

## THE NEGLECTED CHILD? PERSISTENT LOW FOOD WASTE RECORDS IN THE HUNGARIAN HOSPITALITY INDUSTRY

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### Abstract

*Food waste in the hospitality industry is one of the major contributors to food loss and waste globally, yet little attention is being paid to addressing the issue. In the European Union alone, millions of tons of food waste is generated annually, and this figure is merely a rough estimate due to insufficient and unreliable data from the region. Hungary reports persistently low levels of food waste within its hospitality sector, raising questions about the accuracy of these figures. This study seeks to find out why this is so to determine whether it results from effective waste management practices or a case of underreporting. The data used in the study were retrieved from the EUROSTAT 2022 reports of the restaurant and food service sector. It was used to compare Hungarian hotel waste quantities with those of other EU member states to identify existing gaps in their reporting mechanisms.*

*The findings reveal that while national campaigns promoting sustainable consumption as well as the existence of a conservative food culture may have yielded a decrease in waste, disparities between policy formulation and implementation, lack of proper waste management machinery, and the probability of underreporting prevent accurate assessment. The study points out the need for robust data collection and documentation from all the member states. A recommendation is made on using more consumer-friendly food waste management procedures and integrating sustainable food consumption practices in the national education curriculum.*

**Keywords:** food waste, EU member states, Hungary, food services, food waste management, EUROSTAT

**JEL:** D12, L83, Q01, Q53, O52

### Introduction

Food losses and food waste (FLW) have become a major global issue in the recent past and are among the leading political agendas both globally and country-wise (Xue et al., 2017). Food waste generated by the hotel industry, which is increasingly becoming a subject of sustainability discussion across the entire supply chain, depicts the missed opportunities of reducing the negative effects of food production on the environment and economy (Abou Kamar, 2017). Research is clear on the severity of the waste from hotels on the environment, which has been the source of constant criticism (UK Parliament, 2024), with the primary responsibility for kitchen waste falling on the chef and restaurant managers as well as the consumers (Principato et al., 2018a). Despite generating huge amounts of waste, many hotels continue using inappropriate methods of waste management (Agesa et al., 2022).

As indicated by previous publications, there is a distinction between food loss and food waste, with the former consisting of food spills and spoils that result in the adverse reduction of its quality during consumption. The latter refers to food and drinks meant for consumers and waste from the kitchen, such as eggshells, fresh food trimming waste, oils, and spoiled or expired goods (Linh, 2018). It is both necessary and urgent to critically monitor the actual state of food waste within the

EU member states for more insights on the issue, carry out detailed analysis, and develop effective public policies for its reduction (Tkáč et al., 2022). Proper food waste management interventions in the hospitality industry are essential for its economic development as they play a key role in reducing greenhouse gas emissions and carbon footprint, as well as their effects on the environment (Emmanuel Kwabena et al., 2023). Proper and clear communication between chefs, waiters, and managers should be implemented, given that they are directly linked to the food waste issue for efficient and sustainable procedures (Amicarelli et al., 2022).

Globally, food waste per capita is significantly higher in industrialized countries than in developing regions. It is estimated that consumers in Europe and North America waste 95-115 kg of food annually. In Sub-Saharan Africa and South/Southeast Asia, the figure is much lower, ranging from only 6-11 kg per person each year. Approximately 1.3 billion tons of food, equivalent to one-third of food generated for human consumption, go to waste worldwide (Cederberg & Sonesson, 2011). The European Union (EU) generates an estimated 88 million tons of food waste annually, alongside associated financial implications valued at €143 billion. However, over 36 million people are unable to afford a decent meal containing beef, chicken, fish, or plant-based food, with 20% of the food produced getting lost or wasted (European Commission, 2019). In the EU, restaurants are among the largest contributors of food waste, which is also costly to them (Principato et al., 2018b). However, at present, there are no studies focusing on the quantities of food waste generated by food service providers, the primary causes, and the potential strategies for its reduction across most of the 28 EU member states (Filimonau & Sulyok, 2021). There is therefore an urgent need to address the food waste issue, as the large amounts of food thrown away daily can be used to feed hungry people worldwide (Linh, 2018).

