



## A Study Focus in to Hospitality Restaurant Operations in Regard to Food Security, Through Food Waste and Loss Control Mechanisms

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# A study Focus in to Hospitality Restaurant Operations in Regard to Food Security, Through Food Waste and Loss Control Mechanisms.

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## Summary

Food waste and loss within the larger hospitality's restaurant operations contribute immensely to the global food waste through peelings, cooking and the general food pre-preparations. Studies reveals that restaurants contributes 45% of wastes through food preparation and production processes, 21% through food spoilage as a result of poor storage, inclusive of losses accrued through procurement processes such as during transportation, delivery and ultimately storage, and 34% through food leavers as observed from customer plates either as a result of over-portioning, poorly cooked and/ or prepared foods or service of wrong orders. Further, research confirms that food waste has directly resulted in starvation of over 842 million people, with over 1.3 billion tons documented as restaurant food wastes, while substantial amounts taking place within the larger hospitality restaurant operations. The factors influencing these food waste generation included; the type of service, the type of food served, the expected and actual numbers of customers, the season and the food service organization, which are addressed by this study in an attempt to propose ways of reducing food waste and losses, and hence promoting food security. The study narrows down to the prevention solutions approach, which was employed on the basis of; menu design, portion choices and customized dishes, use of smaller plates during service, procuring optimized quantities, proper application of produce specifications, and employment of waste tracking and analytics methodologies, which when appropriately applied in the restaurant food operations business, will significantly minimize food waste and losses, and by extension enhance global food security.

## Key Words

Food pre-preparation, Food preparation, Food production, Food service

### 1.0 Introduction

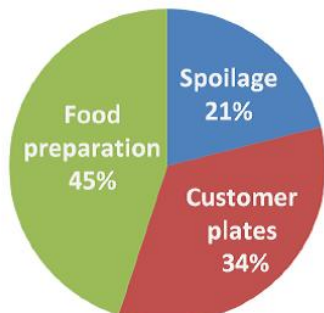


Figure 1: Restaurant Food Waste (Tuppen, 2014)

Food waste is “any by-product from the preparation, production, and service of food” (Okazaki, 2008). Research findings indicate that 45% of food waste is as a result of food preparation and cooking, 21% as a result of food spoilage and 34% as a result of plate debris as illustrated in fig.1. On a global basis, one third of the food produced for human consumption every year, approximately 1.3 billion tones, gets wasted (The restaurant food waste action guide, 2018). Every time food is wasted, the water, energy, time, manpower, land, fertilizer, fuel, packaging and money put into growing, preparing, storing, transporting, and cooking the food is wasted.

Restaurant food waste has been increasing steadily, and in overall accounts for 30% of the total global food wastes (Jarie & Peter, 2012). The general problem is that food waste negatively affects hospitality's restaurant, while the specific corporate problem is that some restaurant managers lack strategies and means to reduce food waste and increase food security and thus profitability. This study review therefore aims at analyzing the hospitality's restaurant operations with a specific focus on the possible food waste control measures that can bear fruits towards the global food security.

## 2.0 Study Approach

According to Sanaa & Arafat (2015), very little has been proposed in relation to restaurant food waste and loss control within the broad studies on food security. However, for purposes of grasping the underlying association between restaurant operations food waste control, the stakeholder theory (Freeman, 1984) was applied in this study review in consideration of the study objectives; to analyze food waste and loss along the hospitality's restaurant food supply chain, and to establish the food waste and loss control measures.

Stakeholder theory dates back to the *Strategic management* (Freeman, 1984), and summarizes the premise of stakeholder theory in relation to the decisions that managers make when responding to stakeholders who can affect firms, and argue that business leaders are under obligation to make decisions that reflect only the wishes of shareholders. In relation to the hospitality's restaurant businesses, all organizations have internal and external stakeholders that influence the decision-making process (Madsen & Bingham, 2014; Tang & Tang, 2012), with an inclusion of mainly employees and managers as the internal stakeholders, and customers, suppliers, the community, the government, and others as the external stakeholders (Tang & Tang, 2012). In relation to the corporate social responsibility, company executives should not intentionally or knowingly inflict harm to stakeholders but should instead function responsibly; protecting the communities, and the environment (Chan, 2013).

## 3.0 Content Study Overview

Food waste from restaurant's operations translates to 0.4 billion tones every year, between one-third and one-half of all food produced (Analysis of U.S food waste among food manufacturers, retailers and restaurants, 2016), which occur at all stages of the food value chain. Nonetheless, most loss in low-income countries occurs during production, while at the service stage in developed countries (Beckford, Campbell & Barker, 2012). According to Tuppen (2014), hotel food waste comprises 20% potato, 08% bakery, 04.5% farinaceous, 15% fruits and vegetables, 05% fish and meat, 03% dairy and egg, 01% whole servings and 05% other food products as illustrated in fig. 2.

