SOLID WASTE MANAGEMENT PRACTICES IN THE FOOD SERVICE INDUSTRY: FOCUS IN GHANA'S CULINARY LANDSCAPE

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ABSTRACT

Purpose: This study investigates waste management practices in restaurants in the Sunyani Municipality in Ghana. The objectives of the study are to classify the types of solid waste generated by restaurants and assess the readiness of restaurants to adopt waste reduction, reuse, and recycling practices.

Design/Methodology/Approach: The study employed a descriptive cross-sectional approach with a sample of 331 restaurants. Simple random sampling was used to select the sample size. Structured questionnaires and observations were used. Descriptive statistics were employed in the review of the data to address the research questions formulated to direct the study. Specifically, percentages, frequencies, means, and standard deviations were used to analyse the questionnaire items.

Findings: The findings reveal diverse waste types: liquid, solid, and gaseous generated by restaurants. The study's findings reveal that waste management in the food service industry within the Sunyani Municipality is highly influenced by restaurant size and operational capacity. Larger restaurants tend to adopt more sustainable practices, such as portion control and waste minimisation, due to the financial and operational incentives available to them. However, many restaurants have yet to adopt paperless technologies for waste reduction. The readiness of smaller restaurants to engage in waste reduction and recycling efforts is still constrained by limited resources and logistical challenges.

Research Limitation: The study's reliance on self-reported data from restaurant managers and staff through questionnaires.

Practical Implication: The study's findings offer actionable strategies for improving waste management within the restaurant industry.

Social Implication: The study emphasises how efficient waste management in the restaurant business may have a positive impact on public health.

Originality/Value: This study addresses knowledge gaps in current waste management by exploring the factors that both promote and hinder sustainability in Ghana's food service industry, specifically focusing on waste management practices in Sunyani restaurants. It offers new insights into the readiness to reduce, reuse and recycle solid waste, an area that has not been extensively researched.

Keywords: Food, recycle, reduce, reuse, solid waste

INTRODUCTION

Solid waste refers to materials that are discarded after being used in industrial, commercial, or domestic activities (Abdel-Shafy & Mansour, 2018). In earlier times, waste disposal was manageable due to smaller populations and abundant land, but with urbanization, increased waste generation, and limited land for disposal, managing solid waste has become a critical issue (Muthuraman & Ramaswamy, 2019). As urban populations grow, the pressure on waste management systems increases, necessitating specialized strategies to maintain community safety and environmental health.

Globally, a large portion of waste, particularly industrial waste and disposable packaging, does not enter proper waste management systems, leading to environmental hazards (UNEP, 2017). A current source that addresses the unregulated waste problem in South Africa reveals that around 34.5% of waste was recovered by 2017, showing some improvement in recycling efforts (Corrêa et al., 2021). The hospitality industry, in particular, faces significant challenges due to inadequate solid waste management, which imposes environmental and economic burdens. For example, the South African tourism sector spends millions annually on beach cleanups (Chen, 2018), reflecting the rising costs of poor waste management.

The food service sector is a significant contributor to solid waste, generating food remnants, packaging materials, and disposable utensils, all of which pose environmental threats if not managed properly (World Resources Institute, 2020). Studies highlight the challenges of waste disposal, limited landfill space, and the complexities of changing consumer behaviour (Natural Resources Defense Council, 2022). However, solutions such as composting, recycling, and using eco-friendly materials are being promoted to mitigate these issues (United Nations Environment Programme, 2017). Despite existing research, the effectiveness of waste management practices in restaurants in the Sunyani Municipality is still unknown. This research contributes to the existing body of knowledge by offering insights into the waste management strategies employed in the food service industry and proposing effective solutions that can be applied across diverse geographical and cultural contexts. The objectives of the study are to (1) classify the types of solid waste generated by restaurants and (2) assess the readiness of restaurants to adopt waste reduction, reuse, and recycling practices.

LITERATURE REVIEW
Waste Hierarchy
Reduce

The reduce principle at the top of the waste hierarchy focuses on minimizing waste generation at the source. It encourages consumers and businesses to reduce material consumption and waste output, thus decreasing the overall burden on landfills and the environment. This concept is critical in waste management strategies as it addresses the root cause of waste accumulation by promoting the efficient use of resources. Reducing waste also helps in cutting production costs, conserving energy, and lowering emissions associated with

waste disposal and recycling efforts. According to the European Environment Agency (2020), reducing waste is the most sustainable action as it prevents unnecessary waste from entering the waste management system altogether.

