

Managing Restaurant's Food Loss and Waste at The Aburi Sushi Bali: A Sustainable Culinary Tourism Enterprise Model in Bali

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Abstract: Food loss and waste (FLW) is a global issue that affects the environment, economy, and society. It also poses a challenge for the sustainability of Japanese culinary tourism which is a growing sector in Bali. This study aims to explore how a sushi restaurant in Bali especially at The Aburi Sushi Bali manages its FLW and contributes to sustainable culinary tourism. The study adopts a qualitative case study approach, using semi-structured interviews, observation, and document analysis as data collection methods. The findings reveal that The Aburi Sushi implements various strategies to prevent, reduce, and recover FLW, such as inventory management, portion control, menu design, staff training, customer education, and food donation. The study also identifies the benefits and challenges of FLW management for the restaurant and its stakeholders. The study concludes that FLW management enhances the environmental, economic, and social sustainability of culinary tourism enterprises in Bali. It also provides implications and recommendations for practitioners and policymakers to improve FLW management practices in the culinary tourism sector.

Keywords: food loss and waste; Japanese culinary tourism; strategies; restaurant management

1. Introduction

The historical relationship between Bali and Japan which began during Japan's colonization of Indonesia from 1942 to 1945, continues to this day, resulting in a multifaceted connection. This enduring bond is evident in various aspects of Balinese culture, including the incorporation of Japanese martial arts into traditional Balinese dance and the popularity of Japanese cuisine in Bali. Furthermore, there is evidence of mutual exchanges between Bali and Japan through initiatives such as student exchange programs, collaborative art

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exhibitions and thriving business ventures. These initiatives underscore the harmonious relationship between the two cultures (Nurita et al., 2018; Asthu & Putra, 2021; Indrowaty et al., 2022). This connection has had a significant impact on Bali's tourism industry, particularly in terms of increasing the number of Japanese tourists. Annually, Japanese tourists' group to Bali seeking immersion in its precisely preserved local culture, which is integral to Bali's distinctive tourism attraction. These experiences epitomize Bali's cultural tourism paradigm, which emphasizes Balinese cultural heritage as a potent attraction for Japanese tourists, as Subadra (2015) has emphasized.

In recent years, there has been a surge of Japanese interest in Balinese culture, with many artists and musicians drawing inspiration from its rich traditions. Subadra (2006) highlights the profound connection between Bali and Japan, emphasizing the symbiotic nature of their cultural exchange. This dynamic partnership extends to tourism and environmental reclamation efforts, showcasing the transformative impact of cross-border collaborations. The Mangrove Information Centre is a joint venture between the Indonesian and Japanese governments, established through the Japan International Cooperation Agency (JICA) (Subadra, 2006). The initiative focuses on ecological conservation and aligns with sustainable tourism principles. It represents a significant milestone in Bali's environmental rejuvenation, particularly in the Southern Denpasar region. The 600-hectare mangrove forest offers a range of activities, including birdwatching, crabwatching, fishing and boating, providing visitors with immersive experiences. Subadra's research (2006) highlights the crucial role of Japan-Indonesia partnerships in promoting shared values of environmental preservation and sustainable tourism in Bali's cultural and ecological landscapes.

Table 1. Number of Japanese Tourists Visiting Bali between 2018-2022

Year	2018	2019	2020	2021	2022
Number	261,666	257,959	48,800	-	19,366

Source: Bali Statistic Agency, 2023.

Table 1 shows the number of Japanese tourists visiting Bali from 2018 to 2022. In 2018, there were 261,666 tourists, which slightly decreased to 257,959 in 2019. Due to the Covid-19 pandemic, the number of arrivals sharply declined to 48,800 in 2020, and there were no arrivals in 2021 due to travel restrictions. However, in 2022, after adjustments to visitation regulations, there was a resurgence with 19,366 visitors (Bali Statistic Agency, 2023). This highlights the significant impact of external factors and policy changes on Bali's tourism industry.

Gastronomy plays a crucial role in tourism, as it appeals to visitors seeking authentic local cuisine for both comfort and cultural experiences (Subadra et al., 2019). It encompasses not only the act of cooking and eating, but also the opportunity to learn about and explore different cultures and traditions through food (Counihan & Van Esterik, 2013; Long, 2004). Culinary loving tourists travel to taste, cook, and write about food to understand its history, science and art as well as to preserve and evolve culinary heritage worldwide (Lee, 2023; Kovalenko et al., 2023). The World Forum on Gastronomy Tourism, organized by the UNWTO, promotes gastronomy tourism as a driver for destination development. Additionally, tourists often seek familiar foods from their homeland when travelling abroad, indicating a link between culinary comfort and travel exploration. Local establishments that serve dishes from tourists’ own cultures provide a sense of belonging and identity in unfamiliar environments (Counihan & Van Esterik, 2013; Björk & Kauppinen-Räisänen, 2014). Therefore, homeland foods become more than just nourishment; they also serve as a means of sharing and connecting with others. Tourism destinations adjust their offerings to meet the culinary preferences of international tourists by using local ingredients and techniques to recreate dishes from various regions (Valverde-Roda et al., 2022). This not only satisfies travellers who miss home but also enhances the cultural diversity of the destination and promotes cultural exchange between locals and visitors (Sthapit et al., 2020; Kovalenko et al., 2023). As a result, international restaurants have succeeded in destinations such as Bali.

