Household Food Wastage – A case study of middle to high income urban households in the City of Tshwane

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ABSTRACT
Municipal waste composition studies globally have indicated that significant amounts of food is wasted and disposed while there is potentially significant opportunity to prevent food wastage at household level (Lebersorger and Schneider, 2011). International trends suggest that food wastage moves up the food supply chain, from pre-consumer to post-consumer stages, as the level of development in a country increases (Institution of Mechanical Engineers, 2013). It is therefore likely that South Africa, as a developing economy may see similar trends in food waste over time. Little information is available on the food waste proportion of the household waste stream in South Africa, but it is estimated to be in the order of 15% (Nahman et al., 2012). This paper investigates the types of food wasted and self-reported percentage of purchased food wasted at household level in a sample of 301 urban households in the City of Tshwane. The results indicate that fruit and vegetables are the most wasted food groups and 53% of respondents rated this wastage as more than 20 % of their weekly fresh produce purchases.

1. INTRODUCTION

Waste characterisation studies globally (WRAP, 2008; European Commission, 2011; Lebersorger and Schneider, 2011; Smuts, 2012) and in South Africa (DEA, 1999, Ball and Associates, 2001; Sibernagl, 2001) has indicated that significant amounts of food is wasted at household level. However, there is potentially significant opportunity to prevent food waste at consumer level (WRAP, 2008; European Commission, 2011). Food waste has a triple negative impact including environmental pollution associated with improper food waste management, the wasting of resources along the supply chain in the production, handling and distribution of food that is not consumed by humans and socio-economic impacts associated with food insecurity (Oelofse and Nahman, 2013). Global estimates suggest that between a third and half of all food produced never reach the human stomach (Institution of Mechanical Engineers, 2013). The magnitude of food wastage at consumer level in South Africa is estimated at 501 000 tonnes per annum (Nahman and De Lange, 2013). However, this calculation used the sub-Saharan Africa waste profile as suggested by Gustavsson et al. (2011) (Nahman and De Lange, 2013; Oelofse and Nahman, 2013) but there is very little quantitative waste information in South Africa against which to check this calculated food waste estimate. Nahman et al. (2012) in a different study estimated household food waste generation at 1.4 million tonnes per annum. This translates to 28 kg per capita per annum which is more than double the 10 kg per capita per annum estimated by Nahman and De Lange (2013). Although Nahman et al. (2012) caution that their household food waste estimate may be an overestimate due to the difficulties of extrapolating food waste quantities from the reported organic waste quantities, this difference may also be an indication that post-consumer food waste in South Africa is potentially higher than the percentage suggested for sub-Saharan Africa (Notten et al., 2014). This potentially higher percentage of post-consumer food waste is supported by the fact that South Africa achieved an economic freedom score of 62.5 which is higher than the regional average for sub-Saharan Africa (54.6) (Miller et al., 2014), which is an indication of economic prosperity in South Africa relative to the rest of sub-Saharan Africa. In addition, in South Africa, the young, and population groups other than white South African consumers, embrace materialistic lifestyles characterised by excessive consumption and wastage (Marx-Pienaar, 2014).

Visagie (2015) reports a significant growth of the affluent 'black middle class' in South Africa between 1993 and 2008. The affluent middle class is defined as receiving a per capita monthly income of between R1400 and R10 000 after-tax income from all sources (1 US Dollar = approximately 11 South African Rands at January 2015 exchange rate) (Visagie, 2015). The upper class with incomes in excess of R10 000 per capita per month experienced the largest relative growth of all income classes over the same period (Visagie, 2015). With a strong correlation between a country's gross domestic product (GDP) and waste generation (EPD, 1998), further economic growth in South Africa will inevitably lead to increased consumption of goods and services and increased waste requiring collection, treatment and final disposal (Oelofse and Godfrey, 2008). Increased household incomes, especially noted for the so-called BRIC countries, are associated with a decline in consumption of starchy food staples and increased diversification of diets towards more fresh fruits and vegetables, dairy, meat and fish (Parfitt et al., 2010). Substantial losses and wastage are reported to occur during retail and consumption, due to product deterioration, discarding of excess perishable products, and food not consumed (Lundqvist et al., 2008). Marx-Pienaar (2014) noted that concerted efforts

to reduce unsustainable fresh produce practices by retailers often fail as a result of unrealistic consumer demands and pressure.

Aliber (2009) reports a clear correlation between economic status and dietary diversity in South Africa, with poor households enjoying far less diverse diets than more affluent households. Changes in the South African food consumption patterns supported by a growing middle class, is already reported. The shift is most evident in the decrease in the consumption of staple maize and bread to a more diverse diet (WWF-SA, 2010). However, it should be noted that diversification of diets is subject to regional and cultural differences (Lundqvist et al, 2008). Chevalier (2015) noted an emergent national middle class culture for South Africa due to South Africans' willingness to experiment beyond the boundaries of their native communities, but there is marked regional differences.

