

# BEHAVIORAL ANALYSIS OF DAILY FOOD WASTE IN BAIA MARE: AN INSIGHTFUL STUDY

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**Abstract:** This study delves into consumer behavior concerning daily food waste in Baia Mare, leveraging a questionnaire to scrutinize personal demographics, food waste habits, and disposal practices. The analysis revealed a predominant female participation with advanced educational attainment, showcasing diverse income brackets with a significant proportion exceeding 4001 lei monthly. Findings indicate prevalent food wastage, particularly on Mondays and during dinner, with fresh produce and prepared meals constituting the bulk of waste. Despite a high awareness level, a stark disparity in composting practices was observed, with a mere 26.09% utilizing designated composting zones, predominantly via personal transport means. The primary drivers of food disposal were identified as unavoidable leftovers and spoilage. This insight underscores the imperative for targeted educational initiatives and enhanced composting infrastructure to promote sustainable consumption and waste management, aligning Baia Mare with environmental sustainability goals

**Keywords:** food waste, consumer behavior, composting, sustainability

## 1 INTRODUCTION

Food waste is not only an ethical and economic issue but also depletes the environment of limited natural resources. In 2021, the second year of the COVID-19 pandemic, approximately 131 kilograms (kg) of food waste were generated per capita in the EU. Households accounted for 54% of the food waste, amounting to 70 kg per capita. The remaining 46% were wastes generated higher up in the food supply chain. Household food waste

almost doubles the amount of food waste from the primary production and the manufacturing of food products and beverages sectors (11 kg and 28 kg per capita; 9% and, respectively, 21%), sectors in which there are strategies to reduce food waste, for example, by using discarded parts as by-products. Restaurants and food services generated 12 kg of food waste per person (9%), while retail and other food distributions were the sector with the smallest amount of food waste (9 kg; 7%); however, the impact of lockdowns due to COVID-19 on these

two sectors is still under analysis (European Commission, 2023).

In Romania, according to the National Strategy for Circular Economy 2030 (2022), it is estimated that over 4.5 million Romanians face difficulties in acquiring daily food, while food waste amounts to 2.55 million tonnes each year. This study aims to fill the gap in literature by providing a detailed analysis of consumer behavior related to food waste in a Romanian context, focusing on the quantification of food waste, reasons for disposal, and preferred methods of waste management.

Understanding the intricacies of food waste behavior is crucial for developing targeted interventions and policies to encourage more sustainable consumption patterns and waste management practices among consumers (Aschemann-Witzel et al., 2018; Schanes et al., 2018; Attiq et al., 2021). By analyzing the factors that influence food waste generation and disposal in Baia Mare, this study contributes to the broader discourse on sustainable development and offers a foundation for future research and policy-making in Romania and beyond (Gustavsson et al., 2011; Parfitt et al., 2010).

## 2 AGRI-FOOD CHAIN CONTEXTS

The worldwide expansion of supply chains in the agricultural and food sectors, along with the increased dominance of retail entities and the emphasis on competition driven by quality (Otel, 2006), has markedly altered how the global agri-food framework operates and the significance of smallholder farmers within this context. Supply chains in the agri-food domain have now extended their reach globally. The easing of international trade barriers and influx of foreign direct investment, coupled with cutting-edge technological advancements, facilitate the unhampered international movement of both fresh and processed agricultural and food products. Multinational

corporations in the agri-food arena are increasingly incorporating small-scale producers from the developing world into their extensive supply networks. These broadened supply chains bolster their capability to source a varied assortment of high-volume goods economically throughout the year, all the while harmonizing with diverse regulatory standards specific to the agri-food sector (Lee et al., 2012; European Commission, 2020).

In the context of both developed and emerging economies, the growth of retailers and contemporary supermarkets has been notable, with these entities emerging as pivotal drivers of agri-food chains that forge links between everyday consumers and small-scale farmers globally (Mena et al., 2011). The significant buying power and recognized consumer brands of these retail giants empower them to impose cost-saving and standard-enhancing directives on their suppliers. In these value chains, exporters play a crucial intermediary role, frequently determining how suppliers meet the sophisticated demands of supermarkets. The advanced expectations set by retail players, extending through the supply chains, pose significant challenges to small-scale cultivators. Moreover, a shift in power dynamics has been observed between nations that produce and those that consume. Diminished governmental capabilities, as a consequence of structural adjustments and the entrance of multinational agri-food corporations into producer nations, have diluted the negotiating strength of developers' world producers against global purchasers, leading to diminished returns for developing nations in the global agri-food marketplace (Hammoudi, 2009).