The development of restaurants in nine regions of Bali increased consistently over the five-year period, from 2,518 in 2018 to 3,868 in 2021. However, there was a slight decrease in 2022 with 3,245 restaurants (Table 2). This points to some challenges and opportunities for Bali’s culinary sector.

Table 2. Number of Restaurant in Bali by Region between 2018 and 2022

No.	Regency/ City	2018	2019	2020	2021	2022
1	Jembrana Regency	76	134	136	158	136
2	Tabanan Regency	40	80	80	119	92
3	Badung Regency	823	823	823	728	823
4	Gianyar Regency	622	612	952	1,053	952
5	Klungkung Regency	146	243	245	375	245
6	Bangli Regency	36	44	47	14	47
7	Karangasem Regency	120	146	146	269	146
8	Buleleng Regency	200	200	200	548	200
9	Denpasar City	455	582	604	604	604
	Total	2,518	2,864	3,233	3,868	3,245

Source: Bali Statistic Agency, 2023.

While the restaurants in Bali are not categorized by specialty, the exact number of Japanese restaurants remains undisclosed. However, Tripadvisor, a prominent online food tourism platform, lists 380 restaurants under “Japanese Restaurant in Bali” (Tripadvisor, 2024). The site also ranks the top 10 Japanese restaurants in Bali, detailed in Table 3. This suggests a growing presence of Japanese cuisine in Bali, fostering information exchange, culinary innovation, and community cohesion. Such establishments offer appetising meals provide insights into Japanese culture and traditions (Counihan & Van Esterik, 2013; Mohanty et al., 2022). With a focus on collaboration, these eateries strive to create memorable dining experiences for their customers (Björk & Kauppinen-Räsänen, 2014).

Table 3. Top 10 Japanese Restaurants in Bali by Tripadvisor

No.	Name of Restaurant	Area	Regency
1	Sushi Bar Bali	Canggu	Badung
2	Sakura Japanese Restaurant	Nusa Dua	Badung
3	Izakaya by Oku	Nusa Dua	Badung
4	Ambar Ubud Bar	Ubud	Gianyar
5	Hamabe Japanese Restaurant	Nusa Dua	Badung
6	Tenkai Japanese Restaurant	Legian	Badung
7	Hiiragi Restaurant	Kerobokan Kelod	Badung
8	Genji Restaurant	Nusa Dua	Badung
9	Asian Spice Restaurant	Legian	Badung
10	Ling-Ling’s Bali	Seminyak	Badung

Source: Tripadvisor, 2024.

The Aburi Sushi Bali (TASB), a new Japanese restaurant in Bali, is listed on Tripadvisor, but not among the top ten Japanese restaurants in Bali. TASB is located at Jalan Sunset Road 108A, Kuta, Bali, and attracts both local and foreign customers. It offers various Japanese dishes, including sushi rolls, sashimi, and tempura, served ala carte or on a conveyor belt. The restaurant has a cosy and inviting atmosphere, with traditional Japanese decor and soft lighting. TASB was established in 2019 and currently employs 53 local staff members who are proficient in hospitality, particularly in food and beverage services. TASB is strategically located and can accommodate up to 200 customers, offering a diverse array of authentic Japanese cuisine, including sushi rolls, sashimi, and tempura. The restaurant’s modern and stylish interior ensures a comfortable dining experience while customers enjoy the flavours of Japan. However, to maintain quality, particular ingredient management is necessary despite the extensive menu. Proper measures, such as temperature-controlled storage and efficient production processes, are imperative to minimize waste and maximize

efficiency. Technology and employee training play essential roles in achieving these goals (Tomasella et al., 2023). Moreover, regular supply chain monitoring aids in identifying improvement areas and preventing losses, ultimately enhancing product quality and safety while reducing environmental impact (Sharma et al., 2022).

At TASB, the conveyor belt system used for food service presents a potential source of food waste, as uneaten items are likely to be discarded. To mitigate this, a more efficient ordering system could be implemented to allow customers to select only the items they desire. Additionally, excess food is donated to local charities or composted to reduce environmental impact. Since seafood is a staple in Japanese cuisine, maintaining freshness is crucial, especially for raw dishes. TASB uses high-quality ingredients to ensure both deliciousness and healthiness, setting it apart from competitors. However, the issue of food loss and waste remains pressing, threatening production sustainability and contributing to harmful environmental consequences like methane gas production. Addressing this issue is essential for establishing a more efficient and sustainable food system at TASB.

