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Food Waste Management in All-Inclusive Hotels: An Exploratory Research in Antalya, Türkiye

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Abstract

Food waste is one of the worldwide issues contributing to hunger and malnutrition. A third of the food produced worldwide is thought to be wasted annually. In the tourism industry, accommodation enterprises, as well as other food and beverage operations, cause large amounts of waste during food production and consumption processes. The main objective of this study is to investigate the principal reasons behind food waste in all-inclusive hotels, the challenges of preventing the waste, and methods for reducing waste in these establishments. According to this goal, semi-structured interviews were carried out with 21 staff members and hotel managers working in all-inclusive hotels in Antalya, Türkiye. According to the results, participants stated that the open buffet service in all-inclusive hotels is the main reason for food waste and also the main challenge for reducing waste in these establishments. Guest demands and unconscious behaviors are also important reasons for the waste. Participants also stated that through efficient open buffet management and by raising awareness among guests about the harms of food waste caused by open buffets, the amount of wasted food can be reduced. Particular theoretical and practical implications are examined at the end of the study, along with suggestions for additional research.

Keywords: Hotels, All-Inclusive, Food Waste, Solutions for Food Waste, Antalya.

1. INTRODUCTION

The sustainability of food systems is considered to be seriously threatened by food waste (Ojha et al., 2020). Food waste, "which occurs along the entire food supply chain from farm to fork" (Kasavan et al., 2022), is "the wastage of edible food due to the decisions of consumers, supply chain managers, and other stakeholders" (Cicatiello et al., 2016). Food waste and food loss are among the global problems causing hunger and malnutrition (Kibler et al., 2018). According to Papargyropoulou et al. (2016), "food waste also affects the main environmental, social, and economic sustainability problems both for developed and developing countries." The Boston Consulting Group (BCG) estimates that 'one-third of the food produced in the world is lost or wasted each year (BCG, 2022). The problem is growing, and it is expected that there will be 2.1 billion tons of food loss and waste in 2030, equivalent to $1.5 billion (BCG, 2018). According to

the “State of Food Security and Nutrition in the World Report” (2023), “in 2022, between 691 and 783 million people faced hunger, which is 122 million more than in 2019.” The world's 795 million undernourished people could be fed with 25% of the food that is wasted annually. Given these findings and the significance of food waste reduction for food safety and sustainability, it is critical to comprehend the origins and causes of food waste (Talwar et al., 2021). It is known that most food losses and waste occur at the household level. Dhir et al. (2020) stated that “food waste is also produced at different stages of the food chain, including the consumption level, where both households and the hospitality industry contribute to waste." In this respect, food waste is critical for the hospitality industry, where operations produce large amounts of waste (Demetriou, 2022). Food waste and losses in the industry are increasing as the number of people eating out increases worldwide. Food waste occurring in the accommodation sector is caused by spoiled food during storage, by wasted food during preparation and cooking, and by the residues left on guests' plates (Pirani and Arafat, 2016).

Food waste in hotels is a major national and international issue because of its impact on social, environmental, and economic concerns (Okumus, 2020). Millions of people travel each year, using resources in the accommodation establishments they stay at and contributing to food waste. In the tourism industry, the biggest contributor to food waste generation is all-inclusive hotels (Okumus et al., 2020). The system of all-inclusive hotels is widely applied, especially in Türkiye (Uner et al., 2006). Although the idea of unlimited food and drink without additional payment is attractive for tourists (Yolal et al., 2017), intense food waste occurs in hotels that implement this system (Sezgin and Ateş, 2020). Therefore, this study aims to examine the main causes of food waste and waste reduction strategies in all-inclusive hotels, in line with the opinions of hotel managers and other hotel staff.

Previous studies about food waste and losses generally focused on consumer behavior issues related to food waste (Aktas et al., 2018; Di Talia et al., 2019; Flanagan and Priyadarshini et al., 2021; Principato et al., 2021); and food waste at households (Kim et al., 2020; Van Geffen et al., 2020; Van der Werf et al., 2021) and employees (Goh and Jie, 2019; Chawla et al., 2022; Islam et al., 2023). With exceptions (Okumus, 2020; Okumus et al., 2020; Amicarelli et al., 2022) there are very few studies that concentrate on the causes of food waste and the waste minimization strategies in hotels. Therefore, the aim of this study is to identify the causes of food waste, the challenges of preventing the waste, and feasible solutions to reduce food waste in hotel establishments. The study investigates all-inclusive hotels operating in Antalya. A brief overview of the literature on the topic of food waste opens the study, and the study goes on by describing the research methodology, procedures for gathering data, and data analysis. The research findings are then discussed and presented. Finally, suggestions are presented along with the results of the research and the limitations of the study.

2. CONCEPTUAL FRAMEWORK

2.1. Food Losses and Food Waste

Food losses and spoilage are common terms used to describe post-harvest food waste. They point to a decrease in food quality or quantity that makes it unsafe for human consumption (Grolleaud, 2002). Food waste is any edible item supplied for human consumption that is eventually lost, spoiled, polluted, or not consumed as a result of inappropriate industrial use, a lack of distribution, or consumer misuse (Okumus, 2020). Food waste is a term that usually refers to behavioral problems, and the term is generally used to describe both food losses and food waste (Parfitt et al., 2010). For this reason, both food losses and food waste are referred to as "food waste" in this study. “As much as half of all food grown is lost or wasted before and after it reaches the consumer" is the estimate that is most frequently cited (Lundqvist et al., 2008). Food waste occurs

in different ways at each stage of the food supply chain. Table 1 lists generalized food supply chain stages and provides examples of the various shapes that food waste can take.

Table 1. Stages and Reasons for Food Waste in the Food Supply Chain

Stages	Examples of food waste
Harvesting	Edible crops left in filed, ploughed into soil, eaten by birds, rodents, timing of harvest not optimal. Crops damaged during harvesting and poor harvesting technique.
Threshing	Loss through poor technique.
Drying	Poor transportation infrastructure. Loss due to spoiling and bruising.
Storage	Pests, diseases, spillage, contamination, natural drying out of food.
Primary processing	Losses while cleaning, classification, packaging, and milling.
Secondary processing	Losses while mixing, cooking, frying, cutting, and extrusion.
Product evaluation	Products discarded based on quality control and standard recipes.
Packaging	Inappropriate packaging.
Marketing and Distribution	Damage and spoilage during distribution and transportation.
Consumer	Food discarded before serving due to poor storage/stock management and poor food preparation. Food discarded in packaging confusion over "best before" and "use by" dates.
End of life	Food waste discarded may be separately treated, fed to livestock/poultry and mixed with other wastes and landfilled.

