

## A STUDY OF ROMANIAN CONSUMERS' FOOD PURCHASING, CONSUMPTION BEHAVIOR, AND MOTIVATION TO AVOID AND REDUCE FOOD WASTE

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### Abstract

*The issue of preventing and reducing food waste (FW) at the household level is of paramount importance and must be analyzed in relation to food purchasing, handling, and consumption habits. This study examines food purchasing and consumption habits in the context of food waste avoidance, among consumers in Romania. An online survey (N = 369, 67.21% women) was conducted to analyze food purchasing and consumption behavior, shopping planning routines, and food waste avoidance behavior. The average age of the respondents was 30.22 years. The collected data was analyzed, processed, and interpreted. Main findings: In 76% of the households surveyed, some of the food needed is produced in the household. The primary source of food supply is the hypermarket, regardless of the food category. About 84.55% of consumers cook at home very frequently and eat meals with their families. The highest scores for shopping planning routines were recorded for the habit of checking food stocks (3.82) and creating a shopping list (3.32). Nearly half of the respondents are responsible for both food purchases and cooking at home. Personal motivation for reducing food waste primarily involves assuming social responsibility (3.92), followed by concern for the environment. Over 87% of consumers believe that a national policy is necessary to implement educational and informational programs and projects aimed at preventing and reducing food waste.*

**Key words:** consumer behaviour, food purchase, food consumption, food waste, sustainability

### INTRODUCTION

Demographic forecasts suggest that the global population will reach approximately 9.8 billion by 2050. Sustainable Development Goal 12.3 (SDG 12.3) aims to halve food waste (FW) by 2030 in the retail, HoReCa, and consumer household sectors. Many researchers argue that halving food waste, both in retail sales and in households, by 2030 will significantly contribute to meeting humanity's future food needs [14, 36]. In EU in 2022, the global level of food waste was approximately 132 kg per capita per year [43]. FW at the consumer level is a significant issue with substantial environmental, economic, and societal impacts [11,15], with various factors influencing its volume. A study conducted by

Dumitru and colleagues (2021) among 991 urban respondents showed that FW decreased from 10.5% in 2016 to 6.5% in 2020 [16].

FW results from a combination of behaviors learned over a lifetime, related to eating habits and food management. The level of FW in households depends on motivational factors and skills related to food acquisition, handling and consumption [42, 44].

Avoiding food waste is closely linked to aspects such as the appearance of food, ease of preparation, taste quality, and health effects. Educating consumers to purchase suboptimal fruits and vegetables, thus contributing to the reduction of food waste, can be achieved using targeted messages [2].

The volume of food waste is most often correlated with the food category (for

example, fresh fruits and vegetables generate higher levels of waste due to their external appearance, as perceived by consumers in terms of shape, color, size, perceived freshness, etc.) [46], and the place where the food is purchased (supermarkets, farmers' markets, greengrocers, organic product stores, organic or conventional product stands in supermarkets, etc.) [43].

In developed countries, with a culture based on increasing consumption and where citizens have significant purchasing power, retailer campaigns have a considerable impact on food waste by encouraging excessive purchases [10]. The methods used to estimate FW levels must be relevant, representative, and easy to apply [47]. The methods used to estimate the volume of FW should also allow for the measurement of interventions aimed at reducing it [45].

In Romania, on March 15, 2024, the Law for the Amendment and Completion of Law No. 217/2016 regarding the reduction of food waste was promulgated. This law provides consumers with the opportunity to purchase food at reduced prices before its expiration date, and it also facilitates the donation of long-lasting food to non-governmental organizations [23].

In addition to national legislation, there are local and regional initiatives aimed at reducing food waste. These initiatives include programs for collecting and redistributing unsold food to disadvantaged people, food waste composting projects, and public awareness campaigns about the impact of FW. Numerous NGOs have implemented projects designed to reduce FW through food solidarity programs, educational meetings within local communities to utilize surplus food from markets, shops, or consumers, the redistribution of unsold fresh fruits and vegetables from markets to families with special needs, the operation of social stores, and the information and education of students and local communities [4]. The use of mobile phone applications also contributes to encouraging sustainable consumption habits and reducing FW at the end of the food supply chain [26, 39]. Digitalization at all stages of the food supply chain will help address the

challenges the global food system will face by 2050, in the context of food security and safety [18].