Hungary, which is one of the transition economies in East-Central Europe, is greatly affected by food waste in its food service sector, yet it has remained under-researched with minimal expert knowledge on food waste patterns and management practices as depicted in the absence of food waste data for the food service sector (Filimonau & Sulyok, 2021). From the waste data form (EU-ROSTAT, 2022), it is clear that Hungary posts the lowest records of food waste in its food service sector, and therefore, this study seeks to unravel the reasons behind this phenomenon by answering the following questions: Q1. Is it due to ineffective waste management mechanisms, or Q2. Is it a matter of underreporting?

The following objectives will guide the study: a) To examine the factors leading to low levels of reported food waste in hotels in Hungary. b) To compare food waste management practices in hotels in Hungary with those in other European countries. c) To identify gaps in reporting mechanisms for food waste in hotels in Hungary.

## **Literature Review**

### *Global Trends in Hotel Food Waste Management*

Globally, nearly one-third of food produced is lost or wasted annually along the food supply chain (FSC) resulting to huge economic, environmental, and social losses and it is particularly pronounced in developed countries where food waste is more evident at the final stages of the FSC due to poor food habits (Principato et al., 2021). Out of the five FSC stages, food waste generated from the distribution, processing, and consumption stages negatively impacts the environment as it ends up in landfills or incinerators, which have several adverse effects on the environment (Linh,

2018). The hospitality sector in the European Union contributes approximately 12% of the total food waste, making it the third-largest contributor after households, which account for 53%, and the food processing industry at 19%. However, it is worth noting that this percentage may be underestimated because it excludes food waste generated by retail catering services, such as coffee shops and supermarket cafes, as well as contract catering in workplaces and hospitals, where food waste is still a problem. This scenario makes it difficult to establish the extent and pattern of food waste generation as well as limiting mitigation efforts in the hospitality sector (Filimonau & De Coteau, 2019a).

Literature is replete with evidence that food waste is more of a human creation than a natural phenomenon. Municipal Solid Waste (MSW), which includes wastes generated from households, businesses, and construction activities, is a human creation managed by municipalities. The rapid population growth and urbanization, combined with economic development and improved living standards, have exacerbated the issue globally (Karak et al., 2012). In the case of Malta, five-star hotels have been found to produce more waste compared to hotels with lower ratings (Camilleri-Fenech et al., 2020). In Singapore, food waste emanates from food spoilage, fear of harming brand reputation with substandard food, insufficient food sorting methods, recycling facilities, and waste collection systems. Other factors included high disposal costs, limited government incentives or regulations, and low consumer awareness. It was also established that consumer habits such as poor planning of food purchases, waste during cooking, and leftover food from cooked, canned, or ready-to-eat products contributed to the problem (Grandhi & Appiah Singh, 2016). A similar case was reported in Turkey, besides the unpredictability of the hospitality industry (Okumus et al., 2020). In Malaysia, it was found that food waste is closely linked to the mode of food provision and consumption as well as its material and socio-cultural context (Papargyropoulou et al., 2016).

The shift to a circular economy, where products and materials are reused and recycled while reducing waste, is essential to effectively addressing waste globally (Pardo & Schweitzer, 2018). Numerous initiatives such as the Waste Framework Directive and the Europe 2030 Strategy (Petrescu et al., 2022) have been created worldwide to reduce food waste in the hospitality industry by offering preventative measures such as the use of locally sourced fresh ingredients, simple menu options and reduced plate sizes (Camilleri-Fenech et al., 2020; Tatàno et al., 2017), increasing consumer awareness, redistributing extra food, and recycling and composting (Filimonau & De Coteau, 2019b). The hospitality food waste hierarchy where waste is categorized as per its level of environmental impact (Petrescu et al., 2022) through waste prevention, reduction, recycling, controlled storage, and energy recovery (McDougall et al., 2001), highlights the significance of recycling and composting in dealing with food waste that cannot be stopped at its source and/or that cannot be re-distributed later (Hu et al., 2013).