Reuse
Reuse promotes extending the lifecycle of products and materials by using them multiple times before discarding them. Reusing materials reduces the need for new raw materials, decreases energy consumption, and lowers the carbon footprint associated with producing and disposing of new items. For instance, reusing packaging materials, repairing products, or donating used items contributes to sustainable resource use. A 2021 study by the United Nations Environment Programme (UNEP) highlights that reuse, especially in low-income regions, plays a vital role in reducing waste and conserving resources, creating economic opportunities through second-hand markets.

Recycle
Recycling involves converting waste into reusable materials, thus closing the loop on material life cycles and reducing the need for virgin resources. It plays a significant role in reducing landfill waste, conserving natural resources, and saving energy. Recycling materials such as plastics, metals, and paper reduces the environmental impacts of extraction and processing. The World Bank (2022) emphasizes that recycling is a critical element of circular economy models, helping mitigate resource depletion and lowering greenhouse gas emissions.

Recover (Energy from Waste)
Recovery focuses on extracting value from waste, primarily through energy recovery processes such as incineration with energy capture. Waste-to-energy (WTE) facilities convert non-recyclable waste into electricity or heat, which can serve as a renewable energy source. This method helps divert waste from landfills while generating energy, although its environmental impact varies depending on the technology used. The Global Waste Management Outlook (UNEP, 2019) suggests that waste recovery is an effective alternative to landfilling, particularly in urban areas with high waste volumes.

Dispose
Disposal, typically in landfills, is the least preferred option in the waste hierarchy and is considered a last resort when all other strategies (reduce, reuse, recycle, and recover) have been exhausted. Disposing of waste in landfills can lead to significant environmental problems such as soil, water, and air pollution. According to the International Solid Waste Association (2021), while disposal remains necessary for certain types of waste, strategies like improved landfill management and waste diversion efforts must be prioritized to minimize environmental harm.

Theories Underpinning the Study

Stakeholder Theory

Originating in the mid-1980s, the Stakeholder Theory, as proposed by Freeman, emphasises that organisations are systems comprising diverse components, each with distinct goals. Stakeholders, including owners, staff, consumers, vendors, and communities, must be managed, and their interests must be integrated for the long-term survival of a business. The theory suggests that company managers act as agents for shareholders, ensuring both company survival and stakeholders' long-term interests (McGahan, 2021). Organisations depend on satisfying the needs of stakeholders for sustained viability. This theory primarily focuses on traditional stakeholders like owners, staff, consumers, and vendors. A gap may exist in addressing new or emerging stakeholders, such as environmental advocates, regulators, or digital platforms that influence modern businesses, particularly in industries like hospitality, where sustainability and digital engagement are increasingly important.

Strategic Choice Theory

Developed to address the limitations of classical contingency theory, Strategic Choice Theory posits that firms can achieve operational success through strategic execution in an appropriate context. It argues that companies strategically address issues beyond the organization, such as environmental concerns, to achieve success (Jisu, 2020). Managers play a vital role in decision-making, aligning the company's finances with its corporate context to navigate environmental risks and opportunities. Organisations need to adapt and realign in response to changing circumstances, enhancing their adaptability to operational demands.

Hines Environmentally Responsible Behaviour (ERB) Theory

The ERB theory, based on a meta-analysis in 1987, explores factors influencing responsible environmental behavior. Individual actions are influenced by personality characteristics, attitudes toward the environment, locus of control, and situational factors. Internal and external factors affect decision-making and subsequent actions, considering variables like environmental knowledge, values, and emotional commitment (Su et al., 2021). The theory suggests that environmentally responsible actions depend on the interplay of individual intentions, internal and external influences, and structural systems. This underscores the importance of these theories in the context of waste management, particularly within the restaurant industry, emphasizing the need for ongoing engagement with stakeholders and strategic decision-making to ensure sustainability and environmental responsibility.

Empirical Review

Bhrat et al. (2022) highlight the dynamic nature of solid waste management, stressing the need for collaboration between public and private sectors and interdisciplinary partnerships involving economics, health science, planning, engineering, politics, and geography for efficient and orderly waste management. Understanding the fundamental issues and connections is crucial for effective solid waste management.

Most local restaurants lack experience in waste prevention and recycling, citing concerns about cost and time (Bilska et al., 2022). Torrente-Velásquez et al. (2022) measured solid waste production from economic sources and found that the hospitality industry produced an average of 400-600kg of waste in a given day. The costs of disposal incurred by a restaurant company extend beyond financial considerations, encompassing other hidden costs such as staff, resources, and energy (Torrente-Velásquez et al., 2022). Waste management in the United Kingdom is currently regulated by the Environmental Protection Act (EPA) of 1990, requiring additional control of waste collectors and producers (Read et al., 2018). The "Duty of Care" Act mandates that waste suppliers, including commercial and manufacturing businesses, properly store, transport, and dispose of their waste (Woodard, 2020).

