

Food Wastage among Mauritian Households.

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Abstract

Food waste is a global issue; however, there is limited data on food waste in Mauritius. The study was undertaken using a questionnaire survey to assess whether any socio-demographic factors of Mauritian households or consumer's food-related behaviours influenced the quantity of edible food discarded as well as to gauge respondents' attitudes towards household food waste. Our findings showed that 50 % of the respondents reported wasting less than 500 g of food per week. A higher household income and having more members in the family resulted in more food being wasted ($p < 0.05$). Our data also highlighted that consumers were more attracted to food discount offers, using food store and having excellent food storage knowledge decreased the volume of food waste. Increasing monthly food expenditure, recurrent food shopping and cooking made people waste more food. Showing a higher concern by the respondents towards food waste resulted in more endeavour to adopt food waste reducing practices in their houses. Being angry about food waste could represent a negative emotion to keep waste reducing practices in line and feeling guilty can be a moral norm to waste less food in households.

Keywords: Household food waste, Attitude, Consumers' behaviour, Mauritius.

During recent years there has been rising international concern about the quantity of food waste and its negative consequences. In 2016, the total amount of waste discarded to landfill in Mauritius was estimated to be around 450,000 tonnes; among which 25 % accounted for food waste. The annual cost of waste management in Mauritius was revealed to be one billion Mauritian Rupees. Moreover, in 2015, the greenhouse gas emission (methane) from food waste was found to be around 40 thousand tonnes in the island. Therefore, it is not a hyperbole to say that food waste is one of the biggest problems facing humanity today in terms of food insecurity, increment in greenhouse gas emission and loss of economic resources. Discarded edible food can be used to feed the poorer people; as recorded for the year 2012, around 33,600 households (9.4%) consisting of 122,700 persons were in poverty (CSO, 2012). Mare Chicose is the sole landfill in Mauritius for dumping waste and it has been predicted to reach full saturation by the year 2018 or 2019. Subsequently, preventive measures need to be taken to reduce the quantity of food waste entering the landfill such as home composting food waste to manure [1].

However, in Mauritius, no research has been conducted yet on food waste at any stage of the food chain supply; from retail to consumers. In order to construct an efficient plan of action to reduce food waste, a profound groundwork needs to be conducted; including a proper survey on this issue. Henceforth, the aim of this study was to investigate reasons for household food waste with special attention to food waste that can be related to household's behaviour, purchase habits, attitudes and lifestyle [2-5].

About 1.3 billion tonnes of edible food is wasted each year worldwide; which makes up approximately one third of the edible parts of food produced for human consumption in a year. Wasted food is a substantial component of the World food system challenges and by the year 2050, the world will need to sufficiently feed more than 9 billion people. Eventually, with the increasing global population and consumption growth, food demand is going to increment across the globe [6].

Food waste is the result of negligence or an intentional decision to throw food away. Food that was found to be mostly wasted in previous studies was fresh vegetables; followed by bakery. Socio-demographic background of households does influence the quantity of food waste generated and these

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concepts have been observed in many studies across the globe. Determined in a study that the amount of avoidable waste was higher in Finnish households where woman was mainly responsible for grocery shopping in comparison where only man or both spouses were responsible. Women could be more inclined to feel a need to give their family healthy food and buy more fresh products than can be eaten in their household. However, this is only supposition and requires more extensive studies on the role of gender on food waste in future [7].

Attitudes towards food waste are composed of two constructs; mainly moral attitudes (feeling of guilt when discarding food) and lack of concern. These two constructs can shape consumer's intention not to waste food as expected based on the Theory of Planned Behaviour (TPB) [8].

The food wasting action of consumers can be consistently related with drivers of food purchasing decisions which are consecutively based on intrinsic and extrinsic food aspects. For example, some people prefer to buy food produced locally or organics due to the negative impact that conventional food have on the environment and this preference, in turn influence the consumers to decrease food waste. Researchers have worked to identify and understand several constructs related to household food waste including: behaviours, attitudes, socio-demographic factors and economic aspect. The majority of this work has been done in European countries such as UK, Italy, Germany, Romania and more. Other studies have been carried out in the US and Australia. In Mauritius, no such study has been conducted yet; to observe food waste at different stage along the food supply chain (from retail to consumer) [9].

