had been chosen due to the fact that it contributes the highest amount of plate waste by offering large portions to consumers, thus generate more waste than other types of restaurants (McAdams et al., 2019). The respondents consist of consumers from diverse background. Convenient sampling technique was used in this study, and the target respondents were within specific age limit from 18 years and above. The customers who visited and dining at the restaurant during lunch and dinner were politely requested to fill in the questionnaires. The respondents completed the questionnaires in the presence of the researchers and completed questionnaires were collected immediately. The questionnaires were personally distributed to the consumers and it was conducted for about 4 weeks. A total of 200 questionnaires were distributed, however only 174 questionnaires were found suitable for analysis.

2. Research Instrument

The study measured consumers' knowledge and attitudes by computing the respondent information based on the questionnaire that have four sections which are Section (A) the demographic details of respondents, Section (B) level of knowledge, Section (C) attitude of consumers and Section (D) the factors of food waste prevention. The 5-points Likert scale was

used to interpret items in the questionnaire that indicate strongly disagree (1), disagree (2), neither agree or disagree (3), agree (4) and strongly agree (5). The questionnaire was subjected to a pre-test for content validity by experts before to the actual data collection. Three experts were engaged in this test; they assessed the clarity of the statements, the questionnaire's presentation, and the acceptability of the statements among the respondents. Following that, after getting comments from the experts, changes were made. After the questionnaire was revised, a pilot research was undertaken in Malaysia, where it was sent to 50 randomly selected respondents. SPSS 24 was used to examine the data by the researchers. The descriptive statistics and correlation analysis were used in this study.

Results and Analysis

Demographic Profiling

The sample comprised a total of 175 respondents which is attributed from the distribution of self-administrated questionnaire conducted during one week at selected areas. The following tables present the respondents' profiles.

Table 1: Distribution of respondent's demographic factors

	Table column subhead	Frequency	Percent
Gender	Male	64	36.6%
	Female	111	63.4%
	Total	175	100%
Age	18-24	79	45.1%
	25-34	34	19.4%
	35-44	26	14.9%
	45-54	17	9.7%
	55-64	15	8.6%
	65-74	4	2.3%
	Total	175	100%
Educational level	Elementary school	11	6.3%
	Secondary school	50	28.6%
	Diploma or degree	92	52.6%
	Masters or PhD	22	12.6%
	Total	175	100%

Based on Table I, respondents' demographic factors are distributed into three categories. Most of the respondents are female with 63.4 per cent (63.4%) while another 36.4 per cent (36.4%) are male respondents. Besides, most of the respondents age between 18 to 24 years old with 45.1 per cent (45.1%). With regard to respondent's age, it is expected that the education level of the respondents are majority in diploma and degree level with 52.6 per cent (52.6%).

Descriptive Statistical Analysis on Knowledge, Attitudes and Food Waste Prevention

This section of analysis presents the mean scores from the respondents on their knowledge, attitude and the food waste prevention. Table II to Table IV represent the descriptive statistic for knowledge, attitude and food waste prevention respectively.

Table 2: Level of Knowledge

	N	Mean	Std. Deviation
There are many people still facing the lacking of reliable access of a sufficient and nutritious food around the world	175	4.35	0.660
High amount of food waste generated is the main cause of most issues related to landfill such as odour of the rotten food	175	4.23	0.717
Food waste that is discarded to the landfill is one of the factors that contribute to the emission of greenhouse gas	175	3.83	0.838
Food waste is associated with wasteful use of resources such as water, land, fertilizer and fossil fuel	175	3.94	0.825
Food wastage can contribute to the monetary lost and also increases the cost of the food	175	4.49	0.624
Malaysians are throwing away many of unconsumed food daily and it requires a lot off cost for reproducing another food	175	4.45	0.631

