

ROMANIAN CONSUMERS BEHAVIOR TOWARDS DOMESTIC FOOD WASTE

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Abstract

It has been reported that worldwide, food waste has become a problem of great importance due to population growth and the daily need for food. Thus, in this present paper, the consumer's attitude from Cluj County, Romania, regarding food waste and ways to prevent, was analysed. An on-line survey on a sample of 114 respondents was conducted in order to achieve the objectives of the research. Descriptive statistics were used to analyse the collected data. The results reveals that main category of wasted food is represented by cooked food, due to the fact that the respondents are cooking more than they need. Buying local products and using a shopping list are two of the main actions that could be taken in order to reduce the food loss and waste. At the other end respondents agree that educational campaign in order to educate and inform people about reducing food wasting are important.

Key words: consumer, food, food waste, waste reduction.

INTRODUCTION

Food waste and food losses are an interesting topic in almost the last decade. Food waste is defined as the drop in quantity and quality of food while being transferred from the producer to the consumer due to the fact that the food hasn't been consumed, has expired or deteriorated as a consequence of consumer's behaviour, stock handling or negligence (Aktas et al., 2018). Food waste is strongly associated with the environment protection and the supplies usage in an efficient way, having a serious impact on the environmental degradation, climate change (for example biodiversity loss, fertile soil loss and the increase of greenhouse effect gas emissions and global temperature) and people's health (Franzo et al., 2018; Lindgren et al., 2018). Poore et al., 2018 claims that food systems constitute 26% out of the total gas emissions with greenhouse effect). As a consequence, the proper handling of food waste from the sustainability point of view has been a major problem for many countries and many organizations, even ONU considers it a major priority (European Parliament. Report on How to Avoid Food Wastage: Strategies for a More Efficient Food Chain in the EU 2011).

According to FAO, 32% of the food produced for human consumption is wasted or lost, approximately 1.3 billions of tones annually (Liu et al., 2016) whereas there is a number of countries which have to face food insecurity and malnutrition. The World Food Program (WFP, 2015) estimates that globally about 805 billion people have no sufficient food and their health and lifestyle are affected. The most important element of food security (there are four: availability, access, usage and stability) (Schmidhuber et al., 2007), is for sure food availability. This element refers to the food supply at the market level and reflects the economic development of a country very well (Patel D.R. et al., 2016). As a consequence there are ongoing debates all over the world regarding ways of reducing food waste for a more sustainable society (Abdel, 2018). Most research in the field of food waste were focused in the area of final sellers (large store chains) and consumers. Store chains encounter a problem with excessive product stocks, and consumers encounter a problem with food consumption. Due to the fact that consumers contribute significantly to food waste, other studies have investigated the consumer behaviour regarding food waste from different perspectives, such as factors affecting food

choices (De Boer et al., 2007), the effect of social influence upon food waste (Comber & Thieme, 2013), or food shopping practices and their relationship with food waste (Farr-Wharton et al., 2014). Therefore, wasted food cannot be defined only by a single behaviour, but rather by a combination of multiple behaviours that can increase or decrease the probability of being wasted.

Researches revealed that financial constraints are stronger, than those related to environment protection regarding consumers' actions in order to reduce food waste (Graham-Rowe et al., 2014; Stancu et al., 2016). This is stronger in the case of younger people, than older whom are more concern about social aspects and environmental consequences of food waste (Tucker & Farelly, 2015). Using a shopping list, checking inventories before shopping are strategies used to reduce food waste and lose (Jorissen et al., 2015; Far-Wharton et al., 2014). There are many studies that are analysing the consumers' behaviour towards food waste generation (Schanes et al., 2018). The household routines such as planning, shopping, cooking, eating, management of leftovers play an important role in domestic food waste (Evans, 2012). The influence of the socio-demographic characteristics on food waste generation was also deeply analyzed. There are studies that revealed that is a direct link between the size of the household and the quantity of food waste (Jorissen et al., 2015; Silvennoinen et al, 2015). At the same time in the families with children the trend is to produce more food waste (Parizeau et al., 2015; Visschers et al., 2016). Cecere et al. (2014) concluded that older people are wasting more, than younger, while other researches underline that older people tend to waste less due to better knowledge regarding the impacts of food waste (Questaed et al., 2013).

