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Ákos Arnold Bartha[1], Bálint Horváth[2]
Szent István University – SZIE, Hungary

Effects of Certain Personal Attributes on Food Waste

Abstract. With the increase of food supply and the improvement of production processes, the real value of certain food products has been steadily declining over the past decades, which is certainly a trend that has seriously transformed the moral value of food, its role in society and its associated personal attitudes. According to UN and FAO estimates, in 2016, 30-35% of our food was wasted. Food waste in households is also a special area of research in terms of their high wasting rate. While exploring the causes of high amounts of consumer waste, a research group has also correlated (with mathematical models) the gradual growth rate of food waste, the US obesity epidemic and the growing supply of cheaper food products (Hall et al. 2009). In our research, we examine certain personal aspects in case of specific (e.g. functional) foods as well. A significant decrease in food waste coming from households could be attained by controlling our attitudes. Food waste, consumption awareness, eating habits, food mileage, water footprint, sustainable eating, energy efficiency: these are all terms which have to have their meaning and importance taught to people, as they contain important – affecting the level of wasting – information. Therefore, we can see that food waste itself is one of the most serious, paradoxical and global modern issues which the developed world has identified, and is trying to decrease by using national and international interventions in order to limit food supply anomalies and environmental loads as much as possible. Understanding personal attributes more precisely might be a good practice for providing future solutions, as well.

Key words: food waste, consumer attitude, sustainable consumption

JEL Classification: Q56

Introduction

Based on the data of the European Union's Committee, an annual 89 million tonnes of food produced for human consumption ends up in waste deposits just in Europe alone (2016), which has a significant economic cost, and is a clearly measurable environmental hazard. This problem has become bigger than ever, and the solution poses an issue both on global and local levels. While developed countries have significant overproduction and overconsumption, in the frame of an 'unhealthy consumption structure' and clear wasting, other areas of the world fight famine, which has created complete famine areas. In light of this paradox, the self-aware, sustainable and healthy usage of our food resources is becoming a bigger and bigger responsibility, similar to protecting the environment as a whole; most notably in cases of our agricultural products and foodstuffs.

Since the 2000's, there has been a growing interest from various scientific fields in identifying factors that potentially are increasing food waste. However, the scientific and professional information at hand is still not enough to address the problem comprehensively.

[1] Climate Change Economics Research Centre, Szent István University KEKK-SZIE, e-mail: akos.bartha@gmail.com
[2] Corresponding author, address: Climate Change Economics Research Centre, Szent István University KEKK-SZIE, Gödöllő 2100, Páter Károly street 1, e-mail: horvath.balint@gtk.szie.hu; https://orcid.org/0000-0001-5238-3320

Beyond understanding and introducing the problem, such research results could perhaps increase the success of preventative projects, or inform enterprise economy developments, with a more complex and comprehensive perspective. Furthermore, the literature at hand is not even homogeneously related to the importance of food waste, the circles of responsibility, or the factors influencing its creation. As for categorising food waste, there are, once again, multiple areas to be developed; for instance, analysing food security and health dimensions. Therefore, the food waste challenge that has become a popular topic in recent decades appears to have done so in vain, as it still has many definitions, and its precise bases for comparison are ever-changing. Some experts think that this is due to, among other reasons, the topic requiring experts from many fields (logistics, environmental protection, consumption sciences, marketing, etc.), and yet, most analyses fail to utilize an interdisciplinary perspective (e.g. circular economy) (Horváth, et al., 2017).

