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Public attitude towards food waste: the case of Lithuania

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Abstract: The purpose of the study is to investigate consumers' perception concerning food wastage and their awareness of economic, social and environmental costs concerning the issue. The research focused on the concept of food waste in the context of consumers' attitude regarding this problem. Comparative analysis, synthesis and evaluation of scientific literature and legal documents, statistical data collection and analysis were carried out together with elaboration of the results of an on-line survey of 500 households representing 1,494 inhabitants from all Lithuanian counties. The data were analysed using statistical package for social sciences (SPSS): descriptive statistics, frequencies, crosstabs. Lithuanians discard relatively small amounts of wholesome edible food in comparison with averages for the EU27, but most of them have a limited knowledge of the meaning of "best-before" dates. Also, consumers are strongly influenced by retail promotions, and wasting food for them is primarily associated with a waste of money. The state's waste management policy is focused on waste sorting, while this research provides the evidence that households are insufficiently informed about economic, social and environmental costs concerning food waste. This underlines the necessity of reassessing the current state policy with an emphasis put on public education as an important factor in minimizing household food waste. Lithuanians realize that it is themselves as consumers who are mostly responsible for food waste, but food wasting is treated mainly as a financial loss. The added value of this article is the proposal to create information campaigns that will raise a sense of guilt for food squandering.

Keywords: waste management, food waste, consumer behaviour, households

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1. Introduction

Food waste is considered to be one of the major signs of inefficient functioning of the food system, representing losses of about 30% of all the food produced (FAO, 2013:7). In fact, with the calculations being hardly accurate in this respect, it is evident that the losses can be as high as 50% (Parfitt et al., 2010: 3066). According to the estimates of Food and Agriculture Organization of the United Nations (FAO), each year approximately 1.3 billion tonnes of food, which by weight amounts to approximately one-third of all the food produced for human consumption in the world, is lost or wasted and this means great economic and environmental costs estimated by the FAO to be USD 1.7 trillion per year on a global scale (European Parliament Committee on the Environment, Public Health and Food Safety, 2017: 4). What concerns Europe – 88 million tonnes (179 kg per capita) of food is wasted annually at a cost of EUR 143 billion (Stenmarck et al., 2016: 4).

According to Monier et al. (2010: 13), the estimates of food waste percentage breakdown of the EU27 show that households produce the largest part of the EU food waste among researched sectors, accounting for about 42%, while the manufacturing sector – 39%, food service/catering – 14%, wholesale/retail – 5%, respectively. A group of researchers working on Fusions project pointed out a more detailed distribution of food waste in the EU28, indicating, that households were most responsible for food loss that made 53% of all the wasted food, the second sector was processing – 19%, then food service – 12%, production – 11%, and wholesale/retail – 5% (Stenmarck et al., 2016: 4).

Scientists recognize that there is a high uncertainty on food waste calculations as a result of different definitions used. There are different measurement (waste) methods, so there is no reliable statistics in order to compare or know exactly how quantities of waste are distributed in the supply chain, however, it is clear that kitchen waste takes the biggest part.

Food is wasted at each stage of food supply chain, starting with farms and ending in the household. People throw out wholesome food as they refuse to use leftovers, throw out fruit and vegetables as they can always buy fresh produce. Food is lost during and after preparation of meals, some food is rid as a surplus. It does not matter at what stage of food supply chain food waste occurs, squandering food also means wasting water, energy, chemicals, land, labour and money, also causing negative environmental impacts. Food loss also affects food prices and this

is especially true for lower-income consumers; furthermore, organization of separate food waste collection systems calls for extra investment at the expense of the general public.

Food wasting is not the only economic problem, it is also a social and moral issue, as it is predicted that the global demand for food will increase, but at the same time the number of people who lack food is increasing: an estimated 821 million people – approximately one out of every nine people in the world – are undernourished (FAO, 2018: 2). It is possible to improve food availability, reducing food losses in all food supply chains or to produce the same amount, using less land.

The goal of the paper is to analyse consumers' perception concerning food wastage and their awareness of economic, social and environmental costs concerning food waste. The main objectives of the article are: 1) to analyse the concept of food waste; 2) to examine food waste management policy in the European Union; 3) to determine the factors influencing the amounts of food waste; 4) to investigate food waste generation in Lithuanian households and identify main factors of wasteful behaviour. The following problem questions were raised during the investigation: Who is responsible for food wasting? What factors influence food waste generation and food wastage? Do consumers have enough information about economic, social and environmental costs related to food waste?

2. Theoretical framework

In general, food waste refers to food that is intended for human consumption but is lost at various food supply chain stages. Food waste in the EU Waste Directive (2008/98/EC:7) is defined as edible material intended for human consumption, which was discarded, lost, degraded, or consumed by pests, between harvest and consumption. Later, the FAO made a distinction between food losses and food waste, where "food losses take place during agricultural production, post-harvest, and processing stages in the food supply chain", while "food waste occurs at the end of the food chain (distribution, sale and final consumption)", the former is mainly due to logistical and infrastructural limitations, while the latter is primarily related to behavioural factors (Gustavsson et al., 2011: 2). In the Report of the 27th FAO Regional Conference for Africa, food loss is referred as a decrease in edible food mass available for human consumption throughout the different segments of the supply chain, whereas food waste is defined as food losses resulting from decisions to discard food that still has value (FAO, 2012:

18). In the summary report "Food wastage footprint" the FAO introduced the category "food wastage" which refers to any food lost by deterioration or waste, therefore, the term "wastage" covers both food loss and food waste (FAO, 2013: 9). In the FAO Working paper "Save Food: Global Initiative on Food Loss and Waste Reduction" food loss is referred to as food that during its process in the food supply chain gets spilled, spoilt or lost, or the reduction of quality and value takes place before it reaches its final product stage, while food waste refers to food that completes the food supply chain as a good quality product which is fit for consumption, but still does not get consumed because it is discarded (Segre et al., 2014: 4).

