

SOCIO-DEMOGRAPHIC EFFECTS ON HOUSEHOLD FOOD WASTE AND PREVENTION IN THE CITY OF TSHWANE METROPOLITAN MUNICIPALITY

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ABSTRACT

Food waste is a growing global concern as it has major economic, social and environmental impacts. This paper reports on findings of a research study conducted in the City of Tshwane Metropolitan Municipality in South Africa. The research was conducted as part of a larger project with the aim to compile household food waste data in a South African context. The research was conducted using structured questionnaires to assess the influence of socio-demographics on the amount of food waste generated in the households and ways to prevent food wastage. Forty three percent of the sampled students and young professionals aged 21 – 30 years old wasted less food compared to older people over the age of 61 – 70 years. Although the statistical significant difference with a probability show that there was no differences between age groups shown with a P-value of 0.0043. This was an interesting target group that has different values towards food than older generations. Food waste reduction is very complex since it is a multidimensional problem which needs more awareness on food waste and better food management that will result in people changing their habits.

KEYWORDS

Food waste, Household, Effects, Socio-demographics, Waste prevention.

INTRODUCTION

The aim of this study is to assess possible socio-demographics factors that can cause food waste at household level in the City of Tshwane Metropolitan Municipality and ways to prevent food waste generation. According to Parizeau et al. (2015), social, demographic, behavioural and attitudinal factors of households have an influence on the amount of food waste generated at household level. Reducing food waste is environmentally and socially important as it keeps food out of landfills and rescued food is redirected to emergency food providers working to eliminate hunger in the community (Bell, 2012). The South African government, represented by the Department of Agriculture, Forestry and Fisheries, has made a global commitment to halve food waste by 2030 (Champion of Sustainable Development Goal 12.3, 2015). This research is the start of compiling household food waste data in South Africa regarding demographics in the City of Tshwane Metropolitan Municipality with the aim to improve the quality of estimated data used before.

The amount of food wasted in developing and developed countries differs i.e. in developing countries food is wasted more in the early stages of the value chain while in developed countries food is wasted more at the consumption stage (Gustavsson et al., 2011). However, Kaminski and Christiansen (2014) shows that losses in developing countries may be lower than the estimation by Gustavsson et al. (2011). Nahman et al. (2013) estimated that the cost of food waste to the society in South Africa is equal to 2.1% of the GDP per annum. Urban South African households dispose on average 0.69 kg of food waste per household per week into the municipal bin, which translates into per capita food waste disposal of about 12 kg per annum (Ramukhwatho, 2016). The amount of edible and inedible food waste in South Africa shown by Ramukhwatho (2016) is higher than the rest of Sub-Saharan Africa (6 – 11 kg) (Gustavsson et al., 2011). This food waste ends up in landfill, putting pressure on already stressed waste disposal systems (CitiesNetwork, 2014). Although, landfilling in South Africa contribute 4.3% of the total greenhouse gas emissions it is still considered to be the most practical and cheapest waste management method (Hartmann and Ahring, 2006).

It is estimated that globally a third of all food produced for human consumption is wasted (Gustavsson et al., 2011). Sub-Saharan Africa is ranked second in the world after South Asia with the highest number of the population being undernourished (insufficient caloric intake) and hungry (Von Grebner et al., 2013). There are 25% of people suffering from chronic undernourishment in Africa (FAO, 2013) and this is challenging especially because of the growing population expected to grow by 2.5% over a period of 30 years (1990 – 2020) (United Nations Department of Economic and Social Affairs (UNDESA, 2014). An assessment conducted by the South African National Health and Nutrition Examination Survey (SANHANES) show that only 45.6% of South Africans are food secure while 28.3% and 26% are at risk of hunger or experienced hunger respectively (Shisana et al, 2013). GIZ (2013) recommended that there is a need for technologies that could reduce losses during postharvest. It is widely agreed that effectively reducing food waste and loss could be one of the most fundamental strategies to improve food security and achieve a sustainable, food future (GIZ, 2013).

SOCIO-DEMOGRAPHICS EFFECTS ON FOOD WASTE

Social, demographic, behavioral and attitudinal factors of households have an influence on the amount of food waste generated at household level (Parizeau et al., 2015). Household size is one of the factors that have an impact on the amount of food waste generated. According to Canali (2014) the number of people in a household correlates with the amount of food wasted per person.

Age has been one of the factors found to influence the amount of food wasted at household level (Jorissen et al., 2015; Secondi et al., 2015; Melbye et al., 2016). Older people waste less food than younger people. People over the age of 65 have been found to wastes less food because they are influenced by their past experiences during times of scarcity (Melbye et al., 2016). There are different factors that cause household food wastage. Studies by Porpino et al. (2015), Waitt and Phillips (2015) showed that demographics play an important role in the amount of food wasted at the household level.

