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SUSTAINABLE FOOD WASTE MANAGEMENT IN UNIKL MICET: CHALLENGES IN TRANSLATING AWARENESS INTO ACTION

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Abstract:

Despite growing awareness of food waste issues, universities face significant challenges in translating awareness into action. This study investigates food waste management practices at UniKL MICET, identifying key barriers that prevent staff and students from adopting sustainable disposal methods. A mixed-method approach was employed, combining quantitative surveys and qualitative observations to examine food waste disposal behaviors, obstacles, and reduction efforts. Findings reveal that 100% of respondents recognize the importance of food waste management, yet only 23% actively practice sustainable disposal methods, such as composting or feeding animals. The continued reliance on municipal waste bins highlights the disconnect between awareness and action. Key challenges include habitual disposal practices, lack of incentive, inadequate infrastructure, and weak institutional policies, which hinder sustainable waste management. Addressing these barriers requires clear policies, infrastructure investment, and behavioral change initiatives. These findings emphasize the urgent need for structured interventions to bridge the awareness-action gap in university food waste management.

Keywords:

Food Waste Management, Awareness-Action Gap

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Introduction

The rapid growth of urbanization and global population has led to an alarming increase in waste generation, including food waste (Ghazali & Syed-Hassan, 2024). Recognizing the severity of this issue, the United Nations has set a goal to reduce food waste by 50% by 2030 under Sustainable Development Goal (SDG) 12.3 (Gonçalves et al., 2023). In Malaysia, food waste constitutes a significant portion of municipal solid waste, presenting serious challenges for waste management systems. With a population of approximately 31 million, the country generates over 39,000 tons of municipal waste daily, of which more than 30% is food waste(International Trade Administration, 2024). Alarmingly, an estimated 3,000 tons of food waste are still edible, highlighting inefficiencies in food consumption and disposal (Zainal & Hassan, 2019).

In 2022, approximately 282,000 male students and over 405,000 female students were enrolled in public higher education institutions in Malaysia. This large student as well as staff population contributes significantly to food waste generation. As centers of education and behavioral development, higher learning institutions play a crucial role in promoting sustainability; however, food waste remains a persistent challenge in university settings.

Studies have explored the relationship between awareness, behavior, and institutional interventions in reducing food waste. Mganga et al., (2021) emphasize the importance of the extended model of planned behavior, identifying environmental awareness, social concerns, and perceived behavioral control as key motivators for students to engage in food waste reduction. However, while awareness is high, subjective norms and behavioral intentions do not always translate into sustainable actions.

Similarly, Alattar et al., (2020) examined food waste-related behaviors among university students and found that while many were aware and willing to act, portion misjudgment and dissatisfaction with food quality led to unnecessary food disposal. Their study also highlighted the role of composting attitudes, sustainability values, and food management skills in shaping waste reduction behaviors, suggesting that structured university programs could enhance food waste diversion efforts.

In an intervention-based study, Pinto et al., (2018) measured food waste reduction in a university canteen before and after an awareness campaign. Their findings revealed that simple informational posters reminding students to take only what they could eat led to a 15% reduction in plate waste, with over 70% of users actively participating in waste separation initiatives. This highlights the effectiveness of targeted awareness programs combined with institutional support in reducing food waste.

Despite these insights, research on food waste management in Malaysian universities remains limited, particularly in institutions located in sub-urban such as Universiti Kuala Lumpur Malaysian Institute of Chemical & Bioengineering Technology (UniKL MICET). While some established universities, including University of Malaya, Universiti Putra Malaysia, and Universiti Tun Hussien Onn, have initiated food waste disposal codes or composting programs,

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these efforts remain isolated and lack widespread implementation. There is no unified approach to food waste management in Malaysian higher education institutions, causing this issue to persist. Understanding how staff and students at UniKL MICET handle food waste is critical for promoting sustainable waste management, and bridging the gap between awareness and action.

This study investigates food waste management practices among UniKL MICET staff and students, focusing on the gap between awareness and sustainable action. By identifying key behavioral, structural, and institutional barriers, the study aims to propose effective interventions and policy recommendations for improving food waste management in universities.

Methodology

Study Area

This study was conducted at UniKL MICET, a technical university in Alor Gajah, Melaka, Malaysia. This sub-urban campus comprises multiple food consumption areas, including cafeterias student hostels, and off-campus rented accommodations.

Data Collection

A mixed-method approach was employed, combining quantitative surveys and qualitative observations to obtain a comprehensive understanding of food waste management among university staff and students. This approach helped in identifying both self-reported behaviors and observable practices related to food waste disposal.

