

Food waste management in the hospitality industry

Case study: Clarion Hotel Helsinki

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<p>Food waste management remains one of the biggest concerns to be controlled in the hospitality industry. The thesis aims to identify the origins of food waste, both pre-consumer, and post-consumer, as well as the impacts and challenges of cutting down on food waste on a scale of a hotel's kitchen. On top of that, the thesis will propose different approaches and practices for food waste management in the food and beverage industry. The thesis examined how food waste was managed in the kitchen of Clarion Hotel Helsinki and provided some suggestions for a better system for food waste management there.</p> <p>The commissioner for the thesis was Clarion Hotel Helsinki. The hotel is located in Jätkäsaari, the West Terminal of Helsinki. The hotel is relatively new since it had its opening ceremony in October 2016. The hotel is operated by Nordic Choice Hotels, a Scandinavian hotel chain, whose first hotel in Finland is Clarion Hotel Helsinki.</p> <p>The study used qualitative research as the main methodology. Qualitative research was chosen in order to deliver an in-depth review of how food waste management system is run at Clarion Hotel Helsinki. Theme interviews were conducted as the prime data collection method. Theme interviews were organised with the employees from Clarion Hotel Helsinki with the aim to give an insight overview of food waste management.</p> <p>The findings presented the causes, the impacts, the challenges, and possible approaches to food waste at Clarion Hotel Helsinki. Some suggestions to improve the overall process of food waste handling at the hotel are built on the provided answers from the interviewees as well as the theories.</p> <p>The conclusion delivered a summary of the research results and suggestions. The recommendations for better food waste prevention and reduction include different means such as the implementation of a food waste measuring system and regular food plan review, raising awareness among employees and customers, staff training and smart food waste reusing, recycling and composting. Reflections on the thesis process and potential further studies were also presented in the conclusion.</p>	
Keywords Food waste management, sustainability, hospitality industry, hotel management	

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1 Introduction

According to Food and Agriculture Organisation of the United Nations (FAO, 2017), one-third of the food produced in the world for human consumption every year, approximately 1.3 billion tonnes, gets lost or wasted. Meanwhile, there are 795 million hungry people out of 7.5 billion people living on this planet, which means one out of nine people in the world suffers from chronic malnutrition. (World Hunger News, 2016) The contradiction here is that in the meantime, while a huge amount of food gets discarded every day, that amount can feed enough the hungry of the world. This is an alarming issue; thus, food waste should be handled with a better approach.

As important as food safety and hygiene, food waste should be taken more seriously into consideration. Certainly, it is very critical that hospitality managers need to give prominence to the quality of the products delivered to the customers; nonetheless, risking all the expenses to replace old production with freshly made products all the time is an abnormal spoilage. Reducing food waste can not only contribute to several environmental benefits but also numerous financial and social impacts.

After working in the food and beverage industry for a considerable amount of time, the author noticed that food waste became an unavoidable problem in every restaurant and food service provider. However, it was an issue that most of the time got neglected or dissembled due to various reasons. While it might be a concern to a lot of managers, yet, not everyone is ready to bring it on and take it seriously. Being an environmentalist herself, the author gained a strong interest in contributing to saving the environment. Since waste management in general and food waste management particularly are a crucial part of protecting the environment, raising awareness as well as presenting proper handling approaches among the public is a necessity. The author decides to address food waste management in the hospitality industry and study in-depth rationale and practices of this matter in her Bachelor thesis.

The aim of the thesis is to shed lights on the origins of food waste, both pre-consumer, and post-consumer. Secondly, the impacts and challenges of cutting down on food waste will also be discussed. On top of that, the thesis will propose different approaches and practices for food waste management in the food and beverage industry.

Yet, food waste in general and in hospitality industry particularly still covers a broad spectrum. It is very challenging to direct food waste in the hospitality industry as a whole. And so forth, the thesis only plans to address this issue on a small scale of a case study.

The research is designed to answer the question of how food waste is being handled in a hospitality premise and how the operating system should be improved to enhance the overall management results. Therefore, the thesis includes a case study of a selected hotel premise, which is Clarion Hotel Helsinki. Clarion Hotel Helsinki belongs to Nordic Choice Hotel chain and it is the very first branch opened in Finland. The hotel is Helsinki's newest hotel and it is located in Jätkäsaari, the West Harbour of Helsinki. The thesis aims to provide the answers to the following questions: 1) *What are the causes of food waste at Clarion Hotel Helsinki?*; 2) *What are the impacts when food get wasted?*; 3) *What are the challenges in reducing food waste at the hotel?*; 4) *What the approaches to tackle food waste?*. Last but not least, the thesis will present some possible practice recommendations and suggestions to improve the food waste managing system of the hotel.

The first chapter explains the differences between the terminologies of food waste and food loss since these two terms are often mistaken for one another. Additionally, the chapter will also introduce the definition of food waste in the hospitality industry. The following chapter presents the causes of food waste, the impacts that food waste create, the challenges of reducing food waste in the food service industry and the potential approaches and practices for food waste reduction in the hospitality industry. In the third chapter, the research methodology is introduced, along with the data collection and data analysis process. Moreover, reliability and validity of the research are evaluated in this chapter. After that, Chapter 4 will present the interview results according to the themes mentioned in Chapter 2. The last chapter brings an end to the research with the conclusion of the case study, the overall evaluation of the research and the development ideas for the commissioner.

2 Food waste in the hospitality industry

The following chapter discusses the terminologies, the causes, and impacts of food waste in the hospitality industry, as well as the challenges and approaches and practices to deal with this issue. These are the themes connected to the empirical part of the thesis.

2.1 Terminology

Previous studies show that there is a difference between food loss and food waste. It is pointed out that food loss means the decrease in food mass or in its quality (FAO, 2014, in Cuglin, Petljak, and Naletina, 2017), which makes it unsuitable for human consumption (FAO, 2011, in Cuglin, Petljak, and Naletina, 2017) Another source indicates that food loss consists of food spills, spoils, incurs an abnormal reduction in quality such as bruising or get lost before it reaches the customers. Food loss usually occurs at the production, storage, processing, and distribution stages in the food value chain. (Lipinski, 2013)

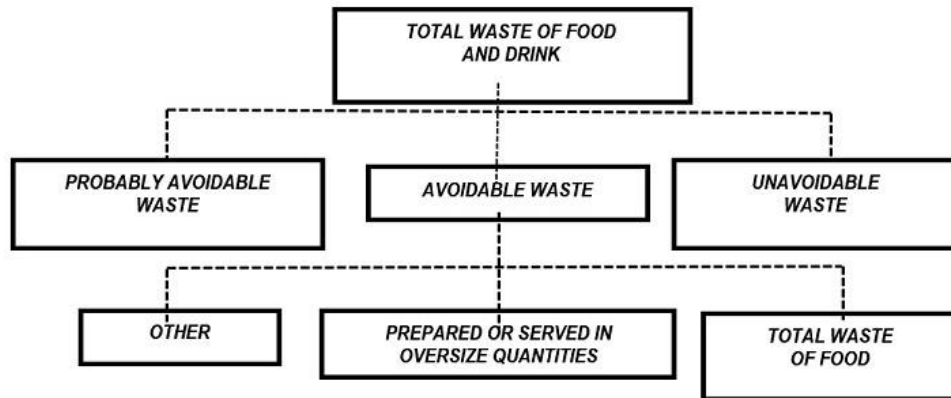
Meanwhile, food waste tends to be food that has fine quality and is suitable for consumption, but does not get consumed because it gets discarded—either before or after it is left to perish. Food waste typically takes place at the retail and consumption stages in the food value chain. The cause can be the negligence or a conscious decision to throw food away. Although both food loss and waste happen all over the world, food loss tends to be more prevalent in developing countries, while food waste tends to be more prevalent in developed countries. (Lipinski, 2013) As the drivers that generate food waste and the solutions to it are different from those of food losses, food waste is recognised as a distinct part of food loss (FAO, 2017)

In the case of food and beverage industry, a food item becomes waste when it failed to be used by a customer or an employee of a food service or restaurant operation. Food waste consists of both food and beverage for customer's consumption and kitchen waste such as eggshells, fresh food trimming waste, oils, spoiled or expired products. Food waste falls into two categories: Pre-consumer food waste and post-consumer food waste. Pre-consumer food waste includes overproduction, spoilage, expiration, and trimming waste. (Shakman, 2013) Post-consumer food waste often referred as plate waste, is the food items left or discarded by the customers. These often include food left on the plates or unused seasoning part or leftover beverages. (Baldwin & Shakman, 2012, 57)

In a similar vein, Constello (2016, in Cuglin, Petljak and Naletina 2017, 538) divides into two types of food waste. The first type is food waste before its consumption. This type of waste refers to kitchen leftovers (any organic material that is thrown away during food

preparation, like peels, grease, fruit and vegetable parts; it is considered inedible) and food which has rotten (either the shelf-life has expired, or it is decomposing; it is considered inedible). The other type is food waste after consumption which is the food served to the guests that have not been eaten.

A simpler classification of food waste is introduced by Cuglin, Petljak, & Naletina (2017) in this figure:



Source: Voća (2014:8)

Figure 1. Classification of food and drink waste relating to the possibility of mitigating their production (Cuglin, Petljak, & Naletina, 2017, 539)

As we can see from the figure 1, avoidable food waste consists of food prepared or served in an enormous amount, food that has been damaged during the cooking such as burnt food or unqualified food from the wrong volume or wrong recipe, as well as food which has not been consumed until they get expired. Most avoidable food wastes are not hazardous, and they should be composted properly. They should be separated to be sent to different waste treatment programs. (Voća, 2014, in Cuglin, Petljak, & Naletina, 2017, 539)

2.2 Causes of food waste in the hospitality industry

This chapter addresses the main causes of food waste in the hospitality industry and when it is often created. Food waste is believed to occur at different stages of the food chain from the supply to the after-service. It is impossible for a restaurant not to produce any waste at all costs. Food waste generation does not indicate poor operating practices, since it takes place due to various comprehensible and sometimes, inevitable reasons. As food waste is categorised into two groups: pre-consumer and post-consumer food waste, the causes of them are different. (Baldwin & Shakman, 2012, 57-59)

According to (Baldwin & Shakman, 2012, 58-59), pre-consumer food waste is often caused by the reasons stated in Table 1. This table below is the summary of the main causes of food waste in the hospitality industry introduced by Baldwin and Shakman in the book "Greening Food and Beverage Services". The causes are categorised into two types: pre-consumer and post-consumer. (Baldwin & Shakman, 2012, 58-59)

Table 1. Causes of pre-consumer and post-consumer food waste (Baldwin & Shakman, 2012)

CAUSES OF FOOD WASTE	
Pre-consumer	Post-consumer
Unidentified demand	Large portion sizes
Overstocking	
Inefficient production	Inefficient service model
Poor communication	
Staff behaviour	
Unskilled trimming	Customer's menu acceptance
Over-merchandising	
Food Safety	

The first and most common cause of food waste is unidentified demand. Kitchen operators sometimes have problems to estimate the number of guests they are going to serve and guess what menu will be the most suitable and cost-effective. If the restaurant offers

a wide range of menu and changes them very often, this can be a struggle. In order to improve the forecast, studying the customers' preferences and other factors such as seasonality, weather patterns, and local competition is very necessary. (Baldwin & Shakman, 2012, 58)

Overstocking is another reason why food service points have to put food to waste. Some restaurants do not want to tell their customers that they cannot fulfill an order, as a result, they end up preparing more than they actually need. This margin of error method might work in many situations but too large margin prediction can lead to waste. (Baldwin & Shakman, 2012, 58)

Besides, inefficient production procedures also create a great amount of food waste in restaurants. Chefs often refer batch cooking to a method to food waste reduction, however, it depends on the time of the day as well as the size of the batch. For example, the schedule for the breakfast buffet is from 7 am to 10 am and the hotel wants to offer food until 10 am. Yet, the demand is low as it is near closing time. If the hotel still keeps the habit of batch cooking despite the fact that closing time is drawing near, it can create a huge amount of leftover. To prevent creating an unwanted amount of waste, they could offer cook-to-order model or present their food in smaller containers and change the display. (Baldwin & Shakman, 2012, 58-59)

Additionally, poor communication among restaurant employees can lead to food waste generation. Communication between the front and the back of the house is very important because when miscommunication happens, due to several reasons such as the physical layout of the operation, language or cultural gaps or limited time, it can result in failure in regulating food production. (Baldwin & Shakman, 2012, 59)

Staff behaviour also plays an important role in food wastage control. Staff behaviours can either reduce or contribute to food waste. For example, if a recipe requires four and a half kilograms of beef and the beef package just comes in 5 kilograms, the chef cannot separate the package and leave the rest unused but use up the whole bag of meat. This action does not come with bad intention, however, it has led to an unexpected amount of food waste. (Baldwin & Shakman, 2012, 59)

Another staff-related cause of food waste is unskilled trimming. Vegetables, fresh fruits, and meat need to go through trimming and preparing phase to be ready for use. Staff members should acquire appropriate kitchen skills training and anticipate skills to produce food without creating so much waste. (Baldwin & Shakman, 2012, 59)

Furthermore, over-prioritizing merchandising creates an enormous amount of food waste. It is understandable that operators want their merchandising products to stay fresh, beautiful, and plentiful on the shelves. Nevertheless, this can result in an excessive amount of products wasted by the end of the day. (Baldwin & Shakman, 2012, 59)

On the other hand, although food safety comes as the first priority at any food service point, it contributes immensely to the dispose of food. Food with any issues regarding timing, temperature or handling should be discarded for the consumers' health reasons. Still, lessons should be learned from the mistakes so that they will not be repeated again. (Baldwin & Shakman, 2012, 59)

