



Issue no: 1 | Vol no: 6 | February 2024: 1-13

The contribution of food waste management on hotel sustainability in Kenya

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Article History
Received: 2023-12-23
Accepted: 2024-01-08
Published: 2024-02-29

Cite this article in APA

Ndung'u, M. W., & Magaju, P. (2024). The contribution of food waste management on hotel sustainability in Kenya. *Editon consortium journal of business and management studies*, 6(1), 1-13. <https://doi.org/10.51317/ecjbms.v6i1.465>

Abstract

This study sought to find out the contribution of food waste management on hotel sustainability in Kenya. For a long time, food waste has remained a global challenge from its collection to its disposal. Food waste has a great impact on the overall business revenue and the environment. In the hotel industry, food waste is a major concern to management, and they are keen on looking for the best ways to reduce food waste. Hotel sustainability will remain uncertain if food waste is not addressed; the hotels will continue to incur additional operational costs and still degrade the environment. Empirical evidence from developed nations has concentrated on food waste management from an emerging economic perspective. Therefore, this article presents the current state of food waste in the hospitality industry from a sustainability perspective. It employs systematic review achieved through searching, evaluating, and synthesising peer-reviewed articles related to food waste and hotel sustainability in the hospitality industry. This study identified various journals with quantitative, qualitative, mixed method and experimental approaches, which were published in different journals. The study findings indicated that food waste management not only significantly influences the sustainability of hotels but also changes the image of the hotel industry by reinvigorating new practices, measures and indicators of best practices in managing the environment and social and economic aspects of nature. The outcome of this study is expected to disclose food waste patterns, causes, and preventive measures in the hospitality sector that can enlighten future research as well as inform policymaking concerning food waste.

Key words: Causes of food waste, food waste management, food waste, hospitality establishment, sustainability.



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INTRODUCTION

Developing nations have encountered food shortages on an annual basis combined with large quantities of food waste. Food waste represents an unsustainable system that is linked to every stage of the human food supply chain and food production, ranging from harvesting to consumption level Rezaei (2017). According to FAO, food waste is a constituent of food loss that represents discarded food products at the consumer level for various reasons. Gustafson (2019) provided four main reasons for increased food waste in the food sector and hospitality, namely surplus purchase, supplying large quantities of low-demand consumable foods, the poor perception among individuals towards leftovers at the household level, and unrelenting appetite for surplus yield. These reasons have adversely influenced the quantity of food supplied, the quality level of food service provided in the hospitality establishment, and the quantity of food discarded.

Based on a report presented by FAO on the different states of food and level of agricultural production

around the globe (Gustafson, 2019), it was observed that 14 per cent of the food produced is wasted during the post-harvesting process before reaching the retail stage of the food supply. This is incomparable to 33 per cent of all the food produced, which is lost or wasted annually (Rezaei & Liu, 2017). To address this problem, the United Nations (UN) proposed the goal of reducing the wastage of food by 50 per cent by the year 2030 as part of its sustainable development goals (SDGs). However, according to Gil et al., 2019, the latest projections on food waste indicate that restaurants' operations have adversely contributed to the growth of food waste at a global scale. Critical hotel operations that were identified by Papargyropoulou et al. (2019) that have increased food waste are preparation and cooking processes in the kitchen, accounting for 45 per cent; food spoilage resulting from poor storage methods representing 21 per cent and food debris from customers' plates representing 34 per cent of food waste, as illustrated in Figure 1 below.

