

## Consumers' Awareness and Knowledge about Food Waste in Selangor, Malaysia

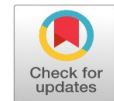
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**Abstract:** Food waste constitutes more than 40% of the Municipal Solid Waste (MSW) in Malaysia. However, the subject is still relatively new for waste avoidance and minimisation incentives. In this study, we strived to unveil the many factors responsible for food waste in homes. There is an extensive discussion in the literature review touching on almost all the possible areas of the behaviour from both international and local standpoints. We chose Behavioural analysis as it can provide methods for recognising the perception, determinants and driving force behind food waste in households. Understanding the food waste phenomenon through the consumer behaviour is paramount to achieving a sustainable future. The literature showed us reasons people have and results from different food waste studies presented around the globe. The survey-based study guided by the theoretical framework targeted household heads from different diverse locations across Selangor. A total of 105 respondents were issued questionnaires touching on various facets of food waste in November 2016. After all due analysis along with mean and standard deviations of awareness and knowledge about the quantity of food they waste, it has been concluded that food waste awareness and knowledge are based around the financial effects and that many feel those around them waste more food than them. We recommend the need for further behavioural studies to fully understand the intention, behaviour and attitudes of consumers to help policy makers make the right laws with regards to food waste.

**Keywords:** Awareness, Knowledge, Food waste, Selangor, Malaysia

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### INTRODUCTION

Food is an essential individual need and it is very important for our survival and performance as individuals. This very important essence of survival gets the unfortunate fate of being wasted more than any other thing in the world. Food waste happens in almost every home on daily basis but it is a sensitive issue as it is to some extent an expression of an individual's way of life. Food goes through a lot of processes before it finally reaches the consumer. At every stage along the process, wastage is sure to occur. According to available literature, the highest amount of wastage happens at the consumer level at astonishing percentages and rates (Kantor, Lipton, Manchester & Oliveira, 1997; Griffin, Sobal & Lyson, (2009). According to Gustavsson, Cederberg, Sonesson, Otterdijk and Meybeck (2011), the world wastes or losses close to one-third of its edible food every year. Malaysia in 2005 with an approximate population of about 25 million generated about 0.76 kg per person daily as compared to other countries it fell in the same category with, and the waste mainly constitutes about 45% food, 7% papers 24% plastics, steel 6% and glass 3% (Abdul-Talib, 2004).

Gustavsson et al. (2011) found that food waste has a lot of causes among which are the lack of suitable technology, complications in managing food, deficiency in proper laws and legislations and consumers' behaviour. Over the past decades, people's ease of access to food also reduced the value of food. Food did not become cheaper but the increase in the household income made food easily available in more quantities. An increase in food prices in the global food market led to the 2008 food crisis. The insufficiency of the earth's resources has always been an important worry, making the problem of universal famine and food waste the heart of the interest (Hall, Guo, Dore & Chow, 2000; Chalmin & Gaillochet, 2009).

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The amount of eatable food thrown away is based on many intertwined reasons with different degree of significance for households. Socio-cultural, socio-demographic profiles with eating trends or food preparation practice are possible influencers of the quantity of food discarded. Notwithstanding Malaysia's waste composition, study details a considerable quantity of food waste in municipal solid waste; the majority of the people do not see the link between ecological damage and the wasting of resources.

Even though households regularly confine the phrase 'food waste' to uneatable bits of foodstuff and surpluses but many definitions went beyond that. Surplus food producing is in concordance with the growth in population. World Bank estimates that between 2009 and 2030, the demand for food will increase by about half a percent as the global population grows, thereby leading to the creation of an encouraging response loop consequential in more waste (Mena, Adenso-Diaz & Yurt, 2011). The current developments in the area of food waste indicate that the public have to be aware of the effects their consumption and wasting behaviour have on the globe and that the thing of endless supply of food is also nothing but misleading (Stuart, 2009). Morgan (2009), also buttressed on how the existing rates of buying and forsaking of food are somewhat not sustainable.

According to SWCorp (2015) report, out of about 15,000 tonnes of food Malaysians waste every day, about 3,000 tonnes are actually eatable and should not be dumped. The food waste composition of Malaysia households' total waste is based on income group on average 30.84% by high income group, 38.42% by middle income group and 54.04% by low income group (Badgie, Samah, Manaf & Muda, 2011). Food waste quantities in Malaysia usually see a 15% to 20% increase during festive seasons (SWCorp 2015). There is no special treatment for food waste in Malaysia. Food waste is categorised under the general problem of municipal solid waste management even though it makes up approximately 60% of municipal solid waste (Kathirvale, Yunus, Sopian & Samsuddin, 2004; Saeed, Hagemann & Jacob, 2009; Hassan et al., 2001). Such soaring rates of food waste envelop harmful effects on the economy, ecology and people in totality.

