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THRIFTLESSNESS AND FOOD WASTE IN HOUSEHOLDS IN POLAND WITH PARTICULAR REFERENCE TO THE PODKARPACKIE VOIVODESHIP

This article investigates the phenomenon of food waste and thriftlessness in Polish households. The authors attempted to determine the extent of thriftlessness and food waste on international, regional, and local scales. Research on food waste was carried out from December 1, 2020, to January 31, 2021, in the Podkarpackie Voivodeship. A questionnaire was used to conduct the research. Three hundred and ten respondents from towns and villages located in the Podkarpackie Voivodeship of various ages and levels of education took part in this study. The research methods used were a diagnostic survey and an analysis of the literature. The survey was conducted in a written interview, while the research tool was a questionnaire. Research shows that the number of people who admitted to throwing away food is constantly increasing. This trend is expected to continue, and food waste will increase rapidly. Therefore, all possible countermeasures should be taken to draw consumers' attention to the problem of food waste and how it can be reduced. This study contributes to the literature on food waste around the world by demonstrating the problem occurring at global and local levels. The research and conclusions may determine future research directions and provide the basis for larger-scale research (both in terms of the number of respondents and the area of research).

Keywords: food waste, problem, world, households, research.

1. INTRODUCTION

Nowadays, considerations about thriftlessness and food waste are becoming the most important problem in expanding the areas of poverty, especially hunger and malnutrition of many societies of individual continents, countries, regions, or local towns. Despite the deepening analysis concerning food waste in a global context, few studies have paid enough attention to the problem from a local perspective, which means from households' and their members' perspective.

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This study attempted to determine the extent of thriftlessness and food waste both on an international, regional and local scale. Food is lost and/or wasted throughout the agri-food chain, including agricultural production, post-harvest and storage handling, processing and distribution, and consumption. It should be emphasized that these phenomena occur in all links of this chain, and their intensity varies and depends on the geographical region of the world.

The main purpose of the paper is to present the phenomenon of thriftlessness and food waste in the world, which is undoubtedly an important problem that remains unsolved on a global scale. Its significance and the need to search for its solutions are undoubtedly worth the attention of scientists worldwide. It should be emphasized that solving this problem may result in an increase in food security, a reduction in the scope of poverty and hunger, and a reduction in mortality, especially of children. The current state of the research field (Higgins et al., 2008, Kloppenburg et al., 1996, Hendrickson & Heffernan, 2002, McMichael, 2009, Hartmann, 2011) shows that there are much research concerning food waste all over the world but most of them present the results from a broad point of view. The authors of the paper tried to analyze the problem from a regional and local perspective with particular reference to households' food waste. Consumption and food waste grow especially with the lifestyle associated with urban areas, which are currently hosting more than half of the world's population and by 2050 will host more than two-thirds of the world's population (Andreola et al., 2021).

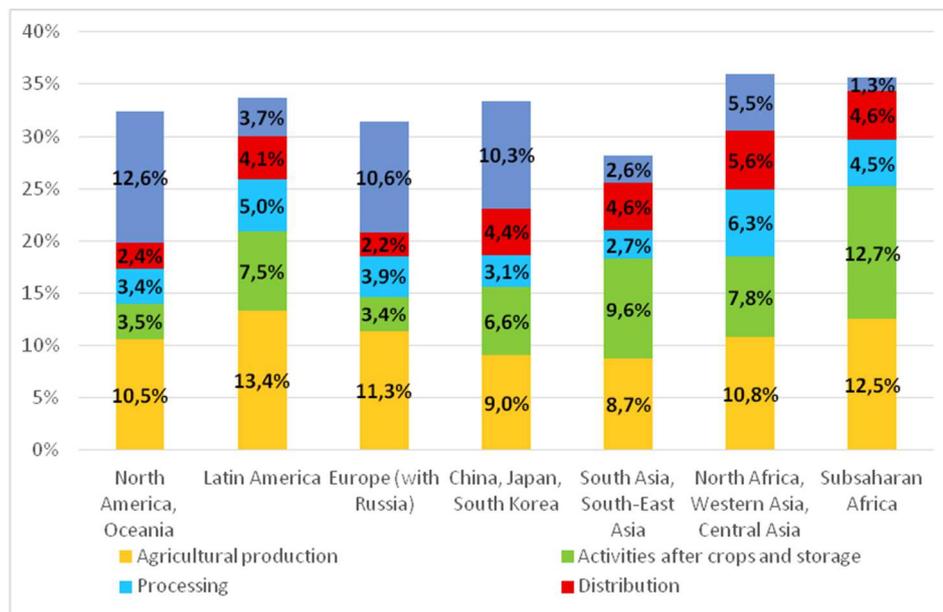


Figure 1. Food losses and waste along the agri-food chain by world region

Source: (HLPE).

Food is lost throughout the agri-food chain, from agricultural production post-harvest storage, processing, and consumption. In developing countries, the greatest losses of food occur in the initial stages of the chain, i.e., during agricultural production and storage. It is related to the lack of access to modern agricultural techniques and the inability to appropriate storage and transport. The greatest waste in agricultural production is recorded in Latin America (13.4%) and Sub-Saharan Africa (12.5%), while in the post-harvest treatment and storage phase in countries such as Sub-Saharan Africa (12.7%) and Southeast Asia and South Asia (9.6%). At further stages, i.e., during consumption and distribution, the greatest losses occur in highly developed countries. The highest food loss and the waste rate is recorded in North America and Oceania (12.6%), which is caused by the production of food in greater quantities than needed, lack of respect for food that is widely available in these countries, poor eating habits of the inhabitants of these countries, market mechanisms, institutional and legal framework, including restrictions on international trade. The largest losses in the entire agri-food chain were reported in North Africa, East Asia, and Central Asia (36%), followed by Sub-Saharan Africa (35.5%), Latin America (33.7%), China, Japan, and Korea. South (33.4%), North America and Oceania (32.4%), Europe, including Russia (31.4%); the least losses were recorded in South Asia and Southeast Asia (28.2%) (Figure 1).

The total food losses and waste in individual continents and their regions ranges from 28.2% in South Asia and South-East Asia to 36% in North Africa, West and Central Asia, and Sub-Saharan Africa. Although in a slightly smaller size, this phenomenon also occurs in Europe, i.e., in the European Union countries.