Based on analysis presented in Table II, most of the respondents agree and strongly agree on the statement given. From the analysis, (Item 1, M=4.35), shows that respondents know 'there are many people still facing the lacking of reliable access of a sufficient and nutritious food around the world'. Next, (Item 2, M=4.23), shows that respondents know 'high amount of food waste generated is the main cause of most issues related to landfill such as odour of the rotten food'. (Item 3, M=3.83), has the lowest mean, showing that respondent has less knowledge of 'food that is discarded to the landfill is one of the factors that contribute to the emission of greenhouse gas'. Next is (Item 4, M=3.94), shows that respondents know 'food waste is associated with wasteful of resources such as water, land, fertilizer and fossil fuel'. The highest mean, (Item 5, M=4.49) shows that the respondents' knowledge of the economic impact of food waste ranked the highest, which 'food wastage can contribute to the monetary lost and also increase the cost of the food'. The last item, (Item 6, M=4.45), shows that respondents agree that 'Malaysians are throwing away many of unconsumed food daily and it requires a lot of cost for reproducing another food'.

Table 3: Level of Attitude

	N	Mean	Std. Deviation
I feel guilty/bad when I throw away food because some people still don't have enough resources of food to eat	175	4.48	0.624
I feel disturbed by the amount of food being wasted since it takes a lot of resources for grow, process, package and transport the food	175	4.40	0.703

I only throw away food if the food smells badly or slightly off	175	4.41	0.720
I would probably throw away less food if I had more information on the cost of food that I throw away	175	3.96	0.761
It bothers me when someone does not finish the food on their plate	175	4.02	0.806
In my opinion, a large part of food waste comes from cooking of food more than we need	175	4.42	0.628

Table III demonstrates the respondent's results on the attitudes. Most of the respondents agree and strongly agree with the statement given. From the analysis, the highest mean is (Item 1, M=4.48), which is 'I feel guilty/ bad when I throw away food because some people still don't have enough resources of food to eat'. Next, (Item 2, M=4.40) shows that respondents agree with the statement 'I feel disturbed by the amount of food being wasted since it takes a lot of resources for grow, process, package and transport the food'. (Item 3, M=4.41) shows that respondents agree that 'I only throw away food if the food smells badly or slightly off'. For the next item, (Item 4, M=3.96) is the lowest mean, showing that respondents agree with statement 'I would probably throw away less food if I had more information on the cost of food that I throw away'. Next, (Item 5, M=4.02) shows that respondents agree with statement 'It bothers me when someone does not finish the food on their plate'. The last item, (Item 6, M=4.42) shows that respondents agree with 'In my opinion, a large part of the food waste comes from cooking of food more than we need'.

Table 4: Food Waste Prevention

	N	Mean	Std. Deviation
Change in consumption patterns such as eating out more often	175	3.32	0.983
Change to a more environmentally friendly style	175	4.28	0.622
Financial reasons/ did not like wasting money	175	4.48	0.595
Concerns about poverty or hunger	175	4.61	0.576
Influenced by others/ someone would get annoyed at me for wasting food	175	3.95	0.856

Table IV shows that for (Item 1, M=3.32), is the lowest mean showing that respondents less agree that the food waste prevention is due to change in consumption patterns such as eating out more often. For (Item 2, M= 4.28), respondents agree that food waste prevention is due to change to a more environmentally friendly style. Next, (Item 3, M= 4.48) shows that respondents agree that food waste prevention is due to financial reasons/ did not like wasting money. The highest mean is (Item 4, M=4.61), showing that respondents agree that food waste prevention is due to concerns about poverty or hunger. The last item, (Item 5, M=3.95) shows that respondents agree that food waste prevention is related to influenced by others/someone would get annoyed at me for wasting money.

Correlation Analysis on Knowledge, Attitudes and Food Waste Prevention

Table 5: Correlation Analysis

		Knowledge	Attitude	Food Waste Prevention
Knowledge	Pearson Correlation	1	0.541**	0.467**
	Sig. (2-tailed)		0.000	0.000
	N	175	175	175
Attitude	Pearson Correlation	0.541**	1	0.422**
	Sig. (2-tailed)	0.000		0.000
	N	175	175	175
Food Waste Prevention	Pearson Correlation	0.467**	0.422**	1
	Sig. (2-tailed)	0.000	0.000	
	N	175	175	175

Table V shows correlation analysis that measures the degree of the linear relationship between two variables. The result demonstrates both of the results are significantly different than 0. The Pearson correlation coefficient of knowledge is 0.467 and it indicates moderately positive linear relationship between knowledge and food waste prevention. It shows that higher score on knowledge are associated with higher score on food waste prevention. For the result of attitude, it shows that the Pearson correlation coefficient is 0.422 and it indicates a moderately positive linear relationship between attitude and food waste prevention.

