
Investigating the Causes of Restaurant Plate Waste and Suggestions for Mitigation

Abstract

Food waste is a pressing global issue, particularly in the hospitality and education sectors, where large amounts of edible food are discarded daily. Plate waste—the uneaten food left on diners’ plates—represents a significant portion of this waste and poses economic, environmental, and ethical challenges.

This paper explores effective strategies for reducing plate waste in hotels, restaurants, and schools by analyzing previous research made in Budapest Business University (since February 2025 renamed as Budapest University of Economics and Business – BUEB) and professional solutions implemented in these settings.

The study highlights key interventions such as portion control, menu optimization, behavioral nudges, staff training, and technological innovations. Best practices from various case studies demonstrate how these approaches lead to substantial waste reduction and cost savings. By synthesizing existing knowledge and successful applications, this paper provides actionable recommendations for stakeholders aiming to enhance their food waste management strategies.

Key Words *food waste, plate waste, best practice, food waste management, hospitality,*

Track *Operational innovation*

Focus of Paper *Industry / Educational*

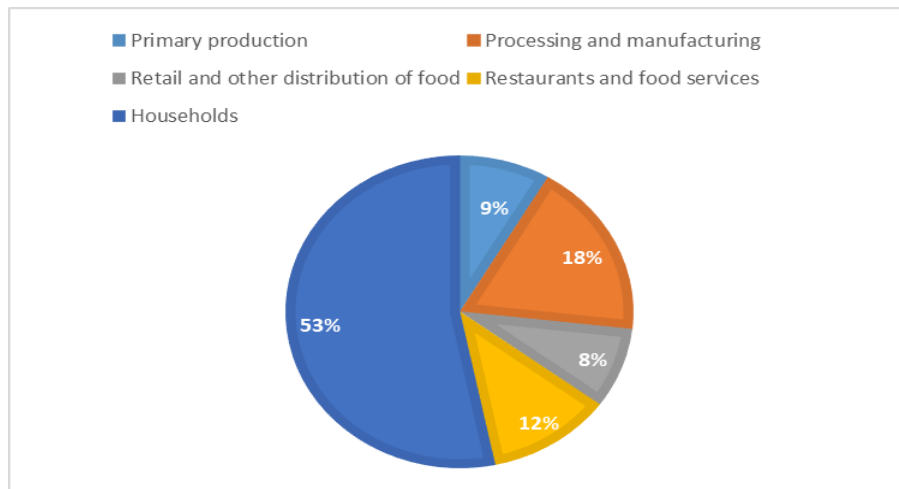
Type of submission: Paper

Introduction

Food loss and food waste is a serious issue for the environment, the economy and society. Food waste represents a major fraction of hospitality waste, both in absolute figures and in terms of the financial implications held for providers of hospitality services (WRAP 2011).

In 2022 around 132 kg of food waste per inhabitant were generated in the EU. Households generated 54% of food waste (Figure 1), accounting for 72 kg per inhabitant, while ‘Restaurant and food service’ sector is responsible for 12% of the total estimated food waste (Eurostat, 2022) showing a slight decrease compared to 2020, where the 14% was represented by restaurants (European Environment Agency, 2020).

Figure 1. Estimation of food waste in EU (Source: Own edition based on Eurostat, 2022))



Waste management and treatment are two essential components of environmental preservation that demand more attention in relation to an upsurge in production and consumption. There are already many examples of initiatives and measures in the hospitality sector aimed at avoiding waste, which can reduce costs and human resources, increase operational efficiency, and improve the position of the business, bringing a good image to the brand, especially in the context of the environment and sustainability, which are top priorities in every sector.

Plate waste, defined as the portion of food served to customers that remains uneaten and is subsequently discarded, represents a major contributor to overall food waste. Various studies have examined the causes of restaurant plate waste and proposed strategies to mitigate it.

Literature review

Definitions

FAO (Food and Agriculture Organisation of the United Nations, 2014) introduced the definition of food loss as "a decrease in quantity or quality of food," whereas food waste is a component of it. Food waste has unique motivations and solutions that differ from food losses. Food waste can occur at all stages of the food supply chain, from food processing, handling, storage, sale, preparation, cooking, and serving (Figure 2).