Each European Union member has a different rate of food waste *per capita*. The Greeks turned out to be the most economical, where the rate *per capita* was 45 kg annually. The Dutch waste the most food – 556 kg of food *per capita*. Countries whose consumption *per capita* exceeds 100 kg are: Slovakia, Latvia, Denmark, Romania, Germany, Portugal, France, Italy, Spain, Luxembourg, Finland, Hungary (from 108 kg in Slovakia to 189 kg in Hungary). Poland shamefully ranked fifth with 236 kg of food wasted *per capita* annually, right after Estonia, Cyprus, Belgium, and the Netherlands (Figure 2).

In the household sector, the greatest amounts of food losses and waste occur – 42%, of which as much as 2/3 of food thrown away could be avoided. Food producers are in second place by sector with 39% of total food waste. Food suppliers, including restaurants and catering chains, are responsible for 14% of losses, while retailers and sales networks generate the least food losses – 5% (Figure 3).

In the light of the discussion above, we propose the following hypothesis: in the modern food economy, there are phenomena of food waste, both in highly developed and developing countries, as well as in urbanized and agricultural areas. The structure of the work was subordinated to this hypothesis.

The paper is organized as follows: we introduced briefly the problem of food waste and its reasons, then we presented a review of the literature on food waste and thriftlessness in households all over the world with particular reference to Polish households from the regional and local perspective. The principal conclusions provide the basis for recommending solutions aimed at minimizing food waste and associated losses.

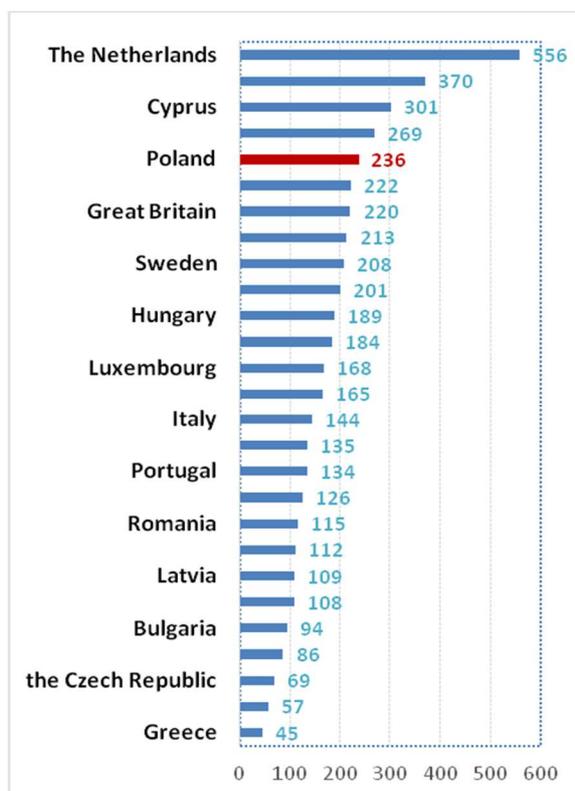


Figure 2. The amount of food losses in European Union countries expressed in kilograms *per capita* in 2018

Source: (Financial Observer, <https://www.obserwatorfinansowy.pl>).

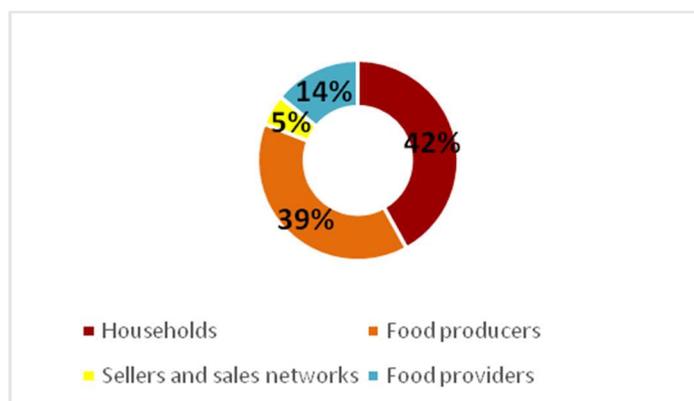


Figure 3. Food waste in individual sectors of the European Union (in %)

Source: Authors' elaboration based on (Food banking, <http://foodbanking.org>).

2. LITERATURE REVIEW

The authors of the study would like to emphasize that limiting the phenomenon of thriftlessness and food waste in the world is undoubtedly an important problem because as a result of its solution, food security may increase, the scope of poverty and hunger may be reduced, and mortality, especially of children, may be reduced. Based on the review and analysis of the literature on the subject, it can be stated with all responsibility that this is a problem of highly developed, poor, and developing countries. According to the European Union Report Council, reducing food losses and food waste by only a quarter would be enough to feed all the hungry people in the world (European Union Council, 2016). The total economic cost of food waste in Europe, with estimates of food loss and food waste ranging from 158 to 298 kg *per capita*, would be around EUR 143 billion annually (Stenmarck et al., 2016). Research shows that about 2/3 of these costs are caused by food waste at the household level. It is confirmed by the research conducted in Hungary, which was carried out in two stages. The first empirical study was carried out using the FUSIONS methodology (FUSIONS, 2016) in 2016, the second – in 2019. Research based on the physical measurement of household food waste was carried out in 2016. The measurement covered 100 households during one week. In 2019, 165 households participated in the research. Based on the research results in the first stage, it was found that annually, the average Hungarian wasted 68.04 kg of food, of which 33.14 kg could be avoided. However, in the second study, i.e., in 2019, it was found that during the measurement period (one week), 165 households participating in the study generated 532.79 kg of food waste, of which the unavoidable food waste was 246.52 kg, and that which could be avoided – 265.56 kg (Kasza et al., 2020).

Also, in a study conducted in Greece among 101 urban households, it was found that over two weeks, the amount of total food waste *per capita* was 76.1 kg, of which 25.9 kg was considered avoidable (Report of Polish Food Banks Federation, 2012). It has also been proven that the fraction of the part that could be avoided is similar in Finland – 23 kg *per capita* (Quested & Johnson, 2009). In studies, which should be explained, it is recommended to distinguish between avoidable and unavoidable food waste, and it is used in the vast majority of measurements (Koivupuro et al., 2012; Elimelech et al., 2018; Giordano et al., 2019; Schanes et al., 2018; Schneider & Obersteiner, 2007; Lebersorger & Schneider, 2011).