The production and consumption of food in the tourism industry, which includes hotels, villas, and restaurants, has significant implications for sustainability, particularly in terms of their contribution to global greenhouse gas emissions (Gössling et al., 2011). Responsible ingredient sourcing and food waste reduction are essential for promoting sustainability in the industry. Sharma et al. (2022) and Tomasella et al. (2023) claim that adopting eco-friendly practices, such as using local ingredients and minimizing waste can significantly reduce the environmental impact of tourism-related food activities. These efforts align with global sustainability initiatives that aim to manage resources, organizations, and systems in ways that support long-term sustainability, considering social, environmental, and economic factors on a global scale (Combe, 2022; Subadra, 2022).

This research examines the barriers and organisers of implementing a culinary tourism model, highlighting the challenges and opportunities for similar enterprises in Bali and beyond. While previous studies on Japanese restaurants have focused on customer aspects, this study is focused on the underexplored area of food loss and waste management. The study of The Aburi Sushi Bali (TASB) contributes significantly to knowledge by emphasising the implications for sustainability, cost-efficiency, and business viability as most of the current studies largely overlook the unique challenges and opportunities faced by the Balinese culinary tourism industry. There is a lack of comprehensive research on the subject, making it difficult to propose practical solutions. Although global initiatives exist, their applicability to Balinese culinary tourism remains

unexplored. Given the dynamic nature of the sector, it is crucial to take a holistic approach to food waste management. Therefore, this research aims to propose a sustainable model tailored to TASB in Bali.

2. Literature Review

2.1 *Understanding Sustainable Food and Beverage Management*

Food and beverage services are essential for tourists visiting a destination and require professional management to maintain the destination's reputation. This is particularly important for international restaurants, which require exceptional service. Effective management of not only the food served, but also minimising food loss and waste, is crucial (Lee et al., 2018). According to Riesenegger & Hübner (2022), managing food loss and waste (FLW) effectively enhances sustainability and environmental responsibility. Therefore, restaurants should implement strategies to reduce food loss and waste (FLW) and work together with local organizations to ensure proper disposal and recycling (Gustavsson et al., 2011; Quedsted et al., 2013).

Dopson and Hayes (2019) highlight the importance of food and beverage management in the success of the food service industry. Success depends on several factors, including strict adherence to food safety protocols, efficient storage procedures, effective marketing strategies and financial management. It is essential to keep up with industry trends, customer preferences, and update menus to remain competitive and profitable (Martin & Steele, 2016; Galloway & Hoek, 2019; Subadra, 2024). Furthermore, ensuring consistent quality service requires fostering a positive work environment, providing continuous training, and supporting staff (Hayes & Ninemeier, 2015; Martin & Steele, 2016).

Non-compliance with health regulations in food and beverage management not only poses health risks to customers but also leads to significant food waste. This includes food procurement, ingredient storage, processing, transit and serving. It is essential for Executive Chefs to train employees meticulously to handle ingredients to minimize waste and maximize revenue (Hayes & Ninemeier, 2015). Employees play a crucial role in providing exceptional customer service (Tomasella et al., 2023). Kotler and Armstrong (2018) highlight their contribution to customer satisfaction and the establishment's reputation. Their expertise enables personalised service, query resolution and an enhanced dining experience (Parasuraman et al., 1998; Zeithaml et al., 2018). Additionally, they cultivate a welcoming atmosphere, fostering customer loyalty and positive word-of-mouth, which attracts tourists to sample the restaurant's cuisine (Björk & Kauppinen-Räsänen, 2014). Likewise, employees play a key role in maintaining rigorous health and safety standards through meticulous food handling and cleanliness practices. They significantly contribute to customer

satisfaction, operational efficiency, and establishment prosperity (Kotler & Armstrong, 2018; Subadra et al., 2019; Tomasella et al., 2023). To ensure high-quality and safe food service and achieve restaurant objectives, managers must regularly inspect equipment, monitor inventory, and implement food safety protocols. This should be done in accordance with the guidelines provided by the FDA (2021) and Tomasella et al. (2023).

Furthermore, effective food management enhances a restaurant's reputation and attracts more customers and promotes sustainable development goals. By embracing global sustainable management concepts, restaurants strive for greater equity, resilience, and ecological awareness, benefiting both current and future generations (Nadra & Subadra, 2006; UNWTO, 2015; Gössling et al., 2020). Appropriate management of food waste contribute to the sustainability and environmental responsibility of a destination. This is achieved by minimising waste sent to landfills and creating a circular economy through composting and recycling.