Cummings (2017) developed the solid waste management hospitality model, comprising five stages in waste minimisation: waste minimisation dedication, eco-intelligent purchase, productivity in waste processing, recycling, and waste segregation. However, the Cummings model faces challenges in motivating restaurants with negative attitudes toward sustainable SWM practices, as it lacks mechanisms to influence their behavioral intentions (Cummings 2017). Implementing a solid waste reduction initiative in restaurants can lead to significant savings on waste transportation costs and contribute to eco-friendly practices (Bhat et al., 2022). Food waste, a major component of restaurant waste, is increasingly addressed through composting as restaurants recognize the benefits of using organic products and composting on-site (Woodard, 2020).

Martin-Rios et al. (2022) emphasise the role of environmentally aware restaurant managers who are likely to influence their organizations positively in reducing solid waste production. Employees, on the other hand, play a critical role in adopting green activities and sustainable practices, with their ecological behavior being influenced by environmental consciousness, interest, and awareness (Chen, 2018). Corporate Social Responsibility (CSR) also emerges as a significant factor in promoting sustainable waste management in restaurants. Business leaders are recognizing the importance of socially responsible practices, and CSR initiatives can enhance the reputation of an organization, leading to sustainable development (Martin-Rios et al., 2022). The training of restaurant workers in energy use, elimination, and recycling further contributes to CSR, impacting employee retention and lowering turnover rates, ultimately benefiting the long-term competitiveness of restaurants (Martin-Rios et al., 2022). Yeboah's (2017) study in Sunyani Municipality focuses on a public-private partnership for solid waste management, revealing administrative challenges and proposing improvements in supervision and by-law drafting.

In the study by Fadhullah et al. (2022), a stratified random sampling technique and cross-sectional survey questionnaire involving 338 households in Panji, Kota Bharu, Malaysia, were employed. Their findings revealed that 74.3% of households disposed of food debris as waste, emphasizing the significance of tailored waste separation programmes. Yousefi et al. (2021) conducted a systematic review to investigate the effects of COVID-19 on waste

quantity and management. Their findings demonstrated significant variations in municipal solid waste composition and quantities during the pandemic, influencing recycling, medical waste management, and littered waste composition. Maalorf and Maalouf (2021) analyzed infectious healthcare waste generation rates in Lebanon before and after the COVID-19 pandemic, revealing an average monthly increase of 39,035 kg of COVID-19-related infectious healthcare waste, constituting 5-20 % of total infectious healthcare waste. The study underscored the impact of the pandemic on waste management challenges in Lebanon.

METHODOLOGY

Research Design

To investigate solid waste management practices in the food service sector of restaurants in the Sunyani Municipality, Ghana, this study used a descriptive cross-sectional research approach. According to Gay et al. (2009), the method measures information on waste categories, the degree of preparedness to reduce, reuse, and recycle, strategic action plans for waste management, and the efficiency of environmental management practices and regulations. Data on solid waste creation in the restaurant industry are gathered and analysed with the use of the quantitative research strategy.

Population and Sampling Method

A total of 331 restaurant managers and employees from 110 registered restaurants around the Sunyani Municipality participated in the research (Sunyani Municipal Assembly, 2020). The staff provided information on solid waste classifications, readiness to reduce, reuse, and recycle, waste management strategic action plans, and the effectiveness of environmental management policies in the restaurant industry. Managers and supervisors also contributed to the research. A simple random technique was utilised to choose the most accessible and close participants from a survey with 331 respondents from the food service sector in the Sunyani Municipality. This method ensured all respondents were included (Welman et al., 2005; Zikmund, 2010).

Research Instruments

The data collection instrument is a crucial tool for social science research, involving the design, collection, construction, and evaluation of instruments (Bhandarkar et al., 2010). A questionnaire was used for data collection, as it allows for a broad sample size to interview any topic. The study used a questionnaire designed to answer each research question on a five-point Likert scale (Hsu & Sandford, 2010). The employees' questionnaire comprised 40 items, while the managers' questionnaire had 51 items. The questionnaires were divided into four parts: A, B, C, D, and E. The questionnaires collected information on demographics, waste classification, waste supply, waste management, and the effectiveness of environmental management policies and practices. The questionnaires were administered to employees and managers, with homogeneity values (Cronbach's alpha) ranging from 0.73 to 0.89. The results ensured the instruments provided quality and usable data for analysis,

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comparing the Kumasi Metropolis and Sunyani Municipality restaurants' waste management practices. The study used self-administered instruments, a departmental introductory letter, and supervised responses from managers and employees, taking four weeks to complete the data collection exercise. The study involved participants signing an informed consent form, understanding that participation was voluntary and that they could withdraw at any time. Confidentiality and anonymity were maintained throughout the process.