It is worth adding that, according to research carried out by *The Waste and Resources Action Program* (WRAP) (Borowski et al., 2016), the phenomenon of food waste also takes place in Great Britain. It is estimated that more than 22% of the food purchased by households is wasted, of which at least 14% could be reused for consumption, and the annual financial loss per household is GBP 480.

The structure of household food waste varies from country to country. However, research has shown that perishable foodstuffs are among the most discarded products. When considering the avoidable category, these foods include fresh fruit and vegetables, breadstuffs, and dairy products. However, according to Hungary's quoted research results, this type of product includes meals, breadstuffs, fresh vegetables, dairy products, and fresh fruit (Szabó-Bódi et al., 2018). On the other hand, in Serbia, breadstuffs and ready-to-eat food products also top the list. An analysis of the structure of food waste in Norway shows that bread and bakery products are at the top of the wasted list. Fresh vegetables and drinks are on this list in the UK (Quested&Johnson, 2009). In Greece, Denmark, Israel, as in Great

Britain, vegetables were the most frequently wasted food products (Edjabou et al., 2016; Abeliotis et al., 2019). The research shows that food waste also occurs in Poland, where the level of food losses per year is estimated at 9 million tons of food. In the ranking of EU countries, Poland is in 5th place (Marszałek, 2018). The Polish government (following the example of other EU countries), on July 19, 2019, developed an act on preventing food waste (Act on preventing foodwaste). The act defines the rules of dealing with food and the obligations of food sellers to counteract food waste and negative social, environmental, and economic effects resulting from food waste. Unfortunately, there is no scientific research on thriftlessness and food waste in Poland. This research could cover the stages of the agri-food chain as well as all food products. Estimates for the European Union can only be followed in foreign literature (Bräutigam et al., 2014). Every year, Poles waste 247 kg of food *per capita* (compared to the average of 173 kg *per capita* in the EU), which ranks Poland in 5th place in the European Union. In 2018, 42% of respondents reported throwing food away (Polish Economy Institute, 2020). It should be noted that the Food and Agriculture Organization of the United Nations (FAO) food balance sheets used in the research do not allow for the differentiation between the amount of food consumed in households and domestic consumption in places such as canteens, restaurants, or fast food outlets (Bräutigam et al., 2014). The presented research results are only the estimates, which unfortunately are burdened with a large error. Such estimates are considered because there is no effective method for collecting official data on the amount of food losses and waste in the European Union countries and Poland. Work is currently underway on introducing a unified program to monitor food losses and waste in the European Union countries. In 2016, the FUSION project presented the results in which it is possible to develop a collective and substantive EU protocol controlling the measurement of food loss and food waste reduction; the project was adopted by the Council of the European Union (European Union Council, 2016). Polish Food Banks disseminate data related to food waste in Poland. It will result in drawing attention to the issue of unmet food needs among members of Polish households. A survey conducted by the Central Statistical Office (GUS) in 2019 shows that approximately 2.8 million people lived on a level of expenditure below the extreme poverty line (below the minimum subsistence level). On the other hand, in households with expenditure below the relative poverty line – i.e., expenditure in these households accounted for less than 50% of the average expenditure for general households in Poland – approximately 4.6 million people. It is estimated that there are 4.6 million people in Poland living on the poverty line and below (Statistics Poland, 2015). The Public Opinion Research Center (CBOS) conducted a study entitled “Poles' declarations regarding food waste” and asked Poles how often food ends up in the trash in their households and what should be done to prevent this practice. The survey results are as follows:

- every fourth respondent admits having thrown away food in their household during the last week;
- young people admit to throwing away food more often than adults, who have a harder time admitting to poor food management;
- the declaration that their households do not throw away food was confirmed by 94% of respondents aged 65 and over, 88% of people who describe their material conditions as bad, and 93% of people who have lower secondary or primary education;

- wealthy people with higher education and holding managerial positions are more prone to throw away food;
- fruit, vegetables, leftovers, and breadstuffs most often end up in the garbage can.

Poles currently waste less food than in 2005, but with some categories of products, such as cured meat, milk, and its products, fruit, vegetables, or fruit preserves, more of them end up in the trash than in 2000 (European Union Council, 2016). The Federation of Polish Food Banks has conducted many information campaigns over the years. According to the Food Banks Report, “I do not waste food”, breadstuffs (49%), fruit (46%), and cured meat (45%) were among the top three discarded products. It was followed by vegetables (37%), yogurts (27%), and milk (12%). Products such as meat, cheese, ready meals, fish, eggs, and other not mentioned products, obtained below or equal to 10% (Figure 4).

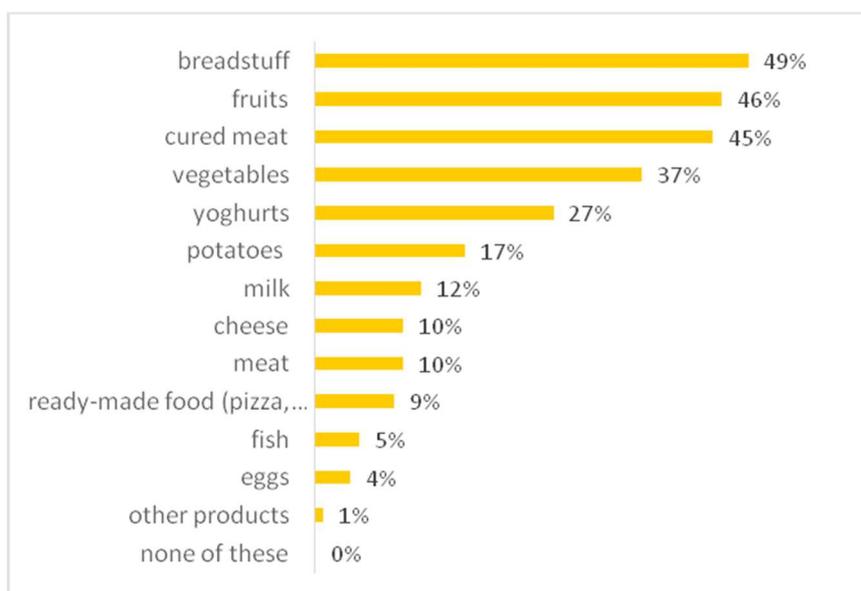


Figure 4. Food products that were usually thrown away in 2018 expressed as a percentage
Source: (Food banking, <http://www.foodbanking.org>).