In 2011, a waste segregation project was implemented in primary and secondary schools by the Ministry of Environment and Sustainable Development, in order to enhance knowledge of the younger generation to adopt recycling practices and to inculcate the concept of sorting in Mauritius (mainly to separate waste into labelled plastic bins, compost bins and polybags for recycling or composting) In 2016, KPMG partnered with the NGO Mission Verte inaugurated a waste sorting bin at the campus of the University of Mauritius. In addition, a compost plant with a capacity of 300 tonnes of waste daily is operational at La Chaumiere with an interim storage facility for hazardous waste. However waste sorting projects are not well established and practiced across the island. Sorting of waste should be encouraged at home or on site itself as a strategy of reducing the amount of waste generated [10].

Methodology

In this study, avoidable food waste was assessed, i.e., all wasted food and raw materials that could have been eaten if they had been stored or prepared differently. To achieve the objectives, a survey was conducted through the distribution of a pre validated questionnaire as the data collection tool.

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In the questionnaire, many different statements regarding attitudes to food waste, as well as purchase habits, were investigated and specific questions to the respondents were asked on the household's socio-demographic position. Respondents were also asked to quantify their amount of food they wasted per week in the categories 'nothing', 'less than 500 g', '500 g to 1000 g' and 'more than 1000 g' 9 (Figure 1).



Figure 1: Statements showing concern towards household food waste

Questionnaire was pre-tested in a preliminary pilot study and minor changes were made. In Mauritius, the population age above 18 years is estimated to be around 955,000 (CSO, 2015). Using the software Epi Info Version 7 Statcalc, the sample size was calculated and the value of the sample size obtained was 384. The data was collected during a two-month period; started in November 2017. The questionnaires were self-administered by the respondents and the data collection was based on random sampling. The response rate was 89.3 % from 440 questionnaires distributed.

The collected data was analysed using SPSS (Statistical Package Social Scientists) version 20.0 and Microsoft Excel version 2016 was used to make charts and graphs. Chi-square test was mainly used as statistical test; where a p-value below 0.05 denoted significant statistical association (Figure 2).

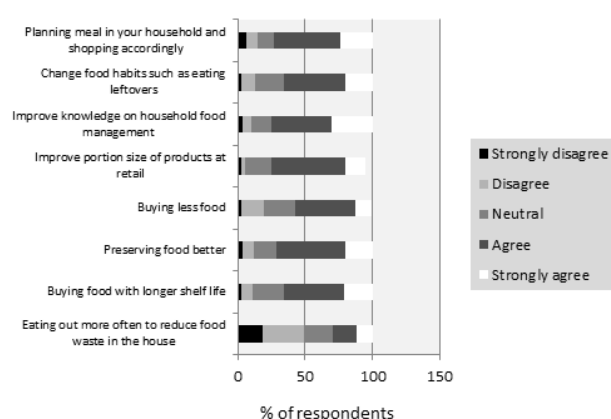


Figure 2: Statements on household waste reducing practices

Results and Data Analysis

Examination of the sample socio-demo graphic characteristics indicates that 31 % of the households consisted of four members, 21.4 % with three members; 22.4

% had five members and 16.1 % composed of more than five members. The highest proportion of the households (23.2 %) had an income between Rs 20000 to Rs 29000; 21.9% earned between Rs 10000 to Rs 19000; whereas only 8.6 % of the households had an income less than Rs 9000.

About 50 % of the respondents stated to waste less than 500 g of food per week; 29 % said to discard between 500 g to 1000 g; 12 % agreed to throw away more than 1000 g of food whilst 9 % admitted to have no food waste within their households.

Demographical and behavioural factors

One aim of the study was to distinguish possible socio-demographic and behavioural factors that might explain food waste in households. The statistically significant factors were found to be:

Size of the household ($p \leq 0.05$)

Household income ($p \leq 0.05$)

Frequency of grocery shopping ($p \leq 0.01$)

Monthly food expenditure ($p \leq 0.01$)

Using a shopping list ($p \leq 0.01$)

Reviewing flyers before shopping ($p \leq 0.01$)

Attraction to food discount offers ($p \leq 0.01$)

Frequency of cooking food ($p \leq 0.01$)

Use of food store on a monthly basis ($p = 0.48$)

Food storage knowledge ($p \leq 0.01$)

Analysis for the statistical association between the waste amounts and the different factors was carried out using Chi-square test. Besides, there were several factors that did not correlate with the amount of food waste; including; criteria to look when purchasing food or shopping habits such as shopping according to a budget, planning meal in advance or checking food store.