The detailed explanation of food waste in the household sector is given by Monier et al. (2010: 9): food waste is composed of raw or cooked food and includes food loss before, during or after meal preparation and it can be grouped as waste from meal preparation, leftovers, and purchased food not used in time. Food waste refers to food suitable for human consumption but discarded, whether or not after it is kept beyond its expiry date, left to spoil or for other reasons such as oversupply due to markets, or individual consumer shopping/eating habits (FAO, 2013: 8).

Most of the studies differentiate food losses from food waste. Food waste generally is related to the retailers' and consumers' behaviour in the food supply chain, while food losses take place at the agricultural production, post-harvesting, processing, storage and distribution stages in the food supply chain. Losses are caused by inefficient infrastructure and logistics, inadequate technology, lack of storage capacity, and poor management.

As food waste and losses take place all along food supply chains, in some definitions there is no difference between food loss and food waste: food waste is any food, and inedible parts of food, removed from the food supply chain to be recovered or disposed of (Östergren et al., 2014: 6), food waste refers to any product or part of a product grown, caught or processed for human consumption that could have been eaten if handled or stored differently (Storup et al., 2016: 9).

Studies on the issue of food waste define food loss and food waste in many different ways, so there is no definition commonly agreed on. According to the Directive (EU) 2018/851 on waste, food waste means all food as defined in Article 2 of the Regulation (EC) No. 178/2002 of the European Parliament and of the Council that has become waste (Directive (EU) 2018/851, 2018). Food (or "foodstuff"), according to this Regulation, means any substance or product,

whether processed, partially processed or unprocessed, intended to be, or reasonably expected to be ingested by humans **(**European Parliament and the Council, 2002: 7).

2.1 Food waste management policy in the European Union

Food waste management covers different policy areas: land use, water and energy resource management, the entire agricultural sector, protection of biodiversity, as well as climate change. The European Union takes various measures to manage food waste reduction.

The Landfill Directive 1999/31/EC sets as a policy target the staggered reduction of biodegradable municipal waste (BMW) going to landfill. The Landfill Directive places an absolute target on the tonnage of BMW that can be landfilled by linking the quantity permitted to the quantity produced in 1995. Under the Landfill Directive, EU Member States are required to send no more than 35% of the volume of bio-municipal waste to landfill than they did during 1995 by 2020 (Council of the European Union, 1999: 5). The ability of Member States to opt for BMW's treatment and recycling techniques is not limited if the countries comply with the general requirements of the Directive.

The Thematic Strategy on the Prevention and Recycling of Waste (COM (2005*)*666) which was adopted in 2005 sets as a long-term goal for the EU to become a recycling society that seeks to avoid waste and uses waste as a resource. The aim of the Strategy is to reduce the negative impact on the environment throughout the entire life cycle of a product, from extraction of resources to their disposal phase and special attention is given to biodegradable waste.

Green Paper on bio-waste management in the EU was published by the Commission in 2008. The aim of the Green Paper was to explore options for the further development of the management of bio-waste by summarizing background information about current policies on bio-waste management and to launch a debate on the possible need for future policy action, seeking views on how to improve bio-waste management in line with the waste hierarchy, possible economic, social and environmental gains, as well as the most efficient policy instruments to reach this objective.

Communication from the Commission on future steps in bio-waste management in the European Union presented recommendations on managing bio-waste as it is expected that bio-waste will increase on average by 10% by 2020 (Communication from the Commission to the

Council and the European Parliament, 2010: 2). The Communication identified actions to be taken by Member States: prevention and treatment of bio-waste according to the waste hierarchy, promotion of separate collection and biological treatment of bio-waste, protecting soils, promotion of the production and use of compost from "clean" bio-waste also producing energy from waste, "zero landfilling" of untreated bio-waste, investment in research and innovation and proper implementation of the EU legal instruments addressing the management of bio-waste.

The Waste Framework Directive 2006/12/E claims to protect human health and the environment against harmful effects caused by the waste management procedures. The Waste Framework Directive was reviewed in 2008 and Directive (EU) 2018/851 made amendments to Directive 2008/98/EC on waste and now provides the legislative framework for the collection, transportation, recovery and disposal of waste. This Directive adds the following three new targets: by 2025 the preparing for re-use and the recycling of municipal waste shall be increased to a minimum of 55% by weight; by 2030 the target is 60% by weight; and by 2035 – 65% by weight (European Parliament and the Council, 2018: 129-130).

For the first time it was indicated in this Directive, that Member States should take measures to promote prevention and reduction of food waste according to the 2030 Agenda for Sustainable Development: by 2030 to halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains including post-harvest losses (European Parliament and the Council, 2018: 114). Those measures should aim to prevent and reduce food waste in primary production, in processing and manufacturing, in retail and other distribution of food, in restaurants and food services as well as in households. Member States should aim to achieve an indicative Union-wide food waste reduction target of 30% by 2025 and 50% by 2030 (European Parliament and the Council, 2018: 114). Member States are required to monitor, assess and report about food waste levels yearly from 2020 and provide incentives for prevention, separate collection and redistributing of unsold/unused food. This means that States will have to adopt special food waste prevention programs as part of an overall waste prevention program. The 50% target is not binding, which means that Member Stares will not be punished for failing to reach it.