Hungary is targeting sustainable product generation and consumption through the extension of its present strategies as well as creating new policies and programs by 2040. Despite these efforts, Hungary is still affected by a myriad of challenges as it is projected that the material consumption of the country will increase by a third come 2050 as compared to the 2017 levels, adding to more environmental degradation. Proper management of biomass, food, and plastics is essential for the Hungarian transition to a circular economy (OECD, 2023). Veszprém, one of the cities in Hungary with tourist activities, has most of its restaurants located in the city centre. Due to the seasonality of tourism in the region, most food is wasted in the evening service, where the a la carte menu is common, unlike lunch, where a fixed menu is used (Filimonau & Sulyok, 2021). During the recession, most hotels implement crisis management measures and cost reduction, followed by marketing, human resource management, and innovation to keep up with their competitors (Pappas, 2015).

## Materials and Methods

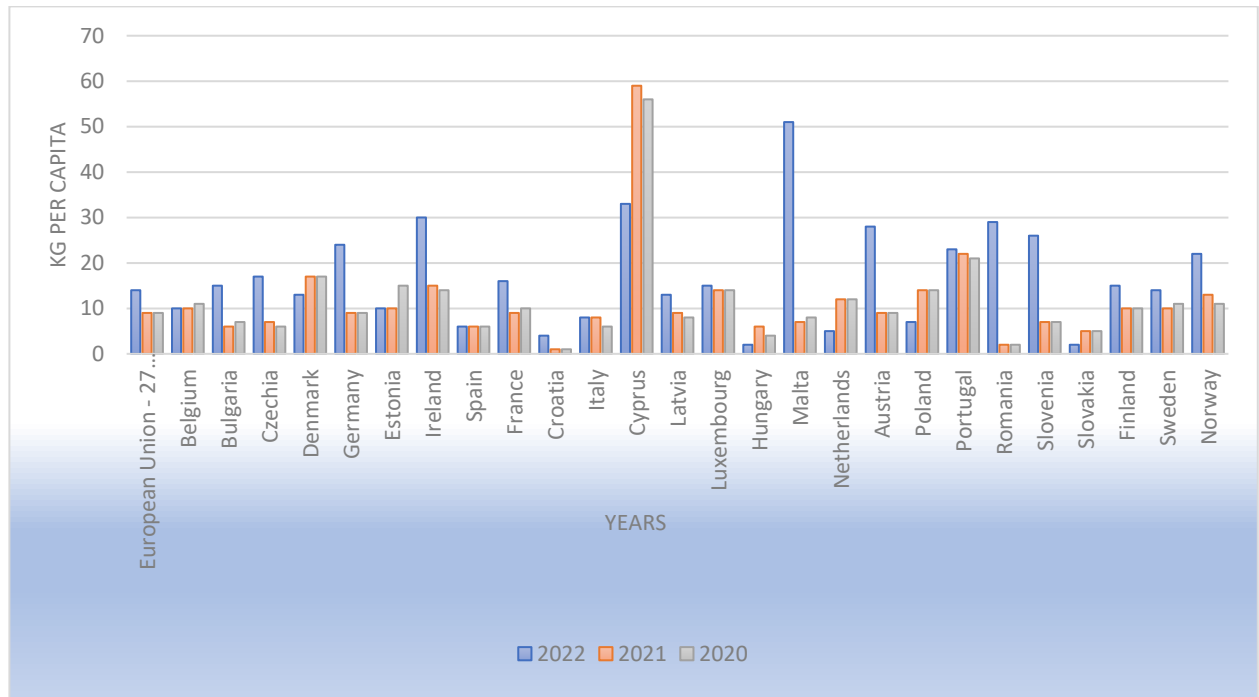
The data used for this study was retrieved from (EUROSTAT, 2022) which is the annual food waste records from the restaurant and food service sector from the EU member states across the period between (2020-2022), which includes the starting period for which every member state is expected to integrate a food waste reduction mechanism in their national policy (Kasza et al., 2020). To ensure the accuracy and reliability of the cross-country comparisons, three countries, Lithuania, Greece, and Iceland, were excluded due to incomplete data. EU members must adopt rigorous food waste measurement practices for effective monitoring and setting of food waste reduction targets (Stenmarck et al., 2016). Table 1 is a summary of the values used to derive Figures 1 and 2, respectively.