According to Public Health National Institute (insp.gov.ro), In Romania 10% of the purchased food is being thrown away, which represents 350g per day or 129 kg per year for each inhabitant, given that 4.5 million people in Romania are facing difficulties when it comes to day-to-day food acquisition. The same source mentions that the people who have high

income waste the most, and the bigger the family, the more food is being disposed of. The largest waste of food is recorded in urban areas: while rural communities use traditional methods of recovery of food waste in the household, in urban areas over 95% of food waste ends up in landfills, making it impossible to be recovered neither as food nor as non-food (<http://foodwaste.ro/wpcontent/uploads/2018/10/FoodWasteRO-Anexa21>).

MATERIALS AND METHODS

The aim of the research was to analysed to consumers attitude regarding the food waste and food combat. The survey method and the structured questionnaire tool were used to collect the data from the respondents. The sample consisted of food consumers from Cluj County, Romania. A convenience sample method was applied in order to achieve the objective of the research. A questionnaire of 17 questions was applied on social media groups of consumers during March-July 2020. A total number of 114 questionnaires were validated and furthermore was analysed using descriptive statistics indicators and chi-square test. Data was analysed by using SPSS, Statistics for Windows, Version 23.0. The questionnaire consists of three main parts: type, frequency and place of purchasing food products; type, frequency and reasons of food waste, and perception of the respondents of food waste on the environment; and the third part was represented by the socio-demographic data.

From the total number of respondents (Table 1) 78.9% were female, while 21.1% were male. This could be explained by the fact traditional the women are those whom are responsible are enjoying more household shopping (Ramprabha, 2017) and are responsible for cooking (Hamasalih et al, 2019). It was observed as well that 45.5% of the respondents are less than 40 years old, and 43.9% of the cases they declared that in the household are also children. More than 45% of the respondents are employee, with an average monthly income ranged from 2000 to 4000 RON, in 40.4% of the cases.

Table 1. Socio-demographic characteristics

Characteristic	Category	Percent %
Age	Less than 40 years old	45.5%
	More than 40 years old	55.5%
Children in the household (under 18 years old)	Yes	43.9%
	No	56.1%
Level of education	Less than university degree	68.4
	University degree or more	31.6
Socio-professional status	Student	3.5%
	Employee	47.4%
	Freelance	1.8%
	Farmer	28.1%
	Entrepreneur	5.3%
	Unemployed	1.8%
	Other	12.3%
Gender of respondents	Female	78.9%
	Male	21.1%
Average monthly household income (RON)	< 650	5.5%
	650-1000	8.8%
	1001-2000	15.8%
	2001-4000	40.4%
	> 4000	29.8%

RESULTS AND DISCUSSIONS

The main aspects that were considered in the present research were grouped into three categories of results.

1. Opinions regarding categories of purchased food, frequency and place of purchase and the degree of using the shopping list

The exact causes of food waste vary around the world and depend greatly on the specific conditions and local situation in a particular country (Nică, 2017). These food losses can be influenced by crop production choices and marketing patterns and distribution channels, as well as by consumers' purchasing and food use practices. So, at the beginning of the research we wanted to reveal the categories of purchased products. The obtained results following the application of the research questionnaire, reveal that the majority of respondents (82.5%) buy bread and bakery products, followed by those who purchase fruits and vegetables (73.7%), while other basic products (oil or sugar) are purchased at a rate of 12.3% (Table 2). Given that fact that on 15 December 2020, FAO

launched the International Year of Fruit and Vegetables 2021 with a call for improving healthy food production and reducing food loss and waste (www.un.org), we consider the results obtained in the present research are worrying. Wasting this category of food could lead to higher prices, but also to a lack of fruits and vegetables.