In terms of post-consumer food waste, Shakman in (Baldwin & Shakman, 2012, 59) lists three main reasons. The first reason is large portion sizes. More than often, the portion sizes are way bigger than what the customers can actually consume. In addition, inefficient service model can generate a significant amount of food excess. Self-service food points such as cafeterias, buffet restaurants, and other non-commercial food service operations allow their guests to take more than what they can eat. Also, customer's menu acceptance can contribute to waste in a sense that when customers do not enjoy some part of the condiments, some certain ingredients, or the quality of the served food, they usually refuse to finish their meals. (Baldwin & Shakman, 2012, 59)

In a different study, although not categorizing the causes of food waste according to the stages, Hogan proposes that the most five common food waste causes include five factors. The factors are illustrated in Figure 2. (Hogan, 2016)

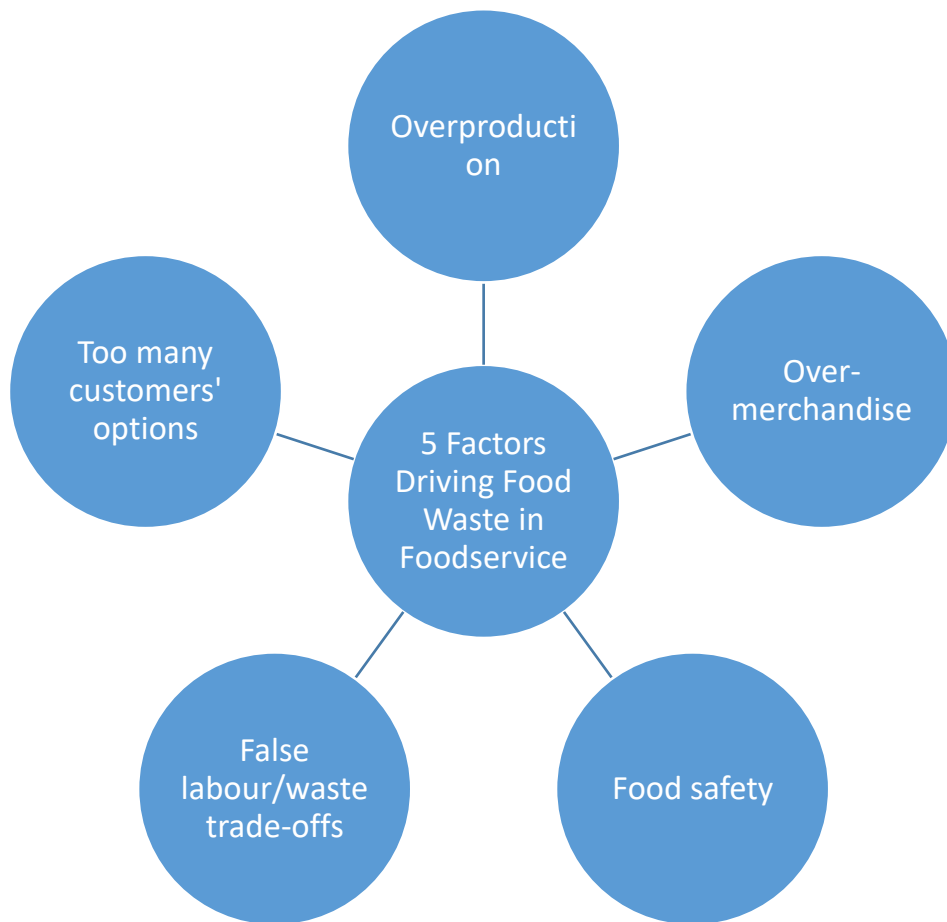


Figure 2. 5 Factors Driving Food Waste in Food service (Hogan 2016)

The first reason to address food waste in restaurants is over-production. Restaurant managers and chefs prefer not to run out on all food items, thus, they often stock up and produce in large amounts. Even though the purpose itself is positive, this usually leads to food waste. In food service industry, overproduction is considered as a part of risk management, nevertheless, the price that we pay for this risk management method is food waste. (Hogan, 2016)

Besides, food service operations tend to over-merchandise, which can lead to food excess. It is understandable that food service providers create bountiful and beautiful displays to attract the customers. Nonetheless, this often links with food excess. Food merchandising can still be organised without creating so much waste by scaling back on buffet sizes and slim down customer serving sizes. (Hogan, 2016)

In addition, confusing food safety policies in different food service operations may produce unexpected food wastage footprint. Food safety is of course the priority that every food service provider keep as a protocol in their business. In order to comply with the food safety regulations, food service providers usually create a margin of error for food safety.

However, more often than not, they end up creating a few margins around the first margin, leading to the disposal of food that is not disqualified. (Hogan, 2016)

In many restaurants, false labour/waste trade-offs is another reason why food is created excessively and ended up in the trash. For the sake of minimizing labour cost, food service operators provide food in large batches without realising that while trying to save on labour cost, they are wasting on resources, food, and money when they toss out food not eaten later. (Hogan, 2016)

Another reason why restaurants are wasting food is it because operations always try to live up to customer options and choices. Many food service operators wish to provide their last customer of the day the same menu and services that the first customer gets. While keeping various menus and services from open till close ensures good customer's experiences consistently, every day is not the same and waste is generated. (Hogan, 2016)

Another study points out that the causes of food waste come from different stages in the supply chain such as improper storage of raw material or products, sloppy transportation or improper preservation leading to expiration, etc. (Parfitt, 2010, in Cuglin, Petljak, & Naletina, 2017, 540) These causes are illustrated through this following figure:

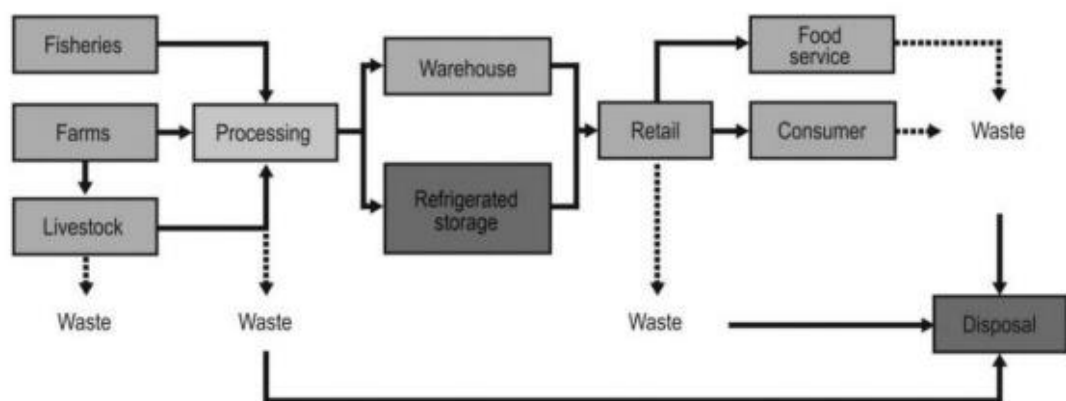


Figure 3. Critical points of food waste in the supply chain (Cuglin, Petljak, & Naletina, 2017, 540)

According to Figure 3, it is clear that food waste can be generated at every stage of the food supply chain. The food supply chain consists of five phases and risks of food loss or excess lie in each of them. This also means after every phase, there are potential subsequent risks of food waste during the later stages. Thus, in order to reduce the whole

amount of food waste created in the supply chain, minimizing waste in the early stages of the chain is needed to be done. (Cuglin, et al., 2017, 540)

In the case of food waste in Finland, a case study conducted by the Natural Resources Institute Finland (Luke) measured the amount of food waste and the causes of food waste in 51 food service outlets including schools, day-care centres, workplace canteens, petrol stations, restaurants, and diners. According to the study, food waste was divided into two categories. The first category is originally edible food waste (OE) with origins from kitchen waste, service waste and customer leftovers. The other food waste category is originally inedible waste (OIE) such as vegetable peelings, bones, and coffee grounds.

(Silvennoinen, et al., 2015, 141) The classification of food waste is demonstrated in the following table. (Table 2)

Table 2. Definition of originally edible and originally inedible food waste (Silvennoinen, et al., 2015, 141)

Type of waste/origin of waste	Kitchen waste, preparation and cooking	Serving waste, left from cooked and prepared meals	Customer plate leftovers
Food waste Originally edible (OE)	Spoiled products, incorrectly prepared food, expired date products	Overproduction, food left from the buffet	Food leftovers by customers on plate
Bio waste Originally inedible (OIE)	Inedible parts of vegetables, coffee grounds and bones	Inedible parts of vegetables, bones	Vegetable peelings, bones

As shown in Table 2, originally edible food waste includes kitchen waste such as spoiled products and incorrectly prepared food, serving waste such as food from overproduction, meaning prepared food that did not get eaten by a customer, and customer leftovers on the plate. Originally inedible food waste was from inedible parts of vegetables, coffee grounds, and bones. (Silvennoinen, et al., 2015, 142)

The figure below (Figure 4) presents the stages of food from the kitchen to customers. It is easy to notice that food waste occurs in all phases, depending on the type of service delivered by the food service operation. (Silvennoinen, et al., 2015, 143)

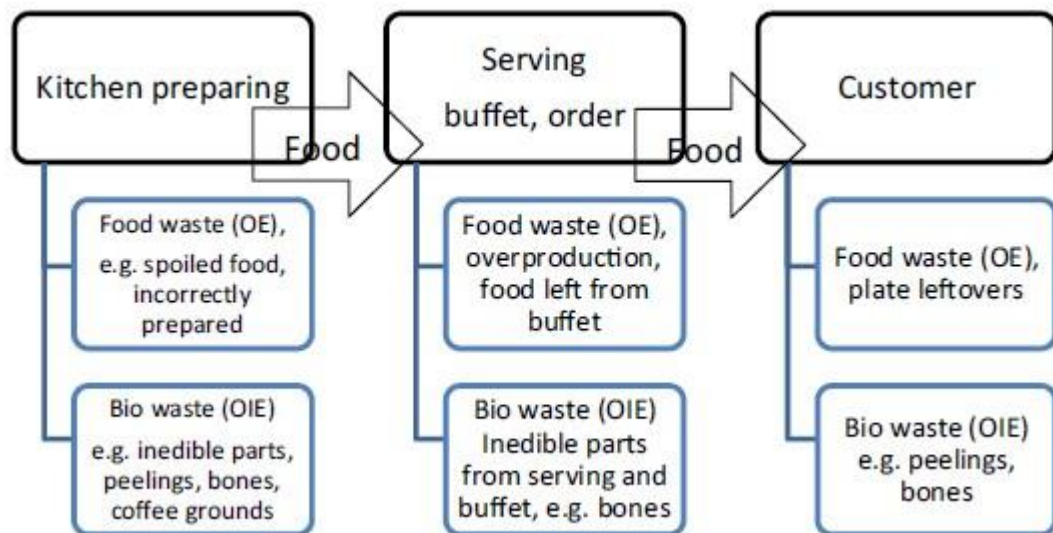


Figure 4. Different waste and how they were sorted (Silvennoinen, et al., 2015, 143)

Food waste (OE) in restaurants and diners is highly dependent on the outlet type. For example, the volume of food waste in à la carte restaurants and diners is different from the volume of food waste generated in buffet type outlets. The main problem comes from self-service at buffet type operators, where overproduction stays as the main cause of food waste. This is the big problem in Finland where lunches are served in buffet type in most food service outlets including many restaurants. (Silvennoinen, et al., 2015, 143)

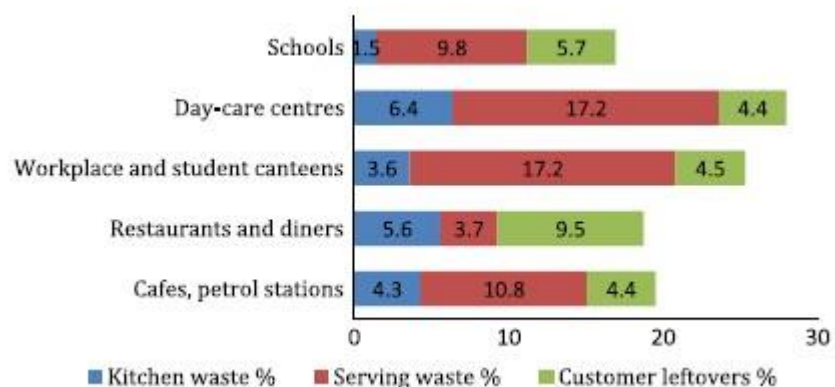


Figure 5. Estimates of food waste (OE) as percentages of food prepared in different food service outlets and from different origins. (Silvennoinen, et al., 2015, 143)

The percentages of different origins of food waste in different food service outlets are presented in Figure 6. In comparison with other types of food service providers, food waste from restaurants and diners are relatively considerable while food waste from serving

waste is low. The most noticeable point is that food waste from customer leftovers accounts for 9.5 percent, which is the highest volume among other food service outlets.