Source: Directly quoted from Okumus, (2020)

Papargyropoulou et al., (2014) classified food waste into three categories: "avoidable, partially avoidable, and unavoidable food waste." Avoidable food waste is defined as "food that is still suitable for human consumption and can be utilized before being thrown out." Sliced bread and fruits that are placed on a dish but not eaten, and packaged goods that have not expired, can be examples of avoidable food waste (Ilyasov, 2017). Partially avoidable waste includes foods like breadcrumbs and potato peels that some people eat and others do not (Akar, 2022). Unavoidable waste is defined as components of manufactured goods that are not fit for human consumption. Food waste that cannot be avoided includes things like eggshells, bones, vegetable and fruit leftovers, meat products' nerve and fat portions, and nut shells (Lebersorger and Schneider, 2014).

In parallel with the increase in the world population, the rate of agricultural production has increased by almost 300% in the last 50 years. Despite this, "the Food and Agriculture Organization of the United Nations (FAO)" stated in its 2023 "State of Food Security and Nutrition in the World Report" that the enormous global production of edible food waste is the reason that an estimated 735 million people worldwide suffer from hunger or malnutrition on a yearly average. In fact, households globally produce about 570 million tons of food waste annually. Individual food waste reaches an average of 74 kg each year (FAO, 2023). Food waste also causes significant environmental problems (Okumus et al., 2020). Food waste accounts for 8–10% of "global greenhouse gas emissions (GHGs)", climate instability, and harsh weather phenomena like floods and droughts. These negative conditions negatively affect crop yields, potentially reduce the nutritional quality of crops, and disrupt supply chains (FAO, 2022). Food waste has drawn the attention of numerous nations, institutions, and non-governmental groups because of these unfavorable circumstances. As mentioned, the scale of the problem and the importance of food service and food waste in the food service industry cannot be ignored (Porter et al., 2016). BCG developed a "food loss and waste model" to determine the extent of the issue (BCG, 2018). BCG projects that "the volume of food loss and waste will increase 1.9% annually from 2015 to 2030, while the dollar value will increase 1.8%," as seen in Figure 1.

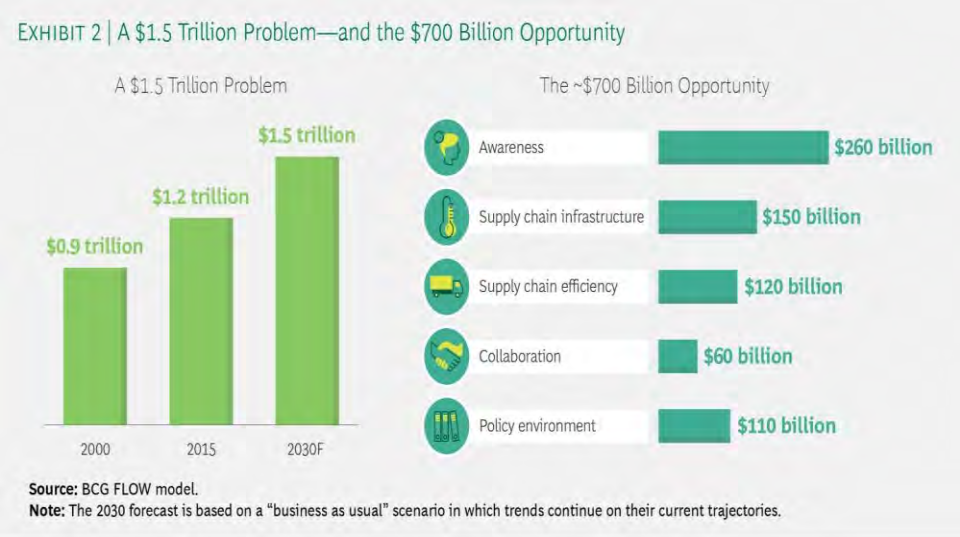

Figure 1. Food Loss and Waste Model

Source: BCG, 2018

As seen in the figure above, five key changes in "awareness, supply chain infrastructure, supply chain efficiency, collaboration, and environmental policies" have been identified as the most effective ways to decrease food waste globally. Food waste worth approximately 700 billion dollars is able to be prevented with initiatives in these areas (TISVA, 2019).

2.2. Food Waste in Hotels

In addition to their primary business of providing accommodation, hotels also serve food and beverages to their customers in an effort to increase their market share and ensure customer satisfaction. Although one of the most crucial aspects of a trip is thought to be the food and beverage service (McKercher, 2016), the unlimited consumption opportunities offered to customers often lead to unsustainable overconsumption trends (Antonschmidt and Lund-Durlacher, 2021). Despite the fact that innovative cooking and 24-hour food service can better satisfy customers, these businesses, especially all-inclusive hotels, pose hazards to the environment and the economy due to the large volumes of waste (Okumus et. al., 2020). "Food Waste Index Report," prepared in 2021 by "the United Nations Environment Program (UNEP)," announced that 26% of food waste occurs in the service sector (UNEP, 2021). Table 2 illustrates the food waste that occurs during the food production stages in hotels and other food and beverage establishments. As seen in Table 2, food waste occurs in different ways at different stages of food production.

Table 2. Food Waste in the Catering Establishments' Food Production Process

Stages of food production	Reasons and examples of food waste
Menu planning and purchasing	Lack of or poor menu planning Extensive menu choices Fluctuations in sales Lack of software
Receiving and storage	Improper shipping Improper handling Improper storage Deterioration due to wait time Loss of weight, volume and quality
Product handling	Frequent handling Inefficient food preparations Food safety concerns
Food Processing	Food safety concerns Removing inedible parts Removing excessive parts Upsizing portions Cooking errors Inefficient cooking equipment Inefficient cooking techniques Preparing large volumes Preparing in advance
Food ordering and serving	Excessive menu choices Excessive food orders by guests Wrong orders Large portions Large plates Buffet serving
Consumption	Buffet serving Large portions Safety regulations Issues related to hygiene and sanitation
Post consumption	Negative consumer attitude and behaviour towards leftovers

Source: Developped from Freedman and Brochado (2010), Gunders (2012), Lipinski et al. (2013), Okumus (2020).