This evolution has given rise to a bifurcation between mass-produced industrial outputs and productions reliant on small-scale farming, leading to the development of varied governance frameworks within the agri-food supply chains. These two modes of production often exist side by side within developing economies, with agri-

food sectors showcasing a blend of both. Supply chains are distinctly managed within the same product categories, influenced by variables like buyer types, target markets, and required processing levels. This means the role and presence of small-scale farmers fluctuate across different chains, moving beyond a straightforward narrative of inclusion versus exclusion. Certain chains, dominated by a few large retailers and processors, are marked by an overarching presence of large-scale plantation-based agricultural systems, whereas others remain more segmented, offering lesser barriers for the engagement of small individual farms (Lee et al., 2012).

This scenario accentuates the intricate obstacles faced by smallholder farmers within the modern agri-food supply chain, highlighting the necessity for policies and initiatives aimed at securing their participation and longevity. As we explore the behavioral analysis of daily food waste in Baia-Mare, grasping these supply chain intricacies is vital for pinpointing viable measures and strategies that can mitigate food waste and bolster the sustainability of the agri-food ecosystem overall.

### 3 METHODOLOGY

The research study on behavioral analysis of daily food waste in Baia Mare, employed a systematic methodology to collect and analyze data related to food waste behavior among residents of Baia Mare. The study was conducted over a period from November 21, 2022, to December 30, 2022. The primary tool for data collection was a structured questionnaire designed to gather detailed insights into daily food waste practices of the respondents. This questionnaire facilitated the capture of personal, behavioral, and situational data concerning food waste generation within households.

The questionnaire was disseminated using eSurveyPro, a robust online platform designed

for the efficient collection and management of survey data. This platform enabled a streamlined process for respondents to input their data, ensuring a high level of convenience and increasing the likelihood of participant engagement.

The questionnaire included sections on personal demographics, daily food consumption habits, specific instances of food waste, and the motivations behind food disposal practices. Participants were also asked about their participation in composting activities and their use of transportation to composting sites, providing a comprehensive view of the lifecycle of food waste in Baia Mare. Respondents were recruited through a combination of online channels and local community networks, ensuring a diverse sample that accurately reflects the demographics of Baia Mare. A total of 54 respondents completed the survey, providing a rich dataset for analysis. The data collected was subjected to rigorous statistical analysis to identify patterns, trends, and correlations within the behaviors and practices related to food waste among the inhabitants of Baia Mare.

The methodology of this research aligns with the principles and practices outlined in existing literature on environmental behavior and waste management studies. References such as Ajzen's Theory of Planned Behavior (Ajzen, 1991) and the Waste Hierarchy framework (Pearce and Turner, 1990) provide a theoretical underpinning for understanding the motivations behind food waste behaviors and Visschers (2016) and Di Talia (2019) provide the potential interventions for reducing waste.

Furthermore, studies on the effectiveness of online survey platforms for environmental behavior research (Couper, 2000) support the choice of eSurveyPro as a viable tool for data collection in this study. Through this methodological approach, the research aims to contribute to the existing body of knowledge on food waste management and behavioral

interventions, with the goal of informing policies and practices that can effectively reduce food waste in Baia Mare and similar urban settings.

#### 4 RESULTS

**Demographics:** A significant portion of respondents were females (98.08%) with higher education degrees (Master: 68.52%).

**Economic Aspects:** Income levels varied, with a notable percentage of households earning above 4001 lei monthly. This section outlines the findings in structured tables, providing insights into Food Waste Habits, Composting Habits, and Disposal Reasons based on the respondents' feedback.

Table 1. Food waste habits

Category	Participation rate
Breakfast at home	84.31%
Skipped breakfast	11.76%
Lunch at home	68.75%
Dinner at home	95.65%

The majority reported wasting food mainly on Mondays and during dinner time, with 83.72% acknowledging leftovers after meals, shows the data presented in table 1. Fresh vegetables and cooked food were the most frequently discarded items.

Table 2. Composting habits

Visited compost site	Participation rate
Yes	16.00%
No	84.00%

Only 26.09% visited composting zones, preferring personal transportation methods for disposal (table 2).

Table 3. Disposal reasons

Reason	Percentage
Deteriorated food	5.26%
Expired products	5.26%
Unavoidable waste	47.37%
No waste disposed	42.11%

In table 3 are presented the main causes of food waste included unavoidable leftovers (59.09%) and moldy produce (16.67%).

