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Sustainable Food Waste Management Practices, Management Support, and Performance of 4- and 5-Star Hospitality Establishments in Nakuru and Narok Counties, Kenya

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Abstract
This study examined how sustainable food waste practices influence the performance of 4- and 5-star hospitality establishments in Kenya, highlighting management support as a key moderating factor. Effective food waste management is vital for sustainable hospitality, yet its impact on organisational performance, especially in developing countries, remains unclear. Using the Triple Bottom Line and Balanced Scorecard frameworks, the study employed a mixed-methods approach combining pragmatic and explanatory strategies. The study gathered data from 135 hotel staff through questionnaires and supplemented them with interviews with 11 food and beverage managers and an officer from Ecotourism Kenya. Quantitative analysis included descriptive and inferential statistics, while content analysis provided qualitative insights. Results showed that sustainable food waste management had a negative, non-significant direct effect on organisational performance ($\beta = -0.056$, $p = 0.115$). However, management support significantly moderated this relationship ($\beta = 0.077$, $p = 0.031$), indicating that management support significantly altered the relationship between sustainable food waste management practices and organisational performance. Qualitative findings indicated that hotels used strategies such as demand forecasting, portion control, first-in, first-out inventory, food donations, composting, recycling, and converting waste into animal feed, all of which enhanced resource efficiency and sustainability. The study concludes that food waste management alone cannot improve organisational performance without strong managerial support and integrated systems. This research advances hospitality sustainability by emphasising the critical role of management support in turning waste management activities into better performance outcomes.

Key words: Food waste hierarchy, hospitality establishments, management support, performance, sustainable food waste management.

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INTRODUCTION

This study examined how sustainable food waste practices influence the performance of 4- and 5-star hospitality establishments in Kenya, highlighting management support as a key moderating factor. Food waste is a major sustainability issue in the global hospitality industry, with significant environmental, economic, and social effects. Hotels generate substantial food waste across all operational stages, from purchasing, storage, preparation, service, and consumption, leading to increased greenhouse gas emissions, resource depletion, and higher operational costs (Kattiyapornpong et al., 2023). The industry is particularly vulnerable to waste because of strict service standards, diverse menus, and the need to satisfy guests. Buffet setups, demand-forecasting errors, large portions, poor inventory management, and limited staff awareness contribute to significant food loss (Filimonau & De Coteau, 2019). Beyond environmental issues, food waste causes substantial financial losses from discarded ingredients, labour, energy, and waste disposal, affecting efficiency and profits (Papargyropoulou et al., 2019). Effective food waste management in hotel operations includes strategies such as prevention, reduction, reuse, recycling, and recovery. Common practices include careful menu planning, portion control, inventory management, food donation, composting, recycling, staff training, and waste-monitoring technologies (UNEP, 2024). These align with the waste hierarchy, prioritising waste prevention over disposal and supporting a move towards a circular economy (European Commission, 2020). Evidence shows that good food waste management can improve organisational performance by lowering costs, increasing resource efficiency, enhancing reputation, and meeting the expectations of environmentally conscious consumers (Filimonau et al., 2020).

Additionally, sustainability certifications and eco-ratings increasingly consider waste reduction a key indicator of responsible hospitality management, encouraging hotels to adopt food waste practices as part of broader sustainability efforts. Despite this global emphasis, empirical research on how sustainable food waste management affects organisational performance in developing countries remains limited, especially in Kenya's hospitality industry. Most studies focus on quantifying food waste or consumer behaviour in developed regions, with little attention to how waste management practices affect hotel performance. As Kenya's tourism sector grows and seeks sustainability certifications, it is crucial to examine whether these practices lead to better organisational outcomes. This study investigates the effect of sustainable food waste management on the performance of selected 4- and 5-star hotels in Kenya. The research is based on the following hypothesis.

H_{o1}

Sustainable food waste management practices do not significantly affect the performance of 4- and 5-star-rated hospitality establishments in Kenya.

H_{o2}

Management support has no significant moderating effect on the relationship between sustainable food waste management practices and the performance of 4- and 5-star-rated hospitality establishments in Kenya.