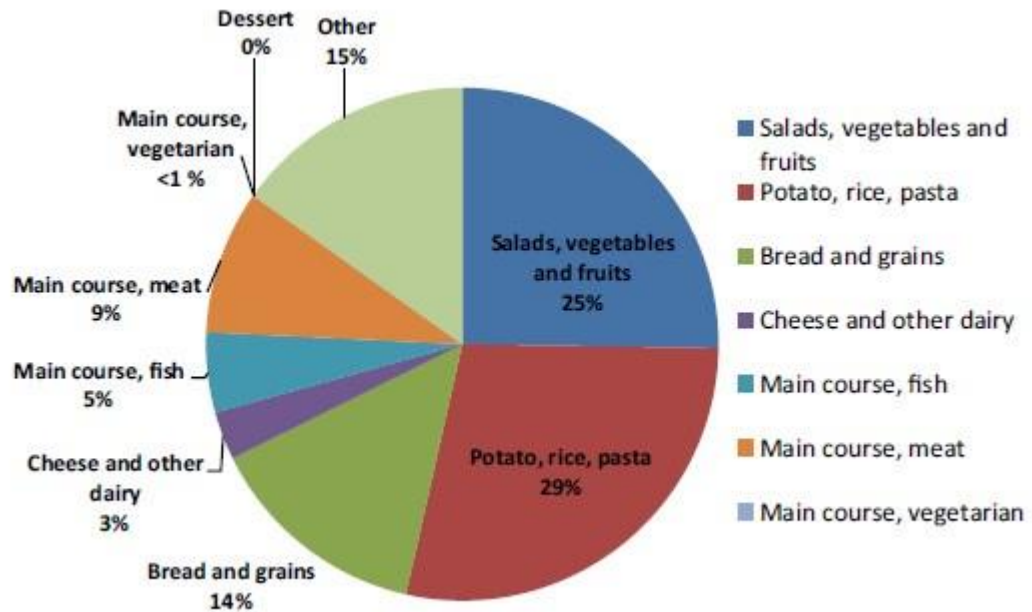


Figure 6. Contribution of the customer plate leftovers in restaurants and diners. (Silvennoinen, et al., 2015, 144)

The ratio of food waste generated from customer leftovers is shown in Figure 6. Certainly, it is the diversity in menu offered in restaurants that affects the food waste from plates. However, it is clear that customers are likely to leave salads, starchy food such as potato, rice or pasta, and also bread. Main courses do not tend to get wasted (Silvennoinen, et al., 2015, 143)

2.3 Impacts of food waste

Every year a third of food produced for human consumption gets lost or wasted. (FAO, 2017). In Finland, “food accounts for more than one-third of the environmental impact of overall Finnish consumption and about one-quarter of the climate impact of consumption.” (Silvennoinen, et al., 2015, 140) According to a small pilot study carried out by the Sustainable Restaurant Association (SRA) in 10 restaurants based in London, an average restaurant may produce 21 tonnes of food waste per year. (Giorgi, 2013, 6) Not only is this number noticeable, but it also indicates that there are many issues associating with it.

Nonetheless, not all the food waste in restaurants get proper treatment. A study in 2014 by the Food Waste Reduction Alliance points out that only 14.3 percent of food waste gets

recycled and 1.4 percent of food gets donated. Up to 84.3 percent simply just get discarded. (Business for Social Responsibility (BSR), 2014, 19) Needless to say, the huge amount of food waste sent to the dumpster certainly have various impacts on the environment, economy, and society.

2.3.1 Environmental impacts of food waste

This chapter discusses the impacts that food waste has on the environment. This figure below is the short summary of the chapter, listing the main influences of food waste on the environment, such as land waste, water waste, air pollution, greenhouse gases, energy waste, and toxicity. (Figure 7)

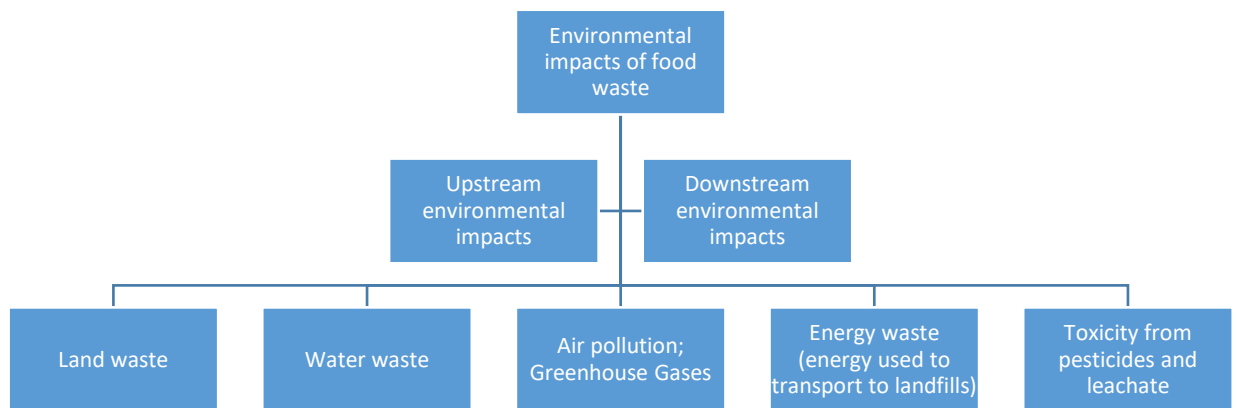


Figure 7. Environmental impacts of food waste

The environmental footprints that food waste create include both upstream and downstream impacts. (Baldwin & Shakman, 2012, 60) Upstream environmental impacts refer to the environmental footprint of a food item before reaching the food service operation. (Baldwin & Shakman, 2012, 60) These impacts are relatively invisible since they are not obvious for operators and other stakeholders to see. However, they account for a comparatively huge amount of food wastage. According to (FAO, 2013, 12), upstream food wastage, occurring during production, post-harvest handling and storage, makes up more than fifty percent (up to 54 percent) of total food wastage. Figure 8 presents the volumes of food wastage at a global level generated along the food supply chain. As shown in Figure 7, upstream food wastage is just as notable as downstream food wastage.

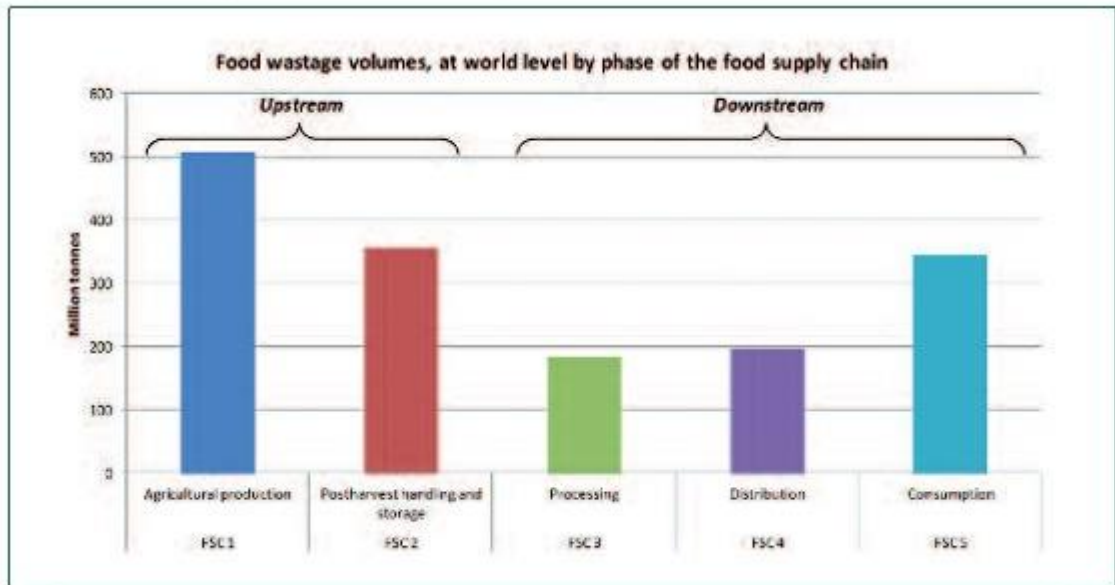


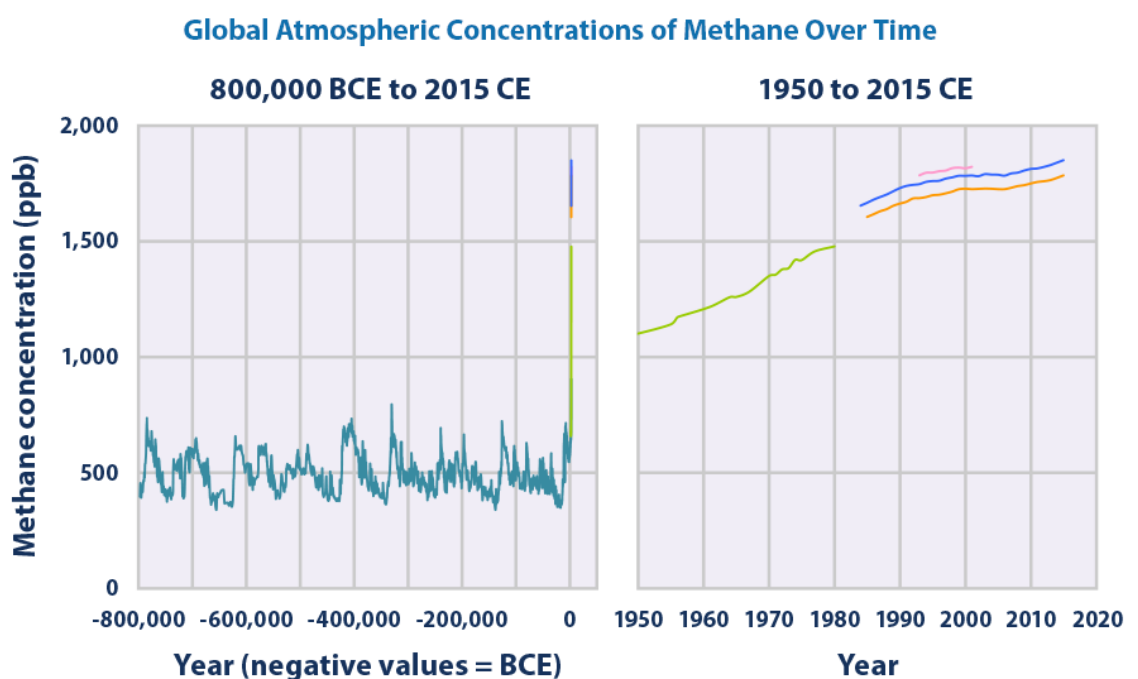
Figure 8. Food waste volumes, at world level by phase of the food supply chain (FAO, 2013, 13)

In terms of upstream impacts, when a food item gets discarded, all resources that are used to produce them go to waste, too. These resources include natural resources that the farmers use for food production such as land, water, fertilisers, pesticides, and the fuel for the tractors; as well as the carbon footprint that the transportation phase costs. At this stage, the food item needs to be refrigerated, which costs energy, water usage, along with the emission of air and water pollutants. Once a food item is wasted, it brings to waste an enormous amount of carbon footprint, energy, water, other natural resources, and certainly hidden expenses. (Baldwin & Shakman, 2012, 60)

At the same time, food waste that occurs during processing, distribution, and consumption damages the environment dramatically as it hits the landfills or incinerators, leading to many downstream environmental consequences. First of all, since approximately seventy percent of food waste content is water (Zhang, 2006, in Baldwin & Shakman, 2012, 61), the activity of transporting food waste to the landfill heavily requires a huge amount fossil fuels and creates air pollution from the emissions. Whereas, this could be prevented by reducing the amount of food waste during different stages of the food supply chain. (Baldwin & Shakman, 2012, 61)

Every day, food waste transferred to the landfills accumulates and piles up, thus, forming a daily cover that traps the old food waste underneath. With no oxygen, this environment

becomes anaerobic as food waste decomposes. This process produces landfill gas emissions of 50 percent methane and 50 percent carbon dioxide. (Baldwin & Shakman, 2012, 61) All food items share a common characteristic which is that they all emit biogenic greenhouse gases (GHGs) such as methane (CH₄) and nitrous oxide (N₂O). Methane and Nitrous oxide are very powerful greenhouse gases. Methane itself weights 25 times more than carbon dioxide, which makes it a very powerful greenhouse gas. (IPCC, 2007, in FAO, 2013, 18; Intergovernmental Panel on Climate Change, 2007, in Baldwin & Shakman, 2012, 61) In addition, it is a crucial fact that according to EPA, there is more methane in the atmosphere now more than at any time in last 400,000 years (EPA, 2010, in Baldwin & Shakman, 2012, 61) The figure below shows the methane concentration in the global atmosphere from 800,000 BCE to 2015 CE. (Figure 9)



Data source: Compilation of five underlying datasets. See www.epa.gov/climate-indicators for specific information.

For more information, visit U.S. EPA's "Climate Change Indicators in the United States" at www.epa.gov/climate-indicators.

Figure 9. Global Atmospheric Concentrations of Methane over time (EPA, 2016)

In addition to methane, the total carbon footprint that food wastage leaves account for approximately 3.3 Gigatonnes in 2007. (FAO, 2013, 17) If food waste were a country, it would rank as the third country which emits the most greenhouse gases, just following the USA and China. This is illustrated in Figure 10.

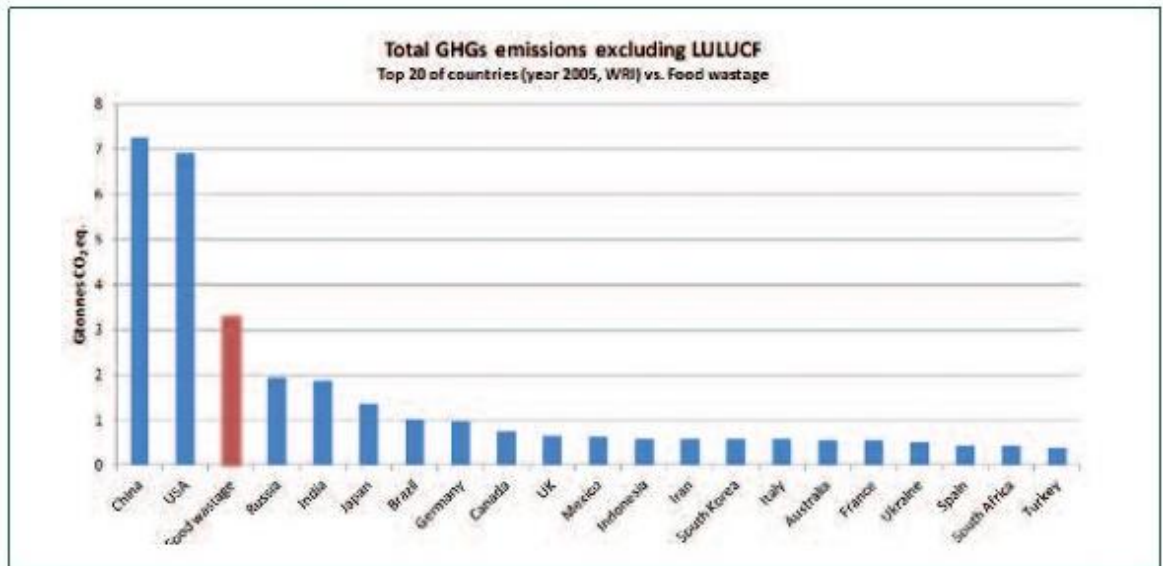


Figure 10. Top 20 of greenhouse gases (GHGs) emitting countries vs. Food wastage (FAO, 2013, 17)

Thus, it is not a surprise that food wastage connects to climate change due to the excessive amount of greenhouse gas emissions. Reducing food waste in different stages rather than sending them all to the landfills helps with both dealing with greenhouse gas emissions and climate change.