The United Nations World Tourism Organization (UNWTO) presents five core principles for global sustainable management. These principles advocate for environmental stewardship, stressing responsible measures to conserve natural resources, minimize pollution and waste, and foster biodiversity (UNWTO, 2023). Additionally, it emphasises on social responsibility, including respect for human rights, fair labour practices, community development, and the promotion of social equity (Mohanty et al., 2022; Subadra, 2022). Furthermore, they advocate for economic viability, encouraging sustainable growth, innovation and efficiency while considering long-term economic impacts. Stakeholder engagement is crucial for a sustainable future which involves involving employees, customers, communities, and investors in decision-making processes. Collaboration and partnerships are also important, as they urge collective action to address global challenges (UNWTO, 2023). These principles encapsulate the elegance and persuasion required to inspire environmental protection, human rights, economic growth, stakeholder engagement and collaboration.

2.2 Defining Sustainable Food Loss and Waste

Food loss and waste present a significant sustainability challenge across various sectors of contemporary society (Filimonau et al., 2019). Effective management of food loss and waste is an essential component of a restaurant's sustainability commitment and financial prudence. These strategies not only reduce the ecological footprint but also lower expenses, playing a fundamental role in addressing global food security concerns. Kim and Hall (2020) argue that effective food waste reduction methods enhance a restaurant's reputation and

promote customer loyalty. Similarly, Teng and Wu (2019) note an increasing consumer interest in sustainability, indicating a preference for businesses that prioritize environmental responsibility. Therefore, managing food loss and waste yield benefits beyond environmental and financial realms, influencing a restaurant's overall success.

Food waste, as defined by the Food Waste Reduction Alliance (2016), encompasses any solid or liquid food substance, raw or cooked, intended for disposal or discarded due to necessity. It includes unconsumed or discarded food, whether due to spoilage or perceived unsuitability for consumption. This issue arises from production and distribution negligence as well as societal pressures favouring appearance over practicality. Alarming, one-third of all food meant for human consumption is wasted annually, underscoring its urgency as a global concern. Furthermore, food waste not only impacts the environment but also carries economic and social ramifications, resulting in substantial financial losses and exacerbating food insecurity, particularly among vulnerable populations. Addressing this issue necessitates collective action from restaurant stakeholders, including indigenous communities, to curtail waste and ensure equitable food distribution. As noted by Tomasella et al. (2023), restaurant industries value local communities, support local food producers, preserve the local environment through sustainable food practices and promote charitable programs.

Many scholars have investigated the issue of food loss and waste from various perspectives. For instance, Gössling et al. (2011) explored the correlation between food waste and greenhouse gas emissions. Legrand (2017) classified food waste into four categories: pre-consumer waste, post-consumer waste, packaging waste, and operation and operating supplies waste. Pre-consumer waste comprises trimmings from vegetables, fruits, and meats, as well as expired or spoiled products. Post-consumer waste consists of leftovers from meals or expired items. Packaging waste refers to materials used for packaging, such as plastic containers or cardboard boxes. Operation and operating supplies waste involves utensils, napkins and cleaning supplies used in food service. Annually, over one-third of global food production is wasted, resulting in significant environmental and economic impacts. It is crucial for sustainable development to reduce food waste throughout the supply chain (Stangherlin & Barcellos, 2018). Kim and Park (2023) discovered that 34.1% of fruits, vegetables, meat, and cereals in Korea were lost or wasted. This highlights the necessity for collaborative efforts towards sustainable development.

Furthermore, Teng et al. (2023) conducted a study linking food waste to religious beliefs. They found that such beliefs increase awareness of divine punishment, rewards and religiously-based food waste control practices among

tourists. Similarly, Filimonau et al. (2022) argue that social and cultural norms often outweigh the positive influence of religious ideals, promoting wasteful behaviours. They suggest a need for greater involvement of religious leaders in promoting waste reduction. These findings highlight the importance of religious backgrounds in promoting environmental awareness and sustainable food waste management practices. This aligns with Subadra's (2022) research, which emphasizes the centrality of the '*Tri Hita Karana*' philosophy in Bali's cultural tourism development. The philosophy emphasizes the harmony between God, humanity, and nature for well-being (UNESCO, 2012; Subadra, 2015).

Food loss entails the wastage or reduction of eatable food throughout harvesting, production, and transportation, encompassing the degradation of food quality during preparation. Disposal of unwanted food includes leftovers on guests' plates and inedible components from meal preparation (Filimonau et al., 2022; Talwar et al., 2023), with significant repercussions on economic, social, and environmental fronts. It escalates expenses for producers and consumers, while exacerbating greenhouse gas emissions and environmental issues (Gössling et al., 2011). Thus, reduction food waste is imperative for sustainable development goals (Stangherlin & Barcellos, 2018).