Data Processing and Analysis
The purpose of this study was to investigate solid waste management practices used by restaurants in the Sunyani Municipality that provide food service. To answer the research objectives that guided the study, descriptive statistics were used in the data evaluation. The survey items were specifically analysed using percentages, frequencies, means, and standard deviations.

RESULTS AND DISCUSSION

Table 1: Demographic Characteristics of Respondents (n=331)

Variables	Staff (n=245)		Managers (n=86)	
Gender	**Freq.**	**%**	**Freq.**	**%**
Male	94	38.4	49	57.0
Female	151	61.6	37	43.0
Age group (Years)				
16 – 19	14	5.7	0	0
20 – 29	70	28.6	0	0
30 – 39	106	43.3	23	26.7
40 – 49	38	15.5	32	37.2
50 – 59	13	5.3	20	23.3
60 – 69	4	1.6	11	12.8
Educational level				
No formal education	81	33.1	13	15.1
JHS	126	51.4	23	26.7
SHS	38	15.5	23	26.7
Tertiary	0	0	27	31.4
Years of working experience				
1 – 5 years	58	23.7	17	19.8
6 – 10 years	80	32.7	23	26.7
11 – 15 years	49	20.0	20	23.3
16 – 20 years	33	13.5	17	19.8
Above 20 years	25	10.2	9	10.5

Source: Field data, 2023

Out of the total 331 respondents, 143 (43.2%) were male, and 188 (56.8%) were female. A higher proportion of females (61.6%) were represented among the staff, while males made up a larger portion of the managers (57%). This suggests that while women dominate the staff positions, men hold a significant number of managerial roles, highlighting a potential gender disparity in leadership positions within the restaurant industry. The majority of respondents were between 30 and 39 years old, accounting for 39.0% of the total sample. This group was particularly dominant among the staff (43.3%) and also made up a significant portion of the managers (26.7%). The 40-49 age group followed with 21.1%, with a higher concentration of managers (37.2%) in this age bracket compared to staff (15.5%). Interestingly, there were no managers under the age of 20, and a small number of respondents (4.5%) were between the ages of 60 and 69. This distribution suggests that most managers are older and more experienced, while younger employees mainly occupy staff roles.

Regarding work experience, most respondents had 6 to 10 years of experience, comprising 31.1% of the total sample. This was followed by respondents with 1 to 5 years of experience (22.7%). A notable difference is observed in the experience levels between staff and managers, with a higher percentage of managers (26.7%) having 6-10 years of experience compared to staff (32.7%). A smaller group of respondents had over 20 years of working experience (10.3%), with relatively fewer employees in this category. This distribution points to a generally experienced workforce, with a concentration of experience around the 6-10 year mark.

In terms of education, 45% of the sample's respondents were JHS graduates, making up the majority of the sample. 33.1% of staff and 15.1% of managers, respectively, were not in the formal education group. It is interesting to note that while 31.4% of managers had a tertiary education, none of the staff had. This implies that there is a glaring educational divide between managers and staff, with leadership positions in the restaurants being correlated with higher education levels.

Categories of Solid Wastes Generated by Restaurants

This research objective sought to classify the solid waste generated by restaurants in the Sunyani Municipality.

Table 1: Type of waste generated

Type of waste	N	Minimum	Maximum	Mean	±SD
Solid		4	5	4.70	.460
Liquid		5	5	5.00	.000
Gas		2	5	3.10	1.001

Source: Field data, 2023

The descriptive statistics of respondents' opinions about the kind of undesired material or useless item they typically throw away are displayed in Table 2. On a scale of 1–never, 2–

rarely, 3–sometimes, 4–frequently, and 5–very often, this was measured. The majority of respondents, according to the summary of the data, stated that they frequently create liquid waste (M=5.00), solid waste (M=4.63, ±SD=.483), and gas waste (M=3.31, ±SD=1.029) during their productive activities. According to Naab (2017), anything will become trash if it is used and does not fulfill its intended purpose or if the owner no longer values it.

Table 2: The quantity of various types of solid wastes that are generated from the selected restaurants daily.