However a study by Aschemann-Witzel et al. (2015) concluded that age and household size do contribute slightly to the amount of food wasted at consumer level.

Quested et al. (2013) showed food waste in a one-person household is more likely to occur in a higher amount per capita, compared to a household with many family members. Similarly, in a study by Aschemann-Witzel et al. (2016), respondents from one-person household have emphasized that due to economics savings, they would choose the larger packages rather than the smaller packages, and thus, food waste is more likely to occur.

The amount of food waste generated per household is also influenced by the income level. Households with high earnings are capable to buy more food than households with fewer earnings. This is because of a higher expendable income linked to affordability (Skourides et al., 2008). However in a study by Ramukhwatho et al. (2014) in Mamelodi township in the City of Tshwane, found that household income level has an impact on the amount of food wasted, the study found that households with a monthly income of less than R5 000 wasted more food than those with a higher monthly income of over R5 000 (Ramukhwatho et al., 2014). This paper outlines some of the measures that can be used to reduce and prevent food waste at household level as reported in literature.

HOUSEHOLD FOOD WASTE PREVENTION

The amount of food wasted in households is caused by a complex process involving consumers' food- and kitchen practices, their behaviour and attitude on food products (Quested et al. 2013). For example behaviors relating to household shopping practices which include the way households plan their shopping, and behavior during food preparation and the way food is stored and consumed (WRAP, 2007). Inappropriate storage of food causes food to develop bad taste and smell in a short period of time and results in discarding the food (Aschemann-Witzel et al. 2016). In a study by Koivupuro et al. (2012) respondents believed that large packages were a reason for wasting food most of the time. The availability of smaller packages, might contribute in reducing food waste (Secondi et al., 2015).

Some of the measures that can be used to reduce and prevent food waste include: a) communication campaigns focusing on strengthening the belief that wasting food is bad, unnecessary and immoral, b) information campaigns on planning e.g. shopping lists and meal plans, c) use of smart fridges and mobile applications that list food inventory, d) training to improve cooking skills and using kitchen devices for better portion control, e) serving food on small plates and sharing food and leftovers. According to research that was conducted by Business for Social Responsibility (BSR) in 2013 from various reports for the consumer sector on recovery and diversion of wasted food, it was found that there was no comparable data available for the reduction, recovery, or recycling of food waste in the consumer sector. Household food waste is generally beyond the point of recovery for feeding people because of health and food-safety concerns.

The research reported in this paper test the findings on socio-demographic impacts on food waste reported in literature in the City of Tshwane Metropolitan Municipality context.

RESEARCH METHOD AND TECHNIQUES

This section will explain how the study was selected in the City of Tshwane Metropolitan Municipality. Data collection will be outlined and how it will be analysed.

Study site selection and participant recruitment

The study was conducted in five areas of the City of Tshwane Metropolitan Municipality (CTMM), in the northern part of Gauteng. The study area was purposefully selected to ensure inclusion of high, middle and low income areas and households representing different cultures. Household income categories were developed by the researcher so to suit the standard of the selected areas which also includes informal areas in a township. The researcher did not adopt the Southern Africa Labour and Development Research Unit income comparison tool because there are difficulties associated with deriving a money-metric measure from it, and mostly used for interpreting policy purposes (Frye, 2014). The aim of the study was not to provide a statistically representative sample of culture, but to be as representative as possible so as not to unnecessarily skew the results. Participants were identified and persons responsible for preparation of food in their houses were recruited, appointments were made and interviews were conducted accordingly.

Data collection and data analysis

Data was collected using (1) a structured questionnaire to collect socio-demographic data through a face-to-face interview with respondents (2) direct measurement methods (weighing of all organic food waste volumes from the kitchen). Participating households kept their food waste separately and the amount of food waste generated per week in each household was collected in plastic bags and weighted using a calibrated mechanical kitchen scale with a stainless steel bowl and measuring limit of up to 5 kg. A total of 123 households in the study area participated in the study through interviews. These households also kept weekly food waste for weighing purposes. Collected data was analyzed through descriptive statistics using Microsoft Office Excel 2010 and the statistical software SAS. The statistical chi-square test was applied and a probability value (p-value) of < 0.0001 was obtained, indicating that the difference between income categories was more than just a random pattern. (Note that any p-value of < 0.05 is considered to be statistically significant, i.e. an indication of an underlying consistent, non-random pattern.)

RESULTS

Age and amount of food wasted

According to the Chi-square results, there is no statistical significant difference between age groups and the amount of food wasted (p=0.4057). However, respondents aged 21 – 30 years old who were students and young professional they have shown to waste 5.4 kg of food while older people aged 61 – 70 years old wasted 8.1 kg of food (Table 1). Thus, older people seem to waste more food than younger people and that is because older people are not as representative as younger people. But the fact of this research show that the older people waste less food when compared to the younger people.