This is in line with the objectives of this study; gauging the awareness levels of consumers with respect to food waste and knowing how knowledgeable they are about the whole food waste phenomenon will be a step in the right direction to knowing what is lacking given the reasons this study found to be possible underlying factors of the food waste behaviour of respondents.

## **LITERATURE REVIEW**

Latest research, aimed at understanding the food waste behaviour of consumers reports high rates of unawareness among consumers towards the issue (Hamilton, Denniss & Baker, 2005; Exodus Market Research, 2007; Lyndhurst, 2007). The lack of awareness regarding food waste has many aspects to it. A high percentage of people are not aware of how much food they discard off (Exodus Market Research, 2007). Related results are reported in other studies as well, with 71% of Australians believing that they almost never or at least occasionally buy products that they end up wasting (Hamilton et al., 2005). The same studies again estimated high rates of food waste among the participating households on the contrary. This study found this trend to be true as respondents who claim to not discarding food unless it is spoilt are the very ones throwing away food after a meal and are against the idea of reusing leftovers.

When it comes to measuring the awareness of consumers, this study in its dig for literature came across three different types of awareness as a potential preparatory point in the food waste outlook: economic, environmental and social awareness. As already discussed, Malaysian consumers are affected by not only specific economic concerns, but also by strong environmentally related considerations, when deciding not to waste food.

Firstly, the economic impact of food wasting is especially high for the consumers. In Malaysia, a household of five spends an average of RM900 a month on food and that a quarter of that food is wasted during preparation, cooking and usage. This literally means that about RM225 goes into the dustbin every month, which works out to RM2, 700 a year per household (SWCorp, 2015). According to Ventour (2008), Households in UK spend 10 billion on food that gets wasted, while Jones (2006), saw that households in the U.S. spend \$48.3 billion and Hamilton et al. 2005 saw \$5.3 billion for Australia.

This study also found that consumers are mostly aware or concerned about how much money they could save if they are to stop or reduce food waste.

Secondly, the ecological impacts are so very severe. Being biodegradable, food waste according to Adhikari, Barrington and Martinez (2006), became the largest supplier of methane which is a greenhouse gas much more potent than carbon dioxide and contributes a huge point to the dilemma of global warming (Ventour, 2008). An even greater ecological dilemma is in the emissions of greenhouse gases and waste in the utilization of natural resources throughout the making, processing and transfer of food from one point to the other. A tone of food waste is accountable for 4.5 tonnes of  $\text{CO}_2$  (Ventour, 2008), while in Malaysia the act stands at a staggering 15,000 tonnes daily. Waste production sees a raise as the population and the economy increase. This hints that since Malaysia dumps in landfills, there is challenge of solving the problem of landfill availability (Hassan et al., 2001).

Ali (2009) saw that Malaysia has about 289 landfills out of which only 7 are sanitary landfills. Apart from the problem of running out of land to use as dump in the near future, the soaring quantity of food waste produced is the core source of the majority of issues associated with landfills like stinking odour, toxic leachate and release of greenhouse gases and parasites infestation. In the European Union, the European Landfill Directive, Commission of European Communities (CEC) 1999 to address the problem, requested the decrease of eco-friendly solid refuse the landfills receive from its Member States with 35% of the amount dumped in year 1995 by year 2016 (Skourides, Smith & Loizides, 2008). Due to the reality of not enough land available for further landfill development coupled with the environmental degradation it causes, dumpsites cannot be a sustainable choice for long.

Food waste has social impacts as well. Living in the era of universal food industry, the availability of resources in one part of the world can indirectly affect the demand in another part (Stefan, 2011). Consequently, the lavish behaviour of the developed countries with regards to food customarily affects the food accessibility in the third world. Presently, we have close to a billion malnourished people in the world and they possibly can all acquire an adequate amount of food if industrialised nations could waste a lesser amount of food (Stuart, 2009).

The case of awareness regarding the information put out by campaigns to reduce food waste through TV and other platforms especially in the context of this study received very little positive responses. Many are not aware of the efforts Governments are putting to help curb this menace. Furthermore, the householders' awareness about what goes on around them with regard to food waste will go a long way.