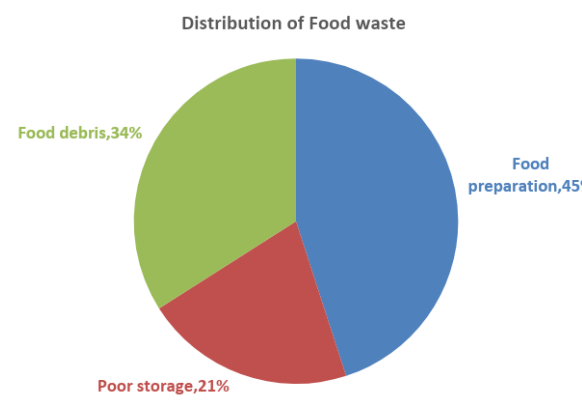


Figure 1: Critical Processes in Hotel Operations Contributing to Food Wastes. Sourced from Papargyropoulou et al., 2019

As a preferred destination by most tourists around the globe, the hospitality sector in Kenya has witnessed an expansion in its hotel operations, which in turn has contributed to the generation of more food waste from hotel operations. Empirical evidence related to food waste has concentrated on how to achieve food security through sustainable agricultural activities and active support for small-scale farmers (Were & Maranga 2018). Additionally, research on food waste from hotel operations has

provided different methodological approaches and contributions; however, these studies have demonstrated the absence of sufficient evidence on how, why, how much and the specific foods that are wasted in Kenya's hospitality sector and how they can be reduced (Palmisano et al., 2021). Therefore, this study concentrates on the current state of food waste in the food sector and hospitality from a sustainability perspective. This research intends to examine how food waste has affected hotel

sustainability with respect to the degradation of the environment, inappropriate procurement practices, and the absence of sustainable food practices.

Apart from contributing to extant literature, the outcome of this study is expected to provide evidence on how and how much food waste has affected hotel operations. Additionally, the study is expected to identify the specific food items that have increased food waste and its associated costs in Kenyan hospitality establishments. Finally, the study will provide appropriate solutions that can be used to reduce the waste of food in the hospitality establishment.

LITERATURE REVIEW

Hospitality establishments comprise different establishments that provide food and drinks as a quick service for immediate intake outside the home environment, such as restaurants, hotels, and staff catering, among others. These establishments are considered to offer different cuisines that take the form of eat-in or takeaway at different locations. A survey of the existing literature linked to the many categories of establishments in the hospitality industry indicates that it has been perceived to possess both commercial and social aspects (Dhir, 2020). Sundt, 2012 also differentiated hospitality establishments in terms of the sectors that influence their operations, namely the profit and cost sectors. This suggests that hospitality establishments can be differentiated based on the service they offer; for instance, the profit sectors provide food and drinks, such as hotels and restaurants, among others, while the cost sectors offer food and accommodation, such as institutions of higher learning and healthcare centres, among others.

From this context, the sources of food waste in the hospitality sector are different for the profit and cost sectors. For example, hotels and restaurants easily accept food donations, while healthcare centres trade with caution due to the risk associated with these sources of food and possible infection that might arise. Learning institutions provide meals to students at a subsidised rate using leftovers, while restaurants and hotels cannot offer leftover foods as a service due to the existing quality standards and food safety regulations.

As a result, the different categories of establishments in the hospitality industry have adversely contributed to an increase in food waste through different methods. This has been influenced by several factors that affected the rate at which hospitality establishments contribute food waste to the environment, such as the type of restaurant, food debris left by the customers on their plates, inefficient food safety measures, poor implementations of regulations, presence of different food varieties for customers to choose from, profit maximisation among others.

Existing literature indicates that food waste from hotel operations has tremendously increased, becoming a source of concern for many given the fact that its contribution to the aggregate food waste is immense (Tostivint et al., 2016). This has been attributed to current procurement practices that have been adopted in the hospitality sector in order to maintain a high standard of quality. A review of current literature has concentrated on food waste from household consumption; literature studies on restaurant food waste seem to be lacking even though the hospitality industry continues to form a critical part of the economy (Wang et al., 2017). As a result, food waste has negatively affected restaurants' operations, which has, in turn, affected efforts to address food security, as well as caused a loss of potential revenue for the hospitality industry. With the rate at which many customers have adopted the out-of-home dining trend, restaurant managers have not been able to develop effective mechanisms that can reduce food waste from restaurants' critical operations (Wang et al., 2017; Reisch et al., 2012).