Table 2. Categories of purchased food

Type of products	%
Fruit and vegetables	73.7
Meat and meat products	52.6
Bread and bakery products	82.5
Milk and dairy products	43.9
Sweets	24.6
Others (oil, sugar)	12.3

Analyzing the purchase frequency (table 3) it was observed that 61.4% of respondents buy bread and bakery products daily, followed by those who buy fruits and vegetables (21.1%) and milk and dairy products (14%). All these products are purchased weekly.

The possibility to purchase food products in Cluj County is varied. In this purpose, another objective of the research (Figure 1) aims to locate the most frequented commercial space from which the county's residents usually buy food.

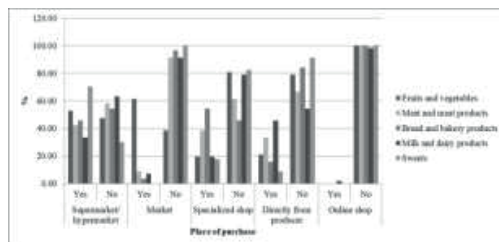


Figure 1. Place of purchase of products

The food products were divided into six groups, for which five places for purchasing were allocated. Thus, it can be observed that fruits/vegetables are purchased by consumers in agro-food markets (35%), while in the case of meat and meat products (33%), bread and bakery products (31%) respectively milk and dairy products (38%) consumers have chosen to purchase them from the supermarket. The explanation of this phenomenon is given by the period in which this research was conducted

(May-June 2020), namely, the pandemic caused default in Cluj County, which has limited the consumers in frequenting specialised stores,

by the SARS Cov 2 virus in Romania, and by respectively, the direct purchase from the manufacture (Table 3).

Table 3. Frequency of food purchases

Categories	Daily	Weekly	Monthly	A few times per year	I do not buy	I do not know
Fruits and vegetables	21.1%	64.9%	8.8%	5.3%	0%	0%
Meat and meat products	12.3%	42.1%	22.8%	10.5%	7%	5.3%
Bread and bakery products	61.4%	28.1%	0%	5.3%	3.5%	1.8%
Milk and dairy products	14.0%	59.6%	5.3%	3.5%	5.3%	12.3%
Sweets	10.5%	40.4%	24.6%	8.8%	5.3%	10.5%

In the context of the current crisis in the field of environmental pollution and food inequity which is affecting the entire population of our country, in this context the use of the shopping list could be a cornerstone in reconfiguring consumer's opinion about food waste. Furthermore it was evaluated the degree in which the shopping list is used during the act of acquisition, and as a result, the survey data showed that 36.8% of respondents are not using it frequently, while 31.6% use it frequently or sometimes (Table 4).

Table 4. The degree of use of the shopping list

Use of shopping list	%
Yes	31.6
No	36.8
Sometimes	31.6

2. Opinions regarding the categories and frequency of food waste

Being asked which are the main types of food that the respondents are thrown away, it was observed that 22.5% of the respondents totally agree that cook food (mean=2.42) ends up to garbage, followed by bread and bakery products (12.3% of respondents totally agree, with an average score of 2.36) (Table 5).

Table 5. Food categories that are most often wasted

Statements	Appreciation scale (%)					NR	Mean	SD
	1	2	3	4	5			
Cooked food	43.9	17.5	14	1.8	22.8	0	2.42	1.603
Bread and bakery products	43.9	17.5	7.0	17.5	12.3	1.3	2.36	1.507
Milk and dairy products	56.1	12.3	15.8	7.0	7.0	1.8	1.95	1.299
Meat and products	50.9	24.6	10.5	3.5	10.5	0	1.98	1.316
Fruits	45.6	22.8	17.5	5.3	8.8	0	2.09	1.286
Vegetables	40.4	35.1	8.8	8.8	5.3	1.8	2.02	1.168

Previous studies revealed that people are cooking a larger quantity that they need (Graham-Rowe et al., 2014; Silvennoinen et. al, 2015). At the other end the less thrown away food products are dairy (56.1% totally disagree with an average score of 1.95) and meat products (50.9% totally disagree, with an average score of 1.98).