Discussions

The main objective of this study is to determine the level of knowledge and attitude of consumers towards food waste prevention. The findings of this study show that the knowledge and attitude do give a positive impact on consumer's food waste prevention. Knowledge appears to be the most essential component in preventing food waste. Consumers that have a high level of knowledge will have a better attitude and value their food more, resulting in less food waste. This is owing to the fact that majority of the study's participants are young consumers with a diploma or degree. As a result of their exposure to the current issue and scenario, they were proven to have a high level of understanding regarding food waste. It is in line with past research that has demonstrated that a person's educational level has a favourable impact on their knowledge and awareness, and as a result, their attitude toward food waste prevention is positive (Jeswani et al., 2021)(Filimonau et al., 2020)(Dhir et al., 2020).

Furthermore, when comparing knowledge to attitude, the study discovered that knowledge has the highest average mean ratings. This finding demonstrates that consumer education, particularly understanding of the economic implications, has a significant impact on food waste prevention. This is confirmed by the findings of (Aktas et al., 2018) who found that the majority of respondents agreed that discarding food might result in monetary losses and raise the cost of food. On the other hand, when compared to the results of the knowledge test on environmental impact, the respondents appear to have little understanding of how food waste affects the environment. The results were interpreted to demonstrate that the majority of customers had greater awareness and focus on their spending rather than the environmental impact of food waste. This is why some of the respondents did not give a high score on the question because

they were unable to see the connection between food waste and environmental and climatic change, notably greenhouse gas emissions.

In terms of attitudes, the respondents agreed that they feel guilty when they throw away food, especially when they know that there are still many others who are hungry. In contrast, according to the findings, just a small percentage of respondents believe that having more information about the cost of the food they throw away will lead to food waste attitude. The respondents may be unaware of the expense of food and this can be linked to the unplanned preparation before ordering food. A good planning prior buying will help the consumers from spending more than their budget and more than their necessity, thus it can help to reduce the amount of food wasted.

Although the concern about poverty and hunger lead the reason for the food waste prevention, it still cannot be denied that the economic or the financial issue play an important role in the food waste prevention. According to the findings, consumers' food waste prevention is influenced by their financial spending concerns, as they dislike wasting money and would rather save it for more important things. The consumer may enjoy the promotions, but they are aware that if they purchase food during a special deal, they may not consume all of it, resulting in an increase in food waste and hence a waste of money that they could have saved. In contrast, when asked whether changing their consumption patterns, such as eating out more frequently, can help prevent food waste, consumers give a slightly negative response. Some of them believe that the portions of food provided outside of their homes are too large for them, resulting in food waste, particularly at buffets given by restaurants and hotels. Aside from that, the study emphasized that the more a person eats outside of their home, the more food they waste since they are more likely to make an accidental purchase.

Conclusions

This research's aim was to determine the knowledge and attitude of consumers in preventing food waste in the foodservice industry in Kuala Nerus, Terengganu. Throughout the study, the researcher found that knowledge and attitude have an effect and significant relationship towards the food waste prevention of consumers, as the increases in those two factors will give a great improvement on how the food waste being reduced and prevented. This study also highlights the importance of consumer knowledge, since people with good understanding are more likely to have a positive attitude, as they will consider carefully before acting.

Consumers appear to be more conscious of their present level of food waste prevention as a result of their understanding of the economic and financial consequences, but their understanding of the environmental impact remains limited. As a result, a better solution for overcoming it must be pursued. Aside from that, it can be concluded that one of the determinants of consumers to limit and prevent food waste appears to be the guilt they experience when handling food, especially when social issues such as the fact that there are still many people who do not have enough food come to mind. As a result of this, they are more motivated to prevent food waste and are more concerned about poverty and hunger. Although the customers who participated in this study do not represent the whole population, the results of this study have provided useful information regarding the elements that can impact a consumer's decision to not waste food.