Theoretical Review

This study combines the Triple Bottom Line (TBL) framework (Elkington, 1998) with Kaplan and Norton's (1992) Balanced Scorecard (BSC) to provide a comprehensive view of how sustainable food waste management affects organisational performance in the hospitality sector. The TBL emphasises that success should be measured not only by financial results but also by environmental and social impacts (Elkington, 1998). In hospitality, sustainable waste strategies benefit the environment by reducing waste, conserving resources, lowering greenhouse gas emissions, and encouraging responsible consumption. Socially, actions such as food donation, staff involvement, and community partnerships enhance societal wellbeing and corporate responsibility.

Economically, effective waste management can cut costs, improve resource use, and enhance reputation, supporting long-term sustainability. The TBL thus frames food waste management as creating value across environmental, social, and economic areas. The BSC complements this by measuring performance beyond financial metrics, focusing on four key areas: customer, internal processes, learning and growth, and financial results (Kaplan & Norton, 1996). In hospitality, sustainable food waste practices can improve efficiency, increase customer satisfaction, foster staff development, and boost overall organisational performance. Therefore, the BSC is a useful tool for capturing the wider benefits of sustainability efforts.

LITERATURE REVIEW

The Concept of Performance

Organisational performance in the hospitality industry encompasses financial metrics such as cash flow, profit,

return on investment, and revenue growth, alongside non-financial indicators including market share, brand reputation, customer satisfaction, process efficiency, and innovation (Conţu, 2020; Lexutt, 2020. Previous studies have measured hotel performance using combinations of financial and non-financial indicators. For example, Dolasinski and Roberts (2020) assessed hotel performance using revenue, profit, and guest satisfaction, while Fatima and Elbanna (2020) highlighted the use of the Balanced Scorecard in hospitality and tourism to integrate multiple performance dimensions. These findings suggest that non-financial measures provide a broader assessment of organisational performance by capturing longer-term outcomes related to organisational capabilities and customer relationships (Lexutt, 2020). Accordingly, this study evaluates performance across four non-financial areas derived from the Balanced Scorecard model (Kaplan & Norton, 2005): customer satisfaction (feedback, loyalty, repeat visits, referrals), competitive advantage (value proposition, market share, responsiveness), internal processes (communication, workflow efficiency, quality, minimal waste and delays), and innovation and learning (training, idea-sharing, professional growth, and fostering an adaptable culture).

Sustainable Food Waste Management

Food waste ranks as the second-largest category of waste in the hospitality sector, underscoring its significance. It releases greenhouse gases such as carbon dioxide, thereby impacting global food resources. Sources suggest that sustainable food waste management in hotels involves strategies to minimise waste throughout the food supply chain. In the United States, the Environmental Protection Agency (EPA, 2016) established a revised waste hierarchy for recyclable food waste, emphasising prevention, reduction, and proper disposal.



Figure 1: Food Recovery Hierarchy

This hierarchy shows that preventing food waste at the source is the most effective strategy. If that is not possible, businesses can donate surplus food to help both animals and people in need. Alternatively, businesses can redirect leftover and inedible food to processes such as composting and energy production, which recover value from waste. Hospitality businesses should treat landfilling as a last resort and avoid it. Although many in the industry prefer reuse or sustainable disposal, waste prevention remains the top priority. Focusing on prevention reduces disposal needs, cuts overall food waste, and lowers procurement costs. Throughout the food service cycle, from menu design and procurement to receiving, storage, cooking, service, and waste disposal, hospitality companies should identify waste sources. Evidence indicates that accurate forecasting, purchasing only what is necessary, real-time inventory management, efficient storage, strategic menu planning, portion

control, and cooking to order enhance sustainability and reduce costs related to resources, labour, energy, and waste. Managing food waste in hotels is increasingly urgent, making waste control and minimisation essential to the sector's role in addressing this issue. Recommended strategies include donating excess food, controlling portions, and diverting waste for animal feed. These align with industry efforts such as working with food banks and charities, often initiated by groups like churches to redistribute surplus food to those in need.

Prolonged waste in the environment compromises ecosystems and poses considerable risks. Food waste, a major global issue, attracts growing concern each day (Wani et al., 2024). Morone et al. (2019) define food waste recovery as reusing food that would otherwise be discarded to mitigate environmental impact. Effective waste management involves reusing, recycling, or transforming waste into valuable products, particularly when disposal space is limited. Common strategies for managing food waste include anaerobic digestion, composting, energy recovery, and, as a last resort, landfilling. The hospitality industry is recognised for its potential to manage waste responsibly and sustainably. As Morone et al. (2019) note, recycling and environmentally sound disposal practices are essential to reduce greenhouse gases and protect the ozone layer.