Owusu et al. (2023) investigated the Carbon Footprint of Food Waste at Classified Star Hotels in Nairobi City County, Kenya. They found out that 83.33 per cent of the hotels wasted an estimated volume of 11-30 kg of food daily, averagely translating to 27.5-75 kilograms of CO₂ equivalent emitted into the atmosphere daily.

Sucheran and Olanrewaju (2021) explored food waste management of restaurants in KwaZulu-Natal, South Africa. The findings revealed that even as restaurants are involved in some forms of food waste management practices, they are faced with many

challenges. The main challenge preventing effective food waste management practices is the lack of awareness of the importance of monitoring food wastage. Therefore, using better technology can be one way of reducing the time to monitor and measure food waste. That food waste can be beneficial to the environment and needs consideration.

Kim and Hall (2020) investigated whether sustainable restaurant practices enhance customer loyalty and the roles of value theory and environmental concerns. They found that sustainable restaurant practices as a second-order construct of food sustainability and waste reduction influence utilitarian values. Sustainable restaurant practices also positively influence diner behaviour as a second-order construct of participation in waste reduction practices and loyalty to sustainable restaurants. Diner behaviour is affected by hedonic/utilitarian values on waste reduction, which are moderated by environmental concerns.

Existing Methods for Addressing Food Waste

Multiple fiscal, social, and environmental indicators demonstrate how the current food practices and procurement practices in hotels and restaurants have massively contributed to an increase in food waste (Tansel et al., 2021). For quite a long time, the capacity of hospitality establishments has been questioned on how they can address food waste towards the achievement of hotel sustainability. Although a wide scope of literature on sustainability has concentrated on environmental issues while maintaining economic development, it is essential to

examine holistically how food waste has affected the sustainability of hotels in terms of procurement practices, customer demands, hotel operations, and its financial implications.

Lindgren et al. (2018) presented a human health scope of sustainable food practices from a hospitality perspective that can reduce food waste by altering the behaviour of customers using appropriate technologies. This view has concentrated on critical decisions made by customers in relation to food choices based on menu practices and nutritional requirements. From this context, hotel sustainability has often been promoted as a promising concept through effective menu practices, procurement practices, and the ability to address environmental impact.

A review of the literature indicates that a broad range of methods and strategies have been employed in the hospitality industry to address food waste (Dhir et al., 2020; Sundt, 2012; Chawla et al., 2021). Some of the practical strategies that have been used to reduce food loss and waste include the adoption of storage facilities and supporting awareness campaigns, among others. Despite the application of these methods, most hotel and restaurant managers have not been able to solve the underlying causes of food waste resulting from hotel operations to a large extent. Additionally, existing literature has not been able to determine how and what type of food waste has impacted the sustainability of hotels (Dhir et al., 2020). Therefore, it is essential to establish how the methods employed by managers have impacted the

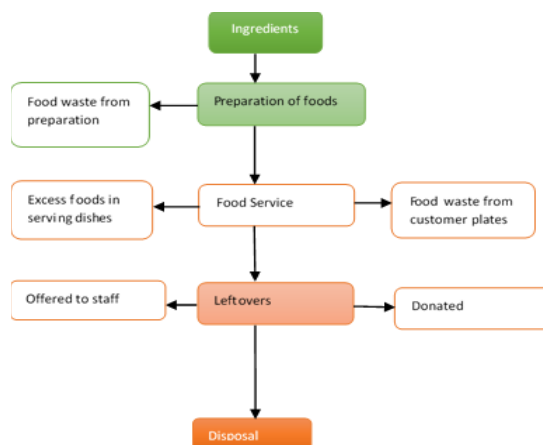


Figure 2: The Stages of Food Preparation and the Different Forms of Food Waste

operations of the hotel, which type of food has contributed to an increase in food waste, and what its cost implications are.