An interesting thing is that there is a noticeable pattern in food waste producing areas. Meanwhile, in developed countries, it is likely that there is more food waste generated in downstream phases of the food supply chain, the opposite is true for developing countries. In low income areas, food waste often occurs during the upstream stages. (FAO, 2013, 14)

Another important wasted resource to mention is blue water. Blue water in agriculture refers to “the consumptive use of irrigation water taken from ground or surface water.” (FAO, 2013, 27) But why blue water is worth mentioning in the environmental impacts of food waste? It is because “blue water use in irrigated agriculture has the potential for causing severe environmental problems, such as water depletion, salinization, water-logging or soil degradation” (Aldaya, 2010, in FAO, 2013, 27). All over the world, the blue water footprint for the agricultural production of total food wastage in 2007 is about 250 cubic kilometres (km³), which is more than 38 times the blue water footprint of USA households, or 3.6 times the blue water footprint of total USA consumption (Mekonnen & Hoekstra, 2011, in FAO, 2013, 27). The volume of blue water coming from food waste makes up about three times the volume of Lake Geneva, or has the same volume as the annual water discharge of the Volga River. (FAO, 2013, 27)

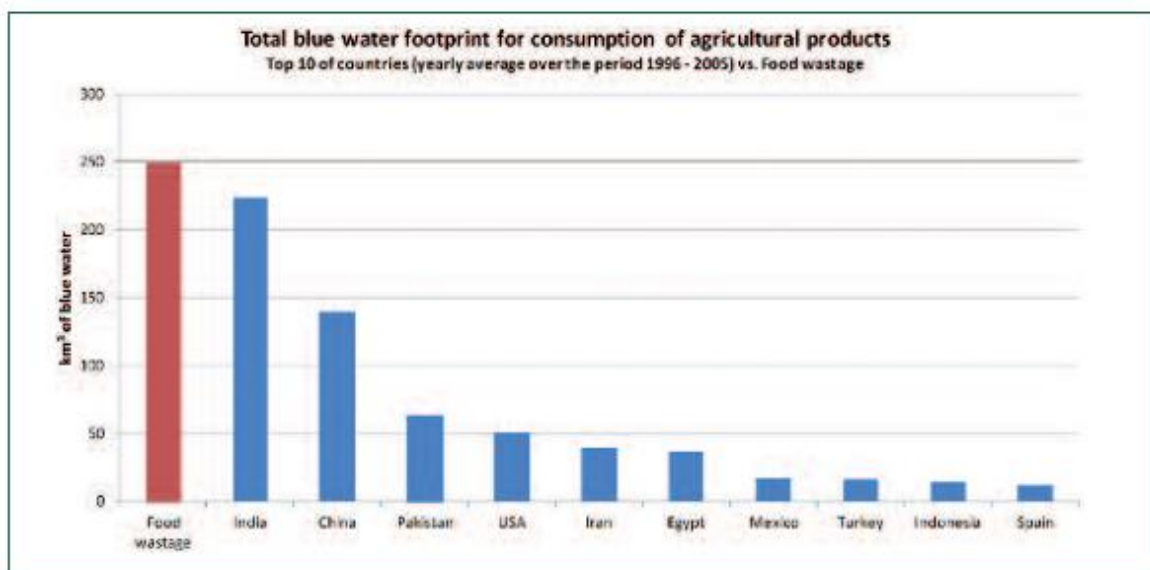


Figure 11. Top 10 of national blue water footprint accounts for consumption of agricultural products vs. Food wastage (FAO, 2013, 28)

As shown in the figure above (Figure 11), the global water footprint of food wastage is higher than that of any country, even higher than countries with relatively large water use or a large country, such as India or China. (FAO, 2013, 28)

Besides, at a global level, the total amount of food wastage in 2007 takes over about 1.4 billion hectares, equivalent to around 28 percent of the world's agricultural land area. If the amount of food waste were spread over the surface of the Earth, it would be the second largest country after the Russian Federation. (FAO, 2013, 37) (Figure 12)

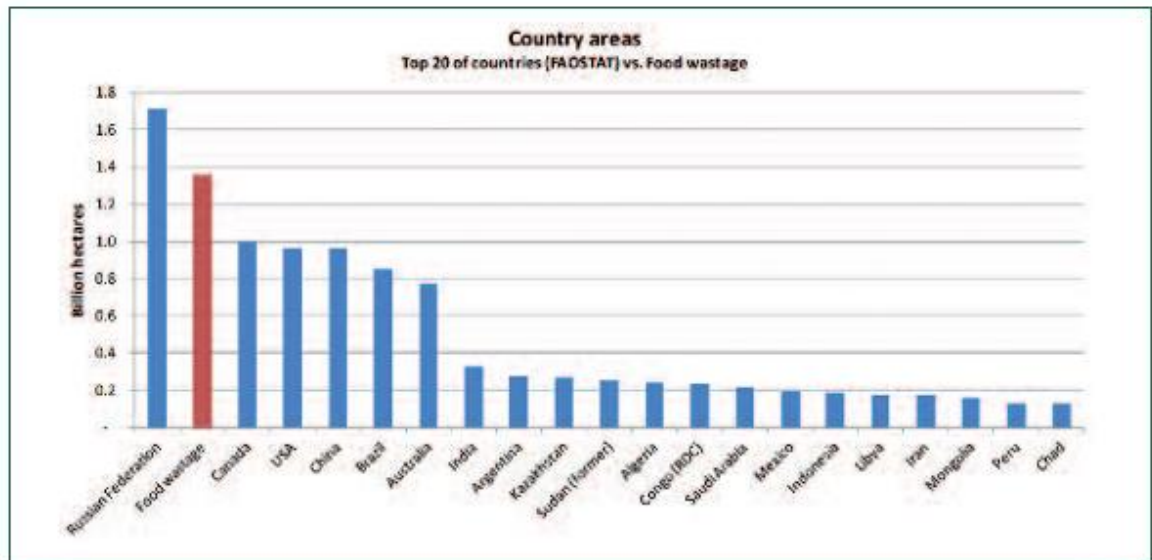


Figure 12. Top 20 of world's biggest countries vs. Food wastage (FAO, 2013, 37)

Furthermore, the occupation of landfills for food waste develops damaging environmental impacts due to the pollutants and toxicity from leachate and groundwater contamination. The development of landfills and conversion of wild lands, on the other hand, harms the ecosystem as well as the biodiversity on a global scale. Even when food waste is sent to the incinerators instead, it is such an inefficient waste-to-energy source for the reason that food waste has a high content of water. As a result, reducing the amount of food waste generated before it reaches the landfills and incinerators, food service operators can build a win-win relationship with the environment. (Baldwin & Shakman, 2012, 61)

2.3.2 Economic costs of food waste

Food wastage does not only creates apparent environmental impacts but also many obvious financial impacts on the overall operations. Particularly, there are four main financial costs created when foodstuffs get discarded in the kitchen: Raw material costs, labour costs used during food production, energy costs used for the kitchen as well as the serving phase, and food waste disposal costs. (Baldwin & Shakman, 2012, 62)

In food service industry, once a food item is sent to the garbage, the first clear thing is that the money used for purchasing the raw material is directly wasted. Food wastage occurs on several occasions such as overcooking, burning or spoilage due to poor food delivery and storage, etc., as a result, these food items are no longer available for serving. These pre-consumer food wastes can be prevented by closely monitoring kitchen operations and other approaches. It is estimated that food industry lost about 4 to 10 percent of their investment on food purchase. This means that for every 1,000,000 USD that is spent on the

raw material purchase, around 40,000 USD to 100,000 USD is poured down the drain. (Baldwin & Shakman, 2012, 62) This figure itself points out the importance of reducing pre-consumer food waste for food service providers to save their financial costs and enhance their operations for higher revenues.

However, in addition to raw material costs, labour and energy costs take place in the kitchen, too. Raw material needs to go through trimming and proper preparation to be ready-to-serve. After preparation, refrigeration and storage might be necessary. All of the labour and energy used during food production are inevitable expenses in every kitchen. Thus, once a food item is wasted, it takes a hidden large amount of money into the dumpster. (Baldwin & Shakman, 2012, 62)

Last but not least, food service operators have to pay several times for the last handling step of food waste. Because food waste can create unpleasant odours and leachate, it is mandatory for operations to provide spacious trash bins and proper staff handling. At this stage, they also have to pay for the garbage hauling companies to come and collect them. With these activities happening daily or weekly, the overall costs just for food waste processing accumulate and may become a concerning financial burden. (Baldwin & Shakman, 2012, 62-63)

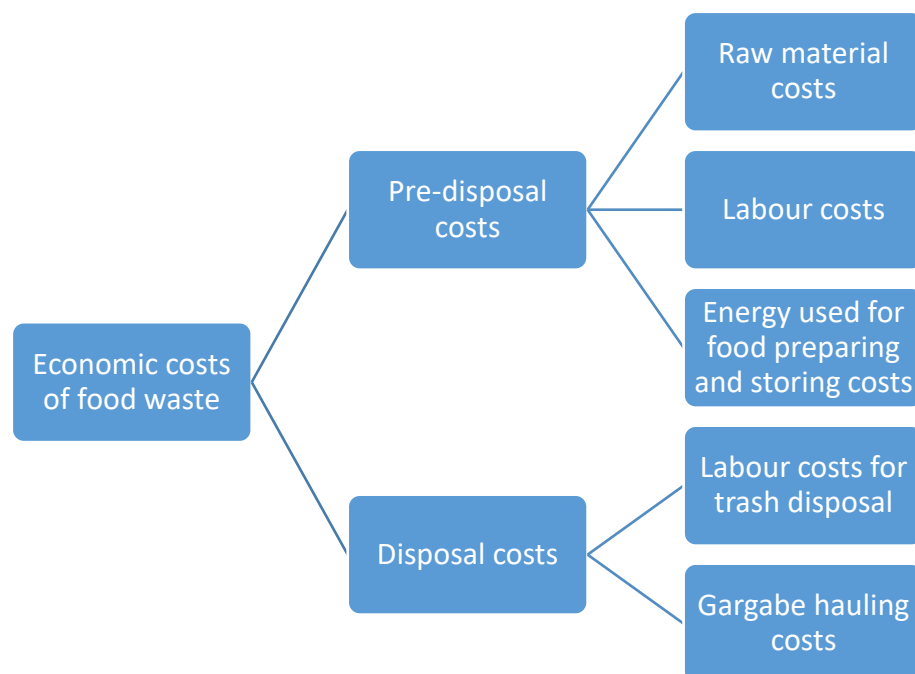


Figure 13. Economic costs of food waste

Needless to say, food waste costs in many ways to the food service operators. Just for the pre-disposal phases of food waste, there are three different types of expenses: raw

material costs, labour costs, and the costs of energy used for food preparation and storing. However, the costs do not end here. Food waste continues to cost even after disposal, due to the fact that it costs the operators to hire labour to handle the trash disposal and garbage hauling service. (Baldwin & Shakman, 2012, 62-63) These financial costs of food waste are presented in Figure 13. (Figure 13)

2.3.3 Social losses caused by food waste

Once the food produced for human's consumption hits the trash bin, not only does it hurt the environment and economy, but it also creates certain negative impacts on the society. First of all, wasting food means that we are actually taking edible food out the food chain and putting them into the dumpster. Whereas, there are 795 million of 7.3 billion people living in the world suffering from chronic undernourishment in 2014-2016. (World Hunger News, 2016)

It is such an alarming issue that we are wasting a huge amount of food. The global amount of food wastage is 1.6 Gigatonnes per year (FAO, 2013, 11) while there are still so many people just need enough food to feed themselves to be alive. Despite the fact that we produce more than enough food to feed all human beings on the Earth, a great part of this food goes to waste. According to the data that FAO collected, the food that is currently lost or wasted in Latin America could feed 300 million people. Similarly, the food currently wasted in Europe could feed 200 million people and the food lost in Africa could feed 300 million people. The most important point is that if one-fourth of the food currently lost or wasted all over the world could be saved, it would be enough to feed 870 million hungry people in the world. (FAO, 2017)

Not all food is sent to the dumpster are rotten and contaminated. Most of the food wasted is actually in good shape and edible. It is calculated that 1.3 out of 1.6 Gigatonnes of food waste consists of edible parts. (FAO, 2013, 11) If food wastage can be recovered, it would feed enough hungry people and animals, too.

Besides, during food production, a significantly great amount of water is used for farming and watering. Thus, when food is wasted, water loss is created, too. The irrigation water that farmers use to grow wasted food would be enough for the domestic water needs for 9 billion people (Vaughan, 2009, in Baldwin & Shakman, 2012, 63)

A summary figure is created to illustrate the social disadvantages when food is wasted. (Figure 14) It is clear that instead of being discarded, the wasted food should be saved to

fight against chronic hunger or feed the animals. The water used to produce the wasted food could have been saved for domestic use.