Figure 5 shows a comparison of the most thrown food products in 2012, 2014, and 2018. The amount of food wasted, unfortunately, increases with each passing year. Polish society threw out 13% more yogurts than in 2018. The amount of fruit discarded remains roughly the same in 2014 and 2018, but in 2012, it was much smaller. The amount of wasted milk increased by 8% over the years studied, the amount of meat increased by 5% in 2014 and remained constant in 2018, the amount of vegetables increased by 4% from 2014 to 2018. The research carried out at TNS Poland (Taylor Nelson Sofres) showed a certain dependence. Wealthy people, who spend less time at home due to their profession, more often make reckless and unjustified food purchases, thus controlling the contents of their refrigerators to a lesser extent. People in this situation are more likely to feel they waste food. People who live on a lower social threshold cannot afford to waste food and careless

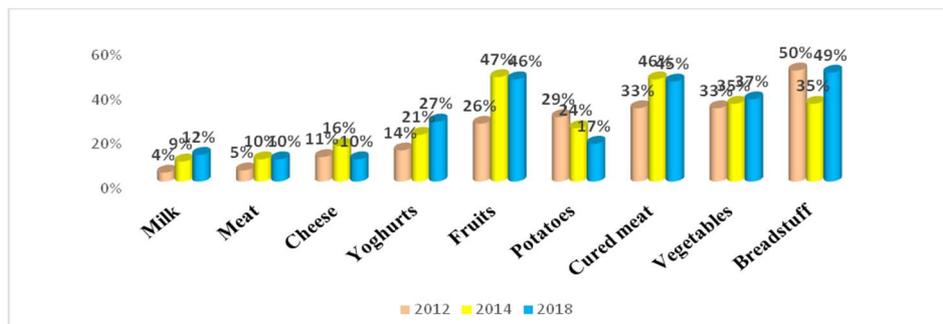


Figure 5. Food products that were most often thrown away in 2012-2014 and 2018

Source: (Food banking, <http://www.foodbanking.org>) Authors' elaboration.

shopping (TNS Poland 2012). Food waste creates large expenses on soft drinks and food. The amount of expenses in 2014 amounted to PLN 1,078.74 *per capita* monthly, of which 24.4%, or PLN 263.34, were expenses for food and drinks. It should be emphasized that when consumers throw away food, they also throw away money (Borowski et al., 2016).

3. MATERIALS AND METHODS

Research on food waste was carried out in December 2020 and January 2021 in the Podkarpackie Voivodeship. The choice of the voivodeship was determined by its location (south-eastern parts of Poland) and its agricultural character. The authors wanted to show that food is wasted not only in urbanized areas but also regardless of urbanization.

The following hypothesis was put forward in the paper: in the modern food economy, there are phenomena of food waste, both in highly developed and developing countries, as well as in urbanized and agricultural areas. The study uses data from two sources: desk research and down research. First, the work was prepared based on analyses of current data from reports and studies by non-governmental organizations devoted to food waste, both in Poland and worldwide. The main source of data is the results obtained during primary research. A questionnaire was used to conduct the research. Of various age groups, three hundred ten respondents from towns and villages located in the Podkarpackie Voivodeship and different education took part in the study. The research methods used in the research were a diagnostic survey and an analysis of the literature. The survey was conducted in the form of a written interview, while the research tool was a questionnaire.

4. RESULTS

The research was conducted among respondents from different age groups, different environments (urban and rural), and different education. The authors hope that the results of these studies will broaden the information and knowledge about wasted food and the causes of this phenomenon and show that regardless of residence place, age or education, food waste is a global, regional and local problem.

In the survey, most respondents (56%) were between 19 and 25 years old. Respondents aged 26 to 40 (18%) were in second place, while respondents aged 41 to 50 constituted 11%. Next, 10% were respondents aged 51 to 64, and only 5% respondents aged 65 and more. The respondents aged 16 to 18 did not take part in the study (Table 1).

Table 1. Age of examined people

Age of the respondents	Percentage
16–18 years old	0%
19–25 years old	56%
26–40 years old	18%
41–50 years old	11%
51–64 years old	10%
65 years old and more	5%
Total	100%

Source: Authors' elaboration.

The vast majority of respondents (78%) turned out to be rural residents, while 11% of the respondents came from cities with more than 5,000 inhabitants. Slightly fewer respondents came from cities with up to 1,000 inhabitants – 6%, and from cities with more than 1,000 to 5,000 inhabitants – 5% (Table 2).

Table 2. Place of residence

Place of residence	Percentage
Village	78%
A city with up to 1,000 inhabitants	6%
A city with more than 1,000 to 5,000 inhabitants	5%
A city with more than 5,000 inhabitants	11%
Total	100%

Source: Authors' elaboration.

As far as education is concerned among the respondents, 3% had primary or lower secondary education. 16% of the respondents had vocational education. Most people had secondary or post-secondary education (72%) of the respondents. In turn, 9% had higher education (Table 3).

Table 3. Education

Respondents' education	Percentage
Primary or lower-secondary	3%
Vocational	16%
Secondary or post-secondary	72%
Higher	9%
Total	100%

Source: Authors' elaboration.

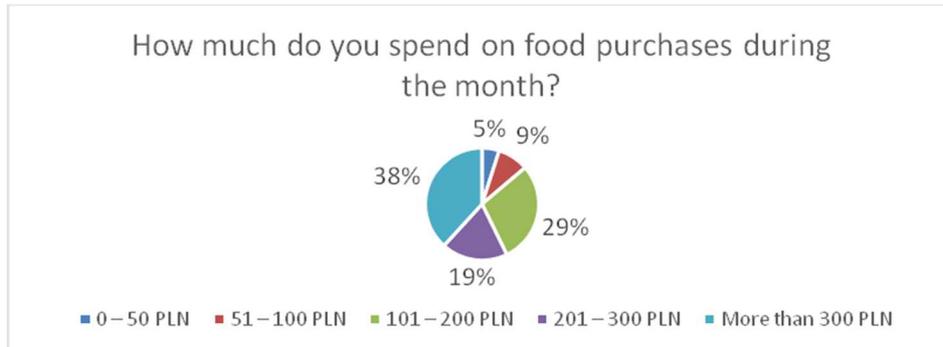


Figure 6. The respondents' expenditure on food during the month

Source: Authors' elaboration.