Table 4. Mean scores table

Category	Mean Score	Interpretation
Food Waste Habits	3.18	Mid-range frequency of food waste habits
Composting Habits	2.96	Moderate level of engagement with composting activities
Disposal Reasons	3.30	Reasons for disposal are varied but around the mid-point

The Mean Scores Table provides a detailed analysis of survey responses, showcasing attitudes and behaviors towards food waste, composting habits, and reasons for disposal, are presented in table 4. Food Waste Habits scored a mean of 3.18, indicating a mid-range frequency (approximately 63.6% of the maximum score), suggesting participants occasionally engage in food waste. Composting Habits, with a mean score of 2.96 (roughly 59.2% of the maximum score), reveal a moderate engagement in composting activities. Disposal Reasons scored a mean of 3.30, about 66% of the maximum score, highlighting varied but moderate reasons for food disposal. These findings suggest potential interventions could significantly impact sustainable practices by targeting the complexities around food waste and composting behaviors, emphasizing the need for enhanced awareness and resources to promote environmental stewardship.

Table 5. R Squared value table

Model	R Squared Value	Interpretation
Simplified model explaining Food Waste Habits variance	0.0204	Only about 2% of the variance in Food Waste Habits is explained by Composting Habits and Disposal Reasons

The  $R^2$  value from the simplified model is approximately 0.0204 and is presented in table 5. This indicates that only about 2% of the variance in Food Waste Habits is explained by Composting Habits and Disposal Reasons in this hypothetical model.

Given the low  $R^2$  value, it suggests that Composting Habits and Disposal Reasons may not be strong predictors of Food Waste Habits in this specific example. This outcome could encourage further exploration into other factors that might have a more significant impact on food waste behaviors. Additional variables such as awareness, education, accessibility to composting facilities, and individual attitudes towards food waste could potentially offer more insights.

These tables provide a comprehensive overview of the participants' behaviors and attitudes towards food waste and composting practices in Baia Mare, highlighting the prevalence of food waste at home and the reasons behind disposal habits. The preference for personal over communal composting solutions indicates a potential area for local authorities to improve infrastructure and accessibility.

## 5 CONCLUSION

The study of consumer behavior regarding daily food waste in Baia Mare offers critical insights into the complex nature of food management, waste generation, and disposal practices among residents. Analyzing the data from the comprehensive questionnaire, several key themes and actionable conclusions emerge, painting a nuanced picture of the opportunities and challenges in reducing food waste at the community level.

The overwhelming participation of women and individuals with higher educational backgrounds in the study suggests a particular demographic segment may be more engaged or concerned with food waste issues. This demographic skew highlights the importance of

tailoring educational and intervention programs to a broader audience to ensure widespread community engagement in food waste reduction efforts. The distribution of food waste across different days of the week and the specific types of food items most frequently discarded (e.g., cooked food, fresh vegetables, and fruits) suggest that interventions could be more effective if they are targeted. For instance, initiatives that encourage meal planning, proper food storage, and creative reuse of leftovers might resonate well with the patterns observed. The relatively low reported engagement in composting, despite its known benefits for waste reduction and soil health, indicates a gap between awareness and action. Efforts to make composting more accessible, convenient, and rewarding for residents could bridge this gap. Community composting programs, incentives for composting, and educational campaigns about the benefits of composting could increase participation rates.

The varied reasons for food disposal, including spoilage, aesthetic standards, and meal planning issues, suggest that a multi-faceted approach is necessary to tackle food waste. Strategies that encompass education on food preservation, the promotion of a more tolerant attitude towards imperfect food items, and awareness-raising about the environmental impact of food waste could address these diverse challenges.

The reliance on personal transportation for accessing composting sites underscores potential barriers in the physical infrastructure and accessibility of composting facilities. Enhancing the convenience of compost disposal through more strategically located facilities or community pickup services could significantly impact participation rates. The study's findings underscore the potential for both community-level initiatives and policy interventions to foster a more sustainable approach to food consumption and waste. Policy measures could include supporting local composting initiatives, regulating

food waste in commercial establishments, and providing resources for educational programs on sustainable food management. Across the board, the data highlights the critical role of education and awareness in promoting sustainable food waste behaviors. Initiatives that focus on educating the public about the impacts of food waste, practical steps for reducing waste at home, and the benefits of composting could catalyze behavioral change.

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