Figure 2. Food waste by phases of service (Source: *Waste Managed, s.a.*)

Phase	Description
Storage waste	waste that has been stored incorrectly so has expired or been contaminated.
Preparation waste	cut-offs, peels, skins, miscuts, spillages
Portion waste	food wastage from restaurants giving too large a portion to customers
Plate waste	leftover food on plates

Food waste refers to food that passes safety and nutrition requirements but is wasted or alternatively used (FAO, 2014). Food wastage can occur during the distribution, marketing, and consumption stages. Food waste can be examined from several perspectives, for example, in which phase of service it is generated (Figure 2) and whether it is avoidable or unavoidable.

- Avoidable food waste was edible at some point prior to disposal (e.g. slice of bread, plate residues etc.) and unavoidable food waste (e.g. bones, egg shell, coffee grounds etc.) is not-edible (Marthinsen et al., 2012). Based on Papargyropoulou et al. (2014), food waste is grouped into three categories: Avoidable food waste refers to food that could have been eaten at some point prior to being thrown away, even though much of it would have been inedible at the point of disposal. EPA (US-Environmental Protecting

Agency) defines it on an easy way: “Food that can be easily prevented from going to waste. Reasons for waste include overpreparation, improper storage, or spoilage.” (EPA, s.a. p:2) Understanding the cause of this waste is key to preventing it.

- Unavoidable food waste refers to the fraction of food that is not usually eaten, including items such as banana skins, apple cores, eggshells and chicken bones.
- Possibly avoidable food waste refers to food that is eaten in some situations but not others, such as potato skins.

Food loss represents the loss right before consumption (Figure 3) and waste occurs in consumer level.

Figure 3. Difference between food loss and waste (Source: SOLEN, s.a.)



Key factors contributing to plate waste

The existing body of research highlights the complexity of restaurant plate waste, emphasizing the interplay between portion sizes, consumer behavior, and restaurant operations.

- Portion control and customization

Several studies advocate for portion control as a key strategy to reduce waste. Research by Freedman and Brochado (2010) suggests that offering variable portion sizes allows customers to choose meals that match their hunger levels, thereby minimizing leftovers. Additionally, using smaller plates and serving utensils has been shown to reduce food waste without negatively impacting customer satisfaction (Wansink & van Ittersum, 2013).

- Consumer awareness and behavioral nudges

Nudges may be described as the signals and reminders sent to make the concerned stakeholders aware of their part in waste reduction. Nudges and other interventions have been found to be useful in decreasing food waste in cafeterias, canteens, and restaurants (Manglik and Yadav, 2025, Dhir et al, 2020). A study by Kallbekken and Sælen (2013) found that simple nudges, such as displaying messages about food waste or encouraging customers to request smaller portions, led to measurable reductions in waste. Another approach involves restaurant staff training, where waitstaff engage customers in discussions about portion choices and potential leftovers (Graham-Rowe et al., 2014). National culture and traditions may play a role in irresponsible food consumption (Heikkilä et al. 2016).

- Restaurant policy and structural changes

Implementing structural changes, such as adjusting buffet pricing models to discourage excessive serving, has also been proposed. A study by Reinders et al. (2017) found that offering discounts for smaller portions or allowing customers to take leftovers home in eco-friendly packaging significantly reduced waste levels. Restaurants can also partner with food redistribution programs to donate unserved meals, thereby reducing overall waste (Papargyropoulou et al., 2016).

- Management practices

The research of Mena et al. (2014) revealed that a number of significant causes of food waste are beyond the control of managers across the supply network. Factors such as weather changes, the natural variability of food products and seasonal effects on supply and demand are exogenous factors. Similarly, regulation, particularly in relation to meat products, was quoted as a significant cause of waste. Among the management-related causes, forecasting and planning, promotions management, availability and inventory management, product specifications, process controls, shelf-life management, and packaging & labelling was mentioned.

Case studies and best practices

The international case studies we found demonstrate that through strategic interventions, significant reductions in plate waste can be achieved across these sectors. Just some of the good practices:

Hotels:

- Marriott Hotels in Costa Rica: Two Marriott hotels implemented Leanpath's food waste tracking system, achieving a 25% reduction in food waste. (Hertzfeld, 2024)
- Accor Hotels: As part of their Planet 21 sustainable development program, Accor committed to reducing food waste by 30% compared to a 2016 baseline. (One Planet, 2023)
- Hilton Hotels in the UAE: Through the "Green Breakfast" campaign across 13 hotels, Hilton achieved a 62% reduction in breakfast-related food waste. (Winnow s.a)

Restaurants:

- New York City's "Make Food, Not Waste" Initiative: During this event, 12 top restaurants, including Michelin-starred establishments, created dishes from kitchen scraps, aiming for zero food waste. (Diaz, 2024)
- Massachusetts Restaurants: Following the state's food waste ban, restaurants began composting and implementing waste reduction practices, leading to significant decreases in food waste sent to landfills. (Walling, 2024)
- Melbourne's Fresho Platform: This startup uses AI to help restaurants predict customer needs more accurately, reducing over-ordering and food waste. (Lynch, J, 2024)

Schools:

- University of Science and Technology Beijing: The "Clean Plate" campaign led to a nearly 40% reduction in food waste, decreasing from 35-40 barrels to 22-25 barrels daily. (BBC, 2020)
- Maryland High Schools: Studies revealed that approximately 40% of waste comprised food scraps and uneaten food, prompting initiatives to reduce this through better meal planning and waste education. Studies show that increasing lunchtime by 10 minutes has the potential to reduce food waste by onethird by giving students more time to eat. (Maryland Department of the Environment, 2023)
- Chartwells and St. Faith's School: Collaborative efforts led to a 58% reduction in food waste, showcasing the impact of targeted waste management programs in educational institutions. (Winnow, 2017)

Methodology

Over the past 3 years, BUEB has investigated and prepared case studies of numerous hospitality venues, the main focus of which was to measure the magnitude of food waste, explore its causes, and the possibilities for reducing it. We considered it important to examine school and workplace restaurants because they have not yet received enough attention from researchers, even though they serve large volumes of meals. Primary school catering is a very strictly regulated area in Hungary, so it stands out a bit from the other types of locations examined.

This article presents a selection of these results. The details of the chosen researches are summarized in Table 4.

Figure 4. Details of the chosen cited researches (Source: Own compilation based on BUEB research)

Venue type	Date of the research	Methods
------------	----------------------	---------

1. Hotel 4* breakfast room in Budapest	14-25. August, 2023	-guest questionnaire (N=104) -measuring the weight of leftover food
2. Two primary schools in Budapest	11-22. November, 2024	-2 associate interview -pupils' questionnaire (N=148) -sensory test of dishes (N=734) -measuring the weight of leftover food
3. Office building canteen in Budapest	3-12. October, 2023	-1 management interview -guest questionnaire (N=105) -measuring the weight of leftover food
4. Vietnamese restaurant in Budapest	12-27. March, 2024	-1 management interview -guest questionnaire (N=111) -employee survey (N=22) -measuring the weight of leftover food

The research included measuring and examining plate waste in all cases. In this article, we focus on exploring the reasons for the studied clientele (hotel guests, restaurant guests, office workers, school children), i.e.: what is the reason for leaving food on the plate? We assume that there are factors that differ in different dining situations, but there are certainly common elements that allow us to formulate general recommendations for plate waste reduction for hospitality service providers.

Summary of the main results

- (1) In the case of the hotel buffet breakfast, a total of 23,658 grams of plate waste was collected in the nine food categories during the 6-days measurements. On average, approximately 4.37% of the food served at the buffet remains on the guests' plates, which is not considered a significant ratio. The average plate waste per person is 22.5 grams, which is in line with similar European results. Although the largest amounts were thrown away in bakery products (29.8%), fruits (20.1%) and egg dishes (13.7%), the waste rate compared to consumption was highest in the categories of cereals and seeds (7.12%), yoghurts (6.91%) and baked goods (6.11%). As a reason for waste, 65% of guests cite being more careless with their plates because they are not strictly following their eating habits while on vacation. Several guests missed vegan and dairy-free alternatives. Regular guests, on the other hand, expect a more varied selection and cited the lack of keeping food warm as a reason for waste. After the awareness campaign, an 18% reduction in plate waste was observed.
- (2) The research on food waste behaviour among pupils (8-10 years old) in the school canteen revealed several key findings. Plate waste during lunch was significant: out of the total 2,116 kg of served food over 20 days, approximately 716.6 kg (33.9%) was wasted. The main reasons for waste, based on questionnaire responses, included dislike of taste (44.6%) and unfamiliarity with the food (18.4%). Interviews and sensory evaluation results further confirmed that poor appearance and smell influence consumption. The study also found that stricter nutritional regulations (e.g., reduced salt and sugar) unintentionally led to higher rejection of meals. Fixed portions emerged as a very important factor, since at school, students do not serve themselves, but rather kitchen workers place uniform-sized portions on the counter. Time pressure during lunch is also a key factor. Pupils have to queue in the dining hall during lunch breaks, leaving them without enough time to finish their meals, contributing to leftovers. Unfortunately, there is a common perception in Hungary that school canteens are not trendy. Parents often give their children too many snacks and do not check whether they are spending their pocket money on chocolate in the cafeteria.
- (3) Based on the findings in the workplace canteen, guest food-wasting behaviour was significantly influenced by portion sizes, taste preferences, and time constraints. The plate waste amounted to an average of 6.9 grams per person, which, although seemingly small, could add up to over 722 kg of edible food wasted annually in a single canteen. Importantly, 98% of the leftovers were still edible, indicating that most waste could have been