These measures can help reduce pollution and mitigate global warming. Experts increasingly recognise anaerobic digestion of food waste as an efficient energy-production method that also benefits the environment. Various methods, including biogas, organic fertilisers, and chemicals, are being used to convert waste into valuable resources and are gaining broader acceptance. Composting food waste within hotels is becoming a more sustainable practice that aligns with global environmental objectives. Authorities emphasise that composting reduces landfill waste and transforms organic materials into useful resources such as fertilisers. Hospitality establishments are increasingly implementing food-waste composting, often with minimal source separation. Although approximately 90 per cent of food waste is biodegradable and suitable for composting, many hotel operators show limited engagement.

Furthermore, hotel staff generally have limited understanding of food-waste composting. Despite growing evidence on food waste reduction, recovery, recycling, composting, and other sustainable food waste management practices, previous studies have not clearly established how these practices influence organisational performance in 4- and 5-star hotels in Kenya. In particular, empirical evidence remains limited on whether management support strengthens or alters this relationship. This gap is important because the effectiveness of sustainable food waste management may depend not only on the practices adopted by hospitality establishments but also on the extent to which management supports their implementation. Therefore, this study addresses the empirical gap by examining the relationship between sustainable food waste management, management support, and organisational performance among selected 4- and 5-star-rated hospitality establishments in Kenya.

METHODOLOGY

The study employed a pragmatic approach that emphasises both quantitative and qualitative methods. An explanatory concurrent mixed-methods design involved collecting survey and interview data simultaneously, analysing each separately, and subsequently integrating the results during interpretation. The study was conducted in Nakuru and Narok Counties, two principal tourism hubs in Kenya, distinguished for their numerous 4- and 5-star hospitality facilities. These regions were selected because their hospitality establishments generate substantial food waste and consume significant resources, driven by both domestic and international tourists. The research employed a pragmatic approach that emphasises utilising both quantitative and qualitative methods. An explanatory concurrent mixed-methods design involved collecting survey and interview data simultaneously, analysing each separately, and subsequently integrating the results during interpretation. The sample comprised 135 respondents, including executive chefs, purchasing officers, and restaurant supervisors, selected through a census for the quantitative study, and 11 food and beverage managers and one officer from Ecotourism Kenya, purposively selected for the qualitative study. The research instruments were pilot-tested, with reliability established by Cronbach's alpha coefficients of 0.778 for sustainable waste management practices and 0.794 for organisational performance.

Table 1: Reliability Analysis

Variable	Cronbach's Alpha	No of Items	Comment
Sustainable Food Purchasing Practices	0.754	11	Reliable
Sustainable Menu Practices	0.909	11	Reliable
Sustainable Waste Management Practices	0.778	12	Reliable
Management Support	0.891	15	Reliable
Performance	0.794	20	Reliable

Source: *(Field Data, 2025)*

Content, face, and construct validity were confirmed through expert review and exploratory factor analysis, specifically using principal component analysis. The data's suitability for factor analysis was supported by a Kaiser–Meyer–Olkin (KMO) measure of 0.701 and a significant Bartlett's Test of Sphericity ($\chi^2 = 8924.639$, df = 2346, $p < .001$). Most items had communalities above 0.50, indicating that the factors explained variance in the measurement items and supporting the instrument's construct validity.

Table 2: KMO and Bartlett's Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy	0.701	
Bartlett's Test of Sphericity	Approx. Chi-Square	8924.64
	Df	2346
	Sig.	0.001

***Source*:** *(Field Data, 2025)*

Data analysis included descriptive statistics such as frequency, percentage, mean, and standard deviation, as well as inferential statistics such as correlation and regression. Data were analysed using IBM SPSS Statistics**.** Before regression analysis, the study assessed the assumptions of normality, linearity, multicollinearity, and homoscedasticity were assessed. Normality was examined using the Shapiro–Wilk test and P–P plot, with $p > .05$ indicating normally distributed residuals. Linearity and homoscedasticity were assessed using scatterplots, while multicollinearity was assessed using VIF values, which were below 10. Standardized residuals fell within the acceptable range of −2 to +2. Overall, the assumptions of regression analysis were satisfied

The following equation was used to test the hypothesis.