**Table 1: Amounts of EU restaurant and food service food waste in kg per capita for the period between (2020-2022)**

Country	2022 Kg/Capita	2021 Kg/Capita	2020 Kg/Capita
European Union- 27 countries(from 2020)	14	9	9
Belgium	10	10	11
Bulgaria	15	6	7
Czechia	17	7	6
Denmark	13	17	17
Germany	24	9	9
Estonia	10	10	15
Ireland	30	15	14
Spain	6	6	6
France	16	9	10
Croatia	4	1	1
Italy	8	8	6
Cyprus	33	59	56
Latvia	13	9	8
Luxenberg	15	14	14
Hungary	2	6	4
Malta	51	7	8
Netherlands	5	12	12
Austria	28	9	9
Poland	7	14	14
Portugal	23	22	21
Romania	29	2	2
Slovenia	26	7	7
Slovakia	2	5	5
Finland	15	10	10
Sweden	14	10	11
Norway	22	13	11

*Source: (EUROSTAT, 2022)*

## Results and Discussion

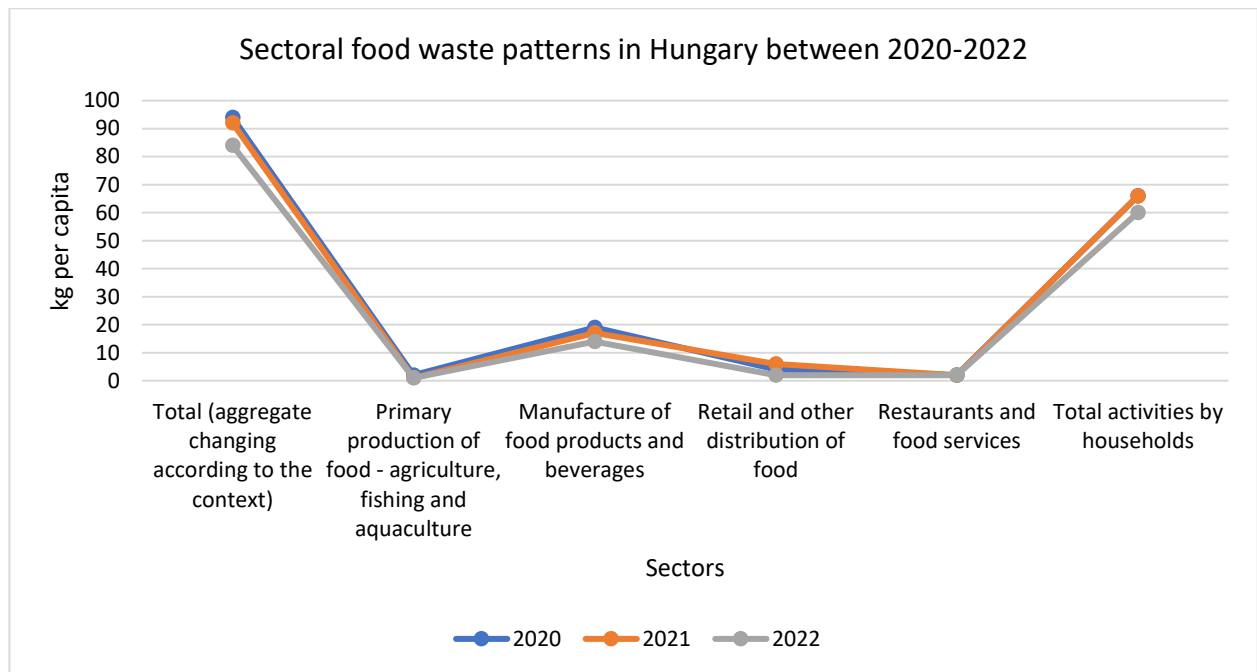


**Figure 1: Trends in Restaurant Food Waste across EU Countries (2020-2022)**

*Source: (EUROSTAT, 2022)*

In Figure 1, Cyprus has consistently had the highest food waste reports over the three years, suggesting potential inefficiencies in waste management practices or poor cultural factors influencing food disposal. It could also be due to seasonal fluctuation of tourism, which leads to increased food waste due to inaccurate demand predictions. There are huge amounts of food that go to waste for not being consumed in the Cyprus hospitality sector, which needs to be addressed (Demetriou, 2022). Due to advanced development and widening sources of income globally, food availability is also on the rise, and this has led to excess food resulting in waste and over-consumption, which calls for its reduction for the sake of the global climate (Xue et al., 2017). Malta, on the other hand, portrays a sudden spike in food waste within the hospitality sector, indicating a recent change in reporting mechanisms, operational inefficiencies, or external factors such as an influx of tourism activity due to the post-COVID pandemic. The scarcity of studies that assess the environmental impacts of tourist consumption and its evolution patterns over time (Li et al., 2020) makes it difficult to fully understand the reason for temporal variations. Conversely, countries such as Croatia, Hungary, and Slovakia report the lowest levels of food waste. This trend raises questions about whether these figures reflect actual effective waste management practices or are a result of underreporting, particularly in transitional economies. The extent and trends of consumer food waste in transitional economies remain largely