### **Reasons for food waste**

Numerous researchers have showed interest towards the influence of different factors on the quantities of food that households waste mostly (Van Garde & Woodburn, 1987; Hamilton et al., 2005; Lyndhurst, 2007; Skourides et al., 2008; Ventour, 2008; Wenlock, Buss, Derry & Dixon, 1980). Some of the studied factors have been found to explain to some degree difference in the amounts of food wasted at household level. The factors investigated most often in this area, are the socio-economic factors, like the income of the household, the age, the number and composition of people in the household.

Differing from other waste like paper and glass that can be recycled, programmes for the separation and reduction of food waste are not yet fully being made use of in this country, Malaysia due to different obstacles like limited awareness about the food waste problem to the producers of the waste and lack of sufficient demand for food waste material to make fertilizers like compost (Periathamby, Hamid & Khidzir, 2009).

To further understand the reasons consumers might have for waste, we asked about respondents' knowledge about 'best before' and 'use-by dates' of edible products. Many consumers, 36% of people, confuse the 'best before' date amid the 'use by' date, confusion which could lead to food being disposed of unnecessarily (FSA, 2008). According to a study by Newsome et al. in 2014 on the way to use and thoughts about date labelling of food, they found the variation within date labelling terms and uses lead to significant food loss as consumers and food industry tend to misunderstand. This study also found the misunderstanding to be true as many term both dates to be one and the same while others say they

do not actually bother about the dates. A rather high percentage candidly stated that they do not know the difference between the two dates.

## **METHODOLOGY**

For this study we utilised a quantitative methodology while adopting the following approach. First, relevant literature, publications and studies were reviewed in order to get in-depth information on food waste in general. Malaysia-specific information on food waste included in municipal solid waste reports and articles was reviewed. Finally, the information obtained from consumers during study was analyzed and processed, and checked against information obtained from literature and other sources for better recommendations.

In the context of the quantitative study, we utilised the questionnaire or survey method. Questionnaires are widely used especially in studies like this when studying a large number of respondents as it is easier to develop and administer. According to De Vaus (1986), this method has advantages such as high reliability, cost and time to implement. Responses of Household heads or people responsible for the buying and preparation of food are the most sort-after targets for this study through the use of different locations across Selangor.

The study for this paper was conducted in Selangor State of Malaysia. Selangor, being the biggest state in Malaysia, provides the diverse and unique background needed for this study. The data were collected across the length and breath of Subang Jaya, Puchong, Cyber Jaya, Kajang, Bangi, Sri Kembangan and Serdang. We aimed at covering as most an area as possible so to get a good representation of the population under study.

The distribution and collection of questionnaires must be made in a manner that it determines the specifically necessary information for proposition testing (Hair, Anderson, Babin & Black, 2010). The questionnaire consists of several major sections. The objective of the questionnaire is to collect sufficient quantitative information with reference to the quantity of food wasted by the respondents, their demographic background, as well as the other potentially relevant factors that determine food waste behaviour (values, awareness, intentions, social and moral norms, attitudes, PBC, planning/shopping/post-shopping routines, consequences). Many questions are inspired from already existent studies or questionnaires in the field of food waste. The questionnaires were filled on the spot as they have been first written in English and afterwards translated in Malay, so that it would be accessible to all the respondents.

In previous surveys the agree/disagree statement is administered with a five-point answer scale from 'strongly agree' through to 'strongly disagree', with 'neither agree nor disagree' as the mid-point. Such a response scale consistently produces results where consumers largely agree that a research for example food packaging is a bigger problem. As recommended by Bishop (1987), odd numbered scale should be avoided to prevent respondents from selecting the midpoint which was in concordance with Coelho and Esteves (2007), who argued that middle-point answers as always been the trend highly affect the quality of data. Pushing the respondents off the middle to either a negative or positive response than a neutral motivated us to choose the even numbered scaling for this study.

This section about awareness and knowledge of respondents about food was loaded with statements which have a four-point Likert scale ranging from very low to very high. We decided to use a four-point scale to avoid the respondents as seen in many cases ticking through the neutral in the case of an odd numbered scale. This section sought respondents' general knowledge and awareness about food waste as well as their awareness about problems and impacts of food waste on society, environment and economy of Malaysia. The information from this section is very important as it provides information on the extent of how much consumers are aware about the effects of food waste. Such information can be used by decision makers to design and implement campaigns and programmes against food waste. Assessing the knowledge of consumers about food waste as manifested by Stefan (2011) gives a better insight into concluding the study and giving policy recommendations of additional or re-enforced efforts to reach and educate about waste. Though, unfortunately, many reports concluded high rates of unawareness among consumers towards this issue as seen in studies by example (Hamilton et al., 2005; Exodus Market Research, 2007; Lyndhurst, 2007).