The goal of our research was to offer a picture of some factors influencing the phenomenon, and to introduce reasons for food waste within households. In the member states of the European Union - including Hungary - there is now an almost opaque choice of foods for end consumers. The real value of food has also declined steadily, along with the development of production processes, which has significantly changed the moral value of food, and thus its role in society and culture. Certainly the related consumer attitudes have also changed a lot. Many daily foods have become relatively inexpensive commodities. All these changes have contributed to the fact that households now produce more food waste than other food chain participants in the European Union, which is estimated to account for up to half of the total of 89 million tonnes a year (Szabó-Bódi, 2018). Food waste contributes to the wasting of fossil fuels and fresh water, which also affects carbon dioxide and methane emissions. Since 1974, US per capita food waste has increased by approximately 50% (Hall et al. 2009). It is not an easy task to determine the severity of this phenomenon, because very little relevant data is available. Rather, we can talk about some tiny studies, expert opinions and general estimates. According to the FAO study, this affects 1.3 billion tonnes of food worldwide. This amount includes food waste from the entire food chain (harvesting, storage, agricultural production, processing, packaging, consumption and distribution). In the developed countries at the end of the supply chain - including in Hungary - a significant proportion of food waste is displayed: within this, the "big black box" now is household waste.

Effects of sociological and attitude-related factors on food waste

In recent decades, a multitude of international researchers have been interested in the negative effects and also quantification of household food waste within the food chain. This research is especially characterised by food waste generated on the consumer level. Apart from the older generations, we do not really understand the feelings of an empty food warehouse. As such, we do not consider food to be a resource that is absolutely necessary to keep life, and have degraded food into an enjoyment product. This has also had a significant impact on personal attitudes. Another problem is that we lack proper knowledge for recycling food leftovers. Therefore, one of the main sources of food waste is the change in sociological and personal attitudes. During the procuring of foodstuffs, we can also often observe this lack of awareness. Well-planned purchases may reduce unneeded food leftovers, negating the "better buy more" attitude. A further source of food waste is our current labelling practices,

and the expiration dates, as many do not navigate well in the midst of the various information sources: a significant number of consumers still think that the "best before" and expiration dates are the same. Incorrect storage also results in loss of foodstuffs; however, further development of packaging may help with this issue (Borbély, 2014).

There may be several aspects to the problem of food waste: environmental, social and economic (Borbély, 2014).

1.) Environmental: One kind of aggregation is the emission of pollutants, which is partly caused by processing, production, sales and logistics processes and also by the decomposition of organic and non-organic food waste. In the last two decades, the energy industry, manufacturing and agriculture have been able to show significant reductions in this area, while the environment is increasingly being polluted by transport and food waste. There are no representative, current resources available on the exact composition of the garbage (Cicatiello et al. 2018), but it can be reasonably assumed that food waste is a major part of it.

2.) Ethical, Social: In the ethical context of food waste, there are almost 900 million malnourished people in the world. In this case, skeptics argue that if we pay more attention to eliminating food waste in the EU, it will not improve the food needs of the inhabitants of distant countries. The weak point of this thought is that we do not have to travel to the other side of the world to find starving people. Such a layer is in every society, even in the European Union: a dimension of poverty (financially deprived, poverty after social transfers, and low-income households) affects more than 85 million people. However, it is a serious organizing task to deliver unused food to those in need, which is undertaken by foundations, volunteers, and other NGOs in most cases. The organizing and coordinating work of the Hungarian Food Bank Association can be mentioned as a good example in Hungary (Borbély, 2014), although the volume of food waste is reduced by only 1-2%.

3.) Economic background: Perhaps the most exciting area in this topic is the analysis of household food dropouts. Since we do not know exactly what the composition of household food waste is, we cannot undertake a direct economic analysis of it, but we can still get indirect results. In terms of food expenditure, data shows that this figure is around 13% for EU-27. In Luxembourg, we see the lowest amount in the European Union, 8.5%; the highest in Romania, 27.5%. We can conclude by analyzing the data that as a society becomes richer, the less part of its income is spent on food, but it is wasted in reverse (Borbély, 2014).

Consumer society, in which wasting food and unhealthy food consumption increases

Ever since World War II, we can observe the increasing popularity of mass consumption – the easier accessibility of material goods, the increase in quality of life – which was a positive thing in the first decades. Yet over-consumption was born due to the consumer society, which threatens resources more and more, not to mention wasting consumption. And the increasing intensity of economic growth became the cause of an economic, social, ecological and health crisis for many areas in a few decades, which was even more intensified by globalization (take a look at the air pollution of Beijing, or the obesity indicators of Hungary for that matter). "The main characteristics of wasting consumption are: bad quality; mass-products made for short usage; more and more disposable products on the market; high energy requirement machines and technological solutions; high material-cost production. In

the case of low quality, short usage period wares, the time where raw materials become waste is significantly shortened." (Medvéné, 2013).