2.3 Sustainable Food Loss and Waste Management

The concept of a sustainable framework for managing food loss and waste aims to address the critical issue of FLW in the culinary industry. This framework integrates environmental preservation, economic viability, and social responsibility, drawing on empirical research, stakeholder perspectives and existing literature (Moggi, 2018; Luo et al., 2021; Wang et al., 2021; Friman & Hyytiä, 2022). The framework aims to reduce food loss and waste (FLW) in the culinary sector by identifying practical solutions, such as inventory optimization and food donation programs. This multi-approach promotes sustainable practices and signals a shift toward responsible consumption, operational resilience, and lasting societal and environmental benefits.

In recent years, restaurants have intensified efforts to mitigate waste, reflecting heightened awareness of environmental sustainability and responsible business practices. One prominent strategy involves implementing waste reduction and recycling programs. Through proactive monitoring and management of waste streams, restaurants identify inefficiencies and endorse measures to minimize food, packaging, and operational waste. This includes composting food scraps, donating surplus to charities and adopting eco-friendly packaging (Lai, 2022; Sundin et al., 2022). Moreover, restaurants embrace innovative approaches like farm-to-table practices and sourcing local, seasonal ingredients to reduce transportation and food waste. Portion control

and customizable menus also mitigate plate waste (Freedman & Brochado, 2010). These efforts underscore restaurants' commitment to environmental stewardship, serving as a model for other businesses and encouraging sustainable consumer choices.

Restaurants have invested significant resources in minimising loss, recognising the importance of operational efficiency and financial sustainability. A key strategy involves implementing robust inventory management systems. By carefully monitoring inventory levels, tracking ingredient usage and forecasting demand, restaurants may reduce overstocking and prevent food spoilage. Advanced technologies, such as automated inventory tracking and real-time analytics aid to optimise supply chain management by reducing the risk of loss from inventory discrepancies or inadequate stock levels. Additionally, restaurants also adopt cost-saving measures, such as portion control and standardised recipes to ensure consistent portions and minimise ingredient waste. Efficient kitchen practices, such as proper storage, strict rotation and staff training are embraced to prevent spoilage and unnecessary loss. These efforts not only increase profitability but also promote sustainability, responsible resource management, and enhance dining experiences for customers (Björk & Kauppinen-Räsänen, 2014).

3. Research Method and Theoretical Framework

3.1 Research Method

The purpose of the research is to investigate food loss and waste management to understand sustainable practises in the culinary industry in Bali, an international tourism destination. The research was conducted at the Aburi Sushi Bali which is located at Jl. Sunset Road No. 108A, Kuta District, Bali. TASB has a large variety of food and drinks that could potentially cause food loss and waste during its operation, and this restaurant remained open and survived during the COVID-19 pandemic.

This research uses a qualitative approach. Primary data were gathered through face-to-face interviews with the Executive Chef of TASB in September 2023 to gain insight into restaurant operations and food loss and waste (FLW) management (Creswell & Poth, 2018). The Executive Chef plays a key role in overseeing, implementing, and bearing responsibility for food management within the establishment (Davis et al., 2008). The aim of the interview was to identify the challenges faced by TASB in reducing FLW and the corresponding mitigation strategies. In addition, photographs were taken to supplement the data and provide a deeper understanding of the phenomenon under investigation (Yin, 2018; Subadra, 2019). The informant perspectives on research objectives were explained through thematic analysis of interview data (Braun &

Clarke, 2006; Guest et al., 2012). These perspectives were then triangulated with existing literature on FLW to formulate conclusions (Creswell & Poth, 2018; Yin, 2018).

3.2 Theoretical Framework

Food loss and waste (FLW) is the eatable food that is discarded or not consumed by customers in restaurants throughout the food supply chain, from production to consumption. Sustainable FLW management in the restaurants adopt the FLW management strategies which include inventory management, food preparation, storage system, portion control, customer education and legal compliance (Freedman & Brochado, 2010; Björk & Kauppinen-Räisänen, 2014; Lai, 2022; Sundin et al., 2022; Filimonau et al., 2022; Talwar et al., 2023). They are grouped into two categories based their characters namely pre-consumer FLW and post-consumer FLW (Diagram 1).

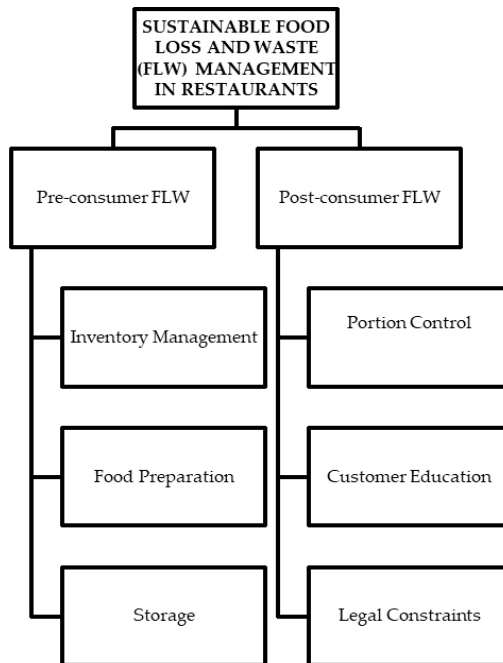


Diagram 1. Sustainable FLW Management, adopted and generated from Freedman & Brochado (2010); Björk & Kauppinen-Räisänen (2014); Lai (2022); Sundin et al. (2022); Filimonau et al. (2022); Talwar et al. (2023)