According to Table 2, *"menu planning and purchasing"* is the initial step in food waste management (Kasavan et al., 2019), which is a crucial variable that must be highlighted. Difficulties in proper inventory management due to a wide range of menu options, large and open buffets, fluctuations in sales (Gunders, 2012), incorrect determination of needs, and the realization of purchases by unprofessional people cause food waste at this stage (Parfitt et al., 2010). The second stage where food waste occurs is *"receiving and storage."* At this stage, "inappropriate vehicle loading and unloading methods, poor packaging, long transportation processes, poor road structures, inadequate cooling and humidity adjustment systems during transportation, uncontrolled movement of products in the vehicle, lack of cooling before loading, transporting products that are not suitable to be transported together, losses caused by the vehicle driver (FAO and Republic of Türkiye Ministry of Agriculture and Forestry, 2020), unhygienic and unclean storage areas, failure to ensure proper temperature, and failure to check expiration dates of products" (Katajajuuri et al., 2014) cause food waste. For instance, an estimated 3% of all fish caught in the Brazilian Amazon is lost in transit due to poor loading techniques (BCG, 2022). Food waste is also caused by contamination from improper handling, careless preparation, and disregard for food safety laws, especially when it comes to perishable items (Parfitt et al., 2010) at the stage of

"product handling." Losses both from local and industrial processing are included in the processing losses (Kummu et al., 2012). "Inadequate infrastructure, machinery, ineffective system design, damage sustained during production, inaccurate supply and demand forecasting, contamination, trimming and lifting, supply and demand issues, inconsistent or confusing date labels, inconsistent ingredient quality, food safety issues, production line changes, deficiencies in the cold chain, and plant employee behavior" are some of the factors that contribute to food losses during the *"food processing"* stage (CEC, 2017; Bulut Solak and Aydinli, 2023). In the food supply chain, *"the service and consumption"* stage is considered the stage where all processes are finalized. Food waste generated at this stage is due to the type of food and beverage service provided, especially in hotel businesses (Pirani and Arafat, 2014). The open buffet system applied in all-inclusive concept hotels offers customers a wide variety of food and unlimited intake. However, individuals' desire to buy more products than they need leads to food waste. Portion size (Benton, 2015), use of inconvenient equipment, confusion in ordered products (Martin-Rios et al., 2018), socio-demographic structure of individuals, inadequate staff training, excessive preparation of food, and poor portion control techniques are other causes of food waste at the service and consumption stages (Sahin and Bekar, 2018).

Table 3 provides a summary of studies on food waste in hotel businesses. The literature was searched, and the identified articles were examined and categorized according to their findings and topics.

Table 3. Prior Studies About Food Waste in Hotels

Author(s)	Purpose	Data Source	Main Findings	Research Design
Leverenz et al. (2021)	Evaluating the potential impact of self-reporting on food waste at the breakfast buffet in hotel kitchens.	4 hotels in Germany	It has been found that small adjustments to daily kitchen practices can greatly reduce the amount of leftovers from breakfast buffets.	Case study
Demetriou (2022)	To examine the causes of significant food waste in hotel establishments in Cyprus and to provide solutions to reduce this waste.	Opinions of hotel managers in Limassol	Strategies to prevent food waste in hotel establishments are available, but they reveal that certain barriers need to be addressed.	Grounded theory approach
Okumus (2020)	Identifying how hotels manage food waste	Opinions of hotel managers in Orlando, Florida	The primary causes of food waste are excessive guest meal orders, mistakes made in inventory control, staff food preparation errors, and inadequate food safety procedures.	Content analysis
Okumus et al. (2020)	Identifying how and why food waste occurs, what staff think about the causes, and how food waste can be minimized in all-inclusive hotels.	Opinions of employees working in all-inclusive hotels in Türkiye	Attitudes, tastes, and behaviors of visitors are thought to be the main factors causing food waste. The cultural backgrounds of the visitors may have an impact on their eating habits, which raises the amount of waste produced even more.	Content analysis

Amicarelli et al. (2022)	To provide a better understanding of food waste management trends in the hotel sector as well as highlight opportunities and weaknesses for minimizing food waste in hotel kitchens and food services.	Opinions of managers, chefs and service staff working in an Italian and a Romanian hotel	Managers, chefs and service staff in Italy and Romania are cognizant of the problems associated with food waste from a financial, social, and environmental standpoint. They are also constantly seeking solutions, but they encounter many challenges in their daily efforts to reduce it.	Content analysis
Goh et al. (2022)	To explore the driving forces behind food waste efforts that food and beverage hotel managers in Indonesia plan to implement.	Opinions from food and beverage hotel managers in Indonesia	Persistent barriers were identified that prevented them from implementing their food waste plans, including a lack of resources and an inflexible menu design.	Content analysis
Pirani and Arafat (2016)	Measure food waste along the food service chain and identify the main motivations and ways of creating food waste in the hospitality industry.	Opinions of staff working in hotels in the United Arab Emirates	It was discovered that the timing and style of service, the type of food served and the precision in predicting the expected number of customers were the elements most strongly responsible for the generation of food waste.	Content and materials flow analysis
Chalak et al. (2018)	Identifying macroeconomic factors affecting food waste generation.	Secondary data from 33 developed countries in North America, Europe, Asia and Oceania.	A clear and comprehensive regulatory framework, combined with awareness programs and economic incentives, could significantly reduce food waste generation by an average of 17.6, 21.3 and 14.3% respectively.	Regression analysis
Papargyropoulou et al. (2016)	To propose a theoretical framework for investigating the causes and reducing food waste.	A case study on food waste generated in a hotel restaurant in Malaysia and employees' views	The way we procure and use food, as well as the material and sociocultural background of food consumption and food waste production, are inextricably linked.	Grounded theory and the constant comparative analysis
Lévesque et al. (2022)	Assessing the level, causes and potential for avoidance of food waste.	Hotel restaurant in Montreal	Most of the total food waste is avoidable waste. Waste in the preparation phase is a hotspot. The amount of plate waste is minimal and there is no significant variation between meal formulas, serving types and portion sizes outside the buffet.	Variance analysis

When Table 3 is examined and the studies are questioned, it is seen that there are many reasons (e.g., guest behavior, staff training, inventory management, menu planning, portion size) that cause food waste in hotels. However, the main factor in food waste has been determined by the attitude and behavior of guests (Okumus, 2020; Okumus et al., 2020). There are also several barriers to preventing food waste (Amicarelli et al., 2022; Demetriou, 2022; Goh et al., 2022). These barriers can be overcome through conscious practices in kitchen operations (Leverenz et al., 2021),

awareness programs among staff, economic incentives, and a clear and comprehensive regulatory framework (Chalak et al., 2018).