This means that we exchange our wares more often, thereby arriving at more than necessary, and often unneeded products. While all this was once the right of certain land-owners and rich social groups, nowadays, the average person in modern society lives like this as well. And the result of increased consumption is the quick depletion of natural resources – values and valuables created and amassed for millions of years by nature – and their quick transition to waste, thereby ruining the ecologic balance. This paradoxical situation means that while some consumer groups waste food more and more (e.g. men above 30 years of age (Bódi-Kasza, 2015)), other families are subject to lack of food, or low-calorie intake. In many areas, changes are already irreversible, but if the tendency persists, we will begin to endanger the quality of life for our descendants (Medvéné, 2013).

The current, wasteful form of foodstuffs may appear to be controversial for experts dealing with environmental economy, which is no surprise, as there is little or no food waste in nature. It is important to note that the modern form of global food production has a further impact on the ecosystem through the packaging that is used. For example, plastic by-products of packaged foodstuffs which land in the bin, and the related artificially added contents. In the circulation of earth's ecosystem, the by-product created by one life serves as the nutrient for another. Therefore, in natural circulation, the input and output sides are always in balance (there is no hazardous waste produced). Furthermore, when the balance is broken, the survival or health of specific species can be endangered as well (Sherrat, 2013). An important characteristic of natural flora and fauna is that our well-known over-consumption, or consumption explicitly breaking healthy inner balance (non-homeostatic eating habits) are also unknown (e.g. obesity among tribes and nations living in nature). The food waste trends observable nowadays were not caused exclusively by artificial supply systems, or foodstuffs which can be procured cheaper and easier than ever, both of which cause nigh-limitless consumption already (Szaky, 2014). Another problem is that there is no actual focus on further risks related to over-consuming unhealthy foodstuffs (for example, that consumers should not consume unnecessary calories that far exceed their daily required intake).

Related to this problem, the responsibility of food manufacturers is also an issue. This is where we have to note that not only wasteful consumption, or over-consumption going beyond the necessary calorie intake have significant loads on the environment for the entirety of our ecosystem. Similarly, manufacturing and consuming unhealthy foodstuffs is also a serious environmental load factor affecting the system's entirety, and it has to be integrated into future food waste research and reduction action plans as well.

According to the 2017 report of FAO, there are fifteen currently observable trends in foodstuffs supply and agriculture which pose a serious challenge for humanity – food waste and food loss are among them. Famine and malnutrition only yield short-term partial counter-measures for now; long-term solutions are all included in the increase of agricultural production's efficiency. According to FAO, a global increase of 50-70% in yield is needed to feed humanity by 2050, said to reach nine to ten billion people by that time (FAO, 2017). The global increase of human food demands – along with a decrease in their environmental pollution – could significantly be satisfied by merely eliminating food waste from all segments of the food supply chain. Another complementary solution could be to significantly reduce the manufacture and consumption capacity of unhealthy foodstuffs (added sugar, corn syrup, trans-fat content of plant oils, foodstuffs without nutrient content, limitless alcohol consumption, coffee, etc.).