unclear, hindering global initiatives targeting food waste reduction, which calls for more current and direct measurement-based analysis (Wang et al., 2017). These observations directly respond to the **first research question (Q1)** concerning the possibility of **ineffective waste management mechanisms**. Although Hungary's low food waste figures could initially suggest efficient management practices, further analysis reveals conflicting indicators. Some restaurants show reluctance to adopt food-saving techniques due to concerns

about customer perception and lack of infrastructure, such as food storage and redistribution mechanisms. This is an indication that there is a possibility that **the low figures may not only reflect ineffective waste management**, but rather a combination of factors, including cultural conservatism, limited redistribution capacity, and weak enforcement of food waste policies.



**Figure 2: Sectoral food waste patterns in Hungary (2020-2022)**

*Source: Researcher (2025)*

Hungary's hospitality sector stands out for its flat trend of 2 kg per capita of reported food waste over the three years. This suggests an efficient waste management system as well as the effectiveness of national campaigns aimed at promoting sustainable consumption habits. In the study to quantify the amount of food waste generated by Hungarian households between 2016 and 2020, a 4% decrease in the annual food waste per capita was observed, and a recommendation was made for the integration of food waste prevention strategies in the education system (Kasza et al., 2020). It is worth noting that over the periods, most of the studies have been on household wastes, leaving out the hospitality industry. The positive change in food waste amounts is an indication of the effectiveness of increased awareness and effort among Hungarians to minimize food waste. Raising awareness about waste management, especially food waste management, is important for environmental protection and the promotion of responsible behaviour across communities (Linh, 2018). Urban food waste policies and interventions must align closely with the goals of Agenda 2030 through the increase of awareness among local policymakers, public officials, the private sector, and citizens. This will help in tracking the link between food waste and its impact on the achievement of the Sustainable Development Goals (SDGs) (Fattibene et al., 2020).