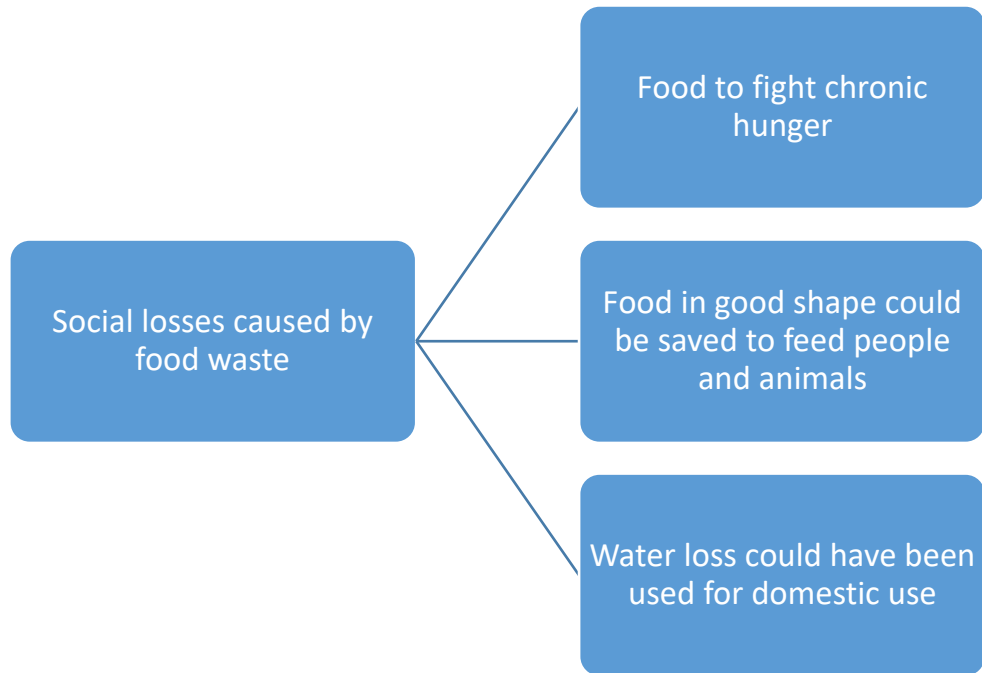


Figure 14. Social losses caused by food waste

In conclusion, food wastage does not do anything but harms the environment, the finance, and the society in many ways. There is a necessity to provide different approaches and practices to deal with food wastage in hospitality industry particularly and all over the world in general.

2.4 Challenges of food waste in the hospitality industry

Food waste requires thoughtful administrations, yet, it is true that handling food waste in food service industry is easier said than done due to the fact that there remain many obstacles. Various factors such as the differences in the number of service locations, type and amount of food discarded and distances from food recycling facilities put food service operators in a dilemma over how to tackle food waste disposal. The barriers presented in this chapter are shown in the following figure. (Figure 15)



Figure 15. Challenges of food waste in the hospitality industry

First and foremost, there are barriers that keep the businesses reluctant from recycling food waste. About 63 percent of food manufacturers claim that there are barriers to food waste recycling. These barriers vary from the limited availability of recycling facilities to high transportation costs due to long travel distances, stern internal requirements for food waste handling or numerous regulatory requirements that limit the reuse of certain types of food waste. Likewise, in terms of food waste for donation, up to 60 percent of manufacturers admit that barriers to food donation are what keep them being cautious. The struggle they often face if they want to diverse food waste into food donation includes the legal responsibility for food donation quality, the lack of refrigerated storage for donations, poor employee awareness of food saving programs, and a lack of information about organizations or resources that receive and distribute donated food. (Hower, 2014)

In addition to the regulatory barriers, the diversity in food service operation concepts and styles make it more challenging for operators to deal with food waste management. Because food service points operate distinctively according to their type of business and concept, approaches to handle food waste can vary from traditional fine dining restaurants to quick-service restaurants, as well as from a fast food restaurant to an all-you-can-eat school cafeteria. On the other hand, companies with franchise-based business models face difficulties to establish and apply a universal food waste tracking system and create sustainable company culture among their employees. (Hower, 2014)

One of the most significant challenges to mention when facing food waste in the food industry is the consumer behaviour. A survey conducted on 5000 customers in the UK shows that over a quarter (27%) of respondents left food at the end of their meals when they ate out. The most common reason why food is left is that the portions are too big. However, due to the fact that meal leavers do not feel the sense of ownership or responsibility for the food they left, they are reluctant to ask for portion sizes before ordering or asking for a doggy bag after finishing their meals. In addition to portion sizes, food quality and social norms are also the reasons for food left uneaten. In order to reduce post-consumer waste, restaurants are encouraged to provide various portion sizes at different prices accordingly to customers' options. Food service operators should also train their service staff to address portion sizes and information on the meals to customers when ordering. (Giorgi, 2013, 1-3)

Furthermore, it is a fact that food waste and losses occur mainly at the early stages of the food chain in developing countries, while the opposite is true for developed countries. In high-income and developed countries, food waste takes place in the later phases of the food chain, mainly due to consumers' behaviour. Figure 16 presents the different amount of food waste and losses in different regions of the world. (Figure 16)

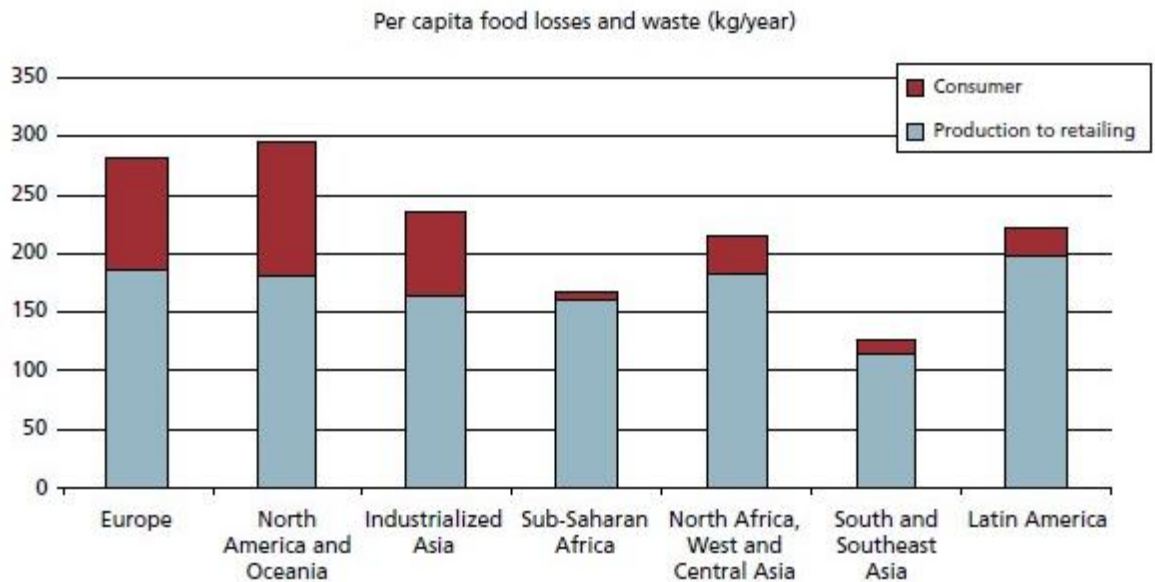


Figure 16. Food losses and wastes in different stages in different regions of the world (FAO, 2011, 5)

As shown in Figure 16, the behaviours of consumers in high-income and developed countries in Europe, North America and Oceania, and Industrialised Asia contribute considerably to food waste in these regions. Meanwhile, in poorer and developing countries, food waste and losses often take place during production to retailing. (FAO, 2011, 5)

2.5 Approaches and practices for food waste reduction in the hospitality industry

The reason why sustainability in the food industry should be maintained is that as the population is growing, the needs for food will grow, too. The world population is estimated to grow from 7.5 billion to 10 billion in 2050, leading to an increase of 60 percent in food demands. (Consultative Group on International Agricultural Research [CGIAR], 2014, in Baldwin, 2015, 2) In order to keep up with this future needs, sustainability in the food industry should be taken care of so that while we can produce and consume food safely, the development of the future generations can also be supported (Baldwin, 2015, 2)

In Finland, a food waste policy mix was created for the purpose of reducing food waste generation and promoting the sustainable use of natural resources, as well as ensuring that the waste does not harm the health of human and the environment. (Silvennoinen, 2016, 12) The policy mix is illustrated in the following figure. (Figure 17)



Figure 17. Finland's Food Waste Policy Mix (Silvennoinen, 2016, 13)

Finland's Ministry of Environment proposes the order of waste management priority including 4 steps. The handling of waste management should follow the priority order from prevention, to reusing, to recycling, and if the waste cannot be recycled, it can finally be sent to the landfills. (Finland's Environmental Administration, 2013, in Silvennoinen, 2016, 12-13)

The European Hospitality Industry (HOTREC) introduces a food waste hierarchy to help food service outlets to handle food waste in a more sustainable way. (Figure 18) The very first step is to prevent food from being wasted in the first place. Otherwise, food waste should be redirected to feed people and animals. The other part of food waste then can be recovered for composting or renewable energy generation. The least preferable step, which operations should try to avoid at their best, is to totally dispose food waste and send them to the landfills. (European Hospitality Industry (HOTREC), 2017, 9)

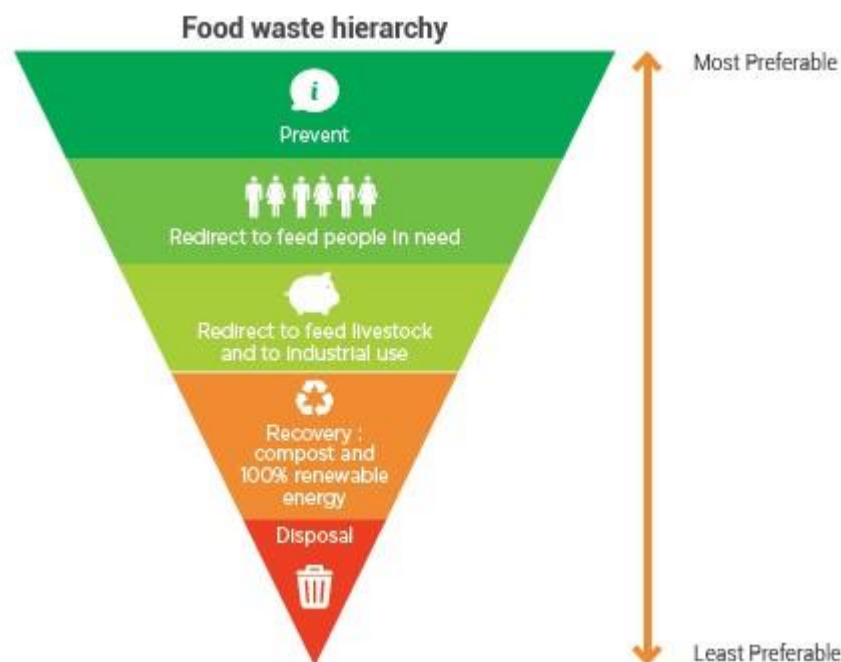


Figure 18. Food waste hierarchy (European Hospitality Industry (HOTREC), 2017, 9)

With the same ideology, International Tourism Partnership (ITP) suggests a food and drink material hierarchy (Figure 20) created by The Waste and Resources Action Programme (WRAP) to tackle food waste with more details. (Figure 19) In this hierarchy, the first priority is also prevention by measuring food waste, followed by optimisation by redistribution to people and animals. The third step in the chart is recycling by composting or anaerobic digestion. The recovery occurs when the waste cannot be recycled, done by sending food waste to the incinerators for energy recovery. The last and least preferable option is disposal and transportation to landfills. (International Tourism Partnership (ITP), 2014, 11-14)

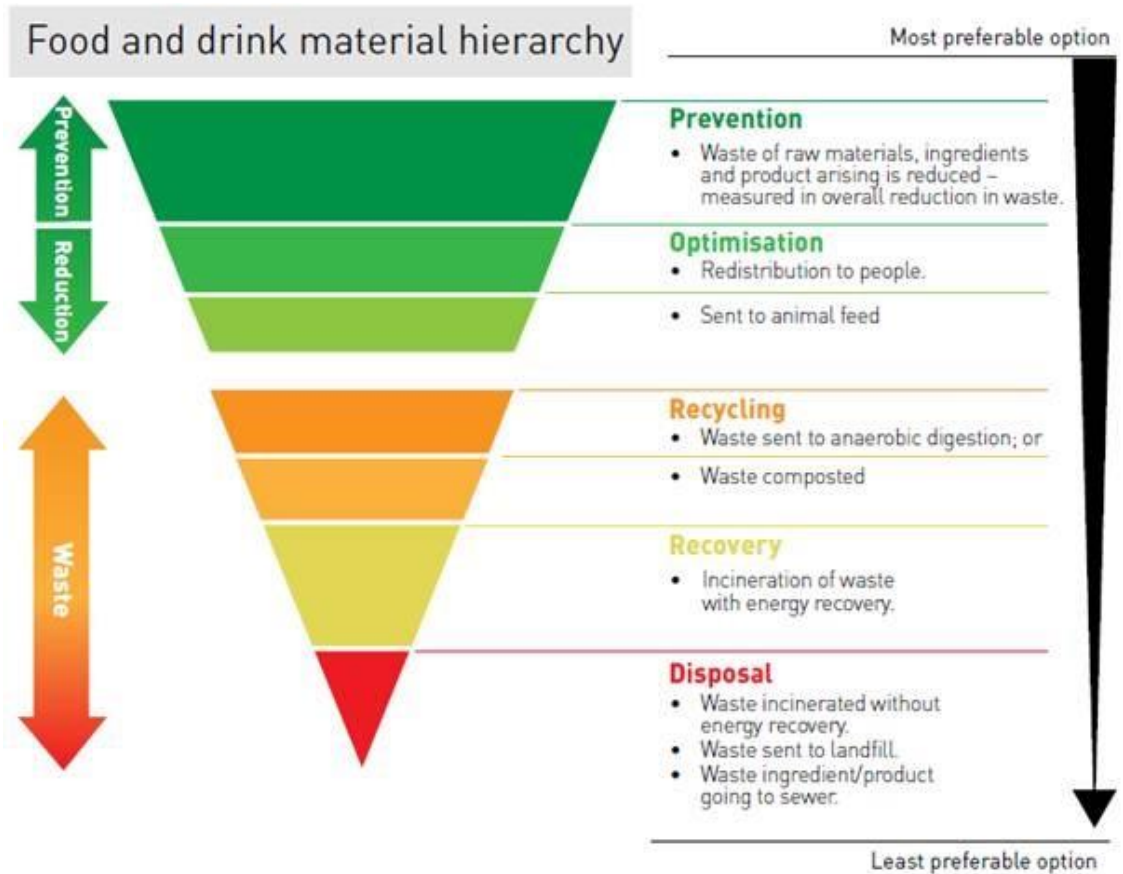


Figure 19. Food and Drink material hierarchy (International Tourism Partnership (ITP), 2014, 11)