The main reasons for disposing food with the highest response rate in this study were 'smelled or taste bad' and 'exceeding the expiry date'. However, 'lack of storage facilities' and 'insufficient cooking skills' indicated the least response as less than 20% proclaimed so.

The statements shown in figure 1 were tabulated to a score for each individual and it was named 'score for concern towards household food waste'. Similarly, the statements in figure 2 were summed up to a score and were identified as 'score for endeavour to control household food waste'. A statistical association between these two scores were examined using bivariate correlation test and it was revealed that there was a valid association. As people showed more concern towards food waste, they had a greater endeavour to control their household food waste.

Discussion

With increasing members in the family, the quantity of food being discarded also increment; similarly observed from a food waste study conducted by Hartikainen in Finland. Subsequently, other studies found conflicting result; single-member family tend to waste more food compared to houses with four members or more. The reason attributed to this observation by Baker et al. (2009) was mainly due to single house owners are more likely to be young and have lifestyles less adjusted to regular eating patterns at home. Monthly household income was noted to have a statistical relationship to the proportion of food waste produced per week within houses in Mauritius. Mauritius is a developing country, with a GDP growth rate of 3.7 % as reported in 2017. Subsequently, food is easily available on the island. In addition, socioeconomic backgrounds of Mauritian households have changed significantly; mainly in terms of an increase in the average monthly household income from Rs 19080 in 2006 to Rs 29,360 in 2012. The increase in income might lead to a rise in food waste as people can afford to buy more food. Buying more food than one can consume in a timely manner is found in the area of the predictors of food waste in households. Frequent food shopping can be referred as 'spontaneous shopping' rather than a day-to-day effective plan and people might over-purchase food than they can consume for a duration of time; leading to food wastage. As consumers spend more money on food, the volume of food that gets wasted increments. It could be due to improper food storage or the abundant availability of food which makes people less prone to adopt proper food management in their households. Embracing a food shopping habit is known to reduce over-purchasing behaviour; which could also be a proper strategy to decrease food waste in the households. The respondents who agreed to use a shopping list while buying food and reviewing flyers before purchasing food tend to discard a lower quantity of food in their households. A probable explanation can be that people who use a shopping list tend to assemble it after viewing their food store and in turn, allow them to buy food products that they only need. In addition, reviewing food flyers enable buyers to have an idea about the price of their purchase beforehand and hence limit their food expenditure. It was revealed that formulating a shopping list was considered as a favourable behaviour for the avoidance of irrelevant expenditure and subsequent food wastage. Food shopping plan and its routine are critical predictors of food waste behaviours; as well as to advocate an impact on moral attitudes and perceived behavioural control on food waste. Participants who affirmed to be never attracted to food discount offers wasted more food whereas those who admitted buying food at a reduced price; discard lesser quantity of food. People prefer buying food at a much lower price on special offers due to a shortage of money or low income; they value the importance of food more and waste less edible food. Recurrent cooking leads to more food waste generation ($p \leq 0.05$). Possible reasons could be that it is difficult to estimate the correct portion to cook per

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person or in some households; they prefer to serve too much food rather than not enough.

For the statement 'I feel guilty when discarding food', a study conducted, revealed a high response rate of 72 % strongly agreeing to it. It was due to the respondents being relatively aware of the negative effects of food waste on the environment. However, only 43 % of the Mauritian participants agreed to the guilt statement. Guilt could suggest a possible pathway to decrease food wastage; by representing a moral norm which can lead to helping household food waste reduction efforts. Eventually, it was found in this survey, as the participants were more concerned about food waste; they were more susceptible to adopt household food waste reduction practices. Being concerned towards food waste plays a critical role in self-regulation and functions as a motivator to keep behaviours in line with perceived standards. Found that intentions to reduce food waste have a positive relationship with negative emotions. 43.8 % of respondents agreed to feel angry about household food waste which reflects a negative emotion and hence could be the cause for this strong intention to reduce food waste.

Conclusion

The participants may want to show themselves in a positive light to the food waste issue and hence the responses can be biased. Improvements may include conducting the study using other food waste collection techniques such as waste analysis or using kitchen diary. Community based interventions on proper household food management and proper food storage behaviours through campaigns can be carried out in society to create awareness on household food waste. Educational campaigns conducted by mass media for supporting the battle against food waste; not only combat negative attitudes but also stimulate model behaviour towards food waste in households. More research needs to be done mainly on the economics of food waste; so as proper food waste reduction strategies can be implemented in Mauritius.

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