Days	Paper Kg	Glass kg	Plastic kg	Metals Kg	Food Kg	Total kg
Monday	137	150	259	150	209	905
Tuesday	250	250	300	200	270	1270
Wednesday	200	300	450	250	280	1480
Thursday	190	320	280	350	290	1430
Friday	220	220	260	450	300	1450
Saturday	290	550	420	450	360	2070
Sunday	240	350	120	350	320	1380
Total	**1527**	**2140**	**2089**	**2200**	**2029**	**9985**

Source: Field data, 2023

The selected restaurants exhibit diverse levels of daily solid waste production, displaying unique trends for different categories of garbage. The quantity of paper trash exhibits variations over the week, with values ranging from 137 kg on Monday to 290 kg on Saturday. The quantity of glass trash demonstrates a notable rise, escalating from 150 kg on Monday to 550 kg on Saturday, suggesting a significant upswing in glass use as the weekend approaches. The amount of plastic waste exhibits variability, reaching its peak at 450 kg on Wednesday (Table 4). The accumulation of metal debris exhibits a trend similar to that of plastic, culminating at its maximum of 450 kg on Friday. In contrast, the quantity of food waste exhibits fluctuations throughout the week, ranging from 209 kg on Monday to 360 kg on Saturday. The cumulative trash generation in all categories totals 9,985 kg, highlighting the substantial influence of routine restaurant operations on the production of solid waste. The provided data is of utmost importance in comprehending the structure and magnitude of waste generated, hence enabling focused interventions aimed at waste reduction and the implementation of sustainable management strategies within the food service industry.

Table 3: Views on the types of waste discarded

	N	Mean	Median	SD	SE
Rubbish (e.g., combustible rubbish, i.e., paper, cardboard, garden trimmings, plastics, textiles, rubber, leather, timber, furniture. Non-combustible waste, i.e., Glass, tin, aluminum, ferrous metals, dirt, ashes).	331	3.40	4	1.307	0.0718
Food waste (i.e., in gardens, restaurants and cafeterias, uneaten portions of meals and trimmings from food processing practices	331	3.17	3	1.413	0.0776
Trash (rubble concrete and waste parts, installations and repairs, washbasins, sinks, bathtubs, plumbing components, parts for cars or vans, batteries for engines, equipment, trees, logs and branches with a diameter reaching 6 inches and tree stumps	331	4.56	5	0.981	0.0539
Special waste (tree waste, animals and abandoned vehicles, litter from the roadside, litter from municipal containers and bin debris	331	3.25	4	1.692	0.0930
Hazardous waste (i.e., toxic, flammable, corrosive, radioactive, explosive and other dangerous materials)	331	3.04	3	1.2	0.0692

Source: Field data, 2023

The participants exhibited diverse perspectives regarding the categories of garbage that are disposed of, so offering valuable insights into their perceptions. The garbage, consisting of both combustible and non-combustible materials, was evaluated and assigned an average rating of 3.40, with a median score of 4. These results suggest a generally favourable perception of the management of this waste. The perception of food waste, encompassing unconsumed portions and trimmings, was found to have an average value of 3.17, indicating a moderate level of perception. The disposal of trash, which includes rubble concrete and various waste pieces, has acquired a relatively higher average rating of 4.56. This rating suggests a more positive perception regarding its management. The average rating for special garbage, which includes tree waste and litter from municipal containers, was 3.25, indicating a varied perception. The category of hazardous waste, which includes materials that are toxic

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and pose a risk, obtained an average rating of 3.04, indicating a rather neutral perspective. The presence of various perspectives highlights the necessity of implementing targeted waste management strategies that take into account the distinct attitudes towards different categories of garbage among the surveyed populace.

Based on the findings, it was evident that the majority of the restaurants that were studied produced a wide variety of waste throughout their operations, from food and kitchen waste to metallic waste. The different wastes produced by the eateries in the research region are depicted in the Plates 1 and 2.

Plate 1: Food/Kitchen waste
Source: Field data, 2023

Plate 2: Plastic and Rubber Waste
Source: Field data, 2023

Separation of waste
The researcher also noted that restaurants and restaurant managers often have a bad attitude toward trash separation in their solid waste management strategy.
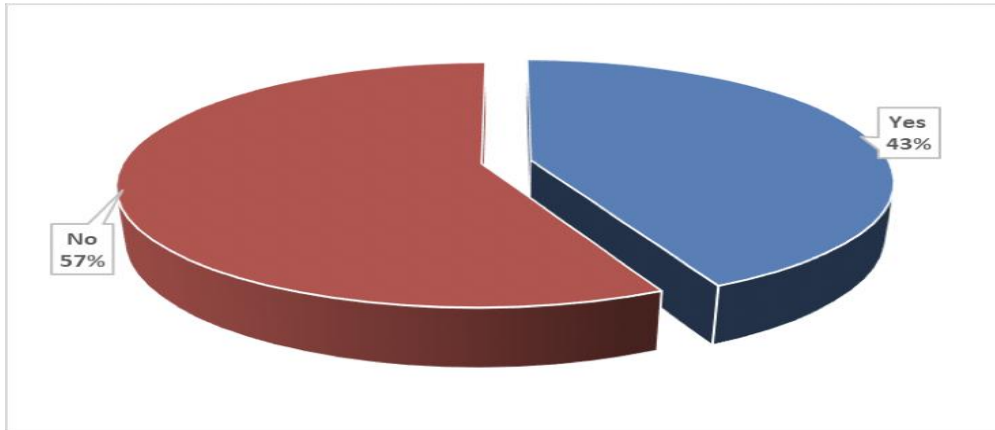
Figure 1: Provision of Separate Bins to Sort out the types of solid Waste
Source: Field data, 2023