Factors Influencing Food Waste in the Hospitality Establishment

This sub-section reviews the main factors that have extensively contributed to increased food waste in the hospitality sector. A survey of the literature relating to food waste in hospitality facilities shows that it is created at different levels of the food chain, from the yields of agricultural production to food service (Tansel et al., 2021). In order to identify the main causes of food waste in restaurants and hotels, it is essential to consider the food preparation process in hospitality establishments.

Figure 2 presents the food preparation process in a hotel, from the purchase of ingredients to the disposal of leftovers.

Several sources of food waste exist during the process of food preparation and food service that are linked to hotel operation, namely the adoption of different culinary skills in the kitchen, preparation of foods in large quantities that are left in serving dishes, food left in customers’ plates among others, as illustrated in Figure 2. Additionally, the process

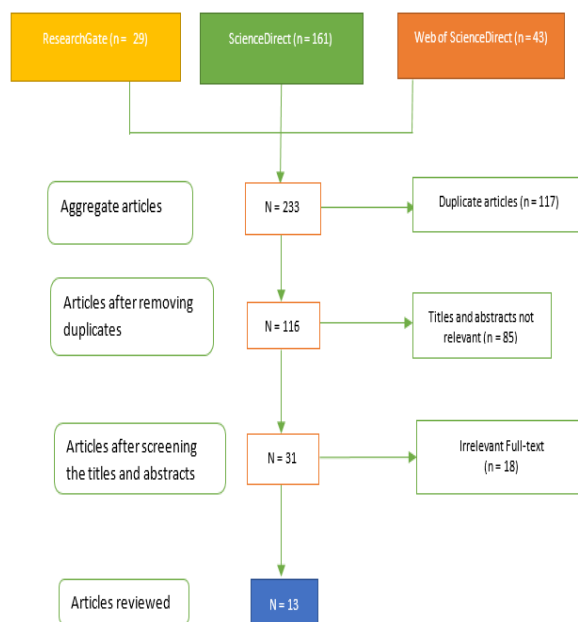


Figure 3: Prisma Flowchart of Selected Articles Indicating Food Waste in Hotel and Restaurant

has depicted some of the methods that have been employed to reduce food waste during food preparation from hotel operations. Some of the methods highlighted include donating and offering leftovers to staff before their expiry. Otherwise, disposal of leftovers is the preferred method of reducing food waste from hotel operations. A closer look at food preparation operations in hotels revealed that less effort has been directed towards reducing food waste Giles and Sophie (2014). Some of the

techniques for reducing food waste in hotel operations include converting food waste from early stages of food preparation to animal food and using food waste for energy production, among other forms of recycling.

Despite existing variations and differences in the methodological approaches adopted by hotel managers to address food waste, most literature studies have demonstrated the absence of sufficient evidence on how, why, how much, and what foods

have been wasted through hotel operations and what measures can be used to reduce its effects on hotel sustainability (Reisch et al., 2020). Very few hotel managers have managed to adopt these mechanisms for various reasons. These have been attributed to the inability to comprehend the recycling process and the cost implications on hotel operations with respect to recycling, among others. Additionally, existing literature studies have failed to take into account the specific types of foods that have significantly contributed to food waste from Kenyan hotels and restaurants (Were & Maranga 2018). This could be attributed to deviations in food preferences among customers from different ethnic backgrounds and variations in nutritional requirements (Chawla et al., 2021).

As a result, hospitality establishment managers have adopted different approaches when addressing food waste. A review of hospitality operations indicates the lack of a comprehensive solution that can solve the underlying problems affecting hotel sustainability in terms of institutional, employee or customer-based food waste at a national level Gil et al. (2019). In order to address food waste generated from hotel and restaurant operations, it is essential for this study to identify specific types of foods that are wasted, how they affect hotel operations, mechanisms that can be used to resolve food waste and some of the likely challenges affecting these mechanisms.