The Directive on waste which was adopted 12 years ago (Directive 2008/98/EC of the European Parliament and of the Council) introduced a five-step hierarchy of waste management options which must be employed by Member States according to set priorities. Waste prevention

was pointed out as the mostly preferred option continued by reuse, recycling, recovery including energy recovery and safe disposal. It took ten years to begin regulating household food waste sorting and separate collection. Finally, attention was drawn to the need to take measures to reduce food waste.

2.2 Factors determining food waste

Food plays an important role in our lives, not only as an indispensable life support, but also as part of our culture, way of communication, and a component of healthy living. The global food system provides consumers, especially in developed countries, with a variety of product choices, convenient purchases, the opportunity to try something new, more attractive and fresh every day. Regrettably, this influences food waste: Why use leftovers if one has unlimited possibilities to purchase just made food or just picked fruits? Thus, societies of economically developed countries are becoming throwaway societies.

Monier et al. (2010: 10) revealed ten main causes of household waste: 1) Lack of awareness of the quantity of food waste generated, of the environmental problem that food waste presents, of the financial benefits of using food more efficiently; 2) Lack of knowledge on how to use food efficiently; 3) Attitudes, as food is undervalued by consumers; 4) Preferences, as many edible parts of food are discarded due to the personal taste; 5) Planning issues, such as "buying too much" and "lack of shopping planning"; 6) Misinterpretation or confusion over date labels; 7) Storage in suboptimal conditions; 8) Packaging methods and materials; 9) Portion sizes leading to uneaten leftovers; 10) Socio-economic factors concerning size of households and ages of the persons staying in them.

Detailed research findings in the UK outlined two essential reasons why avoidable food waste occurs: 1) food is not used in time; 2) too much food was cooked, prepared or served (Parfitt et al., 2010: 3077; Quested et al., 2012: 11). Koivupuro et al. (2012: 185) and Williams et al. (2012: 142) also highlighted that buying or cooking too much is one of the main reasons for food waste occurrence, while Gustavsson et al. (2011: 14) emphasized that reasons for food waste at the consumption level in rich countries included the fact that people simply can afford to waste food. On the other hand, Doron (2012: 23-24) revealed that the barriers to reducing food waste include: food going off too quickly, throwing away leftovers and cooking too much food; furthermore, households lack the space for food storage, do not own a big enough freezer, live far

from the place to buy food conveniently, which forces them to do occasional large shopping. Graham-Rowe et al. (2014: 19) disclosed a similar reason – the desire to shop, cook and prepare food with convenience and time constraints lead to stocking up and discharging food as this is more acceptable than going to the store if necessary.

There are a lot of studies on the impact of labelling "best before" date and "use by" date to food wasting. The label "best before" date means that food may still be used, but consumers have to make their own decision and take personal responsibility if decision is in positive. The product is edible if it was stored according to instructions, the package is not broken, when label "use by" date means the final date by which the product must be consumed. Date labelling influences the selection of food at the point of purchase and its subsequent consumption and has a strong effect on consumers' decision of what to eat or throw out (Toma et al., 2017: 2), so the understanding of product labelling can greatly impact the desirable pro-lower-food-waste behaviour.

According to Asaturian and Erguneva (2018: 176), life transitions such as moving to a new place, e.g. from a village to a big city or away from one's family, can also cause food wastage. Young people beginning their independent lives are not experienced enough to manage households and plan their meals.

Financial constraints encourage frugal behaviour and is one of the essential reasons for avoiding food waste (Graham-Rowe et al., 2014: 18). Some households, and it is typical of Lithuanian ones, prevent food from wasting by eating children's plate leftovers. However, this leads to a type of obesity called "housewife obesity" or self-deprivation of food.

At the same time religious attitudes stimulate frugal behaviour, since throwing away food, particularly bread, is considered to be a sin (Asaturian and Erguneva, 2018: 180). Graham-Rowe et al. (2014: 21) pointed out that lower waste rates could be reached if information campaigns were able to raise a sense of guilt for food squandering in consumers. Food wasting problems are indeed best addressed directly through awareness campaigns, the examples of which can be the following: "Less Food Means More Money in Your Wallet" in Finland, "Love Food, Hate Waste" in the UK, "Take #FoodWaste #OffTheMenu" in London and New York City, "Great Taste is Too Good to Waste" in Australia, "Waste Less, Enjoy More!", "Be a Zero", "Cook it, Store it, Save it. Just Don't Waste It", "Too Good to Waste" in the US, "Reduce Your Foodprint" organized by the UN Environment Programme, the Food and Agricultural Organization of the

UN and Messe Dusseldorf, “Transforming our Food Systems to Transform our World” by the UN and others. These campaigns are aimed at raising public awareness of the problem of food wasting and promoting waste prevention activities.