1.1 Household food wastage between countries

Comparing data on post-consumer food waste between countries is problematic due to different methods and definitions applied to the measurement of food waste and some methods do not provide robust estimates owing to small samples (Parfitt et al., 2010). Dutch households are reported to waste 13.6% of edible food (Ministry of Economic Affairs, 2014) while UK households waste nearly 20% of the food that they buy (Bond et al., 2013). American families are reported to discard approximately 25% of all food and beverages purchased (Gunders, 2012). A waste characterisation study conducted in five African cities, Cairo (Egypt), Harare (Zimbabwe), Monrovia (Liberia), Abidjan (Ivory Coast) and Sekondi-Takoradi (Ghana) found that on average, food waste contributed 10% to the household waste stream in the wet season in as compared to 3 % on average in the dry season (Smuts, 2012).

The main reasons why food that could have been eaten is thrown away in the United Kingdom is because it either wasn't used in time, or too much was cooked, prepared or served (WRAP, 2013). Similar reasons for food wastage are reported for households in the Mamelodi Township in Pretoria, South Africa (Ramukwatho et al., 2014).

The main food types wasted at household level in developed countries is the most perishable food items (i.e. fresh fruit and vegetables, bakery and dairy products) due to high volume of consumption and the food's tendency to spoil (Parfitt et al, 2010; Gunders 2012; Wrap, 2013). In light of this obvious lack of robust evidence on consumer behaviour and post- consumer food wastage in South Africa, the authors of this paper set out to collect data on household food wastage in South Africa as a first step to fill in this gap.

2. METHODOLOGY

2.1 Questionnaires

Quantitative data collection was done using structured, self-administered questionnaires. The questionnaires were divided into four sections covering 1) demographics, 2) the respondent's interpretation of the definition of food waste, 3) types and extent of food wasted and 4) drivers of food wastage. Demographics included gender, age, level of education, approximate monthly household income, population group and number of people living in the household. In section 2 a choice of two definitions of food waste was provided to determine what the respondent understands as being food waste. Section 3 required respondents to rank the food categories (provided as a list) according to the extent that each food category is wasted in the household on a weekly basis. An approximate percentage wasted of what was purchased (provided as different ranges for each food category) allowed respondents to provide an indication of their own perceived wastage by food category. Lastly, the questionnaire listed a number of reasons why food is wasted from which the respondents could select any number of statements.

2.2 Data collection

The questionnaire was uploaded onto Survey Monkey and the link was distributed by consumer sciences students via e-mail and social networks. Data was collected during October 2014 with the aim of reaching at least a sample size of 300.

3. RESULTS AND DISCUSSION

A total of 301 questionnaires were returned for analysis, although not all contained answers on all questions. The results reported provide a preliminary indication of some household food waste behaviour in South Africa. The relative small sample size resulted in a bias towards well educated, high income, white households whereas the overall South African population is dominated by black Africans with some secondary education (StatsSA, 2012). The demographic profile of the respondents is summarised in Table 1.

Table 1: Demographic profile of questionnaire respondents

Variable	Selection provided	% of respondents (n=301)
Gender	Male	35.9
	Female	64.1
Age	18-24	42.2
	25-34	23.9
	35-44	13.0
	45-54	12.6
	55-64	6.0
	65 or older	2.3
Level of Education	Grade 10 or 11	1.0
	Grade 12	27.2
	Grade 12 + Degree or diploma	42.5
	Post graduate	29.2
Household monthly income	Less than R5000	16.9
	R5000-R9999	11.6
	R10000-R14999	9.0
	R15000-24999	15.3
	R25000 or more	47.2
Population Group	White	75.4
	Black	16.9
	Indian	5.6
	Coloured	1.3
	Other*	0.7
No of people living in household	1	14.3
	2	22.6
	3	19.6
	4	29.9
	5	10.0
	6 or more	3.7

When considering the definitions of waste provided, 29.1% of respondents (n=292) chose “food waste is any solid or liquid food substance, raw or cooked, which is discarded after the consumption of a meal (e.g. leftovers, food scraps or spoiled food)”. In contrast, 70.9% of respondents chose the more all-encompassing definition of “food waste is any solid or liquid food substance, raw or cooked, which is discarded during the manufacturing, preparation, and or consumption of a food product and or a meal (e.g. organic residues generated by processing, handling, storage, sale, preparation, cooking, and serving of foods as well as leftovers or scraps).”