3. METHODOLOGY

The current study was designed to identify the factors that lead to food waste in all-inclusive hotels as well as the measures to reduce food waste. In line with these objectives, Antalya was selected as the study area due to its high number of annual visitors and high number of hotel establishments. The city ranks second in the list of most visited destinations in Türkiye after Istanbul (TUROFED, 2024) and ranks 4th in the top ten cities in international arrivals in 2023 worldwide (Euromonitor International, 2023). Antalya was visited by more than 16 million foreign tourists in 2023 (Anadolu Agency, 2024a), according to the Antalya Provincial Directorate of Culture and Tourism data. There are 418 5-star hotels, 218 4-star hotels, and 46 resort hotels in the region. The bed capacity of the city increased to 648 thousand 285, of which 450 thousand 138 were 5 and 4 stars in 2023 (Anadolu Agency 2024b). Many 5-star hotels in the region, including those located in Antalya city centre, especially in the tourism centres of Kemer district and Belek neighborhoods, operate on an all-inclusive system. Antalya is the city where the all-inclusive system is most commonly used in Türkiye (Boz and Buluk Eşitti, 2021). Since the all-inclusive system is not a type of hotel but a pricing and marketing method, hotel establishments serving this concept are not classified separately in the statistics of the "Ministry of Culture and Tourism." For this reason, no official and numerical data regarding all-inclusive system hotels serving in Antalya could be found. However, Antalya was chosen for this research, focusing on the reasons behind food waste in all-inclusive hotels and methods for reducing waste in these establishments, due to its ranking as one of the most visited cities in the nation and the world, as well as the vast majority of hotels located there.

The semi-structured interview technique, one of the qualitative data collection techniques, was preferred for data collection. This technique was preferred because the researcher could guide the interview by asking other relevant questions to the participants that weren't included on the interview form during the sessions (Turnuklu, 2000). Before the data collection process, a study group (n = 21) consisting of general managers, food and beverage managers, executive chefs, sous chefs, and quality managers of nine 5-star hotels in Antalya was determined. The establishments were chosen since they are physically accessible for the research team, and the authors have the possibility of personal contact with officials of these hotels. The purposeful sampling method, one of the non-random sampling methods, was used to determine the study group. The demographic characteristics of the participants are explained in Table 4.

Table 4. Demographic Characteristics of the Participants (n=21)

Gender	Number	%
Female	7	33.34
Male	14	66.66
Job Title		
Hotel Manager	5	23.80
Assistant Hotel Manager	1	4.76
F&B Manager	2	9.54
Executive Chef	3	14.28
Sous Chef	3	14.28
Operations Manager	2	9.54
Quality Manager	5	23.80
Education		
Postgraduate Degree	1	4.77
Undergraduate Degree	13	61.90
Associate Degree	3	14.28
High School	3	14.28
Elementary	1	4.77

Experience (Industry)	Number	%
1-5 years	2	9.54
6-10 years	4	19.05
11-15 years	5	23.80
16+	10	47.61
Experience (Current Company)		
1-5 years	7	33.34
6-10 years	6	28.56
11-15 years	4	19.05
16+	4	19.05

As can be seen in the table, general managers and quality managers were predominant among the participants. 71.4% of the participants have 11 or more years of industry experience. This enables a holistic approach to addressing the causes and solutions of food waste in hotels.

After the study group was chosen, a review of the literature was done to get ready with interview questions for the participants. The interview form utilized by Okumus et al. (2020) was consulted when formulating the questions, in addition to the data gathered from the literature review. Five demographic information questions, four questions about the general situation of food waste in the hotels, two questions about the causes of waste, one question about challenges and barriers to reducing food waste, and five questions about what needs to be done to prevent or reduce waste make up the interview form for this study. Appointments were made with the participants, and the interviews were conducted face-to-face. The confidentiality of the participants was guaranteed; the interviews were audio-recorded and then transcribed. Each interview lasted approximately twenty five minutes and was conducted in Turkish. Data saturation was reached through semi-structured interviews at the end of the data collection phase. The questions in the interview form are listed below:

An overview of food waste in all-inclusive hotels

1- Do you think there is food waste in hotels in general?

2- Do you think food waste should be reduced? (Yes/No)

3- In your opinion, how much of the food prepared in your hotel is wasted daily? Can you give a rate or quantity?

4- Which type of meals/foods are wasted more?

Causes of food waste

5- What do you think are the main reasons for food waste?

6- At what stage do you think there is more waste? (menu planning and purchasing, receiving and storage, product handling, food processing, ordering and service, consumption)

Challenges and barriers to reduce food waste

7- What are the obstacles/challenges to reducing waste?

Food waste reduction practices

8- What are the measures taken to reduce waste in your business?

9- What else do you think can be done?

10- How can technology be used to reduce waste?

11- What should employees do?

12- What should customers do?

In order to evaluate the collected data, the answers to semi-structured interviews were first transcribed and translated into English by the research team. Following the transcription, the data was analyzed with content and descriptive analysis techniques by determining categories and codes through the MAXQDA program. The data was then analyzed, following the question groups of the interview form, namely, "*an overview of food waste in all-inclusive hotels*", "*causes of food waste*", "*challenges and barriers to reduce food waste,*" and "*food waste reduction practices.*" Eventually, key themes and codes were identified and expressed through tables and direct quotes from participants' responses.

4. FINDINGS and DISCUSSIONS

4.1. An Overview of Food Waste in All-Inclusive Hotels

The responses provided to each question underwent a qualitative content analysis in accordance with the interviews carried out as part of the study. Direct quotes from participant responses are used to convey the findings. When the research data were analyzed from the viewpoint of the employees, it was seen that all of the participants largely agreed that food waste occurs in hotels. They emphasized the importance of negative environmental impact, cost savings, social responsibility, and customer satisfaction in reducing food waste. While participants pointed out that food and energy costs have increased in recent years, they stated that developing various strategies and sustainable practices to reduce food waste is important for both the environment and businesses. For example, one participant, a hotel manager with 33 years of experience in the tourism sector, stated the following:

"There is already a hunger, hyperinflation and resource problem in the world. Especially in these days when access to food and safe food is difficult, we need to reduce food waste by using resources carefully. It is very important to reduce food waste at a time when costs are increasing."

Participants generally emphasized the increasing costs of food production and the costs caused by wasted food. A food and beverage manager stated the following when asked why food waste should be reduced:

"Recent researches show that there is a 100% increase in food and beverage costs in hotels in Türkiye. Considering these increases in food and beverage service, which is an essential service for a hotel, food waste is a cause for concern."

These findings indicating the increasing food and beverage costs and costs of wasted food in hotels are consistent with previous studies (Okumus, 2020; Demetriou, 2022). Furthermore, Okumus et al. (2020) discovered that, in their research on all-inclusive hotels, food and beverage expenses were in second place to personnel expenditures.