2.3 Food waste management in Lithuania

Lithuania, like other EU countries, has to ensure that by the end of 2023 biodegradable waste, including food, is collected separately or separated and recycled where it is produced, in accordance with Directive (EU) 2018/851 on waste. According to the National Waste Management Plan for 2014-2020 (adopted in 2012), municipalities are required to implement food/kitchen waste sorting by 2019 and to have sufficient capacity to process separately collected food/kitchen waste. Sorting of household food/kitchen waste at its source and introduction of separate collection must be organized in cities with more than 50,000 inhabitants. In order to ensure the implementation of the planned measures, inspections of food/kitchen waste management companies will be performed with sanctions and financial liability for non-compliance with waste management requirements. In Lithuania, according to the Waste Management Regulations, food waste is collected separately only from public catering facilities. By 2018 household food/kitchen waste was collected in only one region and today many municipalities still do not comply with this obligation.

Of the food waste hierarchy (Papargyropoulou et al., 2014: 109) the most advantageous action to deal with food waste is prevention. The question is: How will the above-mentioned political measures influence food waste prevention to become the most preferred waste management option? It is very likely that there will be a slight impact exerted on the production of food waste, yet some positive effect on food waste treatment is also expected.

3. Research Methodology

With the aim of the research to find out about consumers’ attitudes towards food waste and to propose ways to reduce food waste, a comparative analysis, synthesis and evaluation of scientific literature and legal documents, statistical data collection and analysis were applied. The relevant data for the study were obtained using an on-line survey, to be analysed later with the use of the

statistical package for social sciences (SPSS). In the study, food waste was divided into two categories:

- ✓ Waste from purchased food that was not used in time and disposed of. This category covers food that can be consumed immediately or after heating, i.e. ready-made meals, sausage, bread, milk, cookies, etc. The sources of this category of food and drinks include retail and takeaways.
- ✓ Waste from homemade food that was not eaten and disposed of. This category covers food that has been cooked and/or prepared at home. The sources of this category of food involve products bought from retail and contributions from home-grown food.

The study did not detail the causes of accidental food loss, i.e. food loss during processing (burned food, too much salt added, etc.) as amounts of such food losses are insignificant. Neither did the study assess whether food scraps were fed to domestic animals or went into compost. Food waste was measured only for products that are directed to human consumption, excluding feed and parts of products which are not edible. In the questionnaire the categories "food waste" and "food losses" were considered as synonymous as in the Lithuanian language the use of both categories is appropriate.

Sample description. 500 households participated in the survey, representing 1,494 inhabitants from all Lithuanian counties. The on-line survey was performed from February 2018 to March 2018. The respondent statistics is presented by age, education, place of residence, family composition and income (see Table I).

Table 1. Sample description, 2018

Variable	Description	Frequency (%)
1. Age	Up to 25 years	34.0
	26 to 40 years	42.0
	41 to 50 years	14.6
	51 to 60 years	7.4
	Over 61 years	2.0
2. Education	Secondary	24.4
	Professional qualification	12.8
	Baccalaureate	43.0
	Master's degree and PhD	19.8
3. Place of residence	Private house (in town)	16.0
	Private house (in countryside)	20.4
	Apartment building	63.6

4. Family composition in the household	Lives alone	42.2
	2 persons	35.2
	3 persons	30.0
	4 persons	18.8
	5 and more	11.8
5. Average household income per month	Up to EUR 400	5.2
	EUR 401-600	11.2
	EUR 601-800	19.8
	EUR 801-1000	20.6
	1001 EUR and more	43.2

Source: authors' elaboration on the basis of survey results

The analysis according to gender was not performed in order to avoid overloading the study with additional data. In addition to the socio-demographic variables, the survey included the following declarations: purchase frequency, food discharge reasons, possibilities of food waste reduction, food shopping and preparation of food in connection to food waste, food sharing, emotions regarding food wasting, influence of retail promotions, food labelling and waste sorting.

4. Results

Regardless of the number of people living in the household, place of residence and average household's income per month, food is usually purchased 2-3 times per week. More often than others, respondents, whose incomes are below EUR 400 buy food once a week, while those with incomes above EUR 800 buy food less frequently (once every 2 weeks, once a month). Some differences were noticed in the behaviour of people living in their private houses in countryside – they buy products once per week, more often than others, and this is related to the distance from the residence to the supermarket.

A questionnaire survey found out that in the EU, around 88 million tons of food waste are produced annually. The respondents were asked "Who is responsible for food wasting?" A larger part of the participants (86.8%) blame consumers, then there come stores (29.0%), catering (15.2%), food producers (14.4%), the authorities (13.6%) and farmers (1.6%). The respondents maintained that food is wasted at all stages of the food supply chain, and at the same time highlighted their personal responsibility. The questioned of different educational backgrounds confirmed that the main culprit of food waste is the consumer, respectively: secondary education

– 83.1%, professional qualification – 85.5%, baccalaureate – 87.4%, master's degree and PhD – 92.9%. The authorities are blamed for not providing sufficient regulations or control of food handling and storage conditions, for scarce contribution to running the Food Bank activities as, for example, financial support would help to expand premises, purchase more refrigerators, cars, etc., and this would help to gather and store more food herewith to assist more people in need.

In Eurostat data base one can find statistics concerning waste generated by households by year and waste category. The category "Animal and vegetal wastes" comprises: animal and mixed food waste, vegetal waste, animal faeces, and urine and manure; however, household food waste does not make a separate category. The study by Monier et al. (2010: 12) estimated that annual food waste generation in Lithuania was 33.7 kg/capita/year, while investigation made by Vitunskienė et al. (2016: 1) revealed that around 2.7 kilotons of food are annually wasted in the Lithuanian households and this corresponds to less than 1 kg/capita/year and accounts for 0.6% of the total food waste. Recent publications in mass media state that every Lithuanian throws around 50 kg of food per year (Rašimaitė, 2013). Our study, based on a household survey, revealed that average food waste is 28.8 kg/capita/year.