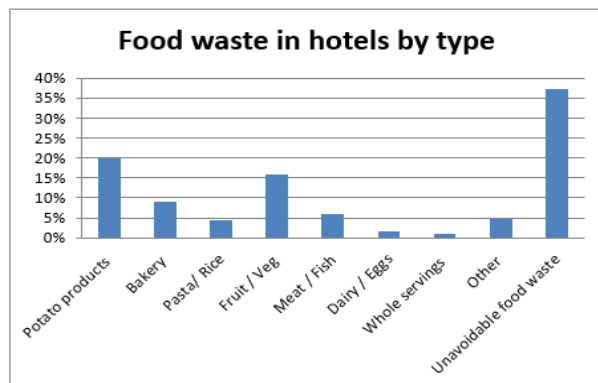


Figure 2: Food Waste by type, (Tuppen, 2014)

## 3.1 Food Waste Generation

Researchers have been concerned with the factors that determine food waste within the hospitality's restaurant operations (Sanaa et. al., 2015), thus the factors found to be most relevant in determining the amount of food waste generated are discussed below.

### 3.1.1 Type of service

The style of service is one of the factors which greatly contribute to the production of food waste in the hospitality's restaurant sector (Sanaa et. al, 2015). The a la carte style of service is reported to generate less waste as compared to the buffet style of service (Hackes et al., 1997), and from study results (Sanaa & Arafat, 2015), a la carte event has performed better in terms of food eaten versus food wasted than the buffet. The study also depicts surprising figures of how food waste from plates made up 12% of the total input food in the case of the a la carte event.



Figure 3: Plate food debris (Sanaa et. al., 2015)

Lam (2010) and Sarjahani et al., (2009) consent that the a la carte style of service helps to reduce plate waste. Though, contradicting results could be justified in light of the nature of food served or due to large serving portions or local culture, as in some cultures, it is considered inappropriate to finish all the food on one's plate, an indication of how an a la carte event may also be wasteful, hence a general strategy to convert all buffet events to a la carte events to reduce food waste may not always be the solution to food waste management.

### 3.1.2 Type of food served

Sanaa & Arafat (2015) compared a la' carte events and found that one property had 10% less preparation waste than the second, an explanation of the variance being that the a la carte restaurant at property one served only Italian while the other served a more international menu reflecting several cuisines, leading to a conclusion that the preparation waste generated depends on the types of dishes prepared. Parfitt et al., (2013), validate more preparation waste from fresh and raw ingredients, with vegetable-based dishes generating more preparation waste than pasta-based. Similarly, Sanaa & Arafat (2015) prove less preparation waste during a breakfast buffet, compared to a lunch buffet, attributable to the type of food served during the breakfast buffet; cereals and jams - a longer shelf life (Siebers, 2013). Thus hospitality establishments can identify those types of food/dishes which tend to generate less waste during their preparation and try to preferentially serve or highlight them by integrating into menus.

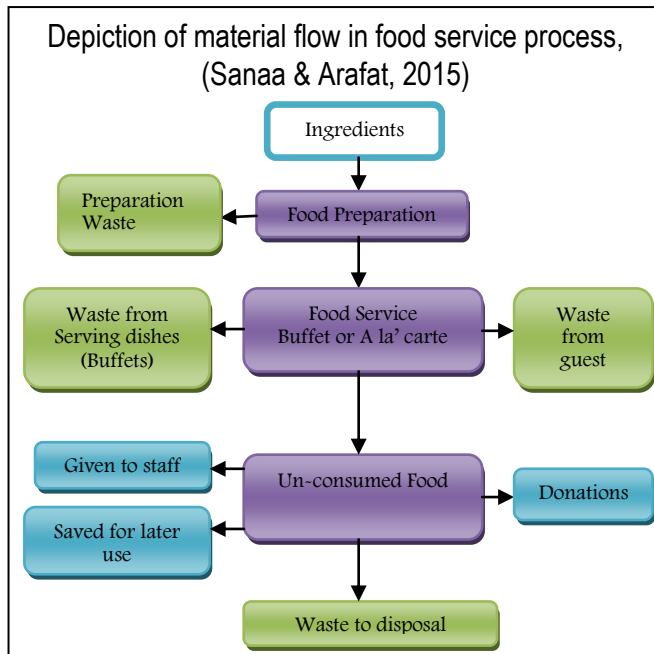
### 3.1.3 Expected and actual number of customers

This factor contributes to food waste as a result of inaccurate forecasting of consumer demand, connected with the guest show-up rate; the lower the value, the more the food waste generated. Hospitality establishments try to be as accurate as possible in their predictions of how many guests to expect in order to save on food costs. Conversely, under-estimating the amount of food is not a risk most hospitality establishments are willing to take and so prefer to err by providing excess. Parfitt et al., (2013) contents that; *"achieving the right balance, when deciding how much food to cook, is not at all a straightforward procedure"*, but depends on other aspects; knowledge of past guest patterns, predictability of guests' numbers, size of the menu, and external factors. However, with the increase in technology, predicting how much to cook can be done using computerized tools (Miller et. al., 2002). Though, Mackenzie et al., (2011) confirms that it is not unusual for circumstances to change suddenly at the last minute rendering cooking quantities rather inaccurate.