The acute lack of food for a large part of the country's population is known as food crisis. Consequently, it's every day waste (32.1%) (Table 6) as being shown by the research results, leads us to the idea that the residents of Cluj County could suffer in the future from lack of food, could spend more for their purchase and not in the least, the environment will suffer from the need to increase cultivated areas and the usage of inputs in agriculture.

As it can be observed there are significant difference ($\chi^2=18.038$, $df=4$, $p=0.001$) between families with children and families without children regarding the frequency of throwing out the food. More 45% of the families in which are children are throwing out food daily, while in the families without children this could be observed only in 21.9% of the cases (Table 6). It was observed that there is a significant difference between the education level and the frequency of throwing food ($\chi^2=16.432$, $df=4$, $p=0.002^{**}$). Less educated people are throwing out food often than more educated ones. In 42.1% of the cases the respondents with maxim high school degree declared that they are daily throwing food, while this was noticed only in 11.1% of the cases of respondents with more than university degree. The results are different that those recorded by Cecere et al. (2014) and Neff at al. (2015). Regarding the average monthly house hold income it was noticed that

in general with lower amount of income tend to produce more food waste, being a significant difference between the income and frequency of throwing food ($\chi^2=41.225$, $df=16$, $p=0.001***$). This is contrary to the results of other researchers which show a positive correlation between income and food waste (Stancu et. al, 2016) or no between income and food waste correlation (Visscherts et al., 2016). This could be explain by the fact that by general the respondents with higher income are also persons more educated (table 6).

At the same time (table 6) younger respondents tends to throw out food more often than older respondents. Around 39% of the respondents less than 40% declared that they are daily throwing food, while only 29.4% of the

respondents older than 40 years stated that they throwing food out daily. Chi-square test reveal that there are significant differences between the two groups of respondents ($\chi^2=12.104$, $df=4$, $p=0.017$). Previous studies underlined the fact that household with children are producing more waste than other types of households (Tucker & Farrelly, 2016). This could be explained by the fact that for families with children is difficult to predict if the children will be eat home at all and their food preferences (Cappellini & Parsons, 2012; Ganglbauer et al., 2015). There was no significant difference between male and female and the frequency of throwing food ($\chi^2=3.507$, $df=4$, $p=0.477$).

Table 6. Correlation analysis between socio-demographic characteristics and frequency of throwing out food

Variables	Frequency of throwing out food				
	Daily	Each two days	Twice a week	Others (once a week/give to animals)	I do not know
Total	32.1	8.9	32.1	21.4	5.4
Type of household					
With children	45.8	12.5	33.3	4.2	4.2
Without children	21.9	6.3	31.3	34.3	6.3
$\chi^2=18.038$, $df=4$, $p=0.001**$					
Age					
Less than 40 years old	38.9	16.7	16.7	16.7	11.1
More than 40 years old	29.4	5.9	41.2	20.6	2.9
$\chi^2=12.104$, $df=4$, $p=0.017*$					
Education					
Less than university degree	42.1	7.9	26.3	15.8	7.9
More than university degree	11.1	11.1	44.4	33.3	0
$\chi^2=16.432$, $df=4$, $p=0.002**$					
Average monthly house hold income (RON)					
< 650	100.0	0	0	0	0
650 – 1000	60.0	0	40.0	0	0
1001 – 2000	55.6	11.1	22.2	0	11.1
2001- 4000	22.7	13.6	36.4	22.7	4.5
> 4000	11.8	5.9	35.5	41.2	5.9
$\chi^2=41.225$, $df=16$, $p=0.001***$					
Gender					
Male	34.1	9.1	34.1	18.2	4.5
Female	25.0	8.3	25.0	33.3	8.3
$\chi^2=3.507$, $df=4$, $p=0.477$					

3. Opinions regarding the causes of food waste, ways and benefits on the environment
 Since the most important goals of the present generation when purchasing food, are related to the sanogenetic virtues of the products, another aspect of the paper was to identify the reasons why food is thrown away and the ways to

prevent food waste. The study consisted of 5 statements, which were evaluated on a scale from 1 to 5, where 1 means "total disagreement" and 5 means "total agreement". The results confirmed what was observed by other researches as well that by general people do not estimate correctly the amount of need food and

they end up to cook more than they need (Ghram-Rowe et al., 2014). As it can be observed just 10.5% (Table 7) of the respondents claimed that the reason of throwing is related to overproviding food.