According to the survey results, 13% of the respondents consume all purchased/homemade food, while the respondents who live alone or in large families consume 20% of purchased/homemade food. A small proportion of food is discarded by about 70% of the respondents, others dispose of food constantly. Having evaluated the relationship between household size, average monthly income per capita and discarded food kg/person/week, it was determined that: household size is directly related to the amount of discarded food, since large households (5 and more persons) produce 4.76 times less food waste than people living alone (see Table 2 below).

Table 2. Relationship between household size, average monthly income and discarded food, 2018

Household size	Average monthly income per capita, EUR	Discarded food kg/person/week
Lives alone	629.0	1.76
2 persons	457.67	0.89
3 persons	320.67	0.60
4 persons	231.38	0.43
5 and more	183.05	0.37

Source: authors' elaboration on the basis of survey results

Our research coincides with the results obtained by Parfitt et al. (2010: 3076) and Quested et al. (2012: 9) who reported that food wastage is significantly influenced by household size as larger households tend to waste less per person than smaller households, the amount of food waste generated per capita decreases along with an increase in household size. Such a situation is determined by various causes, for instance, an effective supply for smaller households is more problematic than for larger ones, as food is often available (or cheaper) in larger quantities. Single occupancy households more often than large households do not use food in time and throw away a greater proportion of purchased products, as well, larger households usually use food leftovers in other meals.

Another finding is that the average monthly income per capita is connected with the amounts of discarded food – the higher the income per a household member, the more food waste there is. The study by Monier et al. (2010: 17), Parfitt et al. (2010: 3077) and Baker et al. (2009: 7) revealed the same tendency, that is an increase in the income at the household's disposal is associated with a rise in food waste.

The analyses of interdependency between respondents' age, average monthly income per capita and discarded food kg/person/week revealed that the youngest and the oldest groups of respondents have very similar incomes, but the amount of waste differs here by more than 50% (see Table 3).

Table 3. Relationship between age, average monthly income and discarded food, 2018

Age	Average monthly income per capita, EUR	Discarded food kg/person/week
Up to 25 years	766.08	1.87
26 to 40 years	942.86	1.82
41 to 50 years	909.6	1.64
51 to 60 years	929.73	1.39
Over 61 years	750.0	0.95

Source: authors' elaboration on the basis of survey results

Other studies reflect the results obtained (Grasso et al., 2019: 10; Parfitt et al., 2010: 3077), indicating that lower levels of food waste are generated in households with older people compared to younger people. Elderly persons waste less food not just because their income is lower compared to other age groups, but due to their life experience and approach towards food.

Most people of the older generation were raised in poverty and scarcity, deficit Soviet economy formed the need to value food, these people regard the waste of food as a sin.

The relationship between the household income and household food expenditure shows, that rising incomes increase food expenditures, but they represent a smaller share of income (see Table 4).

Average wage growth rate is closely linked to food expenditure growth rate, except the economic crisis period, when food expenditure growth rate outstripped wage growth rate (see Figure I). This can be explained as the inertia of spending money not assessing economic constrains. Growth rates in the post-crisis period were very similar, when in the last three years the average wages were growing slightly faster than food expenditure.

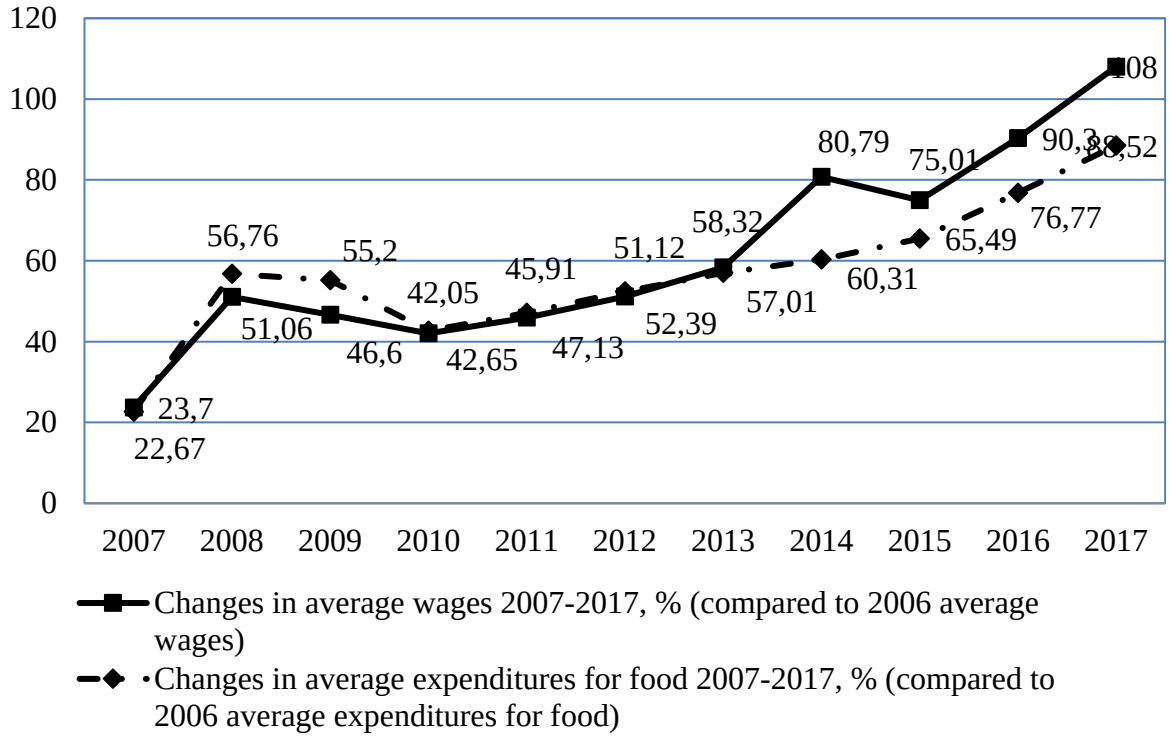
Table 4. Average household income per month vs average household food expenditure, 2018