Pre-consumer FLW refers to food that is lost or wasted before it reaches the consumer which commonly occur during preparation, cooking, or storage. The causes of pre-consumer waste include overproduction, improper handling, spoilage, and inventory mismanagement. On the other hand, post-consumer

FLW refers to uneaten or unfinished food, such as plate waste, leftovers, or take-away food. Factors that contribute to post-consumer waste include large portion sizes, customer preferences, awareness gaps, and legal constraints. Both forms of FLW present significant challenges to sustainable food management in restaurants. Therefore, comprehensive strategies are necessary to effectively address them to reduce their operational costs, improve their resource efficiency, and enhance their reputation among customers and stakeholders as well as contribute to the global efforts to achieve food security, mitigate climate change, and preserve biodiversity.

4. Results and Discussions

4.1 *Unique Cuisine for Competitive Culinary Enterprise*

The food and beverage management at TASB is unique in that it serves mostly fusion Japanese dishes, where the taste has been modified slightly from the original Japanese dish to be more appealing to the public. TASB blends its own ingredients, including sauces, to create the best quality flavours and save money during the production process. A customer shared her experience online on TripAdvisor.

Large, spacious restaurant nicely laid out, with options to sit by the sushi conveyor belt or separately...The salmon sashimi deserves particular mention as it was fantastic. We enjoyed a range of sushi and for dessert had a truly delicious matcha creme brulee. [September 2023]

The evidence suggests that customers found value in the restaurant's physical environment, food quality, variety, presentation, and dessert selection. These aspects highlighted the unique features of the restaurant, such as the sushi conveyor belt and the matcha creme brulee (Photo 1). This indicates that the restaurant offers authentic and innovative Japanese cuisine, which is one of the dimensions of its cultural sustainability.

TASB provides a unique dining experience with its open kitchen concept, enabling customers to observe skilled chefs while enjoying their meals. The restaurant is known for its use of premium ingredients and diverse menu offerings, including sushi, ramen, soup, and regularly updated sashimi selections. TASB stands out among sushi restaurants due to its exceptional quality.

Furthermore, its cosy and intimate ambiance makes it an ideal location for romantic dates or family gatherings. TASB is a recommended destination for sushi enthusiasts and food specialists visiting Bali due to its exceptional food quality and atmosphere (Photo 2).



Photo 1. The typical Japanese cuisines served on the conveyor belt of The Aburi Sushi Bali (Photo: I Nengah Subadra)



Photo 2. Customers having Japanese specialty at The Aburi Sushi Bali (Photo: I Nengah Subadra)

4.2 Managing Food Loss and Waste at The Aburi Sushi Bali

The Aburi Sushi Bali (TASB) has implemented a sustainable management model for food loss and waste (FLW) in the culinary tourism industry. The model includes various strategies to minimize waste and promote sustainability. The strategies for reducing food loss and waste include inventory optimization, efficient tracking and forecasting of ingredients to prevent over-purchasing

and food decay, portion control guidelines to manage portion sizes effectively, reduce plate waste, and ensure customer satisfaction and a comprehensive staff training program to raise awareness among employees regarding FLW reduction techniques and enhance their role in minimizing waste.

Aburi Sushi Bali is highly committed to ensuring the quality of its raw materials. From the planning stage of sourcing ingredients to receiving, storing, and managing food, every effort is made to prevent food loss. Raw materials are ordered through trusted suppliers who cooperate with TASB and are delivered every morning. The purchasing staff meticulously inspects the materials to ensure they match the order and meet the required quality standards. Any damaged goods are identified and rejected. Once approved, the raw materials are stored in a temperature-controlled environment to maintain their freshness and quality (Photo 3).