Data Analysis

Structured questionnaires were distributed among staff and students to assess their awareness, and disposal behaviors concerning food waste. The survey covered aspects such as: (i) types of food waste discarded (e.g., leftovers, food scraps, expired packaged food), (ii) methods of disposal (e.g., municipal waste bins, composting, and animal feeding), (iii) challenges faced in waste management and (iv) efforts toward food waste reduction. Field observations were conducted at key food consumption areas to assess actual disposal behaviors and identify infrastructure limitations in food waste management.

A cause-and-effect analysis was conducted using the Ishikawa diagram to categorize the root causes of the Awareness-Action Gap in food waste management. Factors examined included people, process, materials and measurement.

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Results and Discussion

Awareness on Food Waste Issue

Table 1: Food Waste Management Approaches among UniKL MICET Staff and Students

Category	Recognize Importance of Food Waste Management	Management approach		
		Disposal via Bin	Use as Animal Feed	Compost
Staff (n=14)	14/14 (100%)	14/14 (100%)	3/14 (21%)	1/14 (7%)
Students (n=21)	21/21 (100%)	21/21 (100%)	5/21 (24%)	0/21 (0%)
Total (n=35)	35/35 (100%)	35/35 (100%)	8/35 (23%)	1/35 (2%)

Table 1 presents the recognition of food waste management importance and the approaches adopted by staff and students. The findings indicate that all of respondents dispose of food waste, while unanimously recognizing the importance of proper food waste management. This unanimous agreement highlights a strong awareness of the issue among university staff and students.

The awareness is a primary step toward sustainable food waste management. According to Hennchen (2019), many waste-related challenges stem from a general lack of awareness. Increasing human awareness of this issue can lead to stronger intentions to reduce food waste, ultimately shaping attitudes and behaviors (Aydin & Yildirim, 2021). Both awareness and attitudes significantly influence intentions and actions, aligning with the *theory of planned behavior* (Tunner et al., 1989).

Food Waste Disposal Practices

The findings indicate that 100% of respondents, with most relying on municipal waste bins. Alternative disposal methods, such as feeding animals or composting, were practiced by only a minority. This suggests that food waste management at UniKL MICET is largely dependent on conventional municipal waste collection systems, ended in the landfill. The findings support the statement by Lim et al., (2016), which indicates that landfilling is the most common disposal method in Malaysia. This presents a concerning trend, as it ultimately contributes to landfill accumulation.

Feeding animals serves as an alternative for staff and students (23%) who own livestock such as cows or chickens at home, while some choose to feed stray cats. However, in hostel environments, feeding animals is discouraged as it attracts more stray cats, leading to hygiene concerns. Although small in number (2% of respondent), composting, on the other hand, is practiced on an individual and small scale, mainly for personal planting purposes. Due to the absence of large-scale composting facilities, this method remains limited in impact.

Types of Food Waste Discarded

The findings in Figure 1 highlight the type of food waste among UniKL MICET staff and students, with leftover food being the most commonly discarded, followed by food scraps and expired food.

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The majority of respondents (68.6%) reported discarding leftover food, primarily due to excessive portions or spoilage. This suggests that over-portioning, poor meal planning, and improper food storage contribute significantly to food waste generation (Gonçalves et al., 2023). Although awareness of food waste management is high, findings suggest that disposal practices are influenced by wasteful habits, attitudes, or limited access to proper facilities.

Approximately 31.4% of respondents discarded food scraps, including vegetable peels, bones, and trimmings. This applies to students and staff who prepare meals at home or in rented accommodations, as cooking is not permitted within the university premises. Unlike leftover food, which is preventable through better consumption habits, food scraps are often considered unavoidable waste during food preparation. However, their disposal highlights a missed opportunity for waste repurposing, such as composting or using scraps for broths and animal feed.