The main causes of FW identified in Romania relate to a lack of shopping planning, purchasing excessive amounts of food that end up being thrown away, the lack of selective waste collection and recycling of household waste, and the low impact of current FW prevention campaigns [6].

Reducing FW requires a collective effort from all stakeholders, as it is a sum of individual decisions [9], with targeted actions focused on specific consumer types, considering their eating habits and food waste levels [36]. Wang et al. (2023) draw a correlation between the effect of campaigns promoting healthy diets and the volume of FW, showing that these campaigns only lead to a reduction in food waste among middle-aged consumers [48].

The behavior of Romanian consumers regarding food purchasing and consumption in the context of avoiding FW has been translated into an index that measures the intention to avoid food waste [13], highlighting the need for consumer education and awareness and the absence of a national culture of prevention.

The need for educating and raising awareness among household consumers about the environmental, economic, and social effects of sustainable food consumption and FW is highlighted by other authors as well [9, 24, 25, 28, 37, 38, 39, 41]. A recent study reports the segmentation of household consumers in the context of FW based on different characteristics, such as: gender, age, motivation, involvement, and environmental concern [34].

Any type of educational intervention or consumer awareness campaign requires monitoring and evaluation of effectiveness, through the concrete quantification of FW reduction or changes in behavior aimed at reducing food waste [8].

In the retail sector, there are an increasing number of initiatives to reduce FW, a trend observed in annual sustainability reports [21]. In this sector, most actions undertaken to

reduce FW focus on corporate social entrepreneurship [7].

In the public catering sector, the goal is to optimize technological flows so that special attention is given to optimizing portion sizes, dining space, and meal service schedules, with the aim of minimizing the volume of FW associated with each served portion [1, 17, 20, 22].

**The aim of this study** is to identify the level of knowledge among household consumers regarding FW and their behavior related to food purchasing and consumption to avoid food waste. To achieve this, three objectives were established:

- RO1. Identifying the food purchasing behavior and consumption in households.
- RO2. Identifying the routines for food planning and purchasing and understanding the respondents' status regarding food purchase and preparation in the household.
- RO3. Identification of FW behaviour: categories of FW, quantification and ways of valorisation, attitude towards FW, personal motivation to reduce FW.

## MATERIALS AND METHODS

### Study Design

The study is based on an online survey, conducted among a sample of over 370 domestic consumers in Romania. The questionnaire used was first distributed to students from the Faculty of Agricultural Sciences, Food Industry and Environmental Protection from the "Lucian Blaga" University in Sibiu. They in turn distributed it to other members of the household of which they are a part. The final sample size was 369 consumers with ages ranging from 18 to over 65 years. The respondents were informed about the study's aim and data protection (GDPR). The survey included socio-demographic data and specific questions about food consumption and the prevention and reduction of FW in the national context. It was developed based on the consultation of specialized literature from the Web of Science Core Collection database, various secondary sources, and based on original research ideas. There is still no tradition in Romania of

research on this subject. Most of the questions included a 5-point Likert scale for recording responses, and the questionnaire also collected standard socio-demographic information. For data processing, Excel software, v.365 Microsoft Corporation, Redmond, WA, United States, was used.

Table 1 shows the main and secondary objectives of the study.

Table 1. Main and secondary objectives of the study

Main objectives
O.1. Identifying food purchasing behavior and household consumption
O.2. Identifying food planning and procurement routines and finding out respondents' status related to household food procurement and preparation
O.3. Identification of FW behavior: categories of FW, quantification and ways of valorisation, attitude towards FW, personal motivation to reduce FW
Secondary objectives
O.1.1. Origin of food, frequency of purchase and preferred place of purchase
O.1.2. The preparation of the food and the location of its serving
O.2.1. Food purchase planning routines
O.2.2. Food purchasing routines
O.2.3. Status of the respondent in the family in relation to the purchase and preparation of food in the household
O.3.1. Determining the categories of food wasted and the amount of FW per assortment (self-report)
O.3.2. Capitalizing on FW
O.3.3. Moral attitude towards FW
O.3.4. Subjective norms to FW
O.3.5. Assessment of the intention not to throw away food

Source: own design.