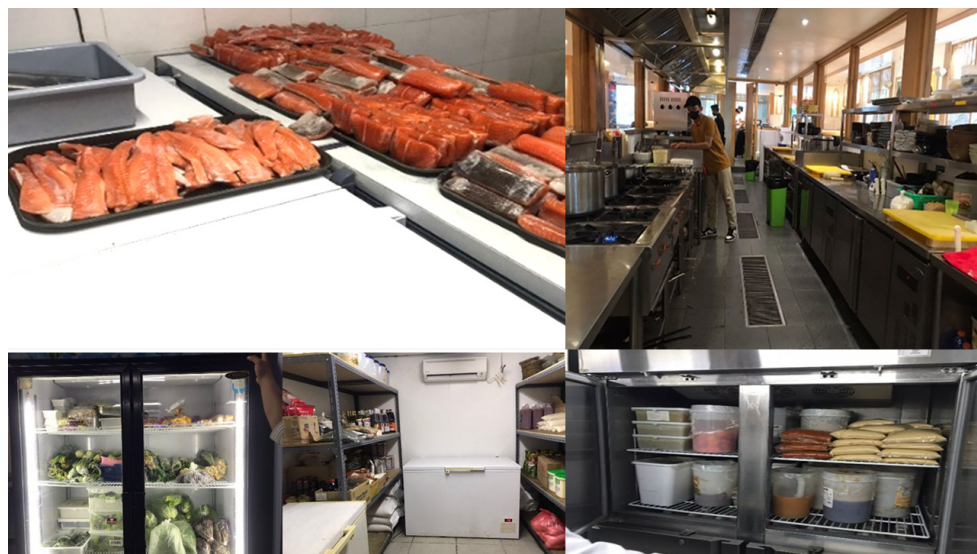


Photo 3. Fresh raw materials before stored in the chiller of The Aburi Sushi Bali (Photo: I Nengah Subadra)

Additionally, TASB also has a strict inventory management system in place to ensure that the raw materials are used before their expiration date. The management of TASB follows very stringent procedures while receiving products or food ingredients from suppliers, notably in terms of ingredient quality and quantity to maximise sales profits and provide customers with excellent meals. These procedures include thorough inspections of the products upon delivery to ensure they meet the restaurant's high standards. In addition, the management also maintains a strong relationship with trusted suppliers to ensure consistent and reliable deliveries.

TASB has sufficient storage facilities for food raw materials, including a chiller, freezer, and dry store. The food ingredients are stored separately based on their type and characteristics, making it easier for staff to retrieve them. Each chiller and freezer have a list of the ingredients contained in them, ensuring that the quality of the raw materials is maintained. Moreover, the storage facilities are regularly cleaned and sanitised to prevent contamination and ensure food safety. TASB's commitment to proper storage practises reflects their dedication to providing high-quality sushi dishes to their customers. The evidence indicates that TASB has effectively implemented superior menu planning and inventory management techniques. They have designed their menus around seasonal and locally sourced ingredients, thereby reducing the prospect of excess inventory. A well-organized inventory system allows the restaurant to practice precise monitoring of food quantities and expiration dates.

Furthermore, the restaurant employs an essential practice to prevent food loss and waste by carefully purchasing and ordering materials based on customer demand and consumption patterns. They establish connections with local suppliers that provide smaller quantities as needed and utilize precise forecasting techniques to estimate required quantities accurately. This approach serves to reduce food waste, manage inventory, and control expenses. The Executive Chef, Muchamad Taufik asserted:

We anticipate and solve food loss and waste from the beginning of our operations, using a forward-thinking strategy. We ensure optimal freshness and suitability for our clients by rigorously selecting and sourcing the freshest raw materials, minimising the possibility of extra waste. [Interview, 08/09/2023]

The prevention and management of food loss and waste emphasise the significance of adopting a proactive and advanced attitude in the restaurant operational processes. This plan starts at the outset of the operations and entails deliberate steps to enhance the appropriateness and freshness of the raw materials. The use of freshest ingredients is essential for minimising the trash produced. TASB strives to reduce waste and improve the quality of products by strictly adhering to these standards.

At TASB, strategies to reduce food waste are implemented through strict portion control measures and innovative food preparation techniques. Staff members receive comprehensive training on the importance of portion control, ensuring that appropriate serving sizes are maintained, and production levels are adjusted according to customer demand. Furthermore, chefs and cooks are encouraged to repurpose surplus ingredients creatively. This includes utilizing

all parts of fruits and vegetables, such as stems and peels, in diverse culinary creations, and repurposing trimmings for stocks and soups. TASB is committed to reducing waste by reprocessing remaining raw materials, such as vegetable trimmings for stock or broth and using leftover chicken or beef bones for ramen soup. Furthermore, sushi dishes at TASB incorporate shredded salmon or fish remnants, demonstrating a commitment to sustainability by reducing food waste while also enhancing the culinary experience. Furthermore, sushi dishes at TASB incorporate shredded salmon or fish remnants, demonstrating a commitment to sustainability by reducing food waste while also enhancing the culinary experience. The Executive Chef, Muchamad Taufik confirmed:

We ensure the effective and efficient control of portion sizes and food preparation by providing comprehensive training to our kitchen staff, optimising resource utilisation, minimising food waste, and promoting cost-effectiveness, ultimately contributing to a more sustainable and responsible food service operation. [Interview, 08/09/2023]

TASB employs various strategies to reduce food waste. Portion sizes on the conveyor belt are adjusted based on guest traffic, and surplus food is often discounted during evening promotions to encourage purchases. On peak days, such as weekends and the 19th of each month, higher customer volumes require increased food production. Additionally, Aburi Sushi Bali donates excess food to local charities and food banks, promoting community support while reducing waste. These initiatives demonstrate TASB's dedication to environmental stewardship and social responsibility, ensuring minimal impact on the environment and active community involvement. The Executive Chef, Muchamad Taufik argued:

Our firm commitment aims to support sustainable tourism development by implementing inventive food loss and waste management techniques... support eco-friendly practises that protect the environment, benefit local communities, and promote responsible tourism for a future that is greener and more prosperous. [Interview, 08/09/2023]

The TASB implements green-oriented measures that align with the international tourism agenda set forth by the UNWTO. This agenda recognises the importance of investing in the revitalisation of the tourism industry to ensure its long-term growth and development. Furthermore, for the upcoming World Tourism Day in 2023, the UNWTO highlights the importance of investing in

the well-being of individuals, preserving the planet, and promoting prosperity. This day serves as a catalyst for global collaboration, urging the international community, governments, multilateral financial institutions, development partners and private sector investors to unite and support an innovative and transformative tourism investment strategy (UNWTO, 2023).

The food service provided by TASB is not entirely free from human error. Mistakes have been made in the past when cooking customer orders and recording them between servers and customers. These errors were mainly caused by miscommunication and a lack of understanding of the restaurant's product knowledge which has contributed to an increase in food loss and waste at TASB. Raising the level of education and awareness among staff members is a useful method in the continuous fight to reduce food loss and waste in restaurants. The Executive Chef empowers employees to act by emphasizing the importance of reducing food waste and their critical role in achieving the restaurant's goal. In other words, the critical components of this process include instructing kitchen staff on correct procedures for storing, handling and rotating food. Additionally, transparent communication channels should be established for reporting and resolving concerns related to food loss and waste.

The unused food waste is disposed of and collected by the waste carrier. One important component of ethical and sustainable food service operations is proper trash management wherein the wastes are treated accordingly. TASB's commitment to managing food waste properly is part of the greater commitment to ethical and sustainable business practices, which ultimately beneficial to both community and the environment. The Executive Chef, Muchamad Taufik (Photo 4), argued:

We ensure that this waste is promptly and responsibly disposed in partnership with local waste carriers ... aim this practice aligns with our commitment to environmental management and adheres to regulations governing waste disposal. [Interview, 08/09/2023]

This shows that TASB has a formal and regular system of disposing of its food waste in collaboration with local waste carriers to reduce the environmental impact of its operations. This also indicates that TASB has a commitment to environmental management and follows the regulations governing waste disposal to enhance its reputation and credibility among its stakeholders.



Photo 4. Chef Muchamad Taufik and the researcher during the data collection at The Aburi Sushi Bali (Photo: I Nengah Subadra)

5. Conclusion

Enterprises engaged in the food supply chain strive to establish collaborative alliances in order to reduce food loss and waste and promote a more sustainable approach among stakeholders such as restaurant owners, staff, customers, and the local community. This attempt requires significant investments in infrastructure, technology, and innovations. TASB, as one of the restaurants contributing to the development of tourism on the island, has effectively managed food loss and waste. Their efficiency is put into practise at every stage, beginning with the acquisition of raw materials from suppliers, the storage, processing, and cooking of those resources, as well as the disposal of any leftover food.

The management of TASB conducts regular training for all employees, especially to prevent and minimise food loss and waste. Additionally, the restaurant also applies time management well, especially in the hours before the restaurant is closed, at the latest by 1 hour before the restaurant closes. There will be a notification from the waiter or waitress to the kitchen team regarding the number of guests who are eating or booking, so that dishes, especially those served on the conveyor belt, can be arranged according to the number of guests who are in the restaurant. The purchasing division is responsible for receiving goods or food ingredients from suppliers. Both the receiving division and the kitchen division have done their jobs properly and placed goods or food ingredients according to the place provided and the temperature determined by management. At last, but not least, the success of FLM at the TASB is also

supported by the active and important roles played by third parties such as local village communities, waste management, and suppliers, which have been running very well to prevent the onset of food loss and food waste.

This study has a positive impact on society, particularly in the restaurant industry, and helps accomplish UN Sustainable Development Goals (SDGs) 12 on responsible production and consumption. It promotes the reduction of food waste and encourages sustainable practices. In other words, restaurants can not only save money by employing techniques to prevent food waste, such as good inventory management and portion control, but they also help creating a more sustainable food system. Additionally, this study educates consumers about the value of responsible consumption and equips them with the knowledge they need to make well-informed decisions when dining out.

The discussion in this research is limited to menu planning and inventory management, portion control and staff training to increase their awareness of the significance of food loss and food waste management. Thereby, future research needs to be undertaken on customer engagement as a means of combating food loss and waste in the restaurant business. Such research educates clients about the establishment's unwavering commitment to sustainability and waste reduction and extended to the convenience of take-out containers for customers to transport any leftover meals home.

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