avoided. Survey results showed that those who ordered smaller portions (half portions) were more likely to leave food uneaten (47%) compared to those choosing regular portions (17%). Additionally, 63% of those who admitted to wasting food identified as picky eaters, and 41% regularly overestimated how much they could eat. After a poster campaign raising awareness, plate waste was reduced by 38% in quantity and 27% in value (cost), proving that guest behaviour can be positively influenced through targeted communication.

- (4) Based on the study of the Vietnamese restaurant in Budapest, several insights were revealed about guest food-wasting behaviour. The data shows that 47% of all food waste came from guest leftovers, with non-vegan items accounting for 83% of total plate waste. Although non-vegan meals were ordered more frequently, vegetarian dishes had the highest relative leftover ratio (28.4%), indicating a mismatch between portion size, flavor preferences, or guest expectations. Survey results revealed that 44.1% of customers often and 18.9% always left food uneaten, with younger guests (under 18) and females being more likely to waste food. The main influencing factors for waste were personal taste (mean score: 4.07 out of 5) and large portion sizes (mean: 3.80), while side dishes like rice and garnishes were most commonly left uneaten. Despite high concern about food waste (mean awareness score: 4.05), a gap remained between customers' values and their actual behaviour. The questionnaire also revealed that guests are unaware of authentic Vietnamese food and eating habits, and are often surprised by the size of the soup and the many side dishes they get.

Conclusion

In research conducted by Budapest Business University (BUEB), we found that there are slightly different drivers of plate waste in the hospitality sector focusing on customers' point of view:

- Hotels: buffet waste, portion sizes, guest behaviour during holidays.
- Restaurants: menu design, customer habits, operational challenges, and cultural differences.
- Schools and canteens: diners' eating behaviour, time pressure, unfamiliarity with food.

The most commonly mentioned causes are shown in the table (Figure 5).

Figure 5. Collection of causes of plate waste in different type of catering outlets (Source: Own compilation based on BUEB researches)

Venue	Causes of plate waste - point of view of the customer
Hotel	<p>A more relaxed attitude towards eating during the holidays.</p> <p>A temptingly rich buffet selection.</p> <p>Curiosity about unfamiliar foods.</p> <p>Overestimating one's own hunger.</p> <p>Taking larger quantities from the buffet table to avoid standing in line multiple times.</p> <p>Taking larger quantities from the buffet table to avoid running out of the desired dish.</p> <p>The "I deserve it because I paid for it" feeling.</p> <p>High quality expectations.</p> <p>Personalization expectations from guests with special dietary needs.</p>

School canteen	<p>Social misconceptions about the poor quality of school meals.</p> <p>Ignorance of traditional foods.</p> <p>Too many snacks outside of meal times.</p> <p>Poor organization by teachers, checking whether children have eaten lunch at all.</p> <p>Short lunch break, little time to finish the meal.</p> <p>Standard, repetitive menus week after week.</p> <p>Undemanding environment, plating and serving.</p> <p>Same-sized portions, no option to ask for less or something else.</p> <p>The child is picky; they are willing to taste fewer and fewer types of food.</p> <p>The food is too hot.</p> <p>"The others won't eat it either" - influence of the reference group.</p> <p>Strict quantity and nutritional requirements (less seasoning, more vegetables).</p> <p>Parents' responsibility.</p>
Office canteen	<p>Picky eater, prefers a small variety of food.</p> <p>Misjudges portion size.</p> <p>Usually finds side dishes too much.</p> <p>Standard dishes taste different from home-cooked food (taste difference).</p> <p>Packaging and taking away leftovers is "tough."</p> <p>Little time to eat because there is a social life with colleagues during lunch break.</p> <p>Mainly side dishes (potatoes, rice, pasta), bread and vegetables/salads are thrown away.</p>
Restaurant	<p>Guests are not familiar with Vietnamese cuisine (this is less common among regulars).</p> <p>Guests do not know what they ordered based on the name of the dish.</p> <p>The menu does not indicate the portion size, so the guest orders too much.</p> <p>They rarely dare to ask the server for advice.</p> <p>The food has strange, unfamiliar flavors and ingredients.</p> <p>The guest is not aware that they will also receive other (traditional) side dishes.</p> <p>There is no option to ask for a half portion.</p> <p>Most often, the side dishes are left on the plate.</p> <p>It depends on the cultural background whether the leftovers are wrapped or not.</p>