METHODOLOGY

This section presents the methods and procedures that are used in examining how food waste has impacted hotel sustainability. This qualitative research conducts a review of existing literature on how food waste has affected hotel sustainability. Four main research questions were formulated to evaluate the effect of food waste on hotel sustainability as follows: 1) What are the causes of food waste in hospitality establishments? 2) How has food waste impacted establishment sustainability with respect to their operations, procurement practices, and cost implications? 3) What challenges

have hospitality establishments faced while attempting to reduce food waste? 4) What approaches can be adopted to address food waste in hotels and restaurants?

The research efforts concentrated on peer-reviewed articles that offer information on food waste from profit sectors. We identified published articles, journals and government reports from several electronic databases using a set of keywords and titles limited to the period January 2000 to December 2020. This was expected to disclose the views of different authors concerning food waste and how it has affected hotel sustainability. Keywords that were considered in the review are food waste and food loss and a subsidiary classification that was intended to limit the output, as the majority of the articles found focused on restaurants, hotels, healthcare centres, and learning institutions, among others. This review was limited to hotels and restaurants only and peer-reviewed articles that had been published in the English language.

Several databases were screened to extract information related to food waste, namely Research Gate, Science Direct, and Web of Science. The titles and abstract resulting from each database search selected consist of 82 from Academia, 16 from Emerald, 58 from Research Gate, 12 from Wille, 28 from Erick SSRN, 4 from Foods, 62 from International Journal of Hospitality Management, 174 from Elsevier Journal of Cleaner Production, 26 from Journal of Tourism and Gastronomy Studies, 86 from Web of Science, 322 from Science Direct and 22 from Sage pub, which is equivalent to an aggregate of 1,219 articles. Further screening identified 327 duplicate articles from the databases, which were removed with the assistance of endnote and, as a result, 892 articles published in 12 peer-reviewed journals were subjected to thematic analyses presented in Figure 4, which presents a Bar Graph on study selection adopted during the assessment of the articles.

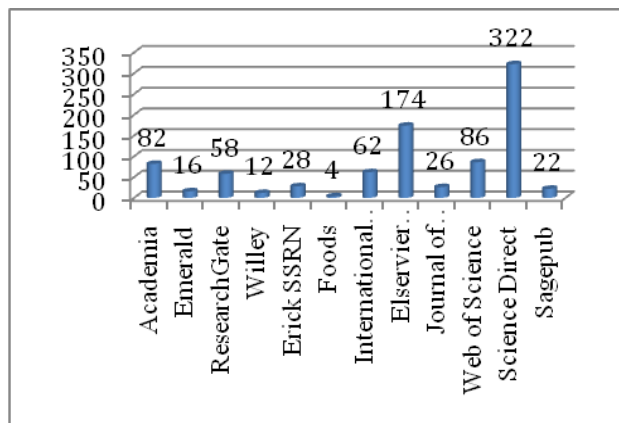


Figure 4: Distribution of Selected Articles by Journal Publication

Apart from excluding duplicate articles, 85 articles were also excluded from the review since their titles and abstracts were not relevant to the study. From the remaining 31 articles, 18 full texts were further excluded from the review since these full texts were irrelevant to food waste and food loss from the hospitality domain. As a result, 13 articles were identified for the review. Table 1 provides a literature summary of the articles identified in terms of the research context, weight per cent of food waste, types of variables used, and references.

During the analysis and interpretation of evidence obtained from selected articles, the study employed the use of a meta-analysis approach. This was meant to inform the sustainability of the intervention, especially when primary data from multiple studies was involved. However, analysis was dependent on the nature of the evidence, the outcome expected, and the reporting adopted. The study outcome concentrated on establishing how, why, how much, and the types of food waste have adversely affected

hotels' sustainability. This was achieved through the selection of papers that could effectively measure the sustainability of hotels' operations in terms of the size and precision of the intervention. Additionally, this was expected to inform the consistency, impact, generalisability, and applicability of the selected studies with respect to the research inquiries.