In general, participants in the interviews indicated that it is difficult to quantify the amount of wasted food. Respondents reported that the amount of food waste can vary depending on a few factors, such as the size of the hotel, accommodation capacity, guest profile, and operational policies. However, in general, respondents indicated that approximately 20–30% of produced

food is wasted in hotels. One of the participants, a quality manager with 10 years of experience, stated that:

"We are very experienced in this. We have control over food production. We cook as much as the guest takes from the buffet. We serve à la minute (quick meal cooking system) and many products are semi-finished. With the blast chiller, we can cool unused, untouched foods very quickly, bring them to the center temperature very quickly and reuse them. So, we are very good at this. But despite this, even in this hotel, there is around 20% food waste."

The research findings also reveal that bakery products, salads, fruits, and vegetables cause more food waste. Among the interviewees, the statement of an executive chef with 30 years of experience on this issue is noteworthy:

"During the peak season we face about 3 tons of food waste per day. The waste generated varies according to the customer profile we host. As we are a hotel with 1100 rooms, we host guests from 20 different nationalities. However, in general, we encounter more salad and fruit waste. For example, guests buy a fruit, eat half of it and leave the other half on the table, causing waste."

4.2. Causes of Food Waste

During the analysis of the data, the answers given to each question were subjected to qualitative content analysis. Factors affecting food waste in all-inclusive hotels were categorized into main themes and coded according to the opinions of the participants. Findings are expressed through tables and direct quotes from participants' responses. Table 5 presents the general framework of the causes of food waste around three main themes, namely management activities, guest characteristics, and kitchen operations.

Table 5. Causes of Food Waste

Main themes	Codes
Management Activities	Open buffet system
	Seasonal staffing
	Errors in menu planning
	Improper storage
	Food with expired shelf life
	Diversity of guest portfolio
Guest Characteristics	Lack of individual responsibility
	Lack of information
	Dietary habits
	Socio-cultural differences
Kitchen Operations	Preparation of special menus
	Meals prepared for large groups
	Freshly prepared meals
	Lack of training for staff
	Lack of individual responsibility of staff

According to Table 5, the first theme was identified as "management activities." Under this heading, the most frequently cited causes of food waste were specified as: open buffet systems, seasonal staffing, menu planning errors, improper storage, food with expired shelf life, and diversity of guest portfolios. As a result of the interviews, it was revealed that all of the participants agreed that the open buffet system was the main reason for food waste in hotels. The findings also reveal that food waste is inevitable in a hotel operating with full-board and open buffet systems. This information is in line with the literature that indicates buffet service as one

of the main causes of food waste (Tekin and Ilyasov, 2017). The following is an example of participants' arguments regarding the food waste caused by the buffet system.

"The buffet system allows guests to take as much food as they can on their own plates. This can lead to guests taking more food than they consume and then wasting unused food."

An executive chef also said the following to point out that the buffet system is one of the reasons for waste:

"In the all-inclusive system, guests who come to the accommodation establishment with a single price are offered food and beverages in the form of open buffet service, but they cannot finish the food they receive, which constitutes the most important dimension of waste."

Participants also stated that food waste was caused by errors that the food and beverage responsibles made in menu planning. In the all-inclusive hotel management system that serves mass tourism, the guest profile has a multinational structure. This multinational structure brings various difficulties to the menu planning phase. Visitors from different nations prefer different foods for different meals. Correct menu planning is important to prevent food waste in buffets prepared for visitors of many different nationalities at the same time. For example, an operations manager said:

"One of the reasons for food waste is wrong menu planning. The guest portfolio is very complicated. For example, a British guest comes in the morning and wants grilled mushrooms, but a Turkish guest does not want it for breakfast. A Russian guest comes in the morning and eats raw fish, the other guest wants something else. When a guest takes it, even to try it, the food goes to waste. Therefore, menu planning becomes difficult. Even if there are a few foreign customers who will eat from the buffet that day, dishes specific to their cuisine are prepared for them. These dishes are not preferred by other guests. If the guest does not choose these dishes prepared for him, the food becomes wasted."

The second theme of the causes of food waste identified in Table 5 is "guest characteristics." Under this theme, the most emphasized causes by participants were: lack of individual responsibility, lack of information about food waste, dietary habits of guests, and socio-cultural differences among guests. Participants also stated that there is a relationship between the unlimited service of the buffet system and the attitude of the guests. For example, a food and beverage manager with 20 years of experience stated that:

"Some guests are not aware of food waste and resource used. The guest's profile, cultural background, eating habits and income group play an active role in food waste. For example, a European tourist visits the buffet first, decides what to take and takes as much as he/she can eat. If he/she is not full, he/she can return to the kiosk. However, uninformed guests come to the buffet, try to have everything and go back to the table. Afterwards, their food are left on the plates. Frankly, I don't think they care that food is wasted and resources are scarce because they pay in advance."

The findings of the study regarding guest characteristics (e.g., behavior, awareness, and expectations) that cause food waste are parallel to studies conducted in this field (e.g., Talwar et al., 2021; Gannon et al., 2022). Likewise, Lyndhurst (2007) found that young people waste more than older people, while WRAP (2010) found that low-income individuals waste more food because they tend to "live from day to day" and less organize their shopping. However, Rathje and Murphy (2001) determined that Mexican households in the United States waste less food than Anglo-American households.

According to Table 5, the last theme among the causes of food waste is "kitchen operations." In line with the answers given by the participants, the codes that cause food waste in kitchen operations were determined as: preparation of special menus, meals prepared for large groups,

freshly prepared meals, lack of training for staff, and lack of individual responsibility of staff. Participants stated that food waste in kitchen operations is approximately 5–10% of the total food waste. They pointed out the reason for this waste as the employment of seasonal personnel. The seasonal staff causes food waste due to their lack of training and kitchen experience. For example, a kitchen chef said that:

"Food waste throughout the food supply chain is lowest in kitchen operations. However, food waste can occur in kitchen operations, especially during busy seasons. Because we sometimes have to employ unqualified personnel. It may take time to provide the necessary training. For this reason, even a small amount of food waste can occur in kitchen operations."