Discussion

The research has shown that guests play a significant role in generating food waste. So far, we have focused mainly on hospitality business processes, but using diners' feedback can go a long way in reducing plate waste. Therefore, communication with guests is an important task for all types of restaurants.

In buffet meals, in addition to appealing serving, special dietary needs are expected to be met (although we know that, for example, lactose-free and vegan diets are often followed by guests only out of fashion; and that there are many technological requirements for gluten-free dishes). The cultural background of the guests and their relationship to food must be known. Where respect for food is low (because it is too cheap or "mandatory", e.g. in schools), there is much more food waste. Food is often a symbol of national identity and national culture may determine how consumers perceive wasted food (Heikkilä et al. 2016). Nations with strong food cultures assign a stronger value to food, implying lower probability of food wastage in hospitality.

Guests always arrive at a restaurant with expectations; more food will be left on the plate if the taste, appearance, temperature, and seasoning of the food do not meet this. Restaurants must also be aware that guests are often not exactly familiar with the dishes on offer, because no one in their household cooks traditional food anymore, or because they come from a different culture. This information gap must be bridged.

Guests are largely unaware of the significance of food waste and their role in reducing it. This places additional information responsibilities on restaurants, because research shows that guests do not act consciously on their own, but they can be involved in restaurant initiatives.

The size of the portions comes up in every research. Since guests arrive with very different expectations, it is important for buffet catering to have even very small "tasting" bites available, or to have small slices and pieces to choose from, so that guests can satisfy their curiosity and taste several items. A buffet must also look full and tempting at the end of the meal period when there should not be much food left to avoid food waste. This can be solved by using smaller serving dishes, which creates the feeling of a wide and varied selection even with a smaller amount of food.

Soup is a major problem in Hungarian school meals, as soup is part of traditional cuisine and is also great from a nutritional point of view. It would be worth allowing students to pick out their own food, they can put as much soup or side dish on their plate as suits their hunger and taste. If this considered to be time-consuming, different-sized portions should be offered. Introducing choice-based or "free selection" systems (like in Hungast's "Szupermenza" programme) could reduce food waste by up to 40%. In traditional restaurants, it should be possible to order smaller portions, which worked well in the past.

In addition, much more precise information should be provided on the menu about the ingredients of the food (allergens are now mandatory) and the portion size. Using digital solutions, unique, colourful and informative interfaces can be created, which can either give a competitive advantage or a better guest experience. The role of well-trained and prepared staff is undeniable. Digital solutions can also help servers.

Sometimes social norms hamper consumers from requesting takeaway boxes/doggy bags for leftover food (Sirieix et al. 2017). Although the provision of doggy bags may simply shift the responsibility of managing food waste from hospitality businesses to consumers, it is considered a feasible mitigation option.

Recommended food waste management strategies for reducing plate waste

Food waste management refers to the practices and strategies implemented to reduce food waste in both post-production and consumption (EPA, 2023). This process minimizes food waste's negative environmental, economic, and social impacts. Food waste management encompasses a range of activities, from preventive measures that reduce food waste at the source to AI-driven methods for recovering and recycling food waste, such as returning nutrients to the soil through composting, redistribution to those in need through food banks, or creating renewable energy. Effective food waste management not only aids in environmental conservation but also can result in cost savings and resource optimization.