When asked how much per month the respondents spend on purchasing food products, 38% of the respondents answered that they spend over PLN 300, 29% of the respondents from PLN 101 to PLN 200. In turn, 19% spend from 201 to 300 PLN on shopping during the month, 9% – from 51 to 100 PLN, and only 5% of respondents – about 50 PLN.

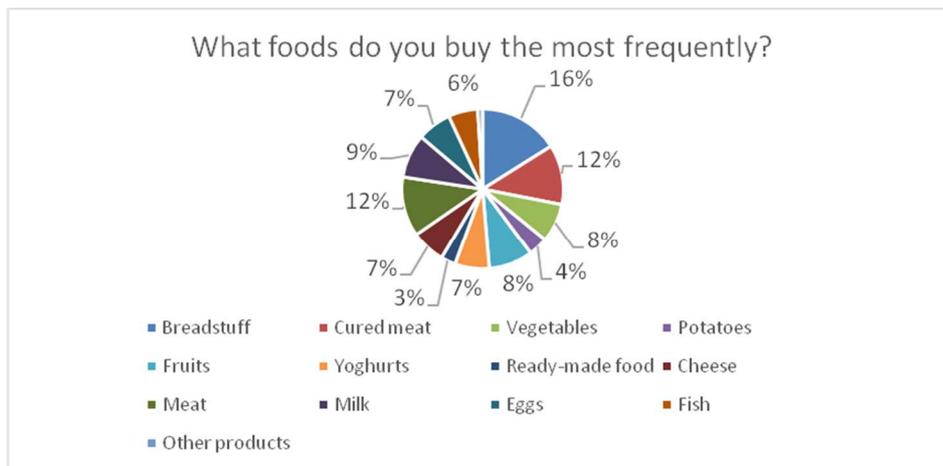


Figure 7. Structure of respondents' expenditure on food products

Source: Authors' elaboration.

The respondents in this question could select more than one answer, and the question was: What food products do you buy most often? Most of the respondents (16%) buy breadstuff, 12% – buy meat, and the same number (12%) buy cured meat, 9% of respondents buy fruit, and the same (9%) – milk. Then, 8% of respondents buy vegetables, 7% – eggs, 37 (7%) yogurts, and 7% – cheese. Definitely less, only 6% buy fish, 4% – potatoes, 3% buy ready meals. The respondents had the opportunity to answer their questions, 1% of

them replied that in addition to the products mentioned above, they also purchased butter, pasta, and frozen food.

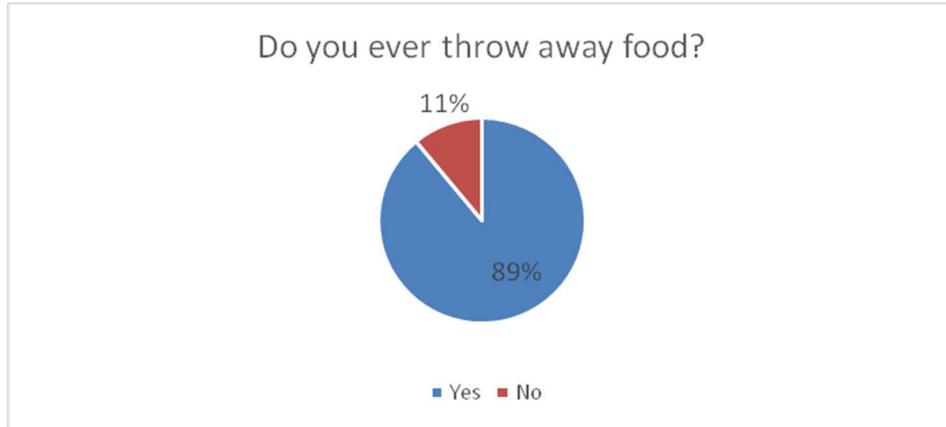


Figure 8. Declaration of the respondents regarding throwing away food
Source: Authors' elaboration.

The vast majority of respondents (89%) indicated that, unfortunately, they sometimes throw away food. Only 11% of the respondents answered that they did not throw away food at all.

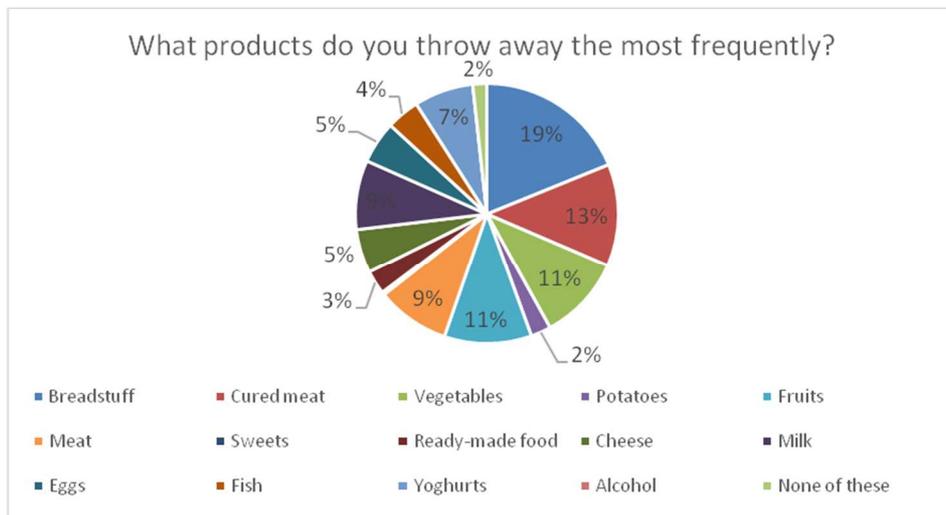


Figure 9. The structure of the food thrown away
Source: Authors' elaboration.

The respondents could also select more than one answer in this question, and the question was: What food products are thrown away most often? Most of the respondents (as many as 19%) throw away breadstuff, and only 2% declared that they do not throw away anything. On the other hand, 11% of respondents throw away vegetables. Subsequently, 5% throw out fruit, 8% – cured meat, 7% – potatoes, 7% – cheese, 6% – milk, and the same number – ready meals and milk. Definitely less (only 4% of respondents) throw away fish, 3% – eggs and meat. The respondents had the opportunity to answer – 1% answered that they did not throw food away but gave it to animals.