### 3.1.4 Food service organization

Previous studies have shown that using smaller plates can lead to less food waste. Consequently, so much of the food goes to waste in buffet service despite the full attendance rate (Sanaa et. al., 2015), which may be as a result of the guests' presence from morning and prior to lunch had at least tea break thus were probably not very hungry by lunch time. Accordingly, to promote effective food waste management for events in the MICE industry, the chef should consider the types of meals being served and their frequency (Miller et. al., 2002). Still Sanaa & Arafat (2015) proposed use of untouched pastries to make popular desserts and effectively using leftovers where HACCP restrictions permit.

## 3.2 Restaurant Operations Food Wastes



Jarie & Peter (2012) authenticate restaurant sector as a significant producer of food waste, although with a significant lack of reliable statistics. According to the schematic presentation of the food waste along the food value chain, food received and stored may accrue wastes, issuance to production areas accrues production wastes, the finished product is passed over to the food service, either a' ala carte or buffet, which generates; wastes from serving dishes and waste from guest plates respectively, yielding un-consumed food which may be given to staff, charities or saved for later use, in addition to waste for disposal (Sanaa et., al., 2015) as shown in the depiction of work flow in food service process.

### 3.2.1 Purchasing and Storing

Lam (2010) proposes a careful thought about menu design as one of the key ways to reduce waste and help realize cost savings. The chef should adjust purchasing policies to reduce excess food purchasing, in addition to application of the use of just-in-time purchasing and adjusting menus to reduce frequently uneaten or wasted items (Tang & Tang, 2012). Proper handling of deliveries is paramount as bruised or damaged products will result in extra waste, and therefore should be rejected on delivery (Gunders, 2012). Storing fresh products and raw ingredients in the most appropriate environment will increase their usable life. Furthermore, continual rotation of food ingredients through the application of the FIFO method is highly recommended (Oelofse, 2014), in addition to clear product labels of purchase and best before dates.

### 3.2.2 Food Preparation/ production

Trimming food products contributes to enormous food waste within the hospitality's restaurant business. For that reason, "skin-on" or "jacket" boiled, baked and roasted offers will reduce the amount of peelings (Bundhun, 2010). The kitchen brigade should avoid pre-preparation of food which will spoil quickly, and store leftovers safely for use the next day. Creativity in making pâtés, soups and stocks, crumbs and croutons from trimmings, excesses is a plus to the kitchen crew, who ought to be trained to reduce prep waste and improper cooking (Schneider, 2015).

Accurate portion control is vital, as not everyone eats the same amount of food, thus consider offering different portion sizes on the menu so customers can choose how much they want to eat, while at the same time keeping portions consistent by use of standard spoons and measures so that portion sizes don't slink up for children and lighter eaters, with second helpings of vegetables or side dishes offered to customers in need of more. Waiters must offer assistance to customers in serving right amount (Miller et. al., 2002) and monitor plate waste as well as offering customers the option to take unfinished food home.

### 3.2.3 Food Service

Meal leavers (54%) are more likely to want the full meal experience and therefore will order more courses, while non meal leavers (71%) just have the main course (High level panel of experts, 2014), thus meal



leavers choose to leave food rather than order less on becoming satiated. A study by Brooklyndhurst (2013) suggests that meal leavers either inaccurately judge the quantity they are able to eat or are more concerned about having the social experience (of several courses) than leaving food when eating out. The main dish and the accompanying side dishes were the courses most left; while appetizers, starters and desserts were less left (Brooklyndhurst, 2013).

### 3.2.4 Food Waste and Loss Control

For efficient curbing of food waste menace within the restaurant business, researchers propose the use of food recovery hierarchy in fig. 4 (The restaurant food waste action guide, 2018) which offer three levels of food waste control; prevention, recovery and recycling.