Theoretically, the current study extend the understanding of individuals' knowledge and attitudes that results in food waste prevention among consumers particularly in foodservice establishment in Kuala Terengganu. This construct can help researchers better analyse the behaviour of diners in varied hospitality and foodservice settings. Practically, for fostering sustainability-oriented behaviours and routines, the current study has substantial implications for numerous stakeholders, including restaurants, society, and governments. They may also be able to provide additional information on the necessity of preventing food waste as well as methods for doing so. Because consumer behaviour and attitudes toward food waste is difficult to modify, the findings of this study can assist restaurateurs in discovering additional ways to reduce food waste. There are multiple ways in which restaurants can engage the attention of diners and increase their knowledge such as displaying posters in the eating area with a moral call to preserve resources, campaign to take away leftovers, and emphasizing eco-friendly practices. It is also critical for government entities such as the Ministry of Housing and Local Government, as well as the Solid Waste Corporation (SWCorp), to propose new policies, interventions, and campaigns aimed at preventing food waste.

The study, like any empirical effort, has limitations that should be considered when analysing the findings. Firstly, the consumers that took part might not be representative of the general population. When utilising this method of sampling, the element of bias, whether large or small, is always present, and sample error cannot be determined. Nonetheless, convenient sampling was chosen since it has intrinsic advantages in terms of time and money management. Secondly, only two independent variables affecting the dependent variable, which is the prevention of food waste, were explored in this study. It is also proposed that the theoretical framework be validated at various points throughout time using the different behavioral theories and model. Thirdly, the researchers mainly focused on the Kuala Nerus, Terengganu. Future research should be conducted in a different location, populations and regions to examine factors that influence their decision not to waste food. More research is needed to elaborate on the findings of this study in different foodservice environments, larger quantitative analysis and attempting to differentiate between different types of foodservice personnel that have line management duties. Methods and tools from a range of disciplines should be used in this endeavour, including business, management, logistics, economics, environmental and waste management, sociology, psychology, behaviour studies, and sustainable consumption.

References

- A. Dhir, S. Talwar, P. Kaur and A. Malibari, "Food waste in hospitality and food services: A systematic literature review and framework development approach," *Journal of Cleaner Production*, Vol. 270, 2020.
- A. Nayak and B. Bhushan, "An overview of the recent trends on the waste valorization techniques for food wastes," *J. Environ. Manag.*, vol. 233, pp. 352-370, 10.1016/j.jenvman.2018.12.041, 2019.
- B. McAdams, M. Massow, M. Gallant and M. A. Hayhoe, "A cross industry evaluation of food waste in restaurants, *Journal of Foodservice Business*, Vol. 22, pp. 449-466, 2019
- C. Reynolds, L. Goucher, T. Queded, S. Bromley, S. Gillick, V.K. Wells, D. Evans, L. Koh, A. C. Kanyama, C. Katzeff, Å. Svenfelt, and P. Jackson, "Review: Consumption-stage food waste reduction interventions – What works and how to design better interventions," *Food Pol.*, Vol. 83, pp. 7-27, 10.1016/j.foodpol.2019.01.009, 2019.
- E. Aktas, H. Sahin, Z. Topaloglu, Z., A. Oledinma, A. K. S. Huda, Z. Irani and M. Kamrava, "A consumer behavioural approach to food waste, *Journal of Enterprise Information*