Materials and Methods

The present analysis is based on a Hungarian national questionnaire from 2017 that aimed to understand some of the tendencies of food purchase and waste in Hungary. The standardised questionnaire had 14 closed and one open question, and thematically touched on general food purchase habits, frequency of food wasting, its method, and the causality behind consumer behaviour patterns (for example, whether spontaneous or planned purchase patterns are more prevalent, or if purchases related to food sensitivity, or specific eating habits have a connection to food waste and its quantity, etc.). The number of usable questionnaires was 628. After cleaning the database, questionnaires were analysed using the IBM SPSS 20 statistical programme suite. 62% of the participants were from Pest County; therefore, in this study, we deal with this specific, mainly urban-living consumer group. Apart from the generic descriptive analysis, we also used crosstabs to analyse tendencies which are statistically sound. We used Pearson's Chi-square test to identify and validate connections. In case the significance rate (Asymp.Sig. (2-sided)) is below 0,05%, generally accepted on the field of social studies, there's a connection between the analysed variables (Sajtos-Mitev, 2007). In order to analyse the strength of the connection, we used associative coefficients: Cramer's V, Gamma and Eta indicators. The strength of connections are determined as detailed below:

- 0 - 0.199: weak
- 0.200 - 0.399: medium
- 0.400 - : strong

47% of the Pest County participants live in Budapest, and are of a varied household, which basically supports the trends of urban families.

Results

59% of participant households purchase food 2-3 times a week, 23% carry out one big purchase each week, whereas merely 17% prefer to purchase food daily (Figure 1). The frequency of purchases and the type of household do not have a statistically sound connection with acceptable significance. However, the case is different for income, where there's a weak connection ($\chi2$=18,641; df=8; p=0,017; Eta=0,188). We can say that households which have a higher income do not fragment their purchases, and prefer to have one big purchase a week (with clearly set purchase targets).

87% of the households pre-plan the types and quantities of food they are going to purchase. In light of this, the result is very surprising, and at the same time, completely contrary to our hypothetical assumption: our households are those that often throw out food (Figure 2.). Merely 13% of participant households consume their purchased food without any direct waste, so do not throw out leftovers (as remaining or spoiled food).

Based on the crosstab results, the quantity of foodstuffs thrown out has a statistically sound relation with the money spent on food ($\chi2$=30,664; df=16; p=0,015; Eta=0,212), and with planned purchases ($\chi2$=11,560; df=4; p=0,021; Cramer’s V=0,173,). Households which spend less per capita on food items, or are aware in planning their purchases, also produce less food waste.

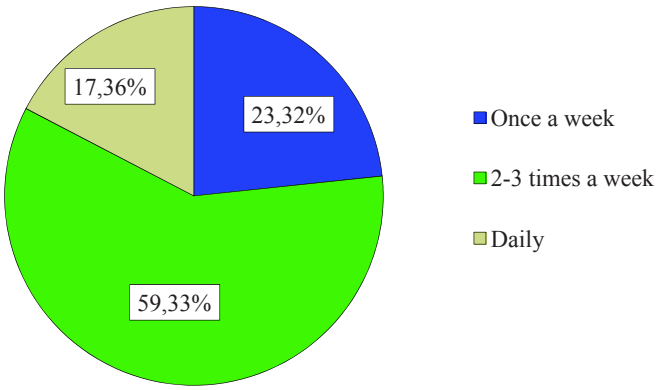

Fig. 1. Frequency of food purchases among the households
Source: based on authors' own research, 2019.

42% of the participating households have a family member who has either an allergy or sensitivity towards a particular food (for example: lactose, gluten, soy, etc.). Therefore, it's no surprise that 64% of the households are aware of certain consumer habits in eating, and are also following some particular dietary guidelines (for example: vegetarian, vegan, paleolithic, etc.).

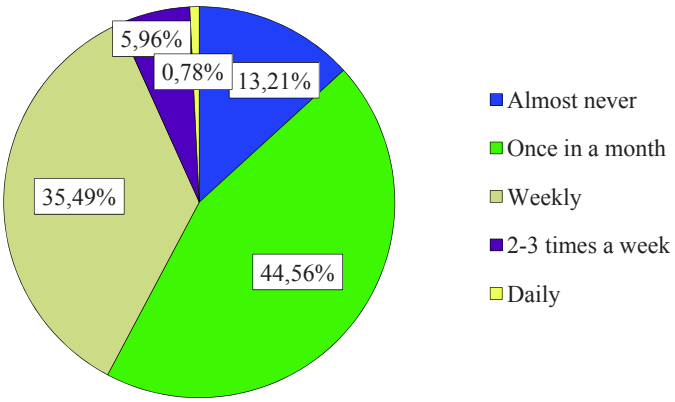

Fig. 2. Frequency of food waste among the households
Source: based on own authors' research, 2019.