Table 7. Causes of food waste

Main reasons for throwing out food	%
Improper estimation at purchase	10.5
Fast degradation	40.4
Preparing large quantities for a meal	66.7
The food is very cheap and it doesn't matter how much you buy	0
Others	7.0

This aspect was highlighted by Parizeau et al. (2015) as well, while Evans (2012) claimed that by general people follow of routine of buying more than they need. Analysing the actions that could be taken in order to reduce the food wasting it was

observed that 68.4% (table 8) of the respondents totally agree that is necessary to buy an accurate quantity of food (mean 4.32 ± 1.208), followed by donation of food (mean 4.05 ± 1.446), while 43.9% of the respondents strongly agree that a shopping list should be used in order to prevent food waste. Jorissen et al. (2015) found out the using a shopping list reduces by 20% the amount of food through away by capita. Buying local products represents for 43.9% of the respondents a tool for reducing food loss and waste (3.76 ± 1.464) (Table 8). Buying local products has a positive effect on reducing food loss and waste. Setti et al. (2016) found out that in case of local food buyers the frequency of wasting vegetables tends to be lower. Food waste was noticed to be higher in the case when people exclusively purchase in supermarkets, and tends to decrease when people are buying food from local and small shops (Jorissen et al., 2015).

Table 8. Actions of preventing food waste

Statements	Appreciation scale					NR	Mean	SD
	1	2	3	4	5			
Proper assessment of food needs	7	1.8	12.3	8.8	68.4	1.8	4.32	1.208
Shopping according to a list	8.8	12.3	17.5	12.3	43.9	5.3	3.74	1.403
Food donation	14	0	12.3	10.5	59.6	3.5	4.05	1.446
Awareness campaigns on food waste provided by the authorities	14	12.3	3.5	17.5	47.4	5.3	3.76	1.541
Purchasing mainly local products	12.3	5.3	17.5	10.5	43.9	10.5	3.76	1.464

Analysing consumers' perception regarding the environmental impact of the food waste, it was observed that 42.7% believes that surfaces covered with waste would reduce, 33.7% believes that it would lead to rational use of the resource, while 23.6% believes that the emissions of the greenhouse gas will decrease (Table 9).

Table 9. Environmental benefits by reducing food waste

Items	%
The reduction of land areas occupied by waste	42.7
The rational use of resources	33.7
Reducing greenhouse gas emissions	23.6

CONCLUSIONS

Studying the consumer's attitude towards food waste reveals an original contribution of the paper, which enriches the literature, by

examining how consumers of different food products can become an important factor in avoiding food waste. At the same time, the article can bring an important contribution to the specialized literature by providing a model for analysing the problem of food waste, which can be applied to any region.

Previous researches proved that there are several factors that are influencing consumers' behavior towards domestic food waste. The results showed that the participants in the study are aware about the methods of reducing the food waste and food waste and its effects on the environment; however this is not reflected in their behavior regarding planning, shopping, cooking meals.

In the case of larger household with children and younger respondents it was noticed that the frequency of throwing out food is higher, most often cooked food is thrown out. In this context in could be concluded that is a need of

educational campaigns against food waste and sustainable cooking. Therefore, women should be targeted for providing information on food waste and ways to avoid it.

The number of dairy cows has continuously decreased during the period 1990–2010, with a negative impact upon milk production.

Milk yield is the only positive aspect, because it has increased reaching 3,980 kg per cow in the year 2010.

As a consequence of the reduced number of cows but an increased milk yield, milk production has continuously increased, except the year 1995 when it recorded the lowest level. The North Eastern region is traditionally suitable for cow rearing, due to its pastures and meadows, the important number of cow livestock and possibilities to produce ecological milk.

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