RESULTS AND DISCUSSION

The research profile of the selected studies mainly focused on descriptive statistics such as timelines, types of hospitality establishments that have been used, research design and method of analysis. Classification of the selected studies based on the year of publication indicated that the number of studies has relatively remained quite low at 10 per cent during the period 2000-2010 before increasing steadily, as illustrated in Fig. 1. Between the years 2011 and 2015, the number of studies increased to approximately 30 per cent and further 40 per cent during the period 2016-2020.

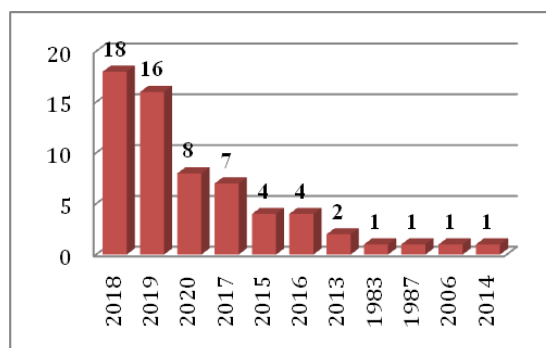


Figure 5: Classification of Selected Studies by Year of Publication

The study reviewed the major topic areas of case studies that consisting of a wide larger field, for example, destination marketing and management, economic development of destinations, dark tourism, structure and analysis of service and hotel industry, crisis management, motivation and experiences, cultural and heritage tourism, sustainable tourism,

stakeholder management, tourism governance, tourism planning and policy, innovation, sharing economy and interrelated fields like peer-to-peer accommodation, Airbnb, satisfaction, service quality, authenticity, and tourism education. The results of the review are presented in Table 1.

Table 1: Word Frequency Used by Research Context

Words	Counts
Tourism	44,669
Tourists	11,412
Hospitality Green Practices	10,426
Local	9,791
Travel	7,213
Hotel	6,962
Service	6,895
Visitors	6,680
Quality	6,556
Economic	6,526
Satisfaction	6,461
Experience	6,338
Value	5,730
Image	5,162
Food Waste Management	4,987
Marketing	4,973
Residents	4,485

The results indicate that approximately 155 266 words were profiled in the context of different frequency variables. However, tourism accounted for the larger frequency of word use, an indication of a greater literature-rich field, while food waste management was among the least represented frequencies, an indicator that it is still an emerging global study area and hence requires a greater focus to help identify theoretical and practical indicator measures to help in the operationalisation process.

Different kinds of hospitality establishments, such as hotels, restaurants, outdoor catering services, and ice,

among others, have been examined by scholars in the selected studies. Figure 2 presents a distribution of the studies based on the different establishments used and how they informed the outcome of their research. The results indicated that the majority of the studies had been conducted in restaurants at 33 per cent and hotels at 25 per cent, as compared to coffee shops/canteens at 5 per cent and hospitals at 5 per cent. However, some studies investigated a variety of food establishments, representing approximately 18 per cent.

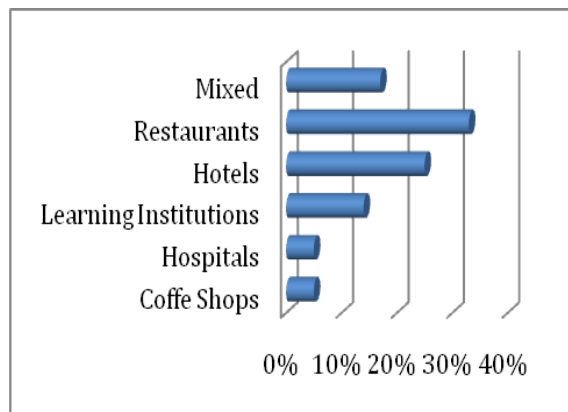


Figure 6: Establishment Used in Selected Studies

Lastly, this current study also reviewed the selected studies in terms of the research design and the method of analysis adopted. Figure 3 presents the research designs adopted by the researchers of the selected studies. The results revealed that the majority of the selected studies had adopted quantitative research, representing approximately 43 per cent. This was closely followed by mix30 per cent) and qualitative research desi22 per cent). However, the results indicated that very few studies

had adopted experimental research design 5 per cent. This is probably attributed to the complex nature associated with experimental research design. Additionally, it was noted that selected prior studies have employed common methods of analysis such as regression analysis (Linear, logit and tobit), parametric tests (ANOVA, t-test, and z-tests), non-parametric tests (chi-square and Manne Witney), and thematic analysis.