### Study Participants

The questionnaire was completed by more than 375 individuals residing in 27 Romanian counties and the municipality of Bucharest. A total of 369 respondents submitted complete responses, which were analysed for this study. Out of the total number of respondents, 221 people (approximately 60%) live in Sibiu County. The analysed sample presents the following socio-demographic data: 67.21% of respondents are female; 68.56% live in urban areas; 76.1% are aged between 18 and 40 years; the average age of respondents is 30.22 years; 53.9% have a secondary education; for 55.28% of respondents, the family consists of 3 or 4 members; the net monthly family

income for 50.14% of individuals is between 1,000 and 2,000 euros; 49.32% of respondents reported that their monthly spending on food purchases ranges between 200 and 400 euros.

## RESULTS AND DISCUSSIONS

### RO1. Identifying the food purchasing behaviour and consumption within the household

#### *Origin of the food consumed by the family*

As shown in Figure 1, 24% of respondents stated that their family does not produce food. For the remaining 76%, food is produced within the household in varying proportions.

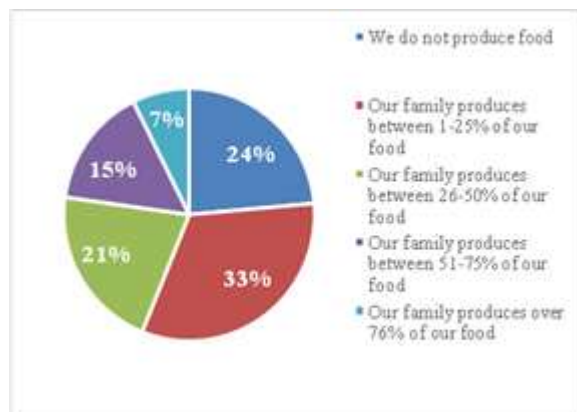


Fig. 1. Origin of food consumed in respondents' households  
 Source: own design.

In approximately 33% of households, between 1-25% of the current food needs are produced; in 21% of households, between 26-50% of the required food is produced; 15% of households produce between 51-75% of their food; and 7% of households produce more than 76% of the food they consume.

#### *Frequency of food purchases in the household*

Approximately 40% of respondents typically purchase food once a week, while 47.70% buy food two-three times during the week. 39.84% used to buy food once a week.

There are also a few respondents (6.50%), who prefer to buy food daily, and also a few individuals who buy food every two weeks (5.96%) (Table 2).

Table 2. Frequency of food purchases in the household

How often do you purchase food for your household?	Frequency (no.)	Proportion (%)
Daily	24	6.50
Once a week	147	39.84
2-3 times/week	176	47.70
Once every 2 weeks	22	5.96
<b>Total</b>	<b>369</b>	<b>100</b>

Source: own design.

#### *Preferred location for food purchases, by type of product*

Although the hypermarket is the preferred place for food purchases, there are differences regarding the purchase location for various food categories. The sources of food, depending on the category, are as follows:

**-Milk and dairy products:** preferred to be purchased from hypermarkets (52.85%), from farms, directly from producers (16.80%), from local producers' shops (10.30%); specialized stores (8.40%); agri-food market (6.78%); neighborhood shop (4.87%);

**-Meat and fish products:** preferred to be purchased from hypermarkets (45.53%), followed by specialized stores (23.31%); local producers' shops (12.74%); from the farm, direct from the producer (10.57%); agri-food market (5.69 %); and neighborhood shop (2.16%);

**-Vegetables and fruits:** preferred to be purchased from hypermarkets (39.57%), from the farmers' market (31.17%), or from farms, directly from producers (9.21%); local producers' shops (7.05%); specialized stores 6.5 %) and neighborhood stores (6.5 %);

**-Bread and bakery products:** mostly purchased from hypermarkets (37.13%), specialized stores (24.39%); local producers' shops (16.53%); neighborhood stores (15.99 %); from the farmers' market (3.25%), or from farms, directly from producers (2.71%);

**-Other food products:** mostly purchased from hypermarkets (75.08%); specialized stores (6.23%); from local producers' shops (6.50%); neighborhood stores (5.42 %); from farms, directly from producers (3.52%); agri-food market (3.25 %).

#### *Where food is cooked and consumed*

As expected, 84.55% of respondents stated

that they cook at home and frequently eat the prepared food with their family (Figure 2).