Indicator	**Average household income per month, EUR**				
	Up to 400	**401 to 600**	**601 to 800**	**801 to 1000**	**1001and more**
Average household food expenditure per month, EUR	183.46	267.32	269.55	327.0	402.27
Percentage of monthly income, %	45.86	53.46	38.5	36.38	33.52

Source: Statistical Yearbook of Lithuania, 2018:19, authors' elaboration on the basis of survey results.

The results of the study suggest that food waste will increase as food expenditure growth rate increases every year.

Figure 1. Variation between average wages and expenditures on food in Lithuania 2007-2017, % (2006 =100)



Source: Statistical Yearbook of Lithuania, 2018:19, authors' elaboration on the basis of survey results.

The respondents were asked to specify their food wastage amounts. Estimations show, that 69% of the respondents discard homemade liquid food (soup, compote) and this may be influenced by the low price of such dishes. A similar proportion (60%) of homemade vegetables and dairy dishes with usually a short expiry time are discarded, while only 27.6% of the respondents throw out fish dishes. A comparison of discard statistics revealed that the questioned dispose of more homemade food than purchased food: in the case of flour dishes/cereals, the difference was 19.6% percentage points, and 11.6 percentage points in the case of meat. Cooking is linked to the use of various resources, such as time, electricity, water, and gas, so the discarded food not only affects the financial health of the family, but also damages the environment. According to the data of Statistics Lithuania, the annual consumption of milk and dairy products is the highest among Lithuanian residents (328 kg), since these products rank second in terms of riddance, with fruit and vegetables taking the first position in the context of food wastage, while

they are the second largest group in terms of consumption (263 kg). Use of fish is rather small among Lithuanian residents (23 kg), therefore it is the least discarded food (Statistical Yearbook of Lithuania, 2018: 22). Most studies that investigated the main food types wasted found that it was the most perishable food items that accounted for the highest proportion of food waste. Fresh food and vegetables were usually among the most wasted items, followed by other perishables like bakery and dairy products, meat and fish (Quested et al., 2012: 9; Peckan et al., 2005: 30; Morgan, 2009: 4; Lyndhurst, 2007: 1). In our case, most wasted items were soup and homemade drinks, which are perishable, not expensive, and take up a lot of space in the fridge.

Regardless of income level, it was found that the majority of respondents dispose of up to 200 grams of both homemade and purchased food per week. Most food is thrown away by households with the average monthly income of EUR 800-1000. 64.1% of these households discard homemade vegetable dishes, 63.1% - diary dishes, 64.1% - meat dishes, 54.4% - flour dishes, and in the case of purchased food, vegetables are thrown away by 73.8% of households and meat by 50.5%. In the case of households with the average monthly income EUR 1000 and more it is dairy products and eggs which dominate in discharges – 51.4%, the second item being drinks – 21.4%.

The key factor in reducing food wastage depends on consumers themselves, as 77.2% of the surveyed respondents pointed out that it is “better planning of shopping and cooking”, the second place was given to leftovers used for other dishes – 35.8%. As the consumer-independent factor “smaller food packing in stores” was specified by 30.6% respondents, and as the lowest impact was reported “clearer information on food labels” – 13.6%. The research by Parfitt et al. (2010: 3078) revealed that food surplus for about 14% of the residents occurs in their households because of poor pre-shop planning: failure to check stocks in cupboards, fridges and freezers prior to shopping, also failure to plan meals – all of the time for 66% of the households, some of the time for 42% of the households; as many as 75% of the respondents do not consider using leftovers for other dishes before doing shopping. Poor home economics skills is also a strong contributor to food waste (Lyndhurst, 2007: 2).

As all households generate food waste or/and have food surplus, the respondents were asked whether they have shared food with those in need directly or through charity organizations, i.e. food banks, charity eateries, etc. Only 3.6% of them indicated that they often or always help people in need, while the largest part – 48.6% never give food to the poor, and 18% of the

questioned do not even think about sharing food. Assessing the respondents' behaviour, according to their education, individuals with the master's and higher education degree distinguished themselves as a group that more often than the other ones offer food to the poor.