Similarly, Baldwin suggests that food waste should be managed following the hierarchy of reducing, reusing, recycling, and landfill. (Figure 20) According to the hierarchy, food waste reduction is the preferable approach since it can prevent the impacts linking with the wastage. The root cause of food waste can be dealt with by a supply chain collaboration. Partnership in the supply chain promotes the development of the food industry standard adjustment such as a better match between demand and supply, and standards for date labelling on retail products. The next stage in the hierarchy is to reuse the food. Reusing the food can be done by saving the food to feed the hungry people or reproduce into different products. Saved food can also be fed to the animals, but under certain safety regulations such as leftovers from customers should be treated before being used for animal feeds. Using saved food can both replace other feed sources and increase the productivity. For example, chicken eggshells can be a useful calcium enrichment ingredient as livestock feed since they are high in calcium with low levels of heavy metals, while the natural calcium carbonate source may be polluted with these elements (Faine, 1995; Whithing 1994, in Baldwin, 2015, 146-148)

Food waste recycling comes as the third stage of the hierarchy. This stage is not preferable since at this stage the original value from the food is lost. Food waste recycling can be used for composting for a soil amendment, anaerobic digestion for energy, or rendering for tallow/meal. Composting and digestion are the most common methods of recycling food waste. The main purpose of these two methods is to reuse the nutrients in the food wastage with controlled decomposition processes. Compost can be set up and done on-site and the final product of compost can be useful as a soil fertilizer. Another recycling scheme, anaerobic digestion, is a closed process that produces methane and carbon dioxide from fermenting the food. The products of this process include methane which is used as an energy source and the remaining solids which can be used as a soil additive. Rendering animal by-products is done to produce tallow and other products, however, this method is rather expensive due to the energy use during the process. (Baldwin, 2015, 148-149)

The least advantageous approach to food waste handling is sending it to the landfills. The reason why this option is the last thing to be considered is that it costs extra resources to deliver the wastage and it produces green house gases GHGs (methane), which is not beneficial for the environment. (Baldwin, 2015, 149)

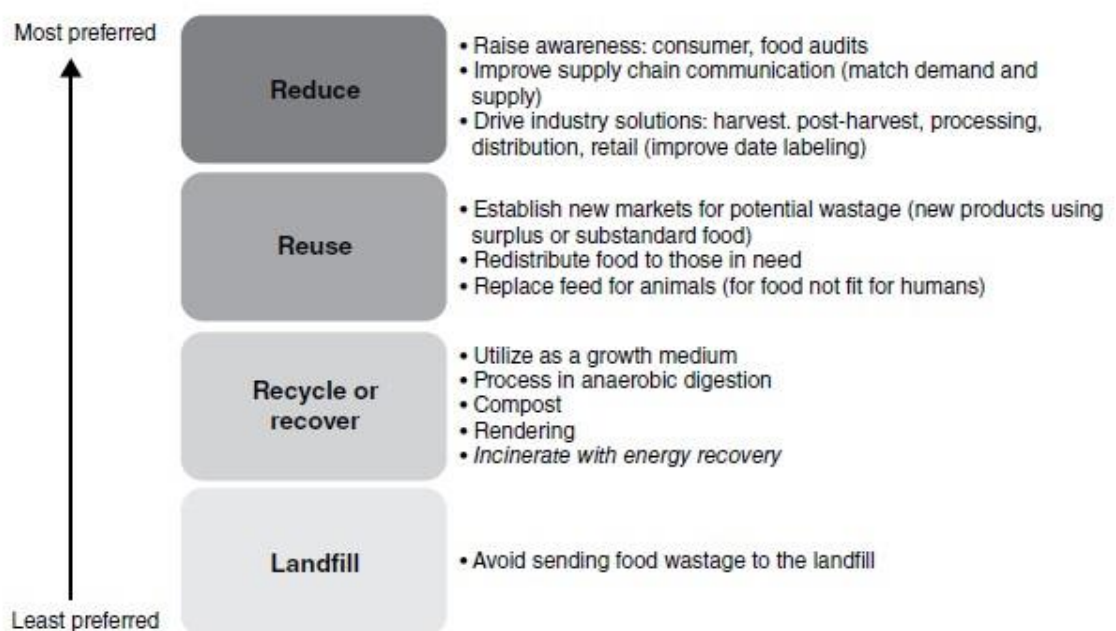


Figure 20. Food wastage hierarchy (Baldwin, 2015, 147)

So how exactly should food service outlets apply this type of food waste hierarchy on their operations? As the first priority, food waste prevention and reduction should be done more thoughtfully. This includes **daily food waste tracking** (Baldwin & Shakman, 2012, 68-69;

International Tourism Partnership (ITP), 2014, 6), **better ingredient purchase and storage** (European Hospitality Industry (HOTREC), 2017, 11-12; Baldwin & Shakman, 2012, 70), **smart food merchandising** to minimise food waste (Baldwin & Shakman, 2012, 70-71), **flexible and low-waste menu design** by creating multiple use for more ingredients to have less waste (Baldwin & Shakman, 2012, 71), efficient **employee training** to create an internal culture and raise awareness among them (Baldwin & Shakman, 2012, 71), and last but not least, **customer engagement**. (European Hospitality Industry (HOTREC), 2017, 13) Food service outlets should **offer menus with more portion sizes** to choose from. The staffs should also engage in a friendly conversation when a customer wants to order something, explaining the differences in ingredients and portion sizes. If the customer can get the meal according to their taste and consuming ability, the less plate residue will be created in the end. Doggy bags should also be introduced to the customers so that no waste is left. (Giorgi, 2013, 28-30) Food service operations can also consider **changes in their service model**, for example, from self-service by guests to staffed-service so that the amount of food taken is controlled and supervised. (Baldwin & Shakman, 2012, 74)

Figure 21 shows a short summary of the aforementioned means to handle food waste smartly in the food service sector. (Figure 21)



Figure 21. Practices for food waste prevention and reduction

After the service, even if the served food is left, **it can be processed** so that it is still edible. Food in good condition can be used for staff's meals, and some leftovers can be used other food production. For example, bread can be turned into toasts, and vegetables and can be made into soups, bouillon, mashes, etc. (European Hospitality Industry (HOTREC), 2017, 13)

When food becomes waste, it can be reused in various ways. Edible food close to expiry but safe and still in good shape **can be donated** to food banks and charitable organisations. (Baldwin & Shakman, 2012; European Hospitality Industry (HOTREC), 2017) Some can be used as animal feed or agricultural production. (Baldwin & Shakman, 2012, pp. 72-73; European Hospitality Industry (HOTREC), 2017, 13)

If wasted food cannot be reused anymore, it is the time for the next step, recycling. Food wastage then can be used for **composting** and generating renewable energy through methanisation. Some leftovers have an extra ecological function such as coffee grounds which can be used as a natural repellent against slugs and snails. (European Hospitality Industry (HOTREC), 2017, 9-13; Baldwin & Shakman, 2012, 77-79)

The last and least preferable step in the food waste hierarchy is sending the waste to landfills and incinerators. However, there are potential alternatives to this step. These alternatives include waste disposers, on-site digesters, dehydrators, pulpers, and scrap collectors. (Baldwin & Shakman, 2012, 77-79)

3 Methodology

This chapter introduces the research methodology chosen by the author. The main characteristics of the research method are reviewed and the reasoning for the selection is then explained. The questions of why and how a qualitative research strategy such as theme interview was conducted will be answered. An overview of the data collection and the data analysis process is also described in this chapter. Last but not least, the reliability and the validity of the research will also be discussed.

3.1 Qualitative research

Qualitative research genres are crucial for the studies of social sciences and applied fields such as education, regional planning, nursing, social work, community development, and management. (Marshall & Rossman, 2006) The purpose of a qualitative research is “to describe and understand a phenomenon and give it a reasonable interpretation”.

(Kananen, 2013, 32)

Qualitative research is often used when there is no prior information, theories or research on the phenomenon, and the phenomenon is new as an object of research. (Kananen, 2013, 31) Regarding the data, while quantitative research produces numbers to structured questions, qualitative research produces words and sentences to open questions to help the researcher gain an in-depth understanding of a phenomenon. (Kananen, 2013, 31-32)

Qualitative research is more flexible than quantitative research in the sense that the research results direct the progress of the research. The interpretation and findings are dependent on the researcher. However, this does not mean that the researcher can produce wrong results and interpretation. (Kananen, 2013, 32)

A case study aims for “in-depth understanding and description of a phenomenon”.

Qualitative research shares the same objective the difference lies in the extent and diversity of a phenomenon in case research. More often than not, case research is described as intensive research or in-depth research. (Kananen, 2013, 39)

In a case study, “the researcher aims to be an external observer who does not participate in the operations of the subject phenomenon nor does he/she aim to bring about a change or development.” (Kananen, 2013, 39) In the case of this thesis, the author only stays as an observer and collects the experiences and opinions from the people who have direct interactions with the subject phenomenon, the food waste management process at Clarion Hotel Helsinki.

The thesis aims to study the question of how Clarion Hotel Helsinki deals with food waste and how to improve their food waste management system. Evaluating a management system is not an easy task since management is a daily ongoing process. In order to give an insight of how the food waste management is run, the thesis is created in an exploratory research format, which makes it a qualitative research. There is no previous study on food waste management at Clarion Hotel Helsinki, thus, it is a new research subject. In order to get an overall understand of the food waste management at the hotel, qualitative research was chosen as the main methodological framework. Theme interviews were implemented to collect the interviewees' opinions and points of view from their experience. Further studies can be done when Clarion Hotel Helsinki carries out the food waste weighing system and gathers new data and figures on food waste quantity and how the new system contributes to food waste handling.

3.2 Theme interview

Qualitative research has three most essential data collection methods including observation, theme interview, and different documents. (Kananen, 2013, 103) A theme interview is used to acquire an in-depth understanding of a phenomenon or a situation where information such as a problem definition, effectiveness evaluation, or results assessment is required. (Kananen, 2013, 110) This study uses theme interviews as the main data collection method. After the information is collected from the interview, it is analysed and compared with the theoretical themes in the literature review.

The theme of the interview is chosen so that it can cover the whole of the studied phenomenon thoroughly. (Kananen, 2013, 112) The reason why theme interview was selected as the main data collection method is that the author wants to examine the food waste management at Clarion Hotel Helsinki in accordance to different themes about food waste in the literature review. The themes were the causes, the impacts, the challenges of food waste and the approaches and practices for food waste. And since there are no tools for observation in person or any documents provided, it is clear that theme interview is the most suitable data collection method for the research.

The interview questions were created and categorised on the order of the themes mentioned in the theoretical parts. This will enable the author to get both overall and comprehensive understanding of the phenomenon, in this case, the food waste management process at Clarion Hotel Helsinki. Consequently, the interviews' answers and the theoretical themes will be compared in the findings analysis.

The answers from the interviewees come from their point of view and experiences from their positions at the hotel. Since they have different roles and duties at work, the opinions provide several perspectives towards food waste at Clarion Hotel. For example, the main chefs were the ones to deal with food waste more frequently than the kitchen manager does. The same goes on for the different views between restaurant staffs and the chefs.

At the beginning of the interviews, the interviewees were asked about their position at the hotel and their opinions on food waste. They were then asked if they have to deal with food waste everyday or not. The next question was to estimate the amount of food waste that Clarion Hotel Helsinki creates on a daily basis. Thereafter, the following questions address the causes, impacts, challenges of food waste at the hotel as well as approaches for food waste reduction. There were 14 questions in total in which five out of 14 were general questions and the rest was created according to four important themes in the literature review. The questions can be found in the table below. (Table 3)

Table 3. Theme interview structure

General questions
1. What is your position at Clarion Hotel Helsinki? Could you tell me where you are from?
2. Can you describe briefly your experience in the hospitality industry?
3. What do you think of food waste?
4. Do you have to deal with food waste on a daily basis?
5. How much food waste does Clarion Hotel Helsinki produce per day?
Theme 1: Causes of food waste at Clarion Hotel Helsinki
6. What are the causes of food waste at Clarion hotel?
7. Which group of stakeholders are responsible for food waste?
8. When does the food go to waste?
Theme 2: Impacts of food waste
9. What are the consequences when food get wasted?
10. Who will have to take the aftermath of wasted food?
Theme 3: Challenges of food waste
11. What are the challenges of reducing food waste?

12. How should we overcome these challenges?
Theme 4: Approaches to food waste
13. Do you know or suggest any good approaches to reduce food waste?
14. Who should get involved in reducing food waste?