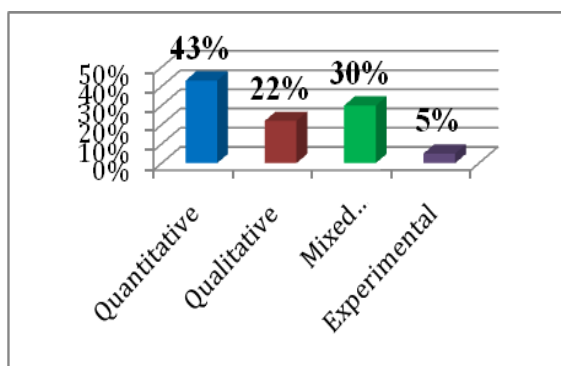


Figure 7: Research Design Adopted in Selected Studies

After reviewing various articles on food waste, the results revealed that 13 articles provided a sufficient account of how food waste is generated and how it impacts hotel operations, procurement practices, customer choices, and the environment. Additionally, the articles selected provided

mechanisms on how hospitality establishments have addressed food waste. Table 2 presents a sample of food waste proportions from customers and how different hotels and restaurants have managed to address food waste.

Table 2: Samples of Articles that have attempted to Address and Measure Food Waste Solutions

Article	Improvement observed	Solutions adopted
Were and Maranga (2018)	Food waste from customers' plates accounts for 12 per cent of the aggregate input.	Menu changes and design could positively impact food waste
Xue and Liu (2019)	After the implementation of the program, food waste was reduced from 128 to 98 g/cap/meal.	Changes to food offered in hotels could provide a way of reducing food waste.
Papargyropoulou et al. (2019)	Food waste has relatively increased the cost of food preparation, increasing the cost of most food services.	Appropriate policies were formulated, and menu items were Revised
Lindgren et al. (2018)	63% of the food used during food preparation in restaurants and hotels was consumed by customers, while 30% of the food was consumed.	Examination of the food wasted by type offered a method of reduction by altering foods used during preparation.

A closer evaluation of the selected studies provided sufficient methods that could be used to reduce food waste from hotel and restaurant operations. Some of the methods that were identified from the majority of the studies reviewed, as illustrated in Table 2 above, include understanding the specific type of foods that significantly contribute to food waste based on the hotel operations, when most of the meals are serviced, existing regulations and how they impact food demand, availability of different food varieties among others.

Additionally, the selected studies were able to provide an indication of how food waste has affected hotel operations in terms of cost. For instance, Papargyropoulou et al. (2019) estimated that food waste has resulted in approximately 23 per cent loss in food purchased. This has, in turn, resulted in increased costs for most services provided in the hotels and restaurants.

The selected studies were able to provide information on some of the types of foods that have contributed to food waste from hotels' operations. Figure 8 shows a pictorial depiction of the proportion of different types of foods served in hotels and restaurants that account for increased food waste. From the selected studies, the majority of the studies observed unavoidable food waste from hotel operations, representing approximately 80 per cent. This was attributed to the use of different culinary skills in the kitchen during food preparation. This was closely followed by vegetable/fruits and potato products representing approximately per cent and 35 per cent respectively. The least food type that contributed to food waste was meat/fish products, which accounted for approximately 11 per cent, as illustrated in the graph. This has been attributed to a higher demand for protein-based foods by the present population as compared to the adoption of a vegetarian-based diet.