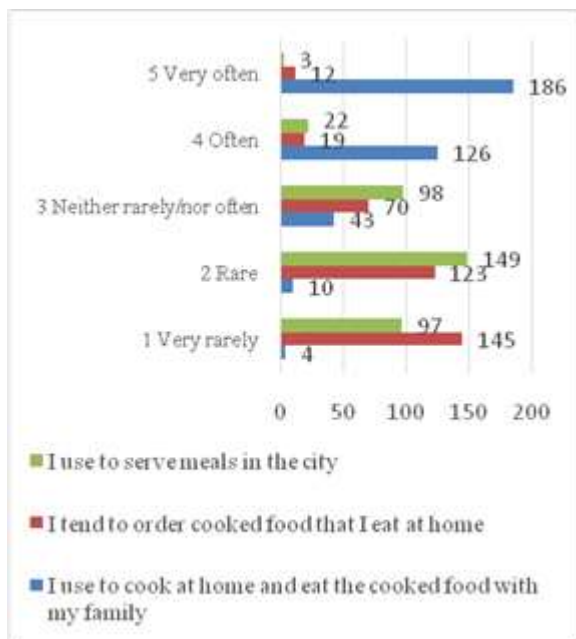


Fig. 2. The place where food is cooked and consumed  
 Source: own design.

At the same time, 72.62% of respondents stated that they very rarely or rarely order prepared food to consume at home with their family. Generally, prepared food is consumed outside the home rarely or very rarely (66.66%).

**RO2. Identifying food planning and purchasing routines and understanding respondents' status regarding food purchasing and preparation in the household**

***Food purchase planning routines to avoid FW***

The assessment of these routines was carried out using a 5-point Likert scale.

As shown in Table 3, the highest score (3.82) was recorded for checking the food stock before going shopping, followed by making a shopping list before going shopping (3.32). On the other hand, it is noticeable that respondents do not usually plan their menu for the following week or purchase food based on this plan (average score of 2.61) as presented in Table 3.

Table 3. Average score recorded for food purchasing routines

Food purchase planning routines	Average Score
How often do you usually make a shopping list before going food shopping?	3.32
How often do you check your household food stock before going shopping?	3.82
How often do you usually plan the menu for the upcoming week before going shopping?	2.61
How often do you think you buy more food than you need when you go shopping?	3.08
When you go shopping, how often do you buy categories of food that you didn't consider necessary?	2.79

Source: own design.

***Respondent's Status in the Family Regarding Food Purchasing and Preparation in the Household***

Although they are young, 51.76% of respondents stated that they are the person responsible for purchasing food in their own household. Almost half of them (47.96%) are also responsible for preparing the cooked food (Table 4).

Table 4. Average Score Recorded Based on Status Regarding Food Purchasing and Cooking

Respondent's Status Regarding Food Purchasing and Cooking	Average Score
Are you the person responsible for purchasing food in your family?	3.47
Are you the person responsible for cooking meals in your family?	3.14
Are you the person responsible for both purchasing and cooking food in your family?	3.12

Source: own design.

A study conducted among 1,700 household consumers in Australia shows the effectiveness of educational programs aimed at improving cooking and food storage skills at the household level, which can significantly reduce food waste [3].



**RO3. Identifying behavior regarding food waste (FW): categories of FW, quantification and ways of valorization, attitude towards FW, personal motivation for reducing FW**

***Self-reported food waste volume by food category***

As shown in Figure 3, the volume of food waste varies weekly depending on the food category:

**-Milk and dairy products:** 40.38% of respondents do not throw away any at all; 39.57% throw away less than 10%; 12.47 % throw away between 11-25 %; 5.15 % throw away between 26-50 %, while 2.43 throw away over 51%.

**-Meat or fish products:** 43.09% of respondents do not throw away any of this category of food; 38.75% throw away less than 10%; 11.92 % throw away between 11 and 25 %; 3.80% throw away between 26 and 50 %; only 2.44% of those surveyed throw away more than 51%.

**-Vegetables and fruits:** More than half of the respondents (50.14%) stated that they throw away less than 10%; 16.80% do not throw away any fruits or vegetables at all; 22.76% throw away between 11 and 25 %; 7.86 % throw away between 26 and 50 %; and 2.44 % more than 51% of the foods in this category.

**-Bread and bakery products:** 20.05 % do not throw away; 43.63% of respondents throw away less than 10% of the leftover bread and bakery products; 20.05% of respondents reported that they throw away between 11 and 25 %; 12.20 % throw away between 26 and 50 %; and 4.07 % throw away over 51%.

**-Cooked food:** 16.53 % do not throw away; 42.82% of respondents throw away less than 10% of leftover cooked food; 25.20% throw away between 11 and 25 % of any cooked food; 10.57% throw away between 26 and 50 % of cooked food; 4.88% throw away more than 51 % of the cooked food.