The answers given by the respondents when asked if their firms offered separate containers for the separation of solid trash are shown in Figure 1. The majority of respondents, or 57%, said that they would not support the provision of separate dumpsters for sorting out-of-sale rubbish. However, 43% of respondents pointed out that distinct dumpsters were provided to separate different kinds of solid trash as it was produced. Though refuse bins are being provided, refuse is deposited on the ground as seen in Plate 3.

Plate 3: Plastic and Rubber Waste
Source: Field data, 2023

Other observations included the fact that there was enough information to conclude that people continued to throw rubbish on the ground, where it would subsequently be swept back into waste bins, even though there were waste containers available for collection, as seen in Plate 4.

Plate 4: Waste bins with refuse on the ground
Source: Field data, 2023

Readiness to Reduce, Reuse, and Recycle Solid Waste
Table 5 summarises respondents' opinions on the reuse of generated garbage and how they employed reusing strategies to reduce waste. A 5-point Likert scale was used to score the replies, with 1 denoting strongly disagree, 2 disagree, 3 uncertain, 4 agree, and 5 strongly agree.

Table 4: Respondent's views on Reduce, Reuse and Recycle solid waste

Levels	Counts	% of Total
Strongly disagree	3	0.9 %
Disagree	60	18.1 %
Neutral	97	29.3 %
Agree	86	26.0 %
Strongly agree	85	25.7 %

Source: Field data, 2023

The perspectives expressed by the respondents regarding the reduction, reuse, and recycling of solid waste demonstrate a diverse spectrum of ideas. A small proportion, constituting 0.9%, expressed significant dissent of these waste management practices. A proportion of 18.1% of participants indicated disagreement, but a significant segment (29.3%) maintained a neutral position. In terms of favourable responses, a notable proportion of participants, specifically 26.0%, agreed with the fundamental tenets of waste reduction, reuse, and

recycling, while a slightly lower percentage of 25.7% exhibited a strong level of agreement (Table 5). The findings highlight the need to customise waste management education and interventions to specifically target the apprehensions of individuals who hold opposing or neutral viewpoints. This approach aims to cultivate a more widespread adoption of sustainable waste reduction practices to buy reusable items instead of disposables, such as rechargeable batteries, sturdy cups, and cutlery.

Table 5: Restaurant Size and the Readiness of Restaurants to Reduce, Reuse and Recycle Solid Waste

		Statistic	**df**	**p**
Solid Waste Diversion Policy Adoption	Student's t	-2.1832	329	0.030
	Mann-Whitney U	10746		0.016
Portion Control for Waste Reduction	Student's t	4.1714	329	< .001
	Mann-Whitney U	9432		< .001
Paperless Policy Adoption	Student's t	-0.5518	329	0.581
	Mann-Whitney U	11836		0.641
Waste Reduction through Avoidance of Over-preparation	Student's t	-0.2504	329	0.802
	Mann-Whitney U	12140		0.923
Composting of Spoiled Food and Plate Scrapings	Student's t	2.0121	329	0.045
	Mann-Whitney U	10661		0.050
Donations for Reuse	Student's t	-2.5229	329	0.012
	Mann-Whitney U	11234		0.008
Purchase of Recycled Utensils and Items	Student's t	-0.5327	329	0.595
	Mann-Whitney U	11935		0.531
Use of Recycled Utensils and Items	Student's t	0.2419	329	0.809
	Mann-Whitney U	12122		0.910
Repair of Solid Waste Items	Student's t	-2.7243	329	0.007
	Mann-Whitney U	9987		0.005
Provision of Additional Bins for Recycling	Student's t	0.4916	329	0.623
	Mann-Whitney U	11868		0.665
Management's Consideration of Recycling the Importance	Student's t	2.4646	329	0.014
	Mann-Whitney U	11880		0.015
Interest in Recycling Due to Cost	Student's t	0.8003	329	0.424
	Mann-Whitney U	11816		0.618
Effort to Avoid Waste Food	Student's t	-0.5844	329	0.559