- Management, Vol. 31, pp. 658–673, 2018.
- E. Papargyropoulou, J.K. Steinberger, N. Wright, R. Lozano, R. Padfield and Z. Ujang, “Patterns and causes of food waste in the hospitality and food service sector: food waste prevention insights from Malaysia,” *Sustainability* 11, 6016, <https://doi.org/10.3390/su11216016J>, 2019.
- F. Ciccullo, R. Cagliano, G. Bartezzaghi, A. Perego, “Implementing the circular economy paradigm in the agri-food supply chain: the role of food waste prevention technologies,” *Resour. Conserv. Recycl.*, vol. 164, pp. 105-114, 2021.
- F. Jarjusey and N. Chamhuri, “Consumers’ awareness and knowledge about food waste in Selangor, Malaysia, *International Journal Of Business And Economic Affairs*, Vol. 2, pp. 91–97., 2017.
- F. Viachaslau, A. Coşkun, B. Derqui and J. Matute, “Restaurant management and food waste reduction: factors affecting attitudes and intentions in restaurants of Spain,” *International Journal of Contemporary Hospitality Management*, Vol. 34, pp. 1177-1203, 2022
- F.G. Santeramo and E. Lamonaca, “Food Loss–Food Waste–Food Security: A New Research Agenda,” *Sustainability*, Vol. 13, 4642. <https://doi.org/10.3390/su13094642>, 2021.
- FAO, “Food security policy brief”, Food and Agricultural Organisation, Rome, available at: www.fao.org/forestry/13128-0e6f36f27e0091055bec28ebe830f46b3.pdf (accessed 19 January 2018).
- FAO, “The state of Food and Agriculture 2019. Moving forward on food loss and waste reduction,”. Licence, Rome CC BY-NC-SA 3.0 IGO, 2019.
- FAO, IFAD, UNICEF, WFP and WHO, “The state of food security and nutrition in the world 2021: Transforming food systems for food security, improved nutrition and affordable healthy diets for all. Rome, FAO. <https://doi.org/10.4060/cb4474en>, 2021.
- G. Alsawah, W. Saleh, A. Malibari, M. M .A. Lashin, T. AlGhamdi, “Food waste, attitudes and preferences of young females : a case study in Saudi Arabia,” *Sustainability*, Vol. 14, pp. 1961. <https://doi.org/10.3390/su14041961>, 2022.
- G. B. Zamri, A. N. K. Azizal, S. Nakamura, K. Okada, N. H. Nordin, N. Othman, F. N. M. D. Akhir, A. Sobian, N. Kaida and H. Hara, “Delivery, impact and approach of household food waste reduction campaigns,” *Journal of Cleaner Production*, 118969. <https://doi.org/10.1016/j.jclepro.2019.118969>, 2019.
- H. K. Jeswani, G. F. Torres and A. Azapagic,”The extent of food waste generation in the UK and its environmental impacts, *Sustainable Production and Consumption*, Vol. 26, pp. 532-547, 2021.
- Household expenditure survey report by state and administrative district Terengganu 2019. Department Of Statistics, Malaysia. Published on July 2020.
- I. Ajzen, “The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, Vol. 50, pp. 179-211, 1991.
- I. Blešić, M. D. Petrović, T. Gajić, T. N. Tretiakova, J. A. Syromiatnikova, M. Radovanović, J. P. Rajić and N. V. Yakovenko, “How the Extended Theory of Planned Behavior can be applied in the research of the influencing factors of food waste in restaurants: learning from serbian urban centers, *Sustainability*, Vol. 13, pp. 9236. <https://doi.org/10.3390/su13169236>, 2021.
- I. N. M. Zain and , H. A. Rahman, “Food waste management and green purchasing behaviour among youths in Malaysia, *International journal of academic research in business and social sciences*, Vol. 11(15), pp. 61–76, 2021.
- J. K. Sundaram, T. Z. Gen, and R. K. Jarud, “Achieving food security for all Malaysians. *Khazanah Research Institute: Kuala Lumpur, Malaysia*, 1-78. SWCorp (2015).