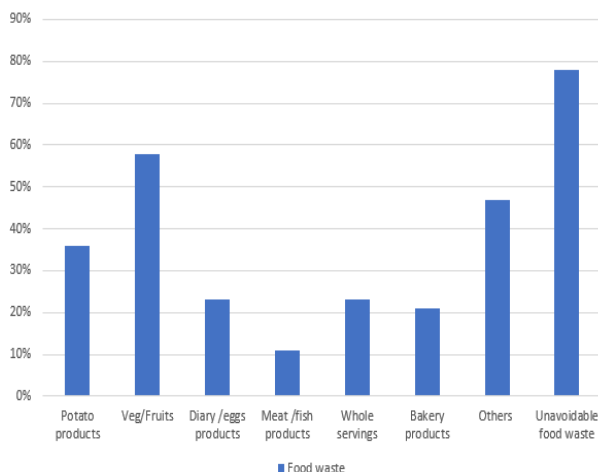


Figure 8: Distribution of Food Waste Based on Food Types in Most Kenyan Hotels and Restaurants

On the other hand, Dhir et al. (2020) attributed an increase in food waste to the ingredients used while preparing foods, the dishes that are served, and the opening hours. They further demonstrated that hotels and restaurants that serve meat-based foods during lunch and dinner are more likely to generate more food waste, while different types of hospitality establishments contribute to food waste due to overproduction and improper food storage. Several studies highlighted the need for hotel operations to observe strict policy guides as provided by the Ministry of Health, which prevents them from serving leftover foods in the next meal. From this context, it is essential to improve the coordination of various hotel functional areas such as bookings, supply and purchase of ingredients, and the preparation of food.

Evaluation of the selected studies with respect to how food waste affected hotel sustainability could not provide sufficient evidence. Despite the fact that the majority of the studies were not able to quantify the effects of food waste, most provide indications. In one of the studies, for example, it was observed that the effects of food waste were more profound, demanding the attention of food service professionals to reduce its cost implications and direct their efforts towards customer satisfaction as opposed to waste mitigation (Hennchen, 2019).

Some degree of consciousness exists on the need to reduce food waste from hotel operations and the

adoption of appropriate mitigation mechanisms in hotels and restaurants. For example, several restaurants are aware of the cost implications of food waste and its alternative to reducing food costs (McAdams et al., 2019). The results revealed that most restaurants and hotels have adopted several measures to reduce food waste, such as using effective culinary skills, proper chopping of vegetables, adoption of proper purchasing approaches, and demand-based forecasts, among others. Additionally, it is essential for hotels and restaurants to have a skilled workforce equipped with culinary skills who are actively involved in the formulation and implementation of various control measures that can effectively reduce food waste (Strotmann et al., 2017).

CONCLUSION AND RECOMMENDATIONS

Conclusion: The development of sustainable food waste practices forms a critical part of improving service delivery in the hospitality and food sector; however, it remains a big obstacle with far-reaching environmental, ethical, and financial implications. The adoption of effective food waste practices is expected to offer economic and environmental benefits. This study explored the current state of food waste in the hotel and food service industry in order to understand how, why, how much, and what type of foods have affected the hospitality establishment. Food waste has greatly influenced the degradation of the environment due to the green gas from landfills. Hospitality establishments should strive to minimise

food waste in their supply chain, from preparation to service. The finding indicates food waste management is a crucial process and further enables hotels to improve their sustainability status.

Recommendations: Key measures for reducing food waste include the reduction of plastic and disposal of food packages and reducing prepared food and plate waste for high-waste items. Besides, most scholars identified preventing food waste from the source as effectively popular (McAdams et al., 2019; Aamir et al., 2018; Principato et al., 2018), donating

unconsumed food or leftovers to those in need or food donating institutions (Jelski, 2019; Pearson & McBride, 2017; Christoff, 2019), recycling and composting programmes (Pearson & McBride, 2017; Okumus et. al., 2020), awareness among the organisations green Practices and promoting campaigns and programmes. The study further recommends that studies on the absence of sustainable food practices should be done in relation to hospitality establishment performance.

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