Contamination	Mann-Whitney U	11499		0.332
Preparedness for Recycling Time Commitment	Student's t	0.0219	329	0.983
	Mann-Whitney U	12111		0.899

[a] Levene's test is significant ($p < .05$), suggesting a violation of the assumption of equal variances
Source: Field data, 2023

Table 6 presents an analysis of the relationship between the size of restaurants and their propensity to adopt sustainable solid waste management strategies. The findings of the independent samples t-test indicated statistically significant differences with the size of the restaurants. There were observed differences in the willingness of smaller and larger restaurants to implement a solid waste diversion policy ($t = -2.1832$, $p = 0.030$), suggesting the necessity for customised interventions. The size of the restaurant had a significant impact on various practices aimed at reducing waste, such as portion control ($t = 4.1714$, $p < 0.001$), donation for reuse ($t = -2.5229$, $p = 0.012$), repair of solid waste items ($t = -2.7243$, $p = 0.007$), and management's consideration of the importance of recycling ($t = 2.4646$, $p = 0.014$). However, there is a statistically difference between restaurant size and Provision of Additional Bins for Recycling, Purchase of Recycled Utensils and Items, Use of Recycled Utensils and Items, Provision of Additional Bins for Recycling, Interest in Recycling Due to Cost, Effort to Avoid Waste Food Contamination, Preparedness for Recycling Time Commitment with $P>0.05$. The robustness of these findings was reinforced by the Mann-Whitney U tests. Significantly, Levene's test detected differences in variance among restaurants of varying sizes. The disparities identified highlight the importance of using sophisticated, situation-dependent approaches to encourage sustainable waste management methods within the multifaceted realm of the food service sector.

Based on the findings, it can be said that food service establishments are prepared to adopt a solid waste reduction program since it can result in significant cost savings on waste hauling fees, proper portion sizes for patrons to avoid waste, and a reduction in solid waste through the avoidance of overpreparation. Instead, to cut down on waste, the respondents advise restaurants to implement a paperless policy that includes using electronic software or systems (like E-copy). This suggests that while some restaurants were prepared to undertake solid waste reduction programs, prevent overpreparing, and serve appropriate portions, the majority of them did not employ paperless systems or electronic software to cut waste.

Discussion
Categories of Solid Wastes Generated by Restaurants
The results about the categories of solid wastes generated by restaurants reveal valuable insights into the waste disposal practices within the sampled establishments. The majority of respondents reported frequent generation of liquid waste, solid waste, and gas, indicating the

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diverse nature of waste produced in the course of restaurant activities. This aligns with Naab's (2017) definition of waste, emphasizing items that are no longer valuable to the owner or do not serve their intended function. The analysis further delves into the specific types of solid waste, highlighting variations in paper, glass, plastic, metal, and food waste generation throughout the week. These variations underscore the dynamic nature of waste production in the restaurant sector, influenced by factors such as daily operations and consumer patterns.

The findings of this study, specifically the quantitative evaluation of cumulative trash output amounting to 9,985 kg, are consistent with previous research that highlights the significant environmental consequences of regular restaurant operations in terms of solid waste generation. The aforementioned statistic functions as a reference point, emphasising the necessity for focused interventions and enduring management approaches within the food service sector (Torrente-Velásquez et al., 2022). The scholarly literature emphasises the significance of comprehending the scale and composition of trash produced to successfully execute waste reduction strategies and advance sustainable waste management approaches (Appiah, 2021).

The implementation of segregated trash containers to sort solid waste aligns with existing scholarly research that underscores the importance of waste separation processes in extracting valuable materials from mixed solid waste (Rhyner et al., 2017). The absence of separate bins among the majority of respondents suggests a potential area for enhancement, which is consistent with existing literature that emphasises the need for raising awareness and promoting the adoption of environmentally conscious trash disposal practices by businesses (Cummings, 2017; Torrente-Velásquez et al., 2022). The findings of this study, within this particular context, provide evidence that reinforces the pressing requirement for focused interventions and implementation of optimal strategies within the restaurant sector. These interventions aim to mitigate the environmental consequences and foster sustainable waste management, as emphasised in existing scholarly works.

In contrast to the assertions made by Rhyner et al. (2017), the outcomes of the study provide insights into the views and behaviours of the participants concerning trash classification. The findings offer significant insights into the varied characteristics of waste management practices, underscoring the necessity for nuanced approaches to trash management. The existing body of literature provides support for this assertion by acknowledging the intricate nature of attitudes toward waste management and emphasising the significance of customising tactics to effectively target specific attitudes about various trash types (Cummings, 2017; Torrente-Velásquez et al., 2022).