The types of food most wasted by all households included in the survey, was determined by adding together ranking orders 1-3 for each of the food types, for example, all responses ranking dairy as the most, second or third most wasted food type was added together to get a score for dairy (Table 2). The same approach was followed for each of the food types. This revealed that fruit and vegetables were most wasted followed by cereals and breads (including pasta, rice, cakes and pastries) with dairy products (including milk, yoghurt and cheese) in a close third place. The fourth most wasted food type is meat, poultry, fish and eggs. The percentage of purchased food wasted (Table 3) for the three most wasted food types is significant with 31% of respondents reporting wasting more than 30% of the fruit and vegetables that they buy, 34% wasting more than 20% cereals and breads, 27% wasting more than 20% of dairy products and 20% wasting more than 20% of the meat, poultry, fish and eggs that they buy.

The most reported reason for wasting food, is that the sell by date indicates that the product has expired (56.7%) (Table 4). Similarly, date labels were noted as the third most important reason for food waste by the

residents from the Mamelodi Township, Pretoria (Ramukhwatho et al., 2014). WRAP (2011) report that levels of consumer understanding and their use of date labels in decision making regarding food waste, indicates widespread consumer confusion. In addition, literature suggest label dates on food are generally not regulated and do not indicate food safety (Gunders, 2012).

Table 2: Food types wasted by households (Ranking order: 1 = most wasted food type; 7 = least wasted food type (n=272)).

Answer Options	1	2	3	4	5	6	7	sum of 1 to 3
Dairy products (e.g. milk, yoghurt, and cheese)	37	49	45	24	23	35	59	131
Fruit and vegetables	121	36	27	22	23	23	20	184
Meat, poultry, fish and eggs	24	28	43	41	42	34	60	95
Cereals and breads (e.g. pasta, rice, cakes and pastries)	21	47	65	56	32	27	24	133
Oils and condiments (e.g. oils, vinegars and sauces)	16	21	21	33	49	55	77	58
Sweets	17	15	12	20	30	56	122	44
Liquids and beverages (e.g. soft drinks, alcohol and fruit juices)	22	13	26	39	47	51	74	61

Table 3: Respondents indication of approximate wastage as a percentage of purchased food (n=272)

Answer Options	> 30%	%	> 20%	%
Dairy products (e.g. milk, yoghurt, and cheese)	51	19	74	27
Fruit and vegetables	83	31	145	53
Meat, poultry, fish and eggs	38	14	54	20
Cereals and breads (e.g. pasta, rice, cakes and pastries)	63	23	93	34
Oils and condiments (e.g. oils, vinegars and sauces)	25	9	45	17
Sweets	21	8	32	12
Liquids and beverages (e.g. soft drinks, alcohol and fruit juices)	40	15	64	24

Table 4: Reasons why food is wasted (n=268)

Answer Options	Response Percent
The sell by date indicated that the product had expired	56.7%
I was concerned about the health and safety of my family using the product	44.0%
I always prepare to much	38.1%
It appears unappetising	33.6%
Promotional material prompted me to buy in excess	22.4%
In-store advertising like attractive displays, encouraged me to buy products that was not on my list	17.2%
I was not aware of the perishability of the food products	15.7%
I prepared the food incorrectly (by burning, overcooking, too much salt etc)	15.3%
I am easily swayed to buy new and interesting products on impulse	14.2%
I did not have sufficient information regarding the correct storage and/or preparation techniques	13.1%
Other (please specify)	9.7%
I always try to abide by new food trends, fads, or diets	5.6%

Preparing too much food was reported by 38.1% (Table 4) of the respondents as a reason for wasting food as compared to 76% of the respondents in the Mamelodi case study (Ramukhwatho, et al., 2014. Leftover

food from cooking was also one of the main reasons listed for food wastage in the United Kingdom (WRAP, 2008).

4. CONCLUSIONS AND RECOMMENDATIONS

The initial findings from this ongoing research suggest that household food waste behaviour in South Africa, based on this sample group, may be very similar to that of households in the developed world. Similarities in food types wasted between European and well-educated, high income White South African households are noted. The reasons for food wastage also appear to be very similar when comparing the South African results with that of the United Kingdom. By interrogating the reasons for food wastage further, there may be significant potential for food waste reduction in South Africa by addressing issues of confusion around food labels. Although preparing too much food is another common denominator, addressing this issue to reduce food wastage in South Africa may proof to be more difficult. Many of the different cultures residing in South Africa prepare more food than required by the household as part of their cultural heritage.

The finding of this research clearly indicate that more research on this topic in South Africa is required on order to provide robust evidence to support decision making about food waste prevention as well as alternative waste management solutions for household waste management in South Africa.

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