## ANALYSIS AND FINDINGS

### Knowledge about food waste

The Table below (Table 1) portrayed the frequencies, mean and standard deviations of factors. The highest mean of 3.59 for this section is recorded for respondents' knowledge that food waste causes environmental pollution with a standard deviation of 0.567. The respondents' knowledge that they can prevent food waste recorded the second highest mean of 3.39 with a standard deviation of 0.612. Their knowledge of food waste causing economic problems recorded the least mean of 3.2 with the highest standard deviation of 0.87. Thus, respondents are more familiar with the pollution bit of waste food that could be due to the attention given to pollution by the press media nowadays.

Table 1: Knowledge about food waste

Knowledge about Food Waste	1	2	3	4	Total	Mean	Std dev.
I know that food waste causes economic problems	5	16	37	47	105	3.2	0.87
I know that reducing food waste can reduce environmental hazards	1	10	44	50	105	3.36	0.695
I know that I can prevent food waste	0	7	50	48	105	3.39	0.612
I know that food waste causes environmental pollution	0	4	35	66	105	3.59	0.567

### Amount of food waste

The Table below (Table 2) portrayed the frequencies of the various scales, means and standard deviations of factors. The highest mean of 2.88 for this section is recorded for respondents' responses to on average how much they think the communities they live in waste on daily basis with a standard deviation of 0.756. The respondents' responses to on average how much they think their neighbours waste per day had the second highest mean of 2.18 with a standard deviation of 0.704. Their response to how much they waste as individuals recorded the lowest mean of 1.5 with the standard deviation of 0.59.

Table 2: Amount of food wasted in every section of the community

Amount of Food Waste	1	2	3	4	Total	Mean	Std dev.
On average, how much food do you think your community wastes a day	4	25	56	20	105	2.88	0.756
On average, how much food does the household waste a day	44	46	14	1	105	1.73	0.724
On average, how much food do you think your neighbours waste a day	14	62	25	4	105	2.18	0.704
On average, how much food do you waste in a day	58	42	5	0	105	1.5	0.59

### Reasons for food waste

To further understand the reasons consumers might have for waste, we asked about respondents' knowledge about 'best before' and 'use-by dates' of food products. Table 4.8 presents the number of respondents who claim to know the difference between these rather confusing dates. This is basically to gauge the respondents' reasons. As presented in Table 4.8, 57% of respondents claim they do not know the difference between best before and use by date while the remaining 42.9% claim to know the difference. This knowledge will help us know if respondents can sometimes discard food that can be consumed due to a confusion of these dates on products. Their knowledge of the response above is presented in table 3 below.

Table 3: Respondents' knowledge about food waste

Respond	Frequency	Percent
No	60	57.1
Yes	45	42.9
Total	105	100.0

## CONCLUSION

In the present study, people's limited awareness about food waste could lead to higher amounts of food waste, while the pre-shopping activities can adversely affect the food waste behaviour. These findings are in line with previous researches (Chandon & Wansink 2006; Lyndhurst, 2007; Exodus Market Research, 2007).

Secondly, people seem to be aware of the economic impacts of food waste but a little less unaware of the environmental ones. Economically, according to Lyndhurst (2007), many of the consumers in his study state that the cost of dumped food makes them think twice while the remaining 10% confess that they actually do not think about the cost at all. The high level of awareness about the cost may be because it is one affecting directly the household's wallet. The awareness regarding the environmental impact of food waste can be seen in the answers we got as to who benefits from reducing food waste. The environment got only 12% mention while the highest of directly affecting the household got almost 30%. Overall, it seems that people do not link food waste to environmental damage (Lyndhurst, 2007). The importance role awareness plays cannot be over emphasised as UK has seen a massive total food waste reduction from 8.3 million to 7.2 million tonnes from 2009 to 2011 as a result of the massive campaign for increasing food waste awareness among the public.

### IMPLICATIONS OF THIS STUDY

The main practical implications of this study are that the results can be used to develop campaigns targeted at decreasing the amount of food waste generated at the household level. Owing to the fact that a social campaign cannot target to influence many factors in a go, setting perspective on the most important ones initially. Therefore, campaigns can be aimed at improving consumers' knowledge and awareness about food waste. There are many possible ways to doing these, but the best way as suggested by respondents themselves during the survey is to have the implications of food waste taught in schools starting from the grass root level of kindergarten.

Moreover, apart from government's efforts, the different dealers in the food industry could make available posters and brochures to shoppers and also providing serving size suggestions to them will go a long way.

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