3.3 Conducting the interviews

Five employees from Clarion Hotel Helsinki were invited for interview individually. The interviewees were the hotel's employees including an executive chef, a breakfast shift manager, the main chef, and two restaurant staff members. The selected interviewees were the people who have direct contact with food waste on a daily basis, thus, they know the current situation of the food waste management system of the hotel. The reason why the author chose to interview hotel employees with different roles was that depending on different duties and responsibilities, the respondents have different views and opinions about food waste. This decision was made to ensure the reliability of the research.

Since the author worked at Clarion Hotel Helsinki for half a year, it was easy to get in touch with the selected interviewees. The author asked for their permission to join the study and provide the needed data. A summary of the interviews is presented in the table below, showing the date of the interviews, the name of the interviewees, their positions at their workplace, and their main duties at work.

Table 4. Conducted interviews

Date of Interview	Positions of the interviewees	Main duty at work
12.01.2018	Main Chef (C1)	Taking care of food preparing in the kitchen
12.01.2018	Restaurant Staff (R1)	Responsible for handling food in the breakfast buffet
22.01.2018	Restaurant Staff (R2)	Taking care of the breakfast buffet
26.01.2018	Breakfast Shift Manager (M1)	Leading the breakfast buffet staff team
30.01.2018	Executive Chef (C2)	Responsible for all managerial issues of chefs in the kitchen

The interviews were all conducted in January 2018. The interviews were conducted in English, recorded, and then transcribed into materials for analysis. The interviews were run as in-depth interviews and face-to-face discussion to collect the respondents' opinions and personal views. The interviews questions were created to cover 4 aspects of food waste: the causes, the impacts, the challenges of food waste and the approaches to deal with this issue. The questions were open questions, so the interviewees are free to give their own personal point of views and thoughts.

The collected answers were then transcribed into words and put into an Excel framework. This Excel file was created to put all the answers to a question in a row and make it easier to compare the answers with each other.

The purpose of the content analysis is to reveal the core of the texts and provide a concise and brief description of the materials (Kananen, 2013, 128) The transcripts were then carefully gone through to disclose the main ideas, facts and insights. Since the interview questions were already divided into themes according to the theories, the collected materials should also then be compared with the theoretical themes. The collected answers were described by figures and illustrations to be easy to follow.

The conclusion and suggestions were generated both from the provided answers as well as from various sources from books and articles.

3.4 Reliability and validity

The quality of a thesis is often measured by the concept of credibility which consists of two components: reliability and validity. (Kananen, 2013, 180) Reliability refers to the consistency of the obtained results, and validity refers to the fact that the right subjects have been researched. (Kananen, 2013, 189)

The research collected information from credible sources such as FAO and other academic sources because it is very crucial to state the scientific facts and insights from professionals in the hospitality industry. The research does not only include the information about food waste in general on a global scale but also domestic data of food waste in the hospitality industry in Finland from previous studies of Natural Resources Institute Finland (LUKE). This secures the research's reliability since this is a case study of a hotel in Finland.

The limit of this study is that all of the interviewee's answers and ideas are mostly based on personal experience. Thus, the collected data cannot describe the phenomenon as a whole. Besides, food waste management is not easy to measure, since management itself is a daily ongoing process. Theme interview does give in-depth insights of food waste management at Clarion Hotel Helsinki in the point of view of the interviewees, however, it cannot evaluate the whole food waste management process on the premise.

4 Findings

The research aims to give trustworthy insights of food waste management at Clarion Hotel Helsinki in accordance with the themes discussed in the literature review. The goal is to address the four main topics such as the causes, the impacts, the challenges, and the possible approaches to deal with food waste at the hotel. It is very important to see the differences in personal views of the interviewees from different professions and duties at the hotels who get associated with food waste on a daily basis. The following chapters present the results of the analysed answers from the interviews. The answers were combined and compared with facts stated in the previous theories, thus, in the same order as the mentioned themes.

4.1 Background data of the interviews

The interviews were conducted with the hotel's staff who get direct exposure to food waste on a daily basis. They are the hotel's executive chef, the main chef, two restaurant staff members, and the breakfast shift manager. They have been in the hospitality industry for quite a long time, for example, the executive chef got 20 years of experience, the breakfast shift manager got 10 years of experience, and one of the restaurant staffs got 5 years of experience. When asked about their opinions about food waste, they shared personal viewpoints. In general, food waste is considered as an issue that needs more attention and should be taken care of.

The breakfast shift manager (M1) claims that it is a complicated issue:

Breakfast shift manager (M1)

"It is a complicated issue when it comes to breakfast. Because breakfast is mostly buffet type service. We have to ensure that the food looks full but by the Food Law we can't save them after they have been out for over 2 hours."

The executive chef (C2) believes that we should pay attention to food waste:

Executive chef (C2)

"We should do much less food waste."

One of the restaurant staff members (R2) shares that she had grown up being taught not to waste food and wasting food is morally and uneconomically inappropriate from her point of view:

Restaurant staff (R2)

“I’ve been taught not to waste food in any meals and to make useful use of leftover if possible. For that reason, wasting food is morally and uneconomically wrong to my personal lifestyle.”

When the interviewees are asked to estimate the amount of food waste that is produced per day at the hotel, since there is no system to weigh or measure the wasted food yet, it is difficult for them to tell so the respondents come up with their own guess. While the executive chef gave the answer of 226 kilograms, the main chef reckons that the amount of daily food waste fluctuates from 5 to 15 kilograms. Meanwhile, one of the restaurant staffs comes up with the number of 20 kilograms and states that:

Restaurant staff (R2)

“The amount of food waste seems to rocket on weekends and seasonal holidays. The average number based on my personal estimation will be around 20 kilograms per day.”

The breakfast shift manager claims that up to now they have not had any measuring system for food waste but they are planning to do so in the very near future. It is one of the projects that they are going to implement soon.

Breakfast shift manager (M1)

“At the moment we haven't weighed the amount of food. It is one of the projects that we will start soon. So it's very difficult to tell you how much in terms of tonnes how much food is wasted. But in the whole week, the wasted food from Monday to Sunday can possibly feed 50 people. Because we have a different selection of food and we have to combine all together.”

Overall, it is a clear picture that all the employees are aware of food waste and think of food waste as an important issue that needs to be handled well.

4.2 Causes of food waste at Clarion Hotel Helsinki

This chapter sheds light on three main factors causing food waste at the hotel. The answers of by what, by whom and when food waste is created are presented.

4.2.1 What are the causes of food waste?

As discussed in chapter 2.2, there are many reasons why food is often wasted in restaurants and food service outlets. Food waste occurs in both pre-consumer and post-consumer phases. The causes of food waste before the service include unidentified demand, overstocking, inefficient production, poor communication, staff behaviour, unskilled trimming, over-merchandising, and food safety. The causes of food waste from the service are from large portion sizes, inefficient service model, and customer's menu acceptance.

Almost all of these causes are mentioned one way or another by the respondents. While the executive chef claim that food waste occurs due to the fact that they prepare the food on-the-spot by themselves, the other main chef believes that food waste comes from the incorrect estimation of food production and ingredient purchase. These causes seem to be the common difficulties of a restaurant because it is indeed tricky to know the exact number of customers and how much food they consume.

Main chef (C1)

“Chefs often have to estimate the amount of food that they have to prepare everyday depending on the type of customers, seasons, and days of the week, etc. [...] And because we never know when the customers eat less or more so we always have to produce a certain amount so that even when they eat a lot we still have enough food for the customers. Also, sometimes when chefs order the food materials and don't use up all, the food expires and goes to waste.”

The breakfast shift manager states even though they always use the forecast to determine how much food should be brought out, the sources of food waste mostly come from the customers. He believes that food waste often takes place when customers reserve but do not show up, customers eat less than what has been predicted, or when they collect a lot of food but do not finish the food. The restaurant staffs also agree with this point. One of the restaurant staffs (R2) thinks that when there are plenty of food selections, customers often end up taking more food than they actually need or they can finish. It is because they want to try different kinds of food, they do not have to go for a second round, or they fear that the food might run out.

Restaurant staff (R2)

“Human behave differently in different situations of food. In common sense, the occasion where there is plenty of choices around the table, guests usually take more than they need. Taking food for fear of it will run out, or with thoughts of I don't have time to go for a second round, I want to try different kinds, will lead to food waste easily. Sadly, only a slightly more than half of food buffet amount is consumed in hotels breakfasts.”

The other restaurant staff member (R1) shares the same point of view that customers usually take more food than they can eat, which eventually leads to food waste.

Restaurant staff (R1)

“It is because the customers often take more than the amount they can eat. We cannot tell them not to take so much food. The kitchen still has to prepare.”

Over-merchandising is also one of the main origins of food waste. Because at Clarion Hotel Helsinki, breakfast is served as a buffet, so they always have to make sure that the food looks beautiful and bountiful. The breakfast shift manager (M1) shares his experience with breakfast buffet management:

Breakfast shift manager (M1)

“We have to make sure the food looks full whether there are few or more people coming. The food must look fresh and full all the time.”

However, as he says, not all of the leftovers from the buffet can be saved due to the Food Safety Law in Finland. This Law does not allow food service to save any food which has been on open display for more than two hours. Thus, after the breakfast buffet, most of the food will be sent to waste:

Breakfast shift manager (M1)

“We have to ensure that the food looks full but by the Food Law we can't save them after they have been out for over 2 hours. [...] Food goes to waste after breakfast service. By Food and Hygiene Safety Laws, we cannot store the food that has been out for more than 2 hours. So after service, the food is going to be thrown away even though you want to give it to people but by law it's not allowed.”

To sum up, the causes of food waste at Clarion Hotel Helsinki vary from an inefficient forecast of food production, incorrect estimation of ingredient purchase, over-merchandising, customer behaviour, and food safety.

4.2.2 Who is responsible for food waste?

The interviewees have different opinions when asked to identify the stakeholder group who contribute to food waste the most. The executive chef (C2) thinks that the kitchen is mostly responsible for food waste. The main chef (C1) says that both customers and chefs generate food waste, however, the latter contribute less to food waste because they often receive good training and they work based on their experience, previous data and policies of the restaurant. Whereas, one of the restaurant staff members (R2) states that she does not have an answer to this question.

The other restaurant staff (R1) relates to the customer group's background as one of the main reason why the customers leave food on the plate. Due to the fact that customers come from different corners of the world, when they travel, they might still have their cultural background at the back of their minds and act the same like in their own countries.

Restaurant staff (R1)

"It depends mostly on the customer group and where they are from. [...] Even when we put a message to the customers, some people just don't read and they just keep their wasting habits from their own country. They take a lot of food because they want to compensate for the price they pay."

Speaking of the customer group, despite regarding the cultural background, the breakfast shift manager (M1) specifies that leisure tourists are the one to leave the most food on the plate in the breakfast buffet. It is because they have more time than the business group, who often take small portions and finish their meals as quick as they can. Whereas, since the leisure tourists have more time to eat, they often take more food than they can eat, leading to food waste eventually.

Breakfast shift manager (M1)

"Leisure groups are people going on holiday and these are the most people who have this kind of attitude. Business people when they come, they take small amounts, they eat, and they go because they are under pressure but leisure customers think they have time so they keep collecting and collecting. So the leisure groups are the people that cause the most food waste."

Apparently, both the kitchen and customers contribute to food waste to some extent. In order to deal with food waste, both groups need to be engaged in the process.

4.2.3 When does food go to waste?

As mentioned in chapter 2.2, food wastage can be generated in any stages of the service, including in the kitchen as well as on the plate. When it comes to the question of when food goes to waste, the majority of interviewees agrees that food waste is created the most on the breakfast buffet. It is because in buffet service, food should be filled from time to time to maintain a beautiful and abundant display.

Restaurant staff (R2)

“Food waste occurs the most in the breakfast buffet where they try to make the food perfect-looking and fully stocked.”

Breakfast shift manager (M1)

“In the buffet, the food must always look full and fresh. Even when we have enough food for the customers, the food must always look presentable and big.”

Restaurant staff (R1)

“The food still needs to be filled near closing time, so food excess is inevitable.”

Food waste occurs even more when there is a crowd. According to one of the restaurant staff members (R1), people tend to take more food when it is crowded. This behaviour might result from a fear of the run out of food or the desire to stock more food for themselves.

Restaurant staff (R1)

“In my opinion, food is wasted more when it is more crowded. People tend to get more food for themselves when there are more customers. Whenever there is a queue, the customers tend to take so much food at a time so that they don't have to come back or because they want to stock for themselves.”

This is the opposite of à la carte service, where customers order the food with smaller portions in accordance with their own selection. However, dinners can also create food waste when customers reserve but do not show up, because the food ends up uneaten.

Main chef (C1)

“The breakfast buffet often produces more food waste. Dinners also generate food waste but less than buffets do. Dinners are served a la carte so the portions are smaller.”

The main chef believes that whenever food is served, there should be food waste. Thus, food wastage is generated throughout the whole day while the hotel operates.

Main chef (C1)

“Because the restaurant operates from morning until the evening, food waste is created throughout the day. Whenever there is a customer who needs food service, food waste must be generated.”

Indeed, when a hotel opens and the restaurant serves the customers for the whole day, food wastage footprint is created all the time. It is true in the case of Clarion Hotel Helsinki, but the most noticeable time of day when food is sent to the trash bin the most is the breakfast buffet.