By food category, respondents do not throw away milk and dairy products at all (40.38%); meat and fish (43.09%); bread and pastries (20.05%); fresh fruits and vegetables (16.80%) and cooked food (16.53%).

At the opposite pole, more than 50% is thrown away by the respondents' families in

the case of cooked food (4.88%); bread and pastries (4.07%); respectively, 2.44 % for each of the category's milk and dairy products, meat and fish, respectively, fresh fruit and vegetables.

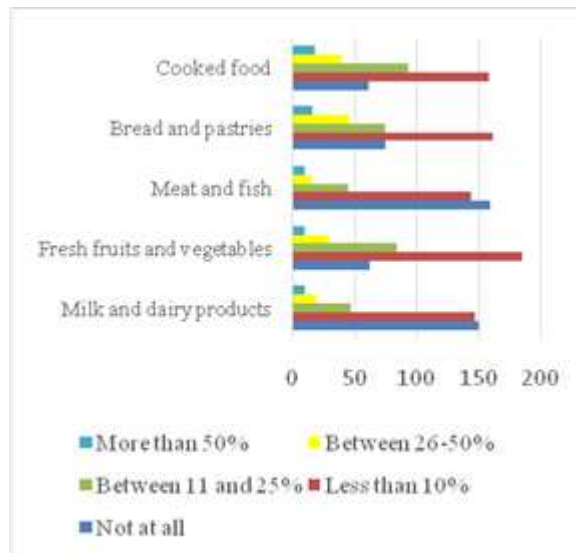


Fig. 3. Quantification of FW by food category  
 Source: own design

Cooked food, which changes its taste after several days of storage, is thrown away most often (average score 2.44), followed by bread and bakery products (average score 2.37), and fresh fruit and vegetables (average score 2.29). Moroşan et al. (2024) reported the following proportion of food waste by food category: 29.67% for cooked food, 27% for bread and bakery products, and 14.33% for fruits and vegetables [29]. Nijloveanu et al. (2024), following a study conducted among 300 consumers, reported between 0% and 20% of food being thrown away from the total purchased [33].

***Valorization of FW***

Figure 4 shows what happens to the food that is thrown away. Under a third of respondents (27.64%) state that they throw uneaten food scraps in the trash.

Almost 40% (39.30%) of them use food scraps as animal feed, and 27.10% sort them separately, as biodegradable household waste. Those who convert FW into compost have a low share (5.96%). These results justify us to claim that there is a need for practical demonstrations of composting and using various household waste.

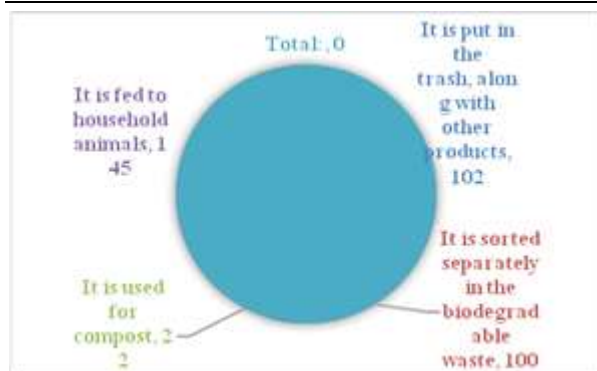


Fig. 4. Utilization of uneaten food (n=369)  
 Source: own design.

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#### **Moral Attitude Towards FW**

In Table 5, it is shown on a scale from 1 to 5 that the highest score was accumulated for the statement "I feel guilty when I throw away food," which demonstrates an awareness that wasted and uneaten food ends up being discarded (average score 4.12).

The second highest score (4.11) indicates an awareness that there are people who have nothing to put on the table while others throw food away.

Table 5. Average Score Recorded Regarding Moral Attitude Towards FW

Moral Attitude Towards FW	Average Score
I feel guilty when I throw away food.	4.12
I care about the impact that the food I throw away has on the environment.	3.96
I am concerned about the amount of food I throw away.	3.58
I am concerned that other people don't have enough food, while I throw away food.	4.11
I care about the cost of the food I throw away.	3.88

Source: own design.

Respondents are then somewhat more concerned about the impact of food waste on the environment (3.96) and the cost of discarded food (3.88). The lowest score (3.58)

was recorded for concern about the amount of food wasted.