Direct effect $Y = \beta 0 + \beta 1X1 + \varepsilon$……Model 1

Moderating effects $Y=\beta 0+\beta 1X+\beta 2M+\beta 3(X\times M)+\varepsilon$……..Model 2

Where:
Y = organisational performance
X = sustainable food waste management practices
M = management support
X × M = interaction between sustainable food waste management practices and management support
β_3 = moderation coefficient
ε = error term

Ethical Considerations

Ethical approval was obtained from Moi University and the participating organisations, with a NACOSTI research permit secured; informed consent, participant anonymity and confidentiality, secure data storage and disposal, and integrity in data analysis and reporting were maintained throughout the study.

FINDINGS AND DISCUSSION

This section presents the findings by study variable and hypothesis. It begins with descriptive statistics on sustainable food waste management practices and performance, followed by the inferential analysis of the relationships among the study variables.

Descriptive Results

Descriptive Results for Sustainable Waste Management Practices

Table 3: Descriptive Statistics Results of Sustainable Waste Management Practices

Sustainable Waste Management Practices	Mean	SD	Skewness	Kurtosis
We monitor food waste	3.9	1.081	-0.968	0.321
We offer a 'Special Dish of the Day' to use stock approaching expiry date	3.7	1.056	-0.741	0.096
We encourage our customers to take away food remains	3.62	1.211	-0.563	-0.69
We practice portion control on the buffet to minimize food waste	3.81	1.109	-0.851	0.023
We use edible garnishes to avoid unnecessary plate waste.	3.91	1.305	-0.985	-0.293
We offer live cooking stations at buffets to reduce food waste.	3.76	1.322	-0.852	-0.509
We avoid the use of disposable plates and cutlery	3.87	1.209	-0.998	0.027
We reduce plastic use in food distribution	3.68	1.264	-0.896	-0.231
We add value products from food surplus	3.61	1.303	-0.651	-0.75
We create awareness among staff on food waste measures	3.62	1.301	-0.734	-0.642
We donate food surplus	3.72	1.292	-0.819	-0.447
We allow farmers to collect food waste for animal feed	3.92	1.27	-1.207	0.433
Sustainable Waste Management Practices	**3.76**	**1.23**	**-0.86**	**-0.22**

Source: *(Field Data, 2025)*

Table 3 presents descriptive statistics for sustainable waste management practices. The overall adoption rate was relatively high (M = 3.76, SD = 1.23), indicating that most establishments have adopted waste-reduction measures. The most frequently used practice was allowing farmers to collect food waste for animal feed (M = 3.92, SD = 1.27), followed by using edible garnishes to minimise plate waste (M = 3.91, SD = 1.31) and monitoring food waste (M = 3.90, SD = 1.08). Less common measures included adding value to surplus food (M = 3.61, SD = 1.30), encouraging customers to take leftovers (M = 3.62, SD = 1.21), and increasing staff awareness of food waste reduction (M = 3.62, SD = 1.30). The data show negative skewness, indicating that responses leaned towards agreement, while kurtosis values are within acceptable limits, indicating that the distribution does not significantly deviate from normality.