Food waste in hotels can often occur at several stages of kitchen operations. Inaccurate demand forecasting or faulty inventory management can lead to the onset of food waste in hotels. Overbuying or extending the shelf life of food ingredients can lead to waste at the stock stage. In the food preparation and cooking stages, preparing the wrong quantities or overproducing to meet customer demands can increase waste. In addition, the short shelf life of food prepared fresh every day in some hotels can also increase the risk of waste at this stage. In the study, participants mentioned perishable food as a contributing factor to food waste. They also mentioned that often, overordering for large gatherings can result in expired products. For example, an executive chef with 23 years of experience said that:

"Some hotels may have food prepared fresh daily. These foods may have a limited shelf life and may spoil before they are used, increasing the risk of waste. They may also offer a wide range of menu options to respond quickly to special meal requests. However, where the ingredients used in these special menus are not requested, there can be waste. Food prepared for large conferences, meetings, or events can also be wasted if the number of guests is lower than expected."

4.3. Challenges and Barriers to Reduce Food Waste

Table 6 is based on participants' views on the challenges of reducing food waste. Centered on three primary themes, codes were created in line with the participants' responses. The study's findings highlight a number of interconnected obstacles to reducing food waste in hotels. The barriers faced to preventing food waste in all-inclusive hotels are similar to the causes of food waste stated in Table 5. The challenges of preventing food waste in all-inclusive hotels are stated in three main themes, namely management activities, guest characteristics, and kitchen operations, in Table 6 below.

Table 6. The Challenges of Preventing Food Waste in All-Inclusive Hotels

Main themes	Codes
Management Activities	Open buffet system
	Demand forecasting challenges
	Cost Increases
	Legal procedures and hygiene standards
	Waste management
Guest Characteristics	Customer satisfaction
	Unconscious consumer
	Cultural differences
	Demographic characteristics
	Diversity of customer portfolio
	Dietary habits
Kitchen Operations	Shelf-life restrictions
	Preparation of special menus
	Inexperienced and untrained staff
	Unconscious staff

Hotels working on various strategies and solutions to achieve sustainability goals and reduce food waste face many challenges, as shown in Table 6. When these challenges are analyzed from a "managerial perspective," factors such as the open buffet system, demand forecasting challenges, cost increases, legal and hygiene standards, and waste management come to the fore. Making accurate forecasts about demand in hospitality businesses is a challenging task. Unpredictable throughput can lead to overordering, which can result in waste. As a hotel manager with 30 years of experience, put it this way:

"Sudden changes in guest numbers or unexpected circumstances can make accurate demand forecasting difficult. This can lead to overstocking and increased waste. Some fresh ingredients have a short shelf life and need to be used and processed quickly, so over ordering can lead to food waste."

Producing food in hotels in accordance with various standards is an important advantage for increasing production quality. However, complying with legal procedures and hygiene standards in production can sometimes pose an obstacle to preventing food waste. Filimonau and Delysia (2019) stated that food safety standards are a barrier to the implementation of food waste initiatives. In the study, a general manager with 30 years of experience stated on this subject that:

"In order to comply with food safety and hygiene standards certain procedures have to be followed. As a result, the implementation of procedures may require more preparation, which can increase waste."

As a result of the interviews with the participants, it was found that they talked a lot about cost increases in food production. Stating that food waste also increases costs, the participants suggested adopting sustainable practices to decrease food waste and sustain their operations. In this regard, an assistant general manager with 35 years of experience said the following:

"Initiating sustainable practices and implementing technological solutions to reduce food waste can initially incur additional costs. Business owners are hesitant to implement such solutions due to the increased costs."

According to Table 6, the second theme of the challenges of preventing food waste is "guest characteristics". In the study, all of the respondents cited guests as the main reason for the challenges encountered in reducing food waste in all-inclusive hotels. Under this theme, the most emphasized challenges by participants were: customer satisfaction, unconscious consumers, cultural differences among customers, demographic characteristics of them, diversity of customer

portfolio, and their dietary habits. The main purpose of accommodation businesses is to ensure customer satisfaction. Customers want to benefit from all of the services offered in an unlimited way when they stay in all-inclusive hotels. Food waste results from open buffets that are set up with the intention of satisfying guests. Kallbekken and Saelen (2013) stated that ensuring customer satisfaction in hotels is valued above environmental sustainability. In businesses that prioritize customer satisfaction, the fact that the open buffet system causes food waste is ignored. A participant who participated in the interviews as a chef said the following:

"Open buffet systems allow guests to take as much food as they can on their own plates and people often choose from a generous menu and may prefer large portions. Hotels that want to ensure customer satisfaction can become hesitant to move to smaller portions or controlled menus."

Similar to the results of this study, Okumus (2020) found that buffets generate a lot of waste and that guests eat without caring that food goes to waste. Furthermore, Bharucha (2018) reported that about 30% more food is prepared in restaurants to ensure potential customer satisfaction and considered this a negative attitude towards food waste. According to Goh et al. (2022), guests anticipate value for their money, and hotels constantly strive to provide more in order to satisfy them.

The last theme of the challenges of preventing food waste, identified in Table 6, is "kitchen operations." Participants stated that kitchen operations have a relatively smaller share of the food waste generated in all-inclusive hotels. The findings of the study indicate the challenges during kitchen operations as: shelf-life restrictions in products; challenges in preparation of special menus; and inexperienced, untrained, and unconscious staff. Hiring seasonal workers is a typical practice in the tourism industry, particularly during the peak tourist season. Employees hired at the busiest time of year are frequently unskilled and inexperienced. Inadequate training duration results in food waste in hotel kitchens since food is handled and stored improperly. As one executive chef said on the subject:

"The lack of education among staff on the importance of food waste and waste decreasing strategies makes an effective waste reduction program useless and difficult to realize."

Assessing the training of food sector workers, Gomes-Neves et al. (2007) highlighted the lack of professional knowledge of staff and noted that they lacked basic information and understanding of hygiene standards, food safety regulations, and microbial hazards. In addition, similar to the results of this study, Principato et al. (2018) stated that food waste occurs due to improper processing and preparation of food in kitchen operations.

4.4. Food Waste Reduction Practices

Within the scope of the study, participants were asked about measures that can be taken to prevent / reduce food waste. In line with the answers received, most of the participants stated that it is difficult to prevent food waste due to the large customer portfolio and the open buffet system in all-inclusive hotels. In addition, the strategies implemented by the participants to reduce food waste and their suggestions on this issue are listed in Table 7. The table illustrates the tips to reduce food waste coded under three main themes, namely management, staff, and guests. Accordingly, measures that the hotel management can take and, the strategies that they can generate to reduce food waste, and the contribution of employees and guests to these actions were categorized.