Following the above-mentioned research, we can distinguish five main reduction strategies (Figure 6)

Figure 6. Food waste reduction strategies (Source: Own compilation based on BBU researches)

Category	Key strategies
1. Management & Operational	<ul style="list-style-type: none"> - Menu engineering and special choice - Option for flexible portions - Demand forecasting and batch cooking - Tasting option and small pieces of food on buffet - Buffet layout redesign, smaller serving bowl - Safe reusing and repurposing leftover
2. Behavioral & Nudging	<ul style="list-style-type: none"> - Smaller plates and default servings - Descriptive menu labeling - Visual buffet cues - Guest incentivization for clean plates - Guests involvement in restaurant initiatives
3. Educational & Awareness	<ul style="list-style-type: none"> - Staff training and sustainability workshops - Guest communication on waste reduction

Category	Key strategies
4. Technological Solutions	<ul style="list-style-type: none"> - Feedback collection from guests and associates - Waste tracking systems (e.g., Leanpath, Winnow) - AI-based demand prediction - Digital and informative menu and guest ordering
5. Policy & Environmental	<ul style="list-style-type: none"> - Zero-waste and food donation policies - Composting and recycling systems - Green certification and compliance - Providing sustainable takeaway boxes

Management and operational strategies

Menu engineering and portion flexibility: Designing menus that offer customizable portion sizes (standard or half) can significantly reduce plate waste. There is a great demand for this in the case of side dishes, mainly from young ladies. By aligning portion sizes with customer preferences, restaurants can prevent food from ending up in the garbage.

Demand forecasting and batch cooking: Utilizing demand forecasting techniques (e.g. ThroughPut AI) enables food service establishments to predict future consumption patterns, optimizing inventory and reducing waste. Cooking in smaller, more frequent batches ensures food freshness and minimizes overproduction, particularly in buffet settings.

Buffet layout redesign: Redesigning buffet layouts by using smaller serving trays and replenishing food more frequently can help control portion sizes and discourage overloading plates, thereby reducing waste. Such structural changes can influence guest behavior and decrease the volume of uneaten food.

Safe reuse and repurposing: Developing policies for the safe reuse of untouched leftover food, such as transforming surplus ingredients into new dishes, can contribute to waste reduction. For example, repurposing day-old bread into croutons or breadcrumbs adds value to what might otherwise be discarded.

Behavioral and psychological nudges

Plate size and portion defaults: Reducing plate sizes has been shown to decrease food waste by approximately 20%, as guests tend to serve themselves less food on smaller plates. This behavioral nudge encourages more mindful consumption and reduces the likelihood of over-serving.

Descriptive labeling and sustainability messaging: Incorporating descriptive labels that highlight the sustainability aspects of dishes can influence diners' choices and promote the selection of items that are less wasteful. Emphasizing locally sourced or sustainably produced ingredients can enhance the perceived value and encourage consumption.

Visual and placement cues: Strategically placing healthier or smaller-portioned items at the beginning of a buffet line can lead guests to select these options more frequently, reducing the amount of food taken and potentially wasted. Visual cues (signage, poster) can involve guests in food waste reduction.

Incentivization programs: Implementing programs that reward guests for finishing their meals or for consciously choosing smaller portions can reinforce positive behaviors. Such incentives can be in the form of discounts on future purchases or recognition within the establishment. At Four Season Hotel Budapest, staff were rewarded with a free ice cream if they returned their plate empty after finishing lunch.

Educational and awareness programs

Staff training and capacity building: Regular training sessions for staff on portion control, waste tracking, and sustainable practices can empower employees to actively participate in waste reduction efforts. Educated staff are better equipped to implement strategies effectively and to communicate the importance of waste reduction to guests.

Guest education and transparency: Providing information to guests about the environmental impact of food waste and the establishment's efforts to combat it can foster a collaborative approach to waste reduction. Transparency about sourcing, portion sizes, and waste management practices can enhance guest engagement.

Feedback collection and iterative improvements: Soliciting feedback from guests regarding portion sizes, menu preferences, and satisfaction can inform adjustments that align offerings more closely with customer expectations, thereby reducing the likelihood of plate waste.

Technological and data-driven solutions

Waste monitoring and analytics tools: Implementing food waste tracking systems, such as those offered by Leanpath and Winnow, allows establishments to quantify waste, identify patterns, and develop targeted reduction strategies. These tools have been shown to cut food waste by up to 50%.

AI-based forecasting and menu optimization: Artificial intelligence can enhance demand forecasting by analyzing historical data and predicting future consumption trends, enabling more accurate purchasing and preparation decisions. This approach helps minimize overproduction and associated waste.