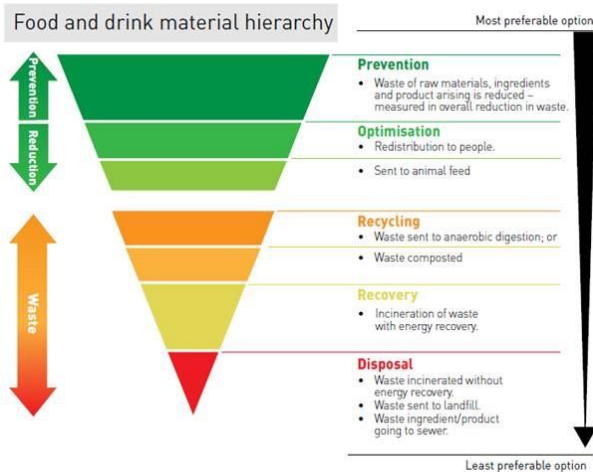


Figure 4: Food recovery hierarchy, (Restaurant food waste action guides, 2018)

However, prevention deals with food wastes at the source and provides reliable solutions with greatest economic value and net environmental benefits (Analysis of U.S Food waste among food manufacturers, retailers and restaurants, 2016) and therefore was considered for this study.

Narrowing down to prevention solutions therefore gives two areas that are potential; *menu planning and service* - menu design, portion choices and customized dishes, and smaller plates, as well as *procurement and supply chain* - optimized quantities, produce specifications, and waste tracking analytics (The restaurant food waste action guide, 2018) as depicted in the food prevention solutions in fig. 5.

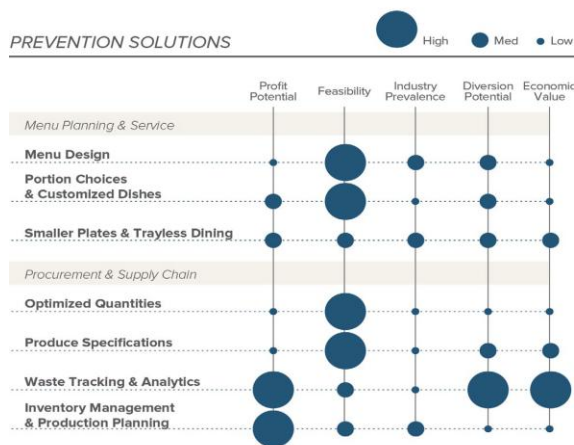


Figure 5: Food waste prevention (Restaurant food waste prevention guide, 2018)

ordering of limited-use food items and systemizing the best practices in operation and training manuals of the organization.

#### b. Portion Choices, Customized Dishes & Smaller Plates

Offering multiple portion choices and a range of alternative allow guests choose the meal that best suits their appetite, provides smaller amounts of a standard menu item with the option of refills, service guests

with exactly what they want, offers a range of sides with mains and clearly indicating on menus what can be swapped out for other options so that guests are served the side that they are most likely to consume comprises the alternative remedies against food wastes. As a control measure, the restaurant may consider providing guests with smaller-sized plates with the objective of reducing waste by 20% in buffet-style operations (The restaurant food waste action guide, 2018).

*c. Optimized Quantities*

Working closely with suppliers and using food waste data to inform ordering gives restaurants the ability to: adjust pack sizes and order quantities, keeping inventory low, and ordering fresh food on a regular basis (The restaurant food waste action guide, 2018). In order to achieve this objective though, the restaurateurs are expected to engage with suppliers and negotiate deals that are best suited to menu and number of guests, in addition to varying packs sizes, which could include smaller minimum order quantities, in addition to the use of quality control assessments to share regular feedback with suppliers about product quality and specifications for improving ordering accuracy.

*d. Produce Specifications*

Employing off-specification produce may be used as a lower-cost substitute for retail-grade since cosmetically perfect food lowers input costs without sacrificing quality; hence this aspect may be pursued via introduction of produce specifications that consider food waste reduction, such as acceptance of imperfect produce and pre-trimmed fruits and vegetables which integrates imperfect produce that meet the restaurant's food safety and quality standards (The restaurant food waste action guide, 2018).

*e. Waste Tracking & Analytics*

According to The restaurant food waste action guide, (2018), this waste solution offers the greatest business benefit to restaurants out of all solutions, since tracking food thrown away has been found to cut food costs by 2 to 6% by increasing awareness of food waste within the company and focusing attention on front- and back-of-house prevention activities (The restaurant food waste action guide, 2018). It therefore calls for food waste audit to establish a baseline, thus the strong data acquired makes the case for investing in food waste prevention efforts and wins buy-in from the executive team and restaurant staff.

### **3.3 Conclusion**

Food waste and loss remains a global threat to food security as it contributes 30% of the global food waste which occurs along the restaurants' food value chain during purchasing and storage, food pre-preparation and preparation, and during food service but significantly buffet service than a la' carte.

On the other hand though, food waste control within hospitality's restaurant business can be effectively minimized through the adoption of the food recovery hierarchy's prevention strategy, which deals with food waste at the source, including menu planning and services as well as procurement and supply chain, hence providing the most reliable solutions to the restaurants' food waste and loss control, and hence key to achieving food security.

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