Descriptive Results for Performance

Table 4: Results on Descriptive Statistics of Performance

Performance	Mean	SD	Skewness	Kurtosis
We receive positive customer feedback regarding customer satisfaction with our services	3.63	1.362	-.552	-1.032
We have repeat customers who recommend us to others	4.32	.980	-1.532	1.577
Our customers' loyalty has improved over the past year	3.76	1.207	-.646	-.748
Our customers are satisfied with the overall quality of our services	3.48	1.360	-.466	-1.110
Our hotel has a clear and unique value proposition in the market.	3.81	1.256	-.734	-.809
Our market share has increased over the past year.	4.17	1.044	-1.454	1.577
We regularly analyze competitor performance and adapt accordingly	4.29	.978	-1.803	3.139
We use innovation effectively to stay ahead in the market.	4.29	.978	-1.767	3.023
Communication among teams is effective and clear	3.96	1.120	-1.028	.154
We encourage employees to suggest improvements for more effective operations	3.45	1.216	-.342	-1.011
We train our staff on suitable food practices to improve the operation process	4.30	.992	-1.686	2.469
We monitor our sustainable food production practices/operations to enhance efficiency	4.05	1.107	-1.153	.479
We have streamlined our internal business process	3.81	1.154	-.664	-.720
Employees feel a strong sense of belonging and commitment to the organization.	3.94	1.119	-.964	-.041
The hotel can deliver high-quality service with minimal waste or delay	3.97	1.132	-1.049	.132
Our organization fosters a culture of innovation on our daily operations	4.28	.935	-1.625	2.641
Continuous learning and development on current trends is a core value of the Organization	3.86	1.104	-.942	.121
Our employees are given opportunities to share ideas related to sustainable food practices	4.21	1.011	-1.570	2.140
Employees are encouraged to participate in training programs related to sustainability in food production	4.05	1.046	-1.145	.595
Employees have opportunities for professional growth and development.	4.29	.949	-1.682	2.690
Mean of Performance	**4.00**	**1.10**	**-1.14**	**0.76**

Source: *Field Data, (2025)*

Table 4 presents descriptive statistics on organisational performance. Overall, respondents reported a high level of organisational effectiveness (M = 4.00, SD = 1.10), reflecting positive outcomes across the evaluated domains. The most highly rated indicator was the proportion of customers recommending the hotel to others (M = 4.32, SD = 0.98), followed by staff training in proper food handling to enhance efficiency (M = 4.30, SD = 0.99), and by regular competitor performance analysis, the use of innovation to maintain competitiveness, and the provision of professional development opportunities for staff (all M = 4.29). The least favoured factors were encouraging employees to propose operational improvements (M = 3.45, SD = 1.22) and customer satisfaction with overall service quality (M = 3.48, SD = 1.36). The negative skewness indicates that responses leaned predominantly toward agreement, while

the kurtosis values suggest the data approximate a normal distribution.

Table 5: Correlation and Regression Results

Variables	P	FPP	SMP	WMP	NMS
Performance (P)	1				
Food Purchasing Practices (FPP)	.739**	1			
Sustainable Menu Practices (SMP)	.734**	.460**	1		
Waste Management Practices (WMP)	.747**	.582**	.463**	1	
Management Support (MS)	.848**	.594**	.901**	.598**	1
**. Correlation is significant at the 0.01 level (2-tailed).					

Source: *(Field Data, 2025)*

Sustainable waste management practices are closely linked to improved organisational performance ($r = .747$, $p < .01$). Sustainable waste management practices are closely linked to improved organisational performance ($r = .747$, $p < .01$). The positive correlation indicates that higher levels of sustainable food waste management practices were associated with higher reported organisational performance. The findings indicate that proper waste management improves operational efficiency, boosts customer satisfaction, strengthens competitive advantage, and promotes innovation and learning. Overall, this underscores the strategic importance of sustainable waste management in driving environmental sustainability and success in the hospitality industry.

Table 6: Model Summary for the Interaction between Management Support and Sustainable Waste Management Practices

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
5	.924[e]	.854	.849	.04106	.003	4.707	3	130	.031

Source: *(Field Data, 2025)*

Table 6 summarises the model showing how management support influences the relationship between sustainable waste management practices and organisational performance. The interaction model explains 85.4 per cent of the variance ($R^2 = 0.854$; Adjusted $R^2 = 0.849$). Adding the interaction term significantly increased the model's explanatory power ($\Delta R^2 = 0.003$, $F(3, 130) = 4.707$, $p = 0.031$), highlighting the important moderating role of management support. Although the increase in explained variance was small (0.3%), it was statistically significant, indicating that the effect of sustainable waste management practices on organisational performance partly depends on management support.

Qualitative Findings

Qualitative findings supported the quantitative data, indicating that many hospitality establishments actively implement sustainable waste management practices. The eleven food and beverage managers interviewed reported integrating waste reduction tactics into their daily routines. Food redistribution emerged as a socially responsible approach to waste minimisation, with surplus food allocated to staff canteens and food scraps supplied to local farmers for animal feed. One manager remarked, "Instead of discarding excess food, we redirect it where possible. Some goes to the staff canteen, while local farmers collect food scraps for animal feed." Portion control, particularly in buffet settings, was recognised as an effective strategy to reduce plate waste, improve customer satisfaction, and control costs. As one respondent noted, "By standardising serving sizes, especially on the buffet, we've managed to reduce plate waste significantly without affecting guest satisfaction." Composting was also emphasised, with managers reporting that they composted organic waste for kitchen gardens to reduce landfill waste and promote sustainable food production.