Table 7. Tips to Reduce Food Waste in All-Inclusive Hotels

Main themes	Codes
Management	Efficient open buffet management
	Better demand forecasting
	Better menu planning
	Education programs
	Recycling and composting
	Donation programs
	Allergen coding
	Technological applications
Guests	Conscious orders or use of open buffet
	Sensitivity and awareness
	Reporting special diets and requests
	Sharing food
Employees	Training and awareness
	Good stock management
	Portion control
	Real-time feedback
	Open communication
	Treats and promotions
	Recycling and waste management
	Staff feedback

As can be seen from Table 7, the first theme of tips to reduce waste is "management." Accordingly, the food waste reduction practices that the hotel management can implement are listed under the codes section. The research participants agreed on several management strategies to reduce food waste, such as efficient open buffet management, improved demand forecasting and menu planning, educational programs to raise public awareness of waste management, the use of technology applications, donation programs, recycling, composting, and allergen coding to reduce food waste.

According to the results of the research, participants agreed that the open buffet service in hotels serving the all-inclusive system is the main cause of food waste. An essential feature of the all-inclusive system is the buffet service, which allows visitors to take advantage of the free services that are included in the cost of their overnight stay and provides them with unlimited food and beverages from open buffets. In this regard, participants share the same opinion that it is not possible to completely eliminate the open buffet service in order to reduce food waste. However, proper management of open buffets can be a solution to reduce waste. At this point, they stated that an application used as a precaution during the COVID-19 pandemic will provide an advantage in buffet management. Thanks to the service personnel assigned to buffets, the practice of serving the customers instead of letting them take their own food from the buffet was widely used in all-inclusive system hotels during the pandemic period. Participants stated that because of this practice, they observed that guests tend to ask for less food than they would take on their own, and that this reduces the waste caused by food taken in large portions and not consumed. The statement of the hotel manager among the participants is striking in this regard:

"Actually, food waste decreased a lot during the pandemic. When the pandemic first started, we had closed the buffets, we were serving the food. The guest could not ask for more, they were embarrassed. When we serve the meals, the guest cannot get too much food. Maybe this method can be applied again."

Demand forecasting is a very important technique to reduce food waste (Gössling et al., 2011). Even though participants acknowledged that it can be challenging to estimate guest demands,

particularly during peak seasons, they also noted that more accurate demand projections can be developed to minimize food waste. Poor demand forecasting is an incorrect management technique that leads to waste (Pirani and Arafat, 2016), and with effective demand management, food waste in hotels can be reduced by 75% (Engstrom and Carlsson-Kanyama, 2004). According to the analysis of the interviews, as well as better demand forecasting, buffet management, staff training, portion control, awareness, recycling, and composting, these are also the strategies that all participants have implemented or recommended to reduce food waste. A sample statement made by a participant who is a quality manager with 13 years of experience in the hotel industry is as follows:

"Making more accurate demand forecasts and optimizing stock management based on factors such as guest numbers, seasonal influences and special events can reduce food waste. In particular, kitchen staff should regularly check stocks and ensure that fresh ingredients are used first. Impending expiration dates should be monitored, this is critical for waste control."

Composting food is one of the last options for managing wasted food, but when done correctly, it minimizes costs and environmental effects (WRAP, 2013). In the study, participants shared the common opinion that waste would be minimal and environmental impact could be reduced by using sustainable waste management systems such as recycling programs and composting organic waste. The findings of the research on this subject are consistent with previous studies (e.g., Radwan et al., 2012; Okumus, 2020; Okumus et al., 2020; Demetriou, 2022). The opinion of a quality manager with 9.5 years of experience on the subject is remarkable.

"We are waiting for the compost machine to eliminate food waste. Currently, there is no such opportunity, the municipality does not compost, it buys and disposes of Integrated Solid Waste Management Systems (ITC). The zero-waste regulation of the government has been published, but the stages have not been published yet. We are currently at the basic level. The criteria will be three phased: bronze, gold and platinum. Once it reaches platinum, it will be composted and create zero waste. Food waste will be completely eliminated."

According to the results about tips to reduce food waste, a significant part of the participants stated that donation programs could be important from a managerial perspective in preventing food waste. This finding is parallel to the study of Okumus (2020). Among the participants, a hotel manager with 35 years of experience stated that:

"Donating food scraps to social responsibility projects or local charities can contribute to reducing food waste."

Food allergies include a variety of diseases caused by adverse immunological reactions to dietary antigens, and this category of diseases can cause acute, sometimes lethal reactions as well as a range of chronic disorders affecting primarily the skin and digestive system (Sicherer, 2002). For this reason, some participants reported that in order to reduce food waste, food ingredients should be presented to guests and information should be provided to guests with allergen coding. For example, a hotel assistant manager with 35 years of experience said:

"People go to a hotel buffet, but they do not know the ingredients of the dishes. The number of people who have allergenic reactions to different food groups in the world is increasing by 1-2% on average. Allergen is also among the sustainability criteria. Allergen warnings have now become a standard. We have taken this practice a little further. The receptionist asks every guest who comes to the hotel whether they have allergens. We give the allergen information form, which we have prepared in 4 languages to the guests with allergies. We have also added a section called allergen coding under the food names in the buffets. For example, if there is flour in the food, it is written as 1, if there is milk, it is written as 4. In this way, the

guest with allergies does not take that product and we prevent food waste with allergen coding information."

Participants also noted that technological advances can help prevent food waste. In this context, they listed the practices related to the use of technology in reducing food waste as: stock management programs, demand forecast analyses, menu optimization, smart refrigerators and warehouses, mobile applications, guest information screens, recycling, and waste management applications. For example, a hotel manager, while drawing attention to stock and demand management in hotels, stated that:

"By using advanced inventory management software, hotels can better plan material purchases, track stock status in real time, and prevent unnecessary purchases. This can prevent overstocking and waste of spoiled materials. Additionally, artificial intelligence (AI) and machine learning (ML) can predict future demand by analyzing data. This can help hotels more accurately determine how much food they need to prepare."

An F&B manager said the following about the use of technology in food waste specifically for guests:

"Mobile apps, QR codes and information screens in restaurants can help guests review menus in important detail and avoid unnecessary food purchases."

As can be seen from Table 7, the second theme of tips to reduce waste is "guests." In the study, all of the participants stated that the most important factor in food waste in all-inclusive hotels is the behavior of the guests. Participants also stated that guests should be conscious when using the buffet, take as much food as they can consume, be aware that food waste is harmful in terms of resource use and environmental impacts, and share large portions. Some participants stated that guests should inform them of their special diets and requests in advance. For example, an operations manager with 21 years of experience said that:

"In buffet system, customers should take care to take as much food as they can fit on their own plates and avoid over-taking. Also, portions can be large in some restaurants. By sharing meals, customers can try a variety of flavors and avoid waste. Customers with special dietary needs or requests should indicate these needs in advance when booking or ordering. This helps hotels plan more accurately in preparation and minimizes the waste."