The evaluation conducted in this study is consistent with existing literature, highlighting the importance of implementing comprehensive waste management strategies that take into account the many forms of trash generated during restaurant activities (Agyeiwaah, 2020). The findings are consistent with the discoveries made by the United States Environmental

Protection Agency (EPA) in 2008, which highlight the varied characteristics of hazardous waste and its possible origins. The mention of toxic waste in various forms, such as liquids, solids, gases, or sludge, underscores the necessity for a comprehensive waste management strategy that takes into account the diverse classifications of waste. Moreover, the proposal to exchange food waste derived from uneaten portions and trimmings from food preparation with companies or individuals involved in animal husbandry represents a promising approach for mitigating waste using recycling or repurposing.

The researchers' focus on the prevention of hazardous waste development within the food-related industry is an important observation. This phenomenon can be ascribed to the inherent characteristics of the business, which generally do not entail the procurement and utilisation of resources that have the potential to generate hazardous compounds. This statement is consistent with the argument put forth by Martin-Rios et al (2022) that the management of hazardous wastes poses difficulties due to the wide range of materials and sources from which they are obtained.

Readiness to Reduce, Reuse and Recycle Solid Waste
The varying viewpoints expressed by participants with the reduction, reuse, and recycling of the solid waste within the food service sector are consistent with the prevailing body of research on attitudes and behaviours about waste management. The findings align with Martin-Rios et al (2022), which underscores the economic benefits of waste recycling and the significance of a comprehensive approach that involves all relevant parties to attain a circular economy. The presence of favourable views towards waste management practices indicates a potential avenue for implementing focused interventions and educational initiatives aimed at advancing sustainable waste practices within the food service sector.

Size and implement sustainable solid waste management strategies
The results of the correlation between the size of a restaurant and its inclination to implement sustainable solid waste management strategies are consistent with existing research on waste management practices and the difficulties encountered by restaurants. The differences revealed in the inclination to adopt a solid waste diversion policy between smaller and larger restaurants align with the wider discourse surrounding the difficulties encountered by establishments of varying sizes in the realm of waste management (Cummings' SWM hospitality model; Torrente-Velásquez et al., 2021).

Smaller food establishments may face distinct obstacles, including constrained financial resources and logistical assistance (Van Niekerk & Weghmann, 2019), which can influence their preparedness to implement complete waste reduction strategies. However, it is important to note that larger restaurants, despite having greater resources at their disposal, may have distinct organisational complexities that can impact their strategies for implementing sustainable waste management practices (Martin-Rios et al., 2022). This highlights the necessity of implementing individualised interventions that are specifically

designed to address the unique obstacles encountered by enterprises of varying sizes. From the results, it can be concluded that the restaurants in the food service industry are ready to implement a solid waste reduction programme because it can create significant cost savings in waste hauling fees, the restaurant serves a proper portion of food to reduce waste and also reduces solid waste by avoiding over preparation.

On the contrary, the responses suggest that restaurants adopt a paperless policy, including the use of electronic software or systems (e.g., E-copy) to reduce waste. This implies that most of the restaurants did not use paperless systems (electronic software) to reduce waste as much as they were ready to implement solid waste reduction programmes, avoiding over-preparation and also serving proper portions of food.

CONCLUSION

This study places significant emphasis on the significance of waste management within the food service sector, underscoring the necessity for focused educational activities and interventions aimed at addressing unfavourable attitudes. The findings of the study reveal that waste management in the food service industry within the Sunyani Municipality is highly influenced by restaurant size and operational capacity. Larger restaurants tend to adopt more sustainable practices, such as portion control and waste minimisation, due to the financial and operational incentives available to them. However, despite these efforts, the widespread adoption of more advanced technologies, such as paperless systems, remains limited. The readiness of smaller restaurants to engage in waste reduction and recycling efforts is still constrained by limited resources and logistical challenges. These results suggest that targeted interventions and financial incentives could encourage broader participation across restaurant sizes, promoting more environmentally responsible behaviours.

Moreover, the study highlights a significant gap in the provision of separate bins for waste segregation, a fundamental aspect of effective waste management. Despite the availability of waste containers, many establishments still dispose of refuse improperly, contributing to environmental degradation. This underscores the need for comprehensive waste education programs that not only inform restaurant managers and staff but also facilitate the practical implementation of sustainable waste strategies. By fostering collaboration between regulatory bodies, local authorities, and businesses, more cohesive and effective waste management practices can be implemented, ultimately leading to positive environmental and social outcomes.

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