Smart appliances and automation: Utilizing smart kitchen appliances equipped with sensors and automation capabilities can improve portioning accuracy and monitor food storage conditions, reducing spoilage and waste. For instance, automated portioning devices ensure consistency and prevent over-serving. We have not encountered such a device in practice in Hungary, but for example, the programmable Rational kitchen technology has been mentioned in several kitchens as a useful tool.

Guest-facing digital tools: Developing applications that allow guests to customize their orders, select portion sizes, or indicate dietary preferences can lead to more personalized meals and reduce the likelihood of plate waste. Digital interfaces can also educate guests on the environmental impact of their choices.

Policy and environmental initiatives

Zero-waste commitments and food donation programs: Establishing policies aimed at achieving zero waste, including partnerships with local charities to donate surplus food, can significantly reduce the amount of edible food discarded. The Hungarian Food Bank put its new food rescue trucks into operation in 2024, allowing partners to immediately portion and freeze leftover ready-to-eat meals. Such initiatives not only minimize waste but also contribute to community welfare.

Composting and waste diversion: Implementing composting programs for food scraps and organic waste diverts waste from landfills and can produce valuable compost for gardening or landscaping. Composting machines of different capacities are also available in Hungary for restaurants of different sizes. This practice closes the loop in the food consumption cycle and supports environmental sustainability and circularity.

Sustainable procurement policies: Adopting procurement policies that prioritize local, seasonal, and sustainably produced ingredients can reduce the environmental footprint associated with food production and transportation. Additionally, sourcing agreements that allow for flexible quantities can help in aligning purchases with actual demand. This can be useful for enhancing the experience of guests interested in the country's food culture.

Green certification and compliance: Pursuing certifications such as Green Key or ISO 14001 demonstrates a commitment to environmental management and can provide a framework for continuous improvement in waste reduction practices. In Hungary, the 'Green Hotel Award' and the 'Responsible Gastronomy' program support hotels and restaurants. Compliance with such standards can also enhance the establishment's reputation among environmentally conscious consumers.

Providing takeaway boxes: If the guests are unable to finish the portion they ordered, a good alternative is to encourage them to take the leftovers home. It is worth paying attention to whether this packaging is sustainable (degradable, environmentally friendly).

In conclusion, the research conducted in Budapest yielded very similar results to those found in the literature. Therefore, the suggestions made for reducing plate waste are also in line with existing ones. As new information, we examined the guests' perspectives in more depth by presenting the factors causing plate waste.