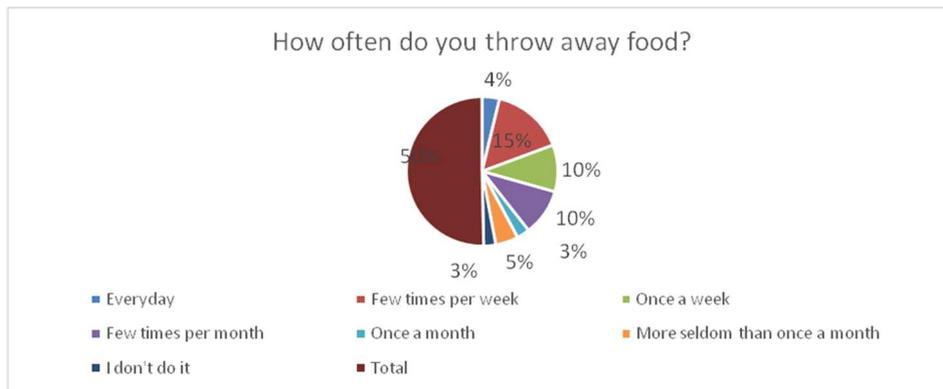


Figure 10. The frequency of food throwing away by respondents

Source: Authors' elaboration.

The answer “several times a week” was the most frequently chosen one. As many as 32% of the respondents answered in this way. *Ex aequo*, 10% of the respondents indicated that they sometimes throw away food once a week and several times a month. Among all respondents, some people said that they were not throwing food away (3%).



Figure 11. Determinants of food selection

Source: Authors' elaboration.

By analyzing the data presented in Figure 11, it can be concluded that the main factor influencing consumer choices is the economic factor, i.e., the price of the product (14% of the respondents answered this way), and then they pay attention to the quality of the product (11% of the respondents). The analysis of the literature on the subject confirms this research. This dependence is highlighted by, among others, Hanus (2017) emphasizing that economic factors play an important role in the choice of food products by older people and inhabitants of rural areas and small towns, with low income compared to other social groups. They suggest themselves *ex aequo* in terms of taste and habits (9%). 1% of respondents mentioned other factors influencing their choices.

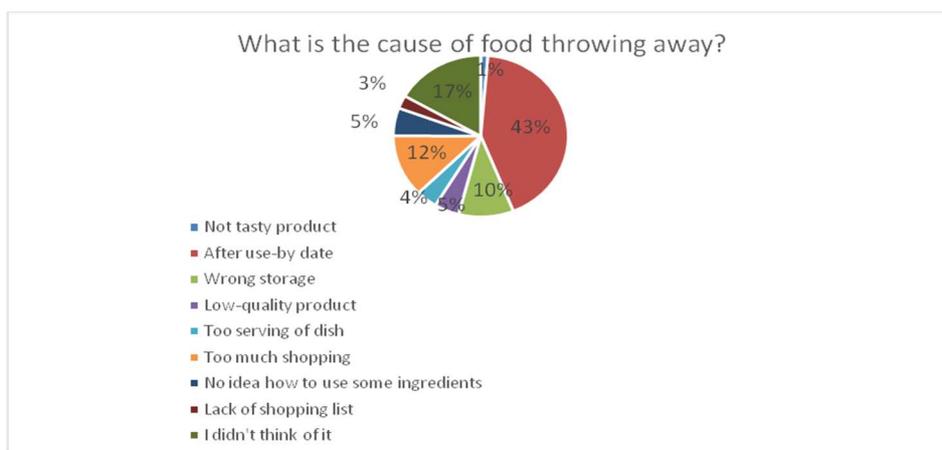


Figure 12. Reasons why respondents throw away food

Source: Authors' elaboration.

The respondents' main reason for throwing away food is the end of the expiry date, rather than exceeding it (43%). The second major reason why food is thrown away is too much shopping, which results in food waste due to the inability to eat it. It is disturbing that 17% of the respondents replied that they did not think about the reasons for throwing away food. It proves that we are insensitive to the problem of food waste. Poor food storage is also one of the main reasons we throw away food (10% of respondents).

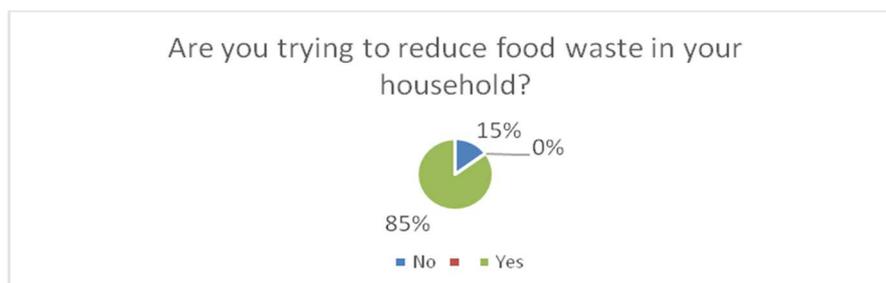


Figure 13. Declaration of the respondents regarding the attempts to reduce food waste

Source: Authors' elaboration.

Responding to the question: Are you trying to reduce food waste at the level of your household?, the vast majority (85%) answered “yes”. Only 15% of the respondents answered negatively to the above question. It is comforting that most respondents are willing to reduce food losses and thus their waste.



Figure 14. Ways to reduce food waste

Source: Authors' elaboration.

The way, in which respondents try to reduce food waste, is mainly by making purchases with a list of necessities (25% of respondents), which may contribute to limiting the purchase of unnecessary products. Almost a quarter of the respondents (21%) stated that one way to reduce food losses was to use leftovers and not buy in stock (13%).

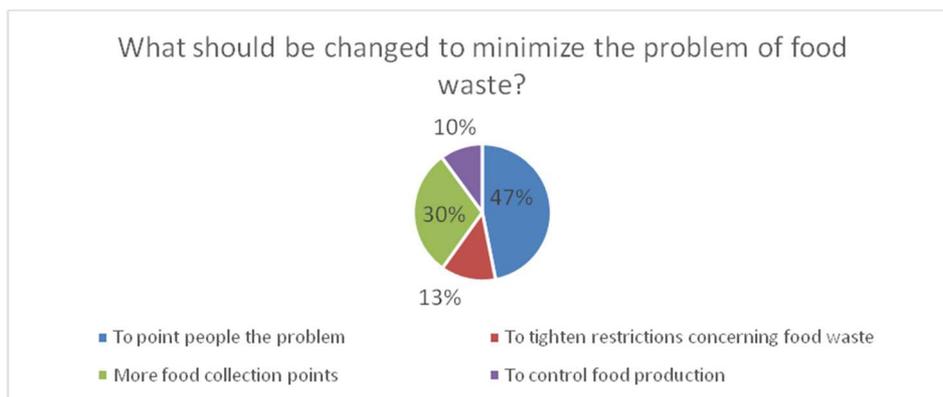


Figure 15. Ways to minimize the problem of food waste

Source: Authors' elaboration.