Table 1: Age and its correlation with amount of food wasted per week

Age group (n=123)	Amount of food wasted in kilograms (kg)	P-value	Interpretation
21- 30 (57)	5.4	0.4057 Not statistically significant	No differences between age groups shown
31 -40 (34)	5.4		
41 - 50 (19)	7.8		
51 -60 (11)	7.0		
61 -70 (2)	8.1		

Household size and amount of food wasted

Table 2 showed that households with 2, 3 and 4 family members dominated this study when compared to households with 1, 5, 7 and 8 family members. Household with seven family members wasted more food as per table 2 (13.8 kg of food waste). The Chi-square results showed that there is statistically significant ($p=0.0043$) between household size and the amount of food wasted. The results must however be interpreted with caution as there was only one respondent of a 7 family member household which could have skewed the results.

Table 2: Household size and its correlation with amount of food wasted per week

Household size (n=123)	Amount of food wasted in kilograms (kg)	P-value	Interpretation
1 (14)	6.1	0.0043 Statistically significant	Differences between household size shown
2 (37)	6.1		
3 (36)	5.6		
4 (28)	5.7		
5 (6)	6.9		
6 (0)	0		
7 (1)	13.8		
8+ (1)	8.1		

Income and amount of food wasted per week

Moreover, analysis of the data confirmed that there is a statistically significant relationship between income level and food waste. The results (Table 3) suggest that the higher the income a household earns the lesser food waste they generate. This could be attributed to a range of possibilities such as educational and employment status of household members. The relationship with these attributes was not tested. A possible explanation for this finding may be that higher income households are more likely to eat out or purchase ready meals due to affordability. This will result in less wastage at household level, but more waste at pre-consumer level. This is however speculation, that will need to be confirmed through future research.

Table 3: Income and its correlation with amount of food wasted per week in kilograms (kg)

Income (n=123)	Amount of food wasted in kilograms (kg)	P-value	Interpretation
R500 - R5000 (17)	7.1	0.0001 Statistically significant	Differences between income
R6000 - R9000 (31)	6		

R10 000+	(75)	5.7	significant	categories shown
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Correlation for the different age group, household sizes, income and questions related to special offers and use of shopping lists

The chi-square results (Table 4) show that there was a statistically significant difference with a probability value (p-value) of < 0.0001 in the values of age group and questions regarding whether respondents were attracted by special offers, used a shopping list and stuck to the shopping list. Similarly, household size results show that there were statistically significant differences ($p < 0.0001$) in the values of questions regarding whether respondents were attracted by special offers and stuck to a shopping list. However there were no statistically significant differences between household size and questions regarding whether they used a shopping list with a probability value (p-value) of > 0.149 . The chi-square results show that there were statistically significant differences ($p < 0.0001$) between income and the values of questions regarding whether respondents were attracted by special offers indicating that the difference between income categories was more than just a random pattern. (Note that any p-value of < 0.05 is considered to be statistically significant, i.e. an indication of an underlying consistent, non-random pattern). There was no statistically significant difference with a probability value (p-value) of > 0.2233 and 0.5452 in the results of the questions on whether they used a shopping list, stuck to the shopping list respectively.

Table 4: Age, Household size, Income and its correlation with amount of food wasted per week

Questions	Special offers	Use of shopping list	Stick to shopping list
		P-value	
Age	0.0001	0.0183	0.0001
Household size	0.0001	0.149	0.0001
Income	0.0001	0.2233	0.5452

CONCLUSIONS AND RECOMMENDATIONS

This paper presented the correlation of socio-demographic effects on household food waste and prevention in the City of Tshwane Metropolitan Municipality. The study was conducted to develop an understanding about socio-demographic factors that influence food waste generation. The following three socio-demographic variables of households were investigated, namely (1) age, (2) household size, and (3) income. The results of this study confirmed that income and family size factors influences the amount of food waste generated in the sample of households of the City of Tshwane, as opposed to the age group in terms of statistically significant difference with a probability. It should be noted however, that this study does not conclusively exclude any other factors as not having an influence in food waste generations. However, their influence in the current food waste generation quantities was not conclusively determined.

This study clearly indicates that the socio-demographic profiles of households can be used as preliminary indicators of socio-demographic factors that have influence on the food waste generation. It is therefore recommended that more socio-demographic factors and their correlation with household food waste be investigated in a South African context so to have accurate data across Africa. Further studies with larger sample sizes are thus recommended as it can provide useful indicators to assist in food waste generation especially to inform better waste management practices. Furthermore, local authorities can manage food waste generation rates by setting specific targets that are aimed at specific demographic profiles of communities. These finding are significant in guiding authorities to identify potential demographic factors that can help, to address a myriad of sustainable development issues, including focused public awareness initiatives.

ACKNOWLEDGEMENTS

The authors would like to gratefully thank the University of South Africa Masters and Doctoral Support Program for funding this research.

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