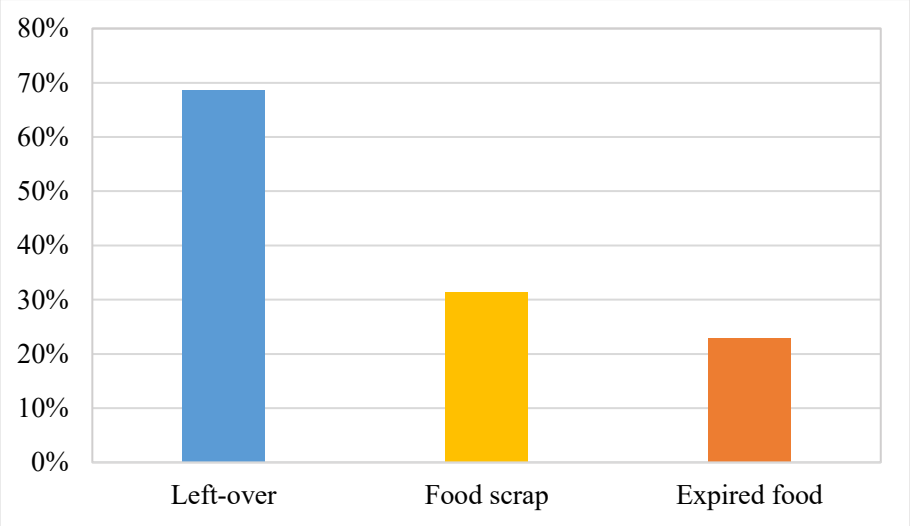

Figure 1: Type of Food Waste Discarded

Expired packaged food accounted for 23% of total food waste. This waste likely stems from buying too much food or buying unintended, neglecting expiration dates, or improper food storage (Aydin & Yildirim, 2021; Jereme, 2017). University students, in particular, may purchase food items in bulk for convenience but fail to consume them before they spoil. One of the challenges for students is managing food inventory in hostels, as limited storage space and lack of proper planning often lead to food expiring before consumption**.**

Common Challenges in Food Waste Management

Figure 2 shows the issues faced by respondents due to food waste mismanagement. It highlight bad odor (43%) being the most common complaint, followed by bin-related issues (17%)**,** pest attraction (3%)**,** and environmental pollution concerns (6%)**.** These problems indicate gaps in waste handling practices, infrastructure, and awareness of proper disposal methods.

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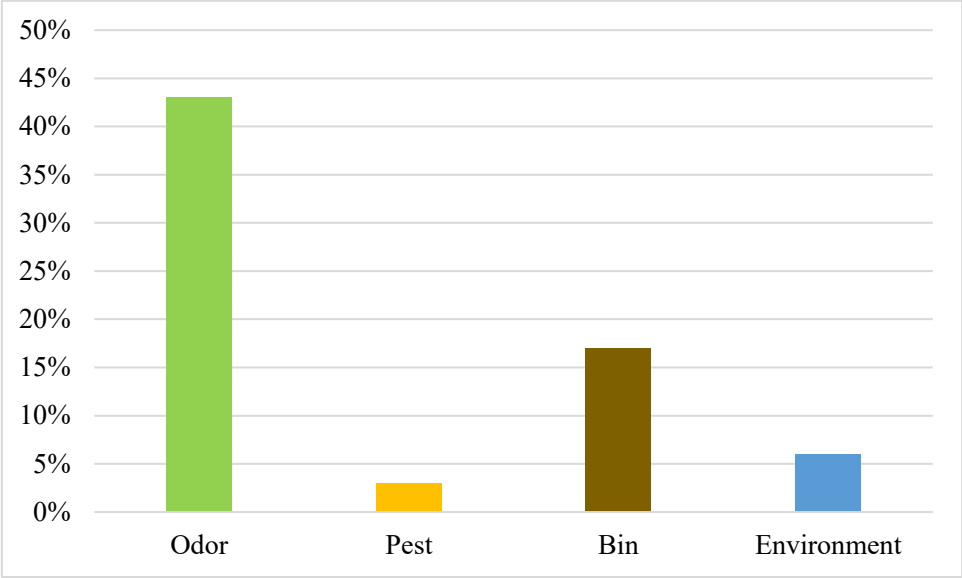

Figure 2: Issue Faced by Food Waste Discarded

Bad odor was the most frequently reported issue, affecting nearly half of the respondents. The decomposition of leftover food, especially in warm and humid conditions, accelerates bacterial growth and leads to foul smells. In university settings, improper waste disposal, irregular waste collection, and the mixing of organic and non-organic waste in bins contribute to this issue. The presence of unpleasant odors not only creates discomfort but may also discourage students and staff from maintaining cleanliness around disposal areas.

Approximately 17% of respondents reported problems with waste bins, such as overfilled bins, missing lids, or improper bin placement. When waste bins reach full capacity without timely collection, food waste spills out, worsening odor issues and attracting pests. Furthermore, pest infestations resulting from food waste disposal were identified as a concern by 3% of respondents. The improper disposal attracts rodents, cockroaches, flies, and stray animals. This poses a hygiene risk, as pests can spread diseases and contaminate food preparation areas (Trematerra & Fleurat-Lessard, 2015).

While many individuals may focus on immediate issues like odor or bin overflow, fewer recognize the broader environmental consequences of food waste. 6% of respondents expressed concerns about pollution, this finding is crucial in understanding long-term sustainability awareness. Improper food waste disposal contributes to landfill overuse, greenhouse gas emissions, and contamination of water sources (Keegan & Breadsell, 2021).