One of the proposed solutions aimed at minimizing the problem of food waste is – according to almost half of the respondents (47%) – making people aware of the importance of the problem. According to 30% of respondents, the number of food collection points should be increased, restrictions on food waste (13%), and food production control (10%) should be increased.

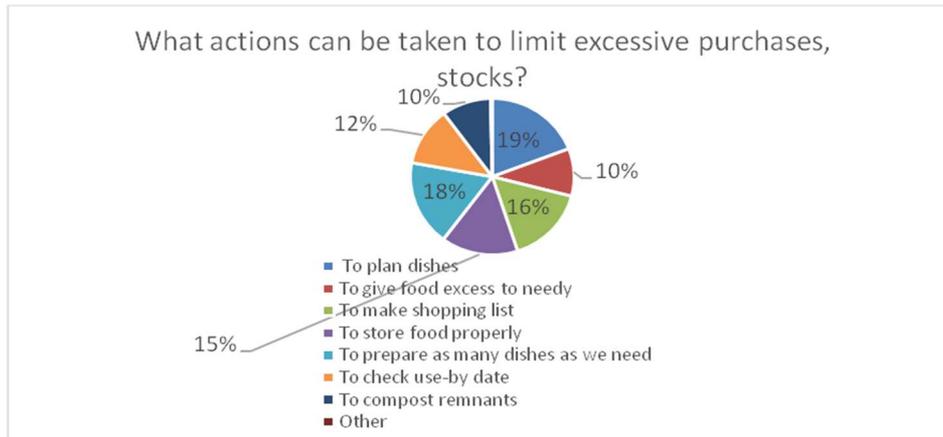


Figure 16. Actions limiting excessive purchases

Source: Authors' elaboration.

The proposals for measures to reduce food waste are very evenly distributed. It is shown by the research results (Figure 16). The highest number of respondents (19%) suggested planned meals related to the deliberate use of food products. According to 18% of respondents, it is also necessary to prepare as many meals as they need (no less, no more) to reduce excessive purchases and stockpiling. In turn, 16% of the respondents propose to make a shopping list, 15% – to store food properly. *Ex aequo* 10% of respondents propose to share excess food with those in need and compost leftovers.

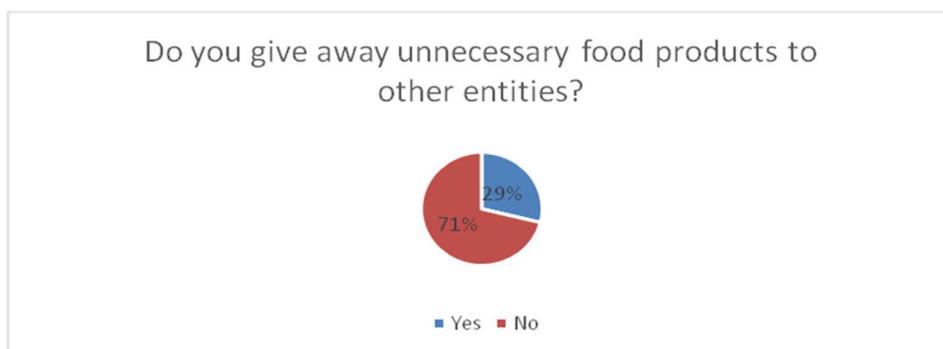


Figure 17. Declaration of the respondents regarding the donation of unnecessary food products to other entities

Source: Authors' elaboration.

The vast majority of respondents (71%) did not declare giving away unnecessary food products to other entities. Only almost 1/3 of the respondents (29%) answered the above question in the affirmative.

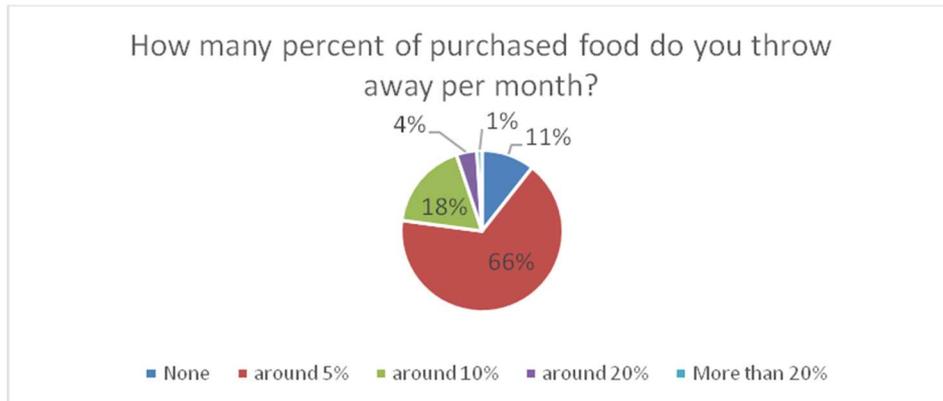


Figure 18. Food thrown away per month (%)

Source: Authors' elaboration.

Most respondents (66%) throw away about 5% of their food a month. Subsequently, 18% of respondents throw away about 18% of the food they purchased. It is disturbing that 1% of respondents throw away more than 20% of the purchased food per month or 1/5 of what they buy unnecessarily. On the other hand, it is comforting that 11% of respondents declared that they did not throw away food at all.