As Table 7 illustrates, the last theme of tips to reduce waste is "employees". In order to address the persistent issue of food waste in hotel operations, employee behavior modification is essential. Reducing food waste can be achieved by examining the effects of employees' work habits on the waste (Chawla et al., 2022). Therefore, chefs and kitchen staff in hotels need to be trained (Goh and Jie, 2019). All of the participants in the study agreed on the importance of staff training among strategies to reduce food waste. As the chef of 20 years puts it:

"In order for staff to be aware of food waste and resource use, employees should be trained on the cost of food waste, its environmental impacts, and why it is important in terms of social responsibility. Raising awareness is a start to reducing waste."

Goh et al. (2022) stated that using smaller portion sizes can prevent food waste caused by guests. While each guest is free to choose their own portion size, all participants in the study agreed that staff might offer advice to guests regarding portion sizes. For example, a F&B manager with 20 years of experience said:

"In our business, we cook meals using the à la minute (quick meal cooking) system. We also advise service staff to provide guests with appropriate portions and make suggestions about portion sizes, for example at meals served by staff, staff may ask customers if they would like a small or medium portion."

Another hotel manager stated the following about guiding guests' by employees while they are taking their food from the open buffet or being served to them:

"Guiding guests and influencing their preferences can help to reduce food waste. Giving suggestions to help them plan their meals better, and drawing attention with special offers and promotions can prevent unnecessary food order or food taking from the buffet ."

Emphasizing the importance of internal communication among employees to reduce food waste, the hotel manager said the following about real-time notification and staff feedback:

"If kitchen staff can receive real-time information about service status, they can respond to requests more quickly and accurately. This ensures that food is served fresh and hot. So it's not wasted by guests since it's not in proper condition. Creating a feedback mechanism that allows employees to share ideas and suggestions on waste in the workplace can also help businesses to find more effective solutions in reducing waste."

5. CONCLUSIONS AND IMPLICATIONS

This study was conducted to determine the reasons for food waste in all-inclusive hotels, the difficulties in preventing waste, and feasible solutions to reduce food waste in these businesses. When the findings obtained from the research are interpreted using a broad framework, it becomes clear that the all-inclusive concept and the open buffet service increase food waste in hotels. In all-inclusive hotels, food waste occurs at stages such as production, service, stock management, and menu planning. Guest demands and behaviors are also important reasons for food waste in these businesses. The findings and discussions that emerged from the views of the participants are supported by the theoretical and practical implications given below.

5.1. Theoretical Implications

Food waste involves more than just the loss of food supplies. Food is produced, processed, and transported using natural resources that are wasted, including water and energy. Food waste has an adverse effect on the environment because of the waste of water and land resources used in the production process, the formation of methane gas during the decomposition of organic waste, and its negative contribution to climate change. The literature generally agrees that food production has a high environmental impact and that reducing food waste will have a positive impact on the environment (Kummu et al., 2012).

Food waste can lead to increased costs and decreased profit margins in accommodation businesses. Hotel managers should develop sustainable strategies to reduce food waste. These strategies can include visions and goals to reduce the environmental and economic impacts of the enterprise. Since guests are among the main sources of food waste in all-inclusive hotels, it is theoretically necessary to raise their awareness on this subject. By increasing their knowledge and awareness of the possible results of wasted food, the eating behaviors of customers can be changed (Papargyropoulou et al., 2016; Filimonau and Delysia, 2019). For this reason, informative brochures, signboards, or other communication tools should be used to help guests develop more conscious consumption habits.

Although research findings show that hotel employees have little impact on food waste, training staff on how to reduce waste is of great theoretical importance (Rebouças et al., 2017; Okumus, 2020). Training programs on proper stock management, effective kitchen operations, and conscientious service can help staff gain competence. Especially the participation of seasonal staff in training programs can be very important in reducing food waste in all-inclusive hotels. In addition, hotel businesses need to systematically monitor and analyze food waste. This

monitoring and analysis can help the business understand the causes of waste and create effective solutions.

5.2. Practical Implications

The findings of this study show that food waste is significantly increased by all-inclusive hotels, as they provide open buffet service with a variety of dining options. In particular, to keep up with guest demands, keeping various meals ready at all times and offering a wide menu of options at open buffets cause unnecessary food production and waste. The study made an effort to determine the causes of food waste, possible preventative actions, and the challenges regarding prevention. By examining these findings, hotels can generate more efficient menu planning and food management strategies to reduce food waste and its negative effects. Specifically.

- Businesses can prevent unnecessary purchases by improving their demand forecasts.
- They can keep close stock tracking to prevent overstock.
- Previous studies found that consumer behavior is the main source of food waste in all-inclusive hotels (Okumus, 2020) and emphasized the importance of plate dimensions (Betz et al., 2015; Okumus, 2020; Okumus et al., 2020). For this reason, to help guests make more informed choices, buffets can offer smaller portions and frequent meals.
- In order to minimize food waste during the production and processing phases, effective planning and preparation processes can be implemented in kitchen operations.
- Guest communication can be given importance in order for guests to consume more carefully.
- The portion of discarded food that is inedible can end up in non-recycling operations, where it can be most effectively transformed into new goals (Pleissner, 2018). In order to reduce the environmental impact of food waste, solutions can be produced by integrating organic waste into recycling or composting systems.

Considering that staff is the main factor in the food production and service processes, it is necessary to train staff on food waste and support their continuous development in conscious practices. The number of deprived individuals in need of basic needs, including food, is increasing (González-Torre and Coque, 2016). For this reason, as a social responsibility, unwasted and usable food can be delivered to those in need by participating in local donations and programs. Implementing these recommendations can help prevent food waste in all-inclusive hotels and create a sustainable business model.

6. LIMITATIONS AND FUTURE RESEARCH

This study has certain limitations. For instance, the data collected cannot be generalized because the study was prepared using a qualitative approach. The findings of the study are limited to the opinions of the interviewed hotel employees. Another limitation of this study is that it deals with 5-star and all-inclusive hotels in Antalya. Future research may be carried out in different types of hotels (4-star, 3-star, resort, etc.) to compare the results. Secondly, a longitudinal study can be carried out by focusing on the behavior and attitudes of guests in all-inclusive hotels. A quantitative approach can be presented by obtaining data through surveys with hotel managers, guests, or employees.

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