The Awareness-Action Gap and Its Implications

The findings indicate that while 100% of respondents acknowledge the importance of food waste management, only 23% actively or regularly practice sustainable disposal methods, such as composting or feeding animals. This highlights a significant gap between awareness and the actual implementation of sustainable food waste practices. The continued reliance on conventional disposal methods suggests that awareness alone is insufficient to drive meaningful behavioral change.

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Figure 3 illustrates the Ishikawa diagram analyzing the factors contributing to the Awareness-Action Gap in food waste management. Despite understanding the importance of food waste management, most respondents continue to dispose of waste through municipal bins. At an individual level, this behavior is influenced by psychological barriers, such as habitual disposal practices, lack of motivation, and limited sense of responsibility for waste reduction (Raghu & Rodrigues, 2020). Many individuals recognize the environmental impact of food waste but lack the personal drive or incentives to adopt sustainable practices (Li et al., 2017). Without direct consequences or tangible rewards, individuals tend to prioritize convenience over sustainability.

The study suggests that food waste generation remains a persistent issue, with students and staff engaging in excessive and unnecessary disposal. The findings align with research demonstrating that consumer habits significantly contribute to large-scale food waste (Coşkun & Yetkin Özbük, 2020). Behaviors such as over-portioning, impulsive buying, and poor inventory management lead to increased food disposal. Additionally, the gap between conventional practices and the adoption of new norms, such as waste segregation, remains a challenge (N Kasmuri et al., 2023). A lack of accountability and the absence of legal enforcement have led to widespread indifference within the university community.

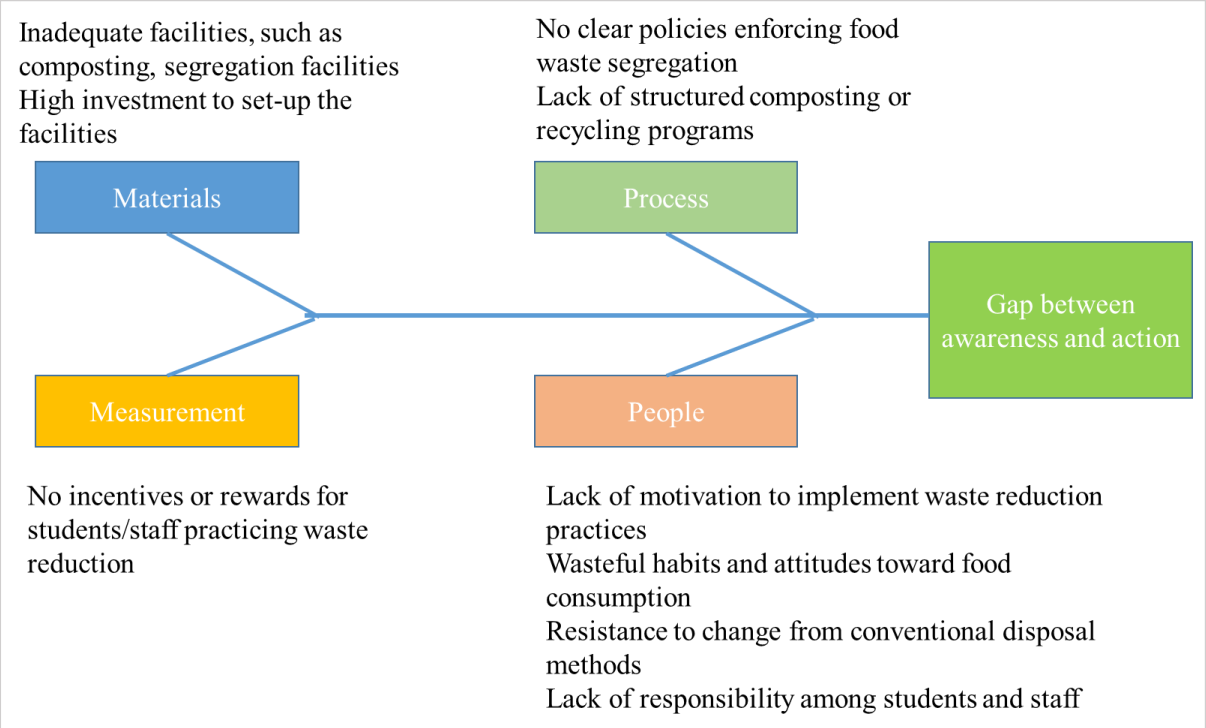

Figure 3: Ishikawa Diagram Analyzing the Awareness-Action Gap in Food Waste Management