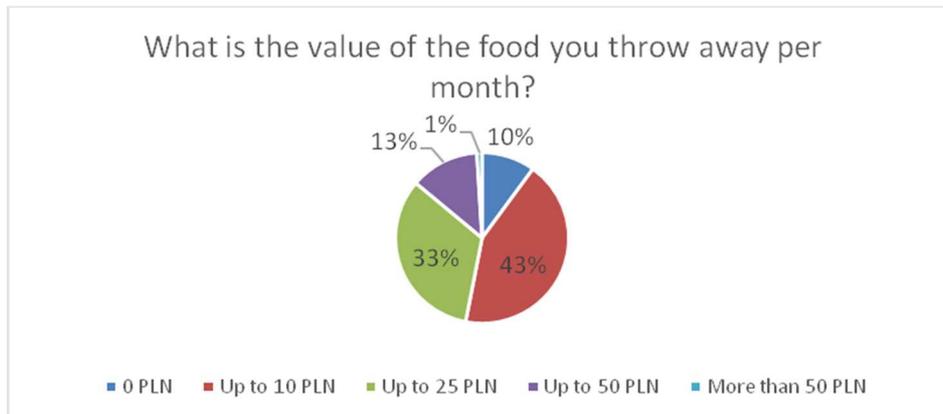


Figure 19. Value of food thrown away per month (in PLN)

Source: Authors' elaboration.

According to almost half of the respondents (43%), the value of food thrown away does not exceed PLN 10. Nevertheless, 33% of respondents (over 1/3) believe that the value of the food they throw away does not exceed PLN 25. 10% of respondents believe that they lose over PLN 50 a month on food waste.

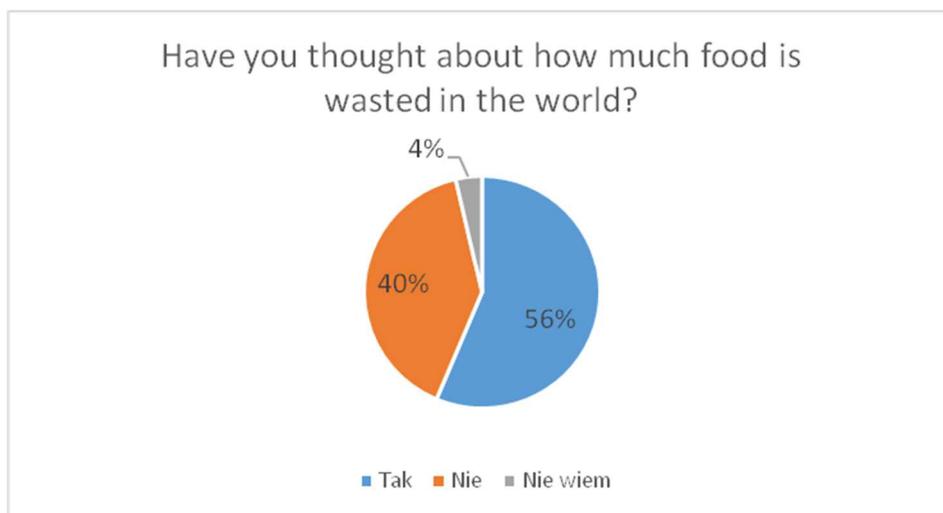


Figure 20. Respondents' awareness of the amount of food wasted in the world
Source: Authors' elaboration.

It is disturbing that 40% of respondents do not consider food waste on a global scale. Nevertheless, more than half of the respondents (56%) declared that the problem of food waste is important, and it is worth considering (Figure 20).

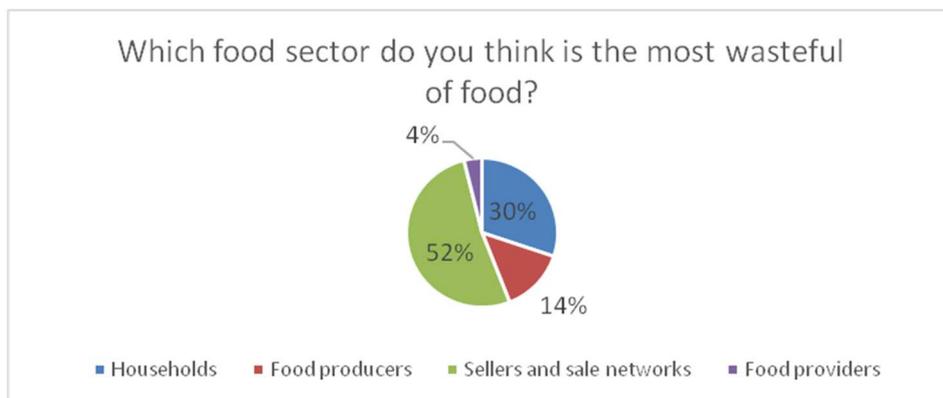


Figure 21. Food sectors wasting the most food
Source: Authors' elaboration.

The last was the question of respondents' awareness of who is most responsible for food waste. The respondents concluded that the greatest waste of food takes place in the sector of sellers and retail chains (52% of respondents), then — households are responsible for food waste (30% of respondents) — which would confirm the hypothesis put forward by the authors of the study in the introduction. Food producers are also responsible for food waste, according to 14% of respondents (Figure 21).

5. DISCUSSION AND CONCLUSIONS

According to the research, most of the respondents admit to throwing away food, and the primary reason for throwing them out turned out to be exceeding the use-by date. The most frequently thrown out are: breadstuff, vegetables, fruit, and cured meat. Ways that respondents take to prevent food waste make thoughtful and wise purchases without buying large supplies of food and feeding animals with food residues. Appropriate storage of products turns out to be equally important. The main assumption aimed at minimizing the problem of food waste is to make the public aware of the importance of the problem. It is heartening to know that more than half of the respondents wonder how much food is wasted globally, and most of those polled try not to waste water.

From the perspective of previous studies, it is worth mentioning that the causes of food waste are known worldwide, and there are ways to reduce them. The most beneficial way is to donate food to the poor and needy. The analysis of the research results and the available literature on the subject show the problem of wasted food and its threat to the whole world and the threat to the natural environment through inappropriate use of natural resources. One such example is inappropriate water consumption. The amount of loss and food wasted is constantly increasing, and so is the number of people who admit it. The expected growth could have catastrophic consequences for the environment and society. All attempts should be made to make consumers aware of the importance of the problem and indicate ways of minimizing this phenomenon on a global scale. Besides, a key aspect of waste reduction is the proper management of food in households. Research shows that the number of people admitting to throwing away food is constantly increasing. This trend is expected to continue, and food waste is expected to increase rapidly. Therefore, all countermeasures should be taken to draw consumers' attention to the problem of food waste and how it can be reduced.

The research and conclusions may determine future research directions and provide the basis for larger-scale research (both in terms of the number of respondents and the area of research).

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