On the other hand, existing literature contradicts partly on the notion of efficient Hungarian waste management systems where it is noted that despite the introduction of several policies focusing on the biological treatment of agricultural by-products and food waste aimed at converting them into compost or energy there is still a gap in their mode of implementation and measurable objectives coupled with the absence of a dedicated bioeconomy policy framework, which hinders the integration and effectiveness of these policies (OECD, 2023). The struggle to divert municipal

waste from landfills to recycling suggests a similar issue in food waste tracking and reporting within the hospitality sector, hence the persistently low reports. This evidence supports **research question two (Q2)** regarding the **possibility of underreporting**. Though Hungary's national policies advocate sustainable consumption as well as the positive cultural attitudes toward food preservation, the hospitality sector remains underrepresented in national datasets. Inadequate machinery, limited food rescue networks, and unclear reporting frameworks indicate that **underreporting is likely to be one of the contributors** to Hungary's persistently low food waste statistics in the restaurant and food service sector.

The study also established that customer relations is a hindrance to the effective implementation of certain food waste management practices, leading to most restaurants rejecting some of the food waste reduction procedures for fear of losing customers. Most restaurant administrators decline to take up the concept of rescuing excess food, citing the absence of charitable organizations in Hungary to redistribute the excess food to the needy, inadequate machinery such as vacuum sealers and deep freezers for handling the surplus food, as well as food safety issues (Filimonau & Sulyok, 2021). There is a high degree of uncertainty in the data estimates of food waste quantities across different sectors of the EU member states, which leads to the exclusion of some countries from certain analyses (Stenmarck et al., 2016). This lack of reliable and consistent data contributes to underreporting, as observed in the hospitality waste records in the study.

## Conclusion and Recommendation

This study highlights critical gaps as well as positive progress in food waste management and reporting within Hungary's hospitality sector. A comparative analysis to determine the trend of food waste in the hospitality sector between 2020-2022 shows different trends across the EU member states, with some recording high amounts across the period, while others, like Malta, show a sudden spike. This is an indication of a problem in waste management or a lack of sufficient information to explain the sudden temporal variations. The study also pointed out that many transitional economies like Hungary face challenges in collecting reliable data, which further complicates efforts to reduce food waste in these sectors. It has also been observed that Hungary reported a constant trend of 2 kg of annual waste per capita, the lowest in the region, which marks a significant gap in food waste management and reporting within Hungary's hospitality sector.

Despite Hungary having a well-established policy and legal framework aligned with EU directives, there is a noticeable disconnect between policy formulation and implementation, particularly in the hotel industry. The focus on household and municipal waste has left the hospitality sector underrepresented in national food waste data, contributing to persistent underreporting. The lack of proper food waste management machinery, as well as the unwillingness of the restaurant administrators, was noted to be one of the main drawbacks in the food waste reduction efforts. However, cultural practices that aim at reducing food waste alongside national campaigns have yielded remarkable results, as shown by the decreasing food waste percentages across different periods of study. It is therefore worth noting that Hungary is on the right track in its fight against food waste and under the EU policy frameworks for sustainability and environmental responsibility.

To achieve commendable progress, it is therefore important to regulate the attention given to the various economic sectors and not only the household that is largely represented in the extant literature to safeguard against neglecting the hospitality sector as one of the significant contributors of global food waste especially post-pandemic when out of home food consumption has increased.

Policy recommendations from different researchers should also be implemented, including the integration of food waste principles in the education system to achieve a long-lasting, responsible food consumption culture for future generations. More food distribution initiatives should also be established, bearing in mind the health regulations in place.

### *Limitations of the study*

The study faced challenges due to inconsistent data across the EU countries, particularly within the hospitality sector, which resulted in the exclusion of some countries and, hence, limited the ability to conduct effective cross-country comparisons. Additionally, due to the research exclusively concentrating on the hospitality sector, some critical sectors, such as household and municipal food waste, were left out. This gives room for future research to determine their impact on the food waste reported in the hospitality sector.

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