An officer from Ecotourism Kenya emphasised that sustainable waste management is crucial to the Eco-rating certification scheme in the hospitality industry. They noted that hotels are evaluated on practices such as minimising food waste, composting, redistributing excess food, inventory control, and creating organic gardens. Ongoing certification reviews drive continuous improvements in these practices. These insights are supported by both quantitative and qualitative data, underscoring that effective waste management is essential for sustainability certification and successful operations in Kenya's hospitality sector.

Discussion

The findings revealed that sustainable food waste management practices did not have a statistically significant influence on the performance of 4- and 5-star hotels in Kenya ($\beta = -0.056$, $p > 0.05$), thereby supporting the null hypothesis. This indicates that, within the establishments studied, variations in food waste management practices were not associated with significant changes in organisational performance. Although food waste management is an integral component of sustainability initiatives, its direct impact on organisational performance appears limited. This observation aligns with prior research showing that waste management enhances environmental sustainability and brand reputation but does not always lead to immediate financial or operational gains (Díaz-Fariña et al., 2023; Kasavan et al., 2022).

Additionally, studies by Swetha et al. (2024) and Filimonau et al. (2022) show that waste reduction benefits the environment; however, costs, infrastructure requirements, and operational challenges often limit performance improvements unless strong managerial commitment and systemic integration support them. Scholars such as Mensah (2020) and Munir (2025) posit that waste management initiatives yield more favourable outcomes when embedded within comprehensive sustainability and performance frameworks. These qualitative findings extend the literature by showing that hotels use various food waste mitigation practices, including demand forecasting, portion control, first-in, first-out (FIFO) inventory management, food donation, composting, recycling, and converting waste into animal feed. These strategies reduce costs, improve resource efficiency, support accreditation, and enhance the hotel's environmental reputation.

Filimonau et al. (2020) reported similar outcomes, finding that food waste management increases sustainability awareness among staff and guests. Furthermore, Christ and Burritt (2017) emphasised that economic benefits depend on organisational commitment and supportive policies. While the present study indicates that food waste management does not directly improve performance, it nonetheless fosters environmental responsibility, operational efficiency, and long- term competitiveness when integrated into a holistic sustainability strategy and effectively implemented (Ashton et al., 2025). The interaction term was positive and statistically significant ($\beta = 0.077$, $p = 0.031$), suggesting that managerial support enhances the impact of waste management practices on organisational performance. Nonetheless, this effect remains relatively modest compared with sustainable menu practices. These findings underscore the importance of managerial involvement in strengthening waste management initiatives, even with operational constraints and resource limitations that may temper their overall influence. The coefficient's significance confirms that managerial support is indispensable for sustainable waste practices to contribute to organisational outcomes meaningfully**.**

CONCLUSION AND RECOMMENDATIONS

Conclusion: The study concludes that while sustainable food waste management is imperative for environmental health, it does not directly influence the operational performance of 4- and 5-star hospitality establishments in Kenya. Instead, the benefits are largely indirect and depend on strong organisational resources, effective implementation, and sustained sustainability strategies. The findings also emphasise that management support is crucial, as it amplifies the effect of waste management practices on organisational performance. Therefore, waste management initiatives are more effective when embedded in broader organisational systems and reinforced through leadership support, resource allocation, staff engagement, and ongoing oversight.

Recommendations: The study recommends that hospitality establishments should strengthen management initiatives to sustainably reduce food waste by integrating waste-minimisation strategies into planning, performance indicators, and daily operations. Management should emphasise staff development, implement food-waste monitoring systems, and establish programs such as demand forecasting, portion control, food donation, composting, and recycling. Moreover, policymakers and industry associations ought to develop policies, incentives, and certification schemes to promote improved food waste management. Stronger institutional support and managerial commitment can help hospitality

establishments achieve long-term environmental benefits, improve operational efficiency, and remain competitive by adopting sustainable waste management practices.

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