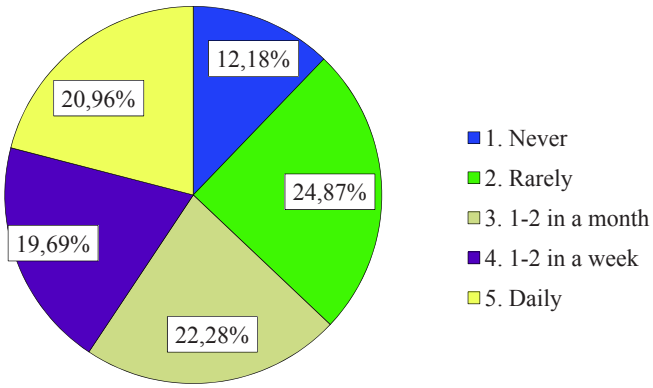

Fig. 3. Frequency of eco/functional food consumption of households
Source: based on authors' own research, 2019.

Figure 3. shows the frequency of bio-, eco and functional foods consumed in sample households using a Likert-scale. Merely 12% of the households in this study consume these types of foods. Foods that are different from the usual, and have some added value (like functional foods) are consumed daily in 21% of the households, once or twice a week in 20% of the households, and once or twice a month in 22% of the households. A bit less than half of the households (44%) in the analysis do not really care whether the foods are locally produced or not. One of the negative results of the analysis is that the consumer segment eating eco/bio/functional foods due to personal attributes (health problems or prevention reasons) aren't also environmentally aware consumers, since 56% of them also throw such foods into the trashcan in the end, which is also applicable to more expensive foods. Though research results are assumptive, they highlight the importance of how food wasting behaviour is a very complex and personal mechanism, and is hard to properly describe via generic demographic attributes and via consumer behaviour patterns. As a continuation of the research, it's advised to further stress factors like socialisation background, social norms and pressure factors; also values and lifestyles, as potential causes of food waste. More pieces of evidence on the qualification and quantification of food waste at the consumer level should be gathered.

Conclusions

According to the estimations of the UN and the FAO, 30-35% of our food became waste in 2016. We can say that food waste itself is one significant worldwide problem of today, and it has been noticed by the western world. As such, we aim to reduce its effects using national and international interventions, in order to reduce the food supply anomalies and related environmental load as much as possible. However, in analyses dealing with food wasting, we can observe that experts of a specific field are mainly focusing on a single

actor within food production processes and consumption trends (producers, transporters, consumers). In order to conduct an overall analysis of the topic, we will need a more complex approach to consumers in the future, one which analyses the main food waste-producing segment from various perspectives (social, ethical, personal). We aimed to contribute to this research aspect with our own research as well.

Nowadays, there is still not enough specific data on which personal factors are related to food waste; and if so, to what extent exactly. One of the negative results of the analysis is that the consumer segment eating eco/bio/functional foodstuffs due to, for example, health or prevention reasons aren't also environmentally aware consumers, since 56% of them also throw such value-added foods into the trashcan at the end, which is also applicable to more expensive foods (or they have no distinctive position from the point of view of reducing food waste).

Although the results of the research are indicative, they draw attention to the fact that food wastage is an extremely complex and complicated mechanism, and can be very difficult to describe based on general demographic characteristics and food shopping/consumer habits. As a continuation of the research, it would be advisable to place even more emphasis on the examination of the socialisation background, social norms and lifestyle in order to identify the causal relationships behind food waste. The aim of our further research work is to provide an even more comprehensive picture of some of the factors that influence the phenomenon and to identify some of the causes of food waste within consumption systems. In addition, we want to identify ways to reduce food wastage through certain health perspectives (eco/bio/functional food purchasing).

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