#### **Assessment of Subjective Norms**

In Romania, there is a complete lack of a culture of food waste prevention, as evidenced by the subjective norms that can influence it. As shown in Table 6, the average scores recorded for subjective norms are below 3, indicating that respondents are less influenced by the opinions of important people in their lives regarding food waste. Ștefan et al. (2013) conducted the first impact study among Romanian consumers, showing that a change in food purchasing planning routines and buying habits is necessary, with a subsequent effect on food waste reduction [41].

Table 6. Average score recorded regarding subjective norms

Subjective Norms	Average Score
Most of the important people in my life disapprove of the fact that too much food is cooked/prepared in our household.	2.67
Most of the important people in my life disapprove of the fact that food is thrown away in our household.	2.82

Source: own design.

#### **Assessment of the intention not to waste food**

The responses regarding the intention not to waste food recorded an average score of 4.13 on a scale from 1 to 5. As shown in Figure 5, over 75% of respondents try not to throw away uneaten food.



Fig. 5. Assessment of intention not to throw away food  
 Source: own design.

Approximately 61.52% of respondents stated that they have heard of awareness campaigns

that teach them specifically what they should do to reduce FW in their households. In 83.20% of households, discussions have been held about the need to reduce FW, and 89.70% said they have considered taking concrete actions to reduce FW in their household.

Personal motivation for reducing FW recorded an average score of 3.97 (on a scale from 1 to 5) in relation to taking on social responsibility, 3.93 in relation to concern for environmental quality, and 3.90 in relation to the potential to reduce food purchasing expenses.

#### ***Assessment of the importance of national policies aimed at promoting the reduction of food waste***

Most respondents (87.26%) believe that it is important for Romania to implement a national policy to encourage the reduction of food waste (Figure 6).

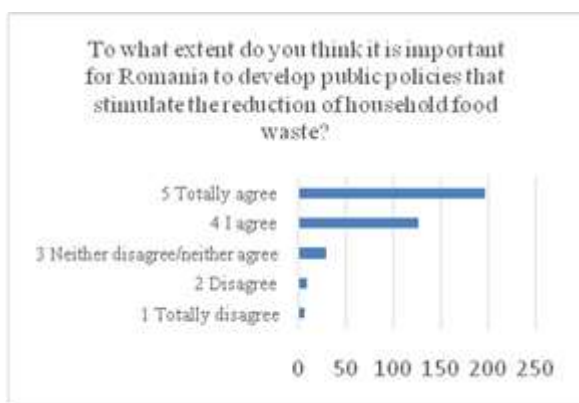


Fig. 6. Assessment of the importance of a national FW reduction policy

Source: own design.

On a scale from 1 to 5, the average score recorded for this item is 4.34.

A recent study published by Baran et al. (2024) shows that, in organizing awareness campaigns on avoiding and reducing FW, it is important to consider environmental concerns and the religion target group [5].

Educational strategies and programmes should highlight aspects related to environmental quality, sustainable food production and consumption behaviours [12,19, 40, 49].

Awareness campaigns on reducing food waste should also promote sustainable production and consumption practices [27], and the role

that civil society can play in their implementation is crucial [30]. Additionally, there is a need for easily implementable government policies [32].

The issue of food waste requires a holistic approach and the involvement of various stakeholders [31].

Halving FW in the coming years can contribute to the creation of a "zero waste" societal culture and a circular economy. Preventing FW reduces food insecurity and remains the key to solving the problem [35].

## **CONCLUSIONS**

Moral attitude significantly influences the intention of Romanian consumers to avoid FW, primarily in relation to societal needs, followed by concern for the quality of the environment. This also correlates with the results obtained regarding personal motivation to make efforts to avoid FW. Personal motivation is given by assuming social responsibility through food consumption, thereby reducing global food safety and security issues and negative environmental impact.

Reducing FW requires a holistic approach, integrating all stages of the food supply chain, educating, informing and raising awareness among household consumers and implementing innovations in food production and consumption practices. In order to improve the sustainability and resilience of the agri-food chain, transformative changes in production and consumption practices are needed, based on regional, national and international policies and plans.

To reduce food waste, information campaigns are needed to promote sustainable consumption, focus on the quality attributes of food, and improve consumers' skills in cooking and preserving food, as well as in accurately estimating their own food consumption. Actions aimed at raising awareness among households about the importance of avoiding and reducing food waste should include aspects related to the waste of all inputs used in food production.



In Romania, there is still insufficient data on food loss and waste, highlighting the need for future national studies on this topic.

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