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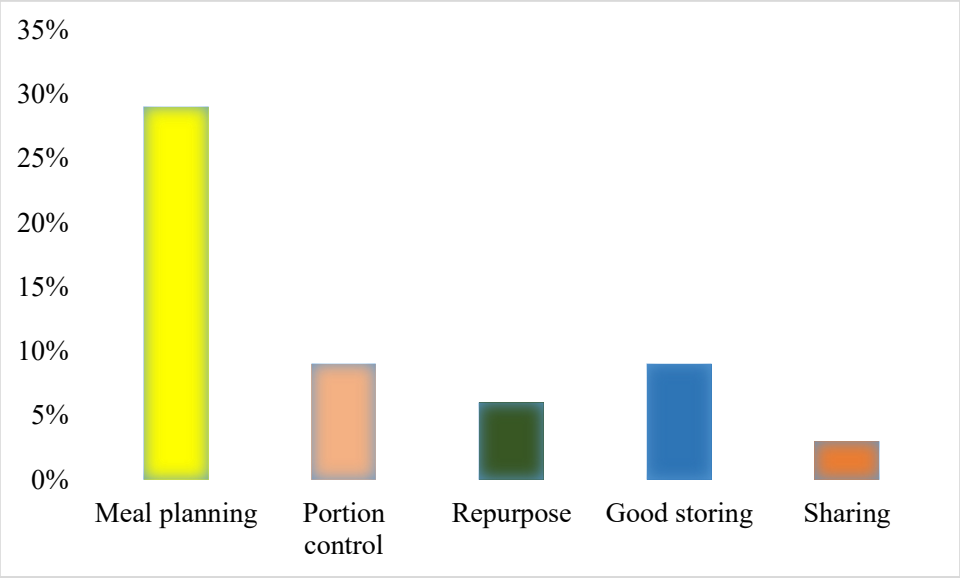

Figure 4: Individual Strategy of Food Waste Reduction Practices among Respondents

Nevertheless, some respondents have embraced sustainable practices. The individual strategies identified in Figure 4 include meal planning (29%), portion control (9%), waste repurposing (6%), proper food storage (9%), and food sharing (3%). Despite their efforts to reduce the volume of food waste generated, many respondents ultimately still dispose of their waste through municipal bins, highlighting the lack of alternative disposal options and structural barriers preventing a shift toward sustainability.

On a broader scale, the findings reveal that universities lack a structured system to effectively address food waste management. This includes both policy frameworks and supporting facilities. Without well-defined institutional policies and guidelines, students and staff continue to rely on conventional waste disposal methods. This lack of formal recognition and structured initiatives leads to a perception that food waste is a minor issue, reducing the likelihood of active participation in waste reduction efforts. Although food donation and composting programs exist, they are restricted to specific academic courses or welfare initiatives, failing to generate widespread awareness or significant institutional impact. The absence of sustainable practices may be due to unclear or insufficient instructions, leading to confusion or a lack of initiative in adopting the suitable approach (Mahayuddin, 2024).

A major challenge contributing to the awareness-action gap is the lack of access to proper food waste disposal facilities, such as composting, as noted by Hashim et al., (2021) and N Kasmuri et al., (2023). Hence, the university relies solely on waste collection services, without a dedicated on-campus system for food waste segregation, composting, or recycling. This infrastructure gap limits sustainable alternatives.

The absence of institutional investment in food waste management may be due to the high cost of implementing new systems and a lack of clear guidelines from authorities on how universities should address this issue. Without financial support, policy frameworks, and regulatory enforcement, universities struggle to integrate sustainable waste management into their operations.

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Conclusion

This study provides insight into food waste management practices among staff and students at UniKL MICET, emphasizing the disconnect between awareness and sustainable action. While all respondents recognize the importance of food waste management, only 23% actively engage in sustainable disposal methods, such as composting or feeding animals. The continued reliance on municipal waste bins indicates that awareness alone is insufficient to drive meaningful behavioral change. Key challenges include habitual disposal practices, lack of motivation, insufficient institutional support, and limited access to sustainable waste facilities. Additionally, psychological barriers, poor meal planning, over-portioning, and impulsive buying further contribute to excessive food disposal. From an institutional perspective, the absence of structured waste management policies, inadequate infrastructure, and fragmented initiatives hinder sustainability efforts. These findings provide a foundation for developing targeted interventions, policy improvements, and infrastructure investments to create a structured and sustainable food waste management system within universities. Without addressing these barriers, food waste mismanagement will persist, undermining sustainability goals. A structured and integrated approach is essential to foster long-term change and establish universities as leaders in sustainable food waste management.

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