The purpose of food products labelling is to ensure the safety of their use. After exploring the respondents' awareness of the labels "best before" date and "use by" date, it was realized that for 60% of the questioned the label "best before" date means that the food is safe to consume before the specified date, but later is not safe to use. Only 22% of the respondents think that products may be used after the specified date, but they may not be of the highest quality, when 3% are ready to consume food after heat treatment, the decision of another 15% would depend on the nature of the product. On the other hand, 82% of the respondents know that the "use by" date means that products must be consumed before specified time; only 6% of them are ready to consume such food, another 3% will consume it after heat treatment, while for 9% of the questioned the decision what to do will be determined by the nature of the food. The results show a rather low tolerance for using food whose expiration date has passed.

For comparison, research on date labelling undertaken in the UK shows that 45-49% of consumers misunderstand the meaning of the date labels "best before" and "use by", and 36% of respondents confuse "best before" date with "use by" date (with potential for food to be thrown away unnecessarily) (Parfitt et al., 2010: 3078). The study initiated by the European Commission, Directorate-General for Health and Food Safety disclosed citizens' perceptions, attitudes and practices related to the management and consumption of food resources. Survey results revealed that less than half (47%) of the respondents said that marking "best before" indicates that food may be consumed after the given date, and only four in ten (40%) correctly said that food should not be eaten after the "use by" date indicated on food labelling (Eurobarometer, 2015: 16-18). Research results show that food product labelling does not work properly and appropriate general public awareness opens a possibility of effective prevention of food wastage.

Despite the fact that about 80% of the respondents (always – 50.2% and most often – 29.8%) follow the validity of the product, 60% of them do not understand the meaning of "best before" date and this increases food riddance. On the other hand, restricting the labelling of foods with a long shelf life would result in 46.4% of the respondents-consumers who will miss such information. Certain products have a long shelf life, so, after inquiring how the respondents would behave if they found unlabelled product packaging (e.g. grits), about 73% of them

indicated that they would use the product. Despite the fact that about 80% of the examined follow the information on the packages, in some cases it is not important.

Most of the surveyed household food purchasers, regardless of their education and income, equal food waste to a waste of money (74.4%), then to a waste of natural resources (30.2%), damage of environment (14.2%). Still, about 15% of the respondents are indifferent to food wastage (multiple answers were possible).

According to Baker et al. (2009: 11) and Graham-Rowe et al. (2014: 17), saving money is the powerful motivator for reducing food waste and it is stronger than the environment, while Dorons' (2012: 12) study discovered that the motivation to reduce household food waste was primarily concerned with its impact on the environment. Other studies show that consumers are not comprehensively informed about food waste (Richter, 2017: 647) or the environmental consequences of food wastage and thus do not identify links between food waste and waste of resources.

Retail promotions exert a strong influence on food purchases as 40% of the respondents frequently take advantage of them, 15.5% – always, 34.2% – occasionally, and only for 12.2% of the questioned they are unimportant. Most regularly, promotions are used by households of 4 family members (61.7%). Due to retail promotions even 50.6% of the respondents purchase unnecessary/unplanned goods, a quarter (25.4%) buy more than usually, another 9.8% buy significantly more, however, for 26.8% respondents purchasing habits do not change (multiply answers were possible). Respondents' behaviour is independent of their education, and of their place of residence, but is influenced by family composition and income. Respondents living alone or in a large family (about 50% of the examined households) are less likely to change their buying habits, while the rest of the groups (2, 3, 4 members in the household) buy unnecessary/unplanned articles more often.

Although the majority of respondents, regardless of income level, react to promotions for food products, 34.6% of the lowest earners (up to EUR 400) *always* buy the promoted items, the largest group who buy promoted items *frequently* (44.6%) are households with the income of EUR 401-600 as well as those with the income over EUR 1000 (42.6%), whereas households with the income of EUR 801-1000 dominate in the *sometimes* buying group (39.8%).

The research results correspond to the results obtained by Parfitt et al. (2010: 3078): 74% of people buy too much food as a result of promotions, and 52% of people always or sometimes

do not follow a shopping list, which also turns out to be a common reason for over-shopping. Customers feel being tempted in the store, be it by "Buy one get one free" offers (30%), or "multi-packs" (22%) and this again leads to excessive shopping (Lyndhurst (2007: 15).

Food waste prevention is the essential goal for all EU countries and it can be realized by behaviour change in the way people buy and use food. Municipal waste sorting is important as it makes people realize that many different items, which are suitable for recycling, accumulate in their households. The question is "How food waste sorting can help people to avoid food wastage?" We can assume that by sorting food waste, households will face the real situation of how much food they are throwing away, and this will influence their behaviour change.

The study revealed that 51.4% of the surveyed households usually sort waste, 36.2% – sometimes, and 12.4% – never. The group that never sort waste were the interviewees with lower education (secondary and professional qualification), while 32.3% of the respondents with master's degree and higher education always sort waste. The habit of sorting waste depends on age, as 75 % of the older respondents (51 and over) stated that they always sort waste, those who always sort waste prevailed in the group aged 26 to 40 (26.7%) as well as in the group aged 41 to 50 (44.2%), while the youngest group of interviewees stood out from the rest as they made only 16.0% of those who do so.

Significant differences were found while comparing the sorting habits of residents living in apartment buildings and private houses (in a city and in the country). 45% of the house owners questioned always sort waste, compared with only 19.2% of apartment residents. House owners have containers for different types of waste and sort waste knowing that they are responsible for the content of the container, as there are penalties for improperly sorted waste, and containers may not be emptied, also they are motivated by a lower tax rate. The residents of apartment buildings have no financial motivation to sort systematically, since the waste management fee is not linked to the amount of sorted waste. Secondly, they are not threatened by fines. Apart from this, containers are in open space areas, accessible to public and can be filled with litter by strangers. Lastly, surveillance of apartment block rubbish containers is complicated.