- SWCorp. Retrieved from www.swcorp.gov.m, 2019.
- K. Thyberg and D. Tonjes, “Drivers of food waste and their implications for sustainable policy development,” *Resour. Conserv. Recycl.*, vol. 106, pp. 110-123, 2016.
- L. Principato, G. Mattia, A. Di Leo, and C.A Pratesi, “The household wasteful behaviour framework: A systematic review of consumer food waste. *Industrial Marketing Management*,” Vol. 93, pp. 641–649, 2021.
- L. Sakaguchi, N. Pak and M. D Potts, “Tackling the issue of food waste in restaurants: Options for measurement method, reduction and behavioral change. *Journal of Cleaner Production*, vol. 180, pp. 430-436, <http://dx.doi.org/10.1016/j.jclepro.2017.12.136>, 2018.
- L.V. Geffen, E. V. Herpen and H. V. Trijp, “Household food waste—how to avoid it? an integrative review,” *Närvänen E., Mesiranta N., Mattila M., Heikkinen A. (eds) Food Waste Management*. Palgrave Macmillan, Cham. https://doi.org/10.1007/978-3-030-20561-4_2, 2020.
- M. Alattar, J. DeLaney, J. Morse and M. N. -Pincus, “Food waste knowledge, attitudes, and behavioral intentions among university students, *Journal of Agriculture, Food Systems, and Community Development*, vol. 9(3), pp. 1-16, 2020.
- M. N. Naim and H. A. Rahman, “Knowledge, attitude and practice on food waste management among food vendors in Universiti Putra Malaysia, Serdang, Selangor,” *Mal J Med Health Sci* 16 (SUPP11): pp. 118-127, 2020.
- M. Zeineddine , S. Kharroubi ,A. Chalak, H. Hassan and M.G. Abiad, “Post-consumer food waste generation while dining out: A close-up view,” *PLoS One*. Jun 18, Vol. 16(6), e0251947. doi: 10.1371/journal.pone.0251947. PMID: 34143777; PMCID: PMC8213176, 2021.
- N. Ramli, N. S Rosli, F. Abdul Wahap, W. N. Wan Nawawi and H. A. Mohd. Abd Majid, “Acceptance of food waste recycling products among public toward sustainable food waste management, *Charting a sustainable future of ASEAN in business and social sciences*, Springer Nature Singapore Pte Ltd, Vol. 1, pp. 391-401, 2020.
- N. V. Moraes, F. H. Lermen and M. E. S. Echeveste, ”A systematic literature review on food waste/loss prevention and minimization methods” *Journal of Environmental Management*, Vol. 286, 2021.
- P. Joshi and C. Visvanathan, “Sustainable management practices of food waste in Asia: technological and policy drivers,” *J. Environ. Manag.*, vol. 247, pp. 538-550, 10.1016/j.jenvman.2019.06.079, 2019.
- S. Abd Razak and S. W. Abd Ghafar, N. A. Mohd Padzil, Nur Aida and A. Kamaruddin and N. Mat Zin, M. Saim, and A. H. Suhaimi, ”Household food wastage prevention in Malaysia: an issue processes model perspective. *Economic and Technology Management Review*, Vol. 13, pp. 51 – 62, 2018.
- S. Talwar, P. Kaur, R. Yadav, R. Sharma and A. Dhir, “Food waste and out-of-home-dining: antecedents and consequents of the decision to take away leftovers after dining at restaurants,” *Journal of Sustainable Tourism*, DOI: 10.1080/09669582.2021.1953512, 2021.
- SWCorp Malaysia. *Kompendium Pengurusan Sisa Pepejal Malaysia 2019*, Solid Waste Corporation Malaysia, 2019.
- V. Filimonau, H. Fidan, I. Alexieva, S. Dragoev, and D. D. Marinova “Restaurant food waste and the determinants of its effective management in Bulgaria: an exploratory case study of restaurants in Plovdiv”, *Tourism Management Perspectives*, vol. 32, pp. 100577, doi: 10.1016/j.tmp.2019.100577, 2019.
- V. Filimonau, J. Matute, M. K. Czerwińska, K. Krzesiwo and M. Mika, ”The determinants of

- consumer engagement in restaurant food waste mitigation in Poland: An exploratory study”
Journal of Cleaner Production, Vol. 247, 2020.
- W. N. Wan Nawawi, S.A. Khalid, N. Ramli, and N. M. Daud, “Attitude and expectation: food waste recycling as a business opportunity in Terengganu,” Social Sciences & Humanities. Vol 25, pp.65–74. , 2017.
- Y. Yu, E.C. Jaenicke, “Estimating food waste as household production inefficiency,” American Journal of Agricultural Economics, Vol. 102 (2). Pp. 525-547, 2020.