Citations and References

- BBC (2020). China launches 'Clean Plate' campaign against food waste. Available at: <https://www.bbc.com/news/world-asia-china-53761295>
- Dhir, A., Talwar, S., Kaur, P., Malibari, A. (2020). Food waste in hospitality and food services: A systematic literature review and framework development approach. *Journal of Cleaner Production* Vol. 270 (2020) pp. 1-16. <https://doi.org/10.1016/j.jclepro.2020.122861>
- Diaz, A. (2024). NYC's first-ever 'garbage' restaurant week is here: Michelin chefs making special dishes — out of trash. Available at: https://nypost.com/2024/09/30/lifestyle/nycs-first-make-food-not-waste-restaurant-week-aims-to-produce-zero-waste/?utm_source
- EPA (s.a.): Reducing Wasted Food & Packaging: A Guide for Food Services and Restaurants. Available at: https://www.epa.gov/sites/default/files/2015-08/documents/reducing_wasted_food_pkg_tool.pdf
- EPA (2023). Sustainable Management of Food Basic. Available at: <https://www.epa.gov/sustainable-management-food/sustainable-management-food-basics>
- Eurostat (2022). Estimation of food waste in EU, 2022. Available at: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Food_waste_and_food_waste_prevention_-_estimates
- European Environment Agency (2020). European Environment Agency (2020) What are the sources of food waste in Europe. Available at: <https://www.eea.europa.eu/media/infographics/wasting-food-1/view>
- FAO (2014). SAVE FOOD: Global Initiative on Food Loss and Waste Reduction. Available at: https://www.fao.org/fileadmin/user_upload/save-food/PDF/FLW_Definition_and_Scope_2014.pdf
- Freedman, M.R., Brochado, C. (2010). Reducing Portion size reduces food intake and plate waste. *Obesity* 18(9): 1864-6, DOI:10.1038/oby.2009.480
- Graham-Rowe, E., Jessop, D.C., Sparks, P. (2014). Identifying motivations and barriers to minimising household food waste. *Resources, Conservation and recycling*. Vol(84). pp:15-23.
- Heikkilä, L., Reinikainen, A., Katajajuuri, J-M., Silvennoinen, K., Hartikainen, H. (2016). Elements affecting food waste in the food service sector. *Waste Management* Vol. 56 (2016) pp. 446–453. <https://doi.org/10.1016/j.wasman.2016.06.019>
- Hertzfeld, E. (2024). Two Costa Rica hotels cut food waste by 25%. Available at: <https://www.hotelmanagement.net/food-beverage/two-costa-rica-hotels-cut-food-waste-25>
- Lynch, J. (2024). Melbourne start-up Fresho aims to tackle \$940bn food waste crisis. Available at: <https://www.fresho.com/blog/melbourne-start-up-fresho-aims-to-tackle-940bn-food-waste-crisis>
- Kallbekken, S., Sælen, H. (2013). 'Nudging' hotel guests to reduce food waste as a win-win environmental measure. *Economics Letters* 119(3): 325-327. DOI:10.1016/j.econlet.2013.03.019
- Manglik, R., Yadav, S. (2025). An Assessment of Food Waste Management Campaign *Journal of Information Systems Engineering and Management* 2025, 10(49s), pp: 1083- 1089, e-ISSN: 2468-4376 <https://www.jisem-journal.com/>
- Marthinsen, J., Sundt, P., Kaysen, O., Kirkevaag, K. (2012): Prevention of food waste in restaurants, hotels, canteens and catering. Copenhagen, Nordic Council of Ministers, ISBN:978-92-893-2377-2
- Maryland Department of the Environment (2023). Food Residual - Source Reduction Activities and Case Studies. Available at: https://mde.maryland.gov/programs/land/RecyclingandOperationsprogram/Documents/Source%20Reduction%20Suggestions%20and%20Case%20Studies%20MDE%20APR%202023.pdf?utm_source=chatgpt.com
- Mena, C., Terry L.A., Williams, A., Ellram, L. (2014). Causes of waste across multi-tier supply networks: Cases in the UK food sector. *International Journal of Production Economics*, Vol. 152 June 2014, pp. 144-158
- One Planet (2023). Case study from Accor-Planet 21: Reducing food waste in the accommodation sector. Available at: https://www.oneplanetnetwork.org/knowledge-centre/resources/case-study-accor-planet-21-reducing-food-waste-accommodation-sector?utm_source

Papargyropoulou, E., Lozano, R., Steinberger, K., Wright, R., Ujang, N., Bin, Z. (2014). The food waste hierarchy as a framework for the management of food surplus and food waste. *Journal of Cleaner Production*, Vol. 76 pp. 106-115, 10.1016/j.jclepro.2014.04.020

Sirieix, L., Lala, J., Kocmanova, K. (2017). Understanding the antecedents of consumers' attitudes towards doggy bags in restaurants: concern about food waste, culture, norms and emotions. *Journal of Retailing and Consumer Services*. Vol 34 pp. 153-158. DOI: [10.1016/j.jretconser.2016.10.004](https://doi.org/10.1016/j.jretconser.2016.10.004)

SOLEN (Environmental Solutions Joint Stock Company, Vietnam) sa. Food loss: The other side of food waste Available at: <https://solenvn.com/en/food-loss-the-other-side-of-food-waste/>

Walling, M. (2024). Cutting food waste would lower emissions, but so far only one state has done it. Available at: <https://apnews.com/article/food-waste-bans-landfill-organic-compost-aa84f95027bb053133fdd36961b9cae4>

Wansink, B., van Ittersum, K. (2013). Portion size me. *Journal of experimental psychology-Applied*. DOI: 10.1037/a0035053

Waste Managed (s.a.). Restaurant waste guide 2025. Available at: <https://www.wastemanaged.co.uk/our-news/restaurant/restaurant-waste-guide/>

Winnow (s.a.). Hilton's Green Breakfast Campaign – A 62% reduction in food Waste across 13 UAE hotels. Available at: https://www.winnowsolutions.com/en/case-studies?utm_source

Winnow (2017). Educating by Example: St. Faith's 58% Reduction in Food Waste. Available at: <https://650776.fs1.hubspotusercontent-na1.net/hubfs/650776/2024/Winnow%20Case%20Study%20%7C%20St.%20Faiths%2058%25%20Reduction%20in%20Food%20Waste.pdf>