Waste sorting habits can be successfully adapted to food waste sorting, but the respondents declare they would be ready to sort if special containers adapted for this purpose were installed (58.2%) and equipped with special sealed packages (52.2%). Reduction in the waste management fee is not a major factor in sorting – it seems important for 27.2% of the

questioned. Only for 4.8% of the residents, sorting can be stimulated by relevant information on the negative effects of food waste. Some respondents are not ready to sort food waste: there is lack of space (9.8%), lack of time and no desire (3.6%), it is unhygienic (1.0%).

There are cardinal differences concerning readiness to sort food waste based on the place of residence: those who live in apartment buildings pointed out that they will have difficulties sorting because of limited space in the kitchen (87.8%), whereas house owners who indicated that they do not have enough room in the kitchen for sorting accounted for 6.12%; many more apartment residents pointed out that food waste sorting is unhygienic (from 80.0% to 20.0%). The best sorting motivator for apartment residents would be provision with special sealed bags, while for house owners – a reduced waste management fee and special containers adapted for food waste would play the role. House owners living in urban areas need detailed information concerning the negative effects of food waste, while house owners in rural areas want to be provided with special sealed bags.

5. Discussion and conclusions

The present study results show that Lithuanians discard relatively small amounts of wholesome edible food, in comparison with averages for the EU27, which makes up *c.* 75.6 kg/cap/per year. The amount of food waste is significantly influenced by household size, as large households dispose of less food than smaller ones, and also by residents' age, as older people waste less than young people. Although population aging is an advancing process recorded in Lithuania, this cannot be attributed to the prospect of food waste decrease or its remaining unchanged. The behaviour of the younger generation differs from that presented by older generations, primarily because of today's fast-paced lifestyle, income growth, and it can hardly be expected that the young will get more responsible regarding care for food as they grow older.

The respondents realize that it is they as consumers, first of all, who are responsible for food wastage, and the main factor in reducing food wastage is "better planning of shopping and cooking". Retail promotions play an important role in overconsumption and, consequently, in generation of food waste, but nobody can control the quantity and frequency of such promotions, as only customers' awareness and personal responsibility can influence shopping habits in this respect.

The surveyed associate wasting food primarily with a waste of money, which reflects the results of many previous studies, indicating the lack of awareness as regards the value of food. The limited knowledge of the meaning of "best-before" dates influences the wasteful behaviour, as more than a half of the questioned pointed out that products should not be consumed after the expiry date given on the product.

Lastly, the survey has proved that the respondents do not have enough information about economic, social and environmental costs concerning food waste, so educating the public in this sphere is an important factor in minimizing household food waste. Schools, universities, social activists, NGO-s must be involved in this process and educate society about the value of food. The role of state organizations, municipalities and waste management companies that ought to promote the awareness and unacceptability of food loss and waste is clearly beyond any question. By now, the Lithuanians have received only superficial information about the implementation of the food waste sorting system, but no reliable education concerning food waste prevention.

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Postawa społeczeństwa wobec marnotrawienia żywności: przypadek Litwy

Streszczenie

Celem pracy jest zbadanie postrzegania marnotrawienia żywności przez konsumentów oraz ich świadomości ekonomicznych, społecznych i środowiskowych kosztów związanych z tym problemem. Badania koncentrowały się na koncepcji marnowania żywności w kontekście postaw konsumentów wobec tego problemu. Przeprowadzono analizę porównawczą, syntezę i ocenę literatury naukowej i dokumentów prawnych, zebrano i przeanalizowano dane statystyczne, a także opracowano wyniki badania on-line 500 gospodarstw domowych reprezentujących 1494 mieszkańców ze wszystkich litewskich powiatów. Dane zostały przeanalizowane przy użyciu pakietu statystycznego dla nauk społecznych (SPSS): statystyki opisowe, częstotliwości, tabele przestawne. Litwini wyrzucają stosunkowo niewielkie ilości zdrowej, jadalnej żywności w porównaniu ze średnią dla 27 krajów UE, ale większość z nich ma ograniczoną wiedzę na temat terminu przydatności do spożycia. Również konsumenci są pod silnym wpływem promocji detalicznych, a marnowanie dla nich żywności wiąże się przede wszystkim z marnowaniem pieniędzy. Polityka stanu gospodarki odpadami koncentruje się na sortowaniu odpadów, a badania te dowodzą, że gospodarstwa domowe są niedostatecznie poinformowane o ekonomicznych, społecznych i środowiskowych kosztach marnotrawienia żywności. Wskazuje to na konieczność ponownej oceny dotychczasowej polityki państwa z naciskiem na edukację publiczną jako ważny czynnik ograniczania marnotrawstwa żywności w gospodarstwach domowych. Litwini zdają sobie sprawę, że to oni sami jako konsumenci są w większości odpowiedzialni za marnotrawienie żywności, ale marnowanie żywności jest traktowane głównie jako strata finansowa. Wartością dodaną tego artykułu jest propozycja stworzenia kampanii informacyjnych, które zwiększą poczucie winy za marnotrawstwo żywności.

Słowa kluczowe: gospodarka odpadami, marnotrawstwo żywności, zachowania konsumentów, gospodarstwa domowe