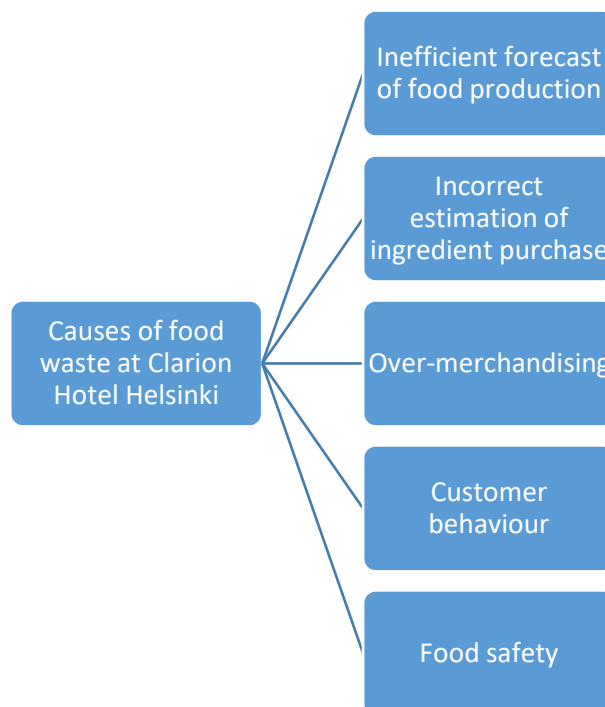


Figure 22. Causes of food waste at Clarion Hotel Helsinki

To sum up, the major causes of food waste at Clarion Hotel Helsinki include inefficient forecast of food production, incorrect estimation of ingredient purchase, over-merchandising, customer behaviour, and food safety. Both the kitchen and customers are responsible

for food waste generation, thus, both groups should get involved in the food waste prevention and reduction process. In addition, food waste is believed to be created the most at the hotel in the breakfast buffet, especially when there is a crowd, or when customers reserve their meals but do not show up. Customer profiles are also a noticeable influence on the food wastage footprint created on-site.

4.3 Impacts of food waste at Clarion Hotel Helsinki

This chapter acknowledges the impacts of food waste from the point of view of the interviewees. The impacts of food waste and who gets affected by these impacts will be discussed.

4.3.1 What are the consequences when food get wasted

There are various consequences when food is wasted. As discussed in chapter 2.3, food waste costs several environmental, economic, and social damages. In terms of environmental harm, it can lead to pollution, greenhouse gas emission, and toxicity. Economically speaking, food waste does no good for the business because it brings up many subsequent costs. It also harms the society due to the fact that while there are millions of people who have to suffer from hunger, food waste is sent to the dumpster.

The breakfast shift manager regards the impact of food waste as very wide and has a huge influence on the environment, the finance, and the society.

Breakfast shift manager (M1)

“It's very wide. It's not environment-friendly, not cost-effective, and it leads to hunger all over the world.”

While one of the restaurant staff members (R2) shares the same opinion, the other interviewees mainly see the costs of food waste from the economic view. It is affirmed that once the food is wasted, it does no good to the business because the overall costs will be raised. Food going to waste brings along many costs such as supply costs, labour costs including labour costs for food preparing and labour costs for cleaning, and disposal costs.

Main chef (C1)

“When food is wasted, the overall costs will increase. The supply costs increase, the disposal costs also increase, the labour costs also increases because there must be cooks to prepare the wasted food and the workers to clean the waste.”

4.3.2 Who has to suffer the consequences of food waste?

Wasted food can lead to countless problems and issues, yet, who will have to suffer the most? Most of the interviewees associate food waste's consequences with the hotel itself, the hotel employees, and the staffs who directly deal with food waste daily. To be more specific, one of the restaurant staff members (R2) points out that the hotel's chefs, restaurant managers, and financial managers are the ones to take the responsibilities for food waste on the premise:

Restaurant staff (R2)

“Chefs, restaurants managers, and financial managers are responsible members who will take actions to the food waste and find out optimal solutions.”

On the other hand, the breakfast shift manager (M1) says that both the hotel and the customers suffer from food waste. It is obvious that food waste has a direct impact on the hotel because it costs the hotel financially. Because when the food is wasted, the hotel wastes the money from different stages that they use to purchase the food, cook the food, and dispose of the leftovers. Nonetheless, to cover up the losses in finance, the hotel will increase the overall price that they charge the customers. So eventually it also costs the customers all the way around.

Breakfast shift manager (M1)

“When food is wasted, consumers and hotels will suffer by the end of the day because if there are a lot of food is going to waste, it is expensive for us to produce, then we will have to increase the price that we are charging the customers. So I would say the hotels will be affected but in the long run, the consumers will also be affected because prices will go up if it's costing us so much.”

Once food waste is generated, it creates several negative environmental, financial, and social impacts. Particularly, financially speaking, food waste increases the overall costs because of many costs such as raw material costs, labour costs, and food waste handling costs. As a result, in order to cover the costs, the hotel will have to increase the price that they charge their customers. Hence, overall, food waste is not beneficial for any party that get involved with it.

4.4 Challenges of food waste at Clarion Hotel Helsinki

Food waste is a complicated issue that involves many parties and many stakeholders, thus, there still remain many obstacles. This chapter will present the challenges of food waste as well as some possible ways to overcome these challenges of reducing food waste.

4.4.1 What are the challenges of reducing food waste at Clarion Hotel Helsinki?

Chapter 2.4 points out that these obstacles consist of barriers to food recycling and donation, diversity in food service operation concept, and consumer behaviour. Surprisingly, these challenges are all mentioned in the interviews.

The barrier to food recycling and donation in Finland is the Food Safety and Hygiene Law. According to Finnish Food Safety Law, any food that has been outside for more than two hours cannot be saved for donation because if someone gets poisoned by the food, the donator will have to be responsible for the situation. This is the main reason holding back the hotels and restaurants from saving and donating the leftovers. It is because they cannot be responsible for the quality of the food that has been on display for more than two hours. It is very tricky because not all food that has been out can go bad after two hours, however, only packed food and food that does not get affected by temperature can be saved.

Breakfast shift manager (M1)

“By Food and Hygiene Safety Laws, we cannot store the food that has been out for more than 2 hours. So after service, the food is going to be thrown away even though you want to give it to people but by law it's not allowed.”

Another challenge is the service type. At many hotels, breakfast buffets are common. The downside of the buffet is that the food must always look full and presentable. The restaurant staff members should always bring out new foods to refill the trays and display. Even though the number of guests by the end of the buffet declines, the food trays must be filled so that the food looks plentiful and fresh. Despite the fact that there might be enough food for the number of customers, the customers do not want to see a lack of food. If they see that the food is old or too little compared with the full tray, they might think that they do not get the value for the price they pay.

Breakfast shift manager (M1)

“Even when we have enough food for the customers, the food must always look presentable and big. [...] People want to see a lot of food so when you reduce the amount the food that is coming out, they think they are not getting the value for the money.”

Consumer behaviour is another challenge when the hotel wants to reduce food waste. It is a complex issue because it is not something that is easily changed in a day or two, especially when it is something that nobody has the control of. It is not easy to interfere with a customer behaviour. Two restaurant staffs share the same viewpoint on this obstacle:

Restaurant staff (R1)

“We can't interfere with the customer behaviour. We can't simply tell them that they should only take just a little and come back if they want more.”

Restaurant staff (R2)

“It is hard to tell customers in a tender, non-harsh way that they should not waste food, especially when you have hundreds of customers per day. It is due to time limitations and different ethical perceptions and there are no standard behaviours in eating habits.”

Once again, it is stated that in the buffet, several customers take more food than what they can consume. This is an alarming issue yet difficult to solve because customer perception about food is usually the product of a cultural background.

Restaurant staff (R1)

“They take a lot of food because they want to compensate for the price they pay. They are curious about the food or they want to try even though they are not able to finish them.”

From a different angle, the chefs have a particular hardship in the kitchen. The mentioned challenges in the kitchen include the chef's lack of experience and the difficulty in food demand measurement. Because a chef often estimates the forecast based on his or her experience, if he knows his customers well, he can produce enough food with just a small amount of waste. But if he is new and does not comprehend his customers well, he will make an incorrect forecast, leading to an enormous amount of food waste.

Main chef (C1)

“If a chef has lots of experience and he knows the customers well, he can produce enough amount of food and create just a small amount of waste, around a few kilograms. So the most difficult challenge is when the chef doesn't comprehend his customers. This often happens to new chefs or newly open operations, when they don't know their customers and haven't got suitable measurements yet.”

Likewise, the executive chef (C2) declares that the main challenge of reducing food waste lies in the difficulty to measure the right amount of needed food for customers.

However, the main chef (C1) believes that after the operation is run for a while, a business can obtain their own statistics of customer's profiles and learn from them, creating patterns for employees to follow.

Main chef (C1)

“Usually, after one year, the operation can build and collect their own statistics and know the factors that affect the number of customers visiting the service such as the day of the week or the time of the day, as well as the weather and the seasons.”

4.4.2 How should these challenges be tackled?

The most responded answer to this question is to raise customer's awareness. One good method is to create customer-friendly and eye-catching cards to deliver the messages. The messages should be diplomatic but educational so that the customers know the importance of their role in reducing food waste and saving the environment.

It is so crucial to raise awareness among the hotel's employees and staff as well. Because a single person cannot improve the whole system of food waste handling, it is a process that requires efforts and attention of the whole organization.

Restaurant staff (R2)

“We should have a clear written out sets of rules to not waste food for the company and apply to our daily working situations.”

The executive chef (C2) insists on the fact that the staffs should pay more attention to details and be more careful when it comes to food in order to reduce food waste. On another page, the breakfast shift manager (M1) suggests a potential approach in terms of operation, which is a switch from buffet to a la carte service for breakfast. He also suggests

spreading more awareness among customers. The hotel has been creating flyers and cards to deliver the message to their customers. The message is presented in the below picture. (Figure 23)

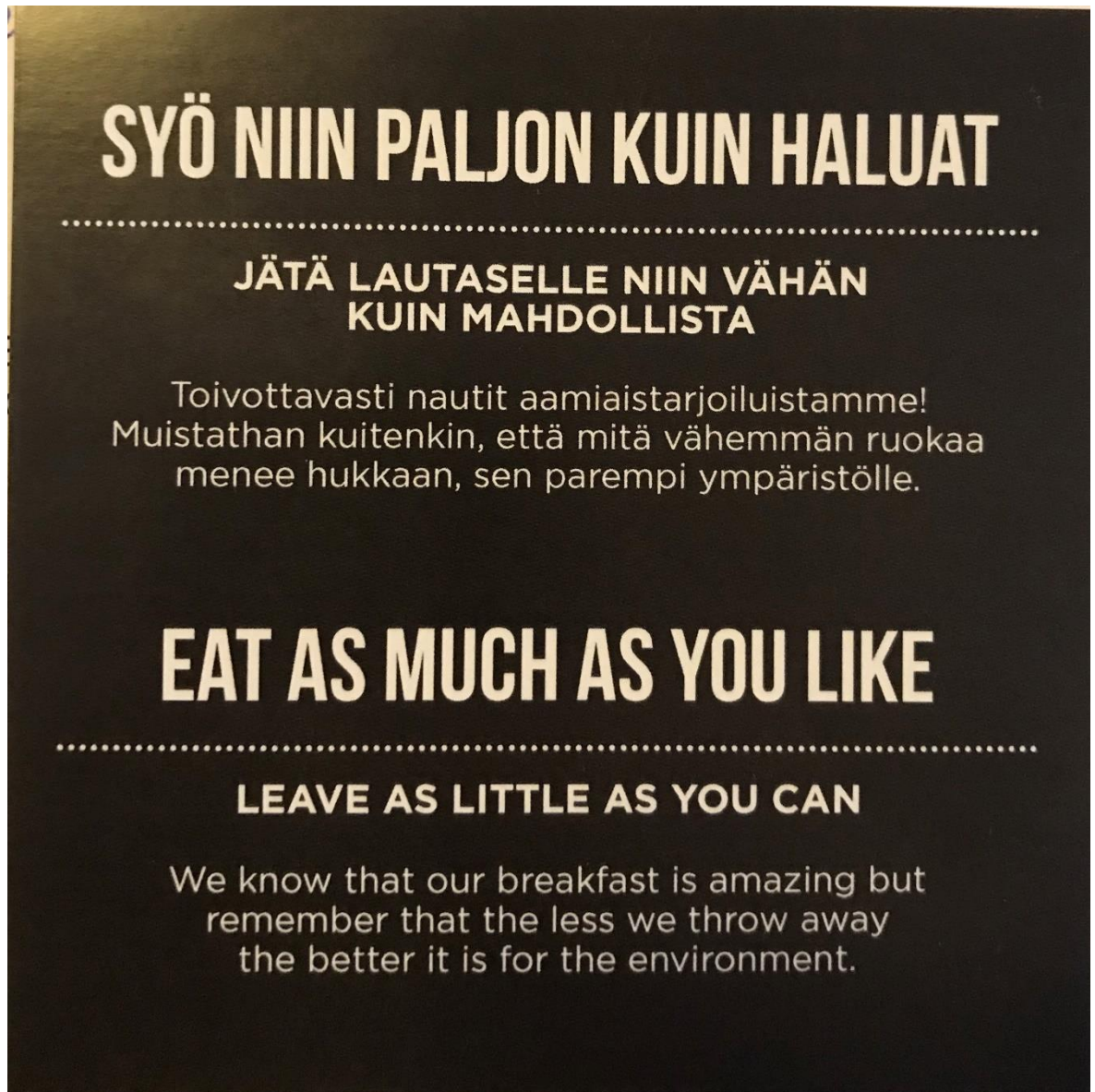


Figure 23. Clarion Hotel Helsinki's message to raise awareness about food waste
(Source: Clarion Hotel Helsinki's restaurant flyer)

The barriers to food waste handling at Clarion Hotel Helsinki varies from the Food Safety and Hygiene Law, to the service type, to customer behaviour and difficulties in food demand measurement. The suggested methods to overcome these challenges include raising awareness among customers and the hotel's employees and staff and switching from buffet to à la carte service.

4.5 Approaches and practices for food waste reduction at Clarion Hotel Helsinki

Even though food waste management remains a complicated issue to deal with, there are still many practices that the hotel can apply within their reach to tackle the problem. This chapter introduces the feasible and practical approaches to food waste suggested by the interviewees.

4.5.1 Approaches for food waste reduction at Clarion Hotel Helsinki

One of the most important steps that should be taken in order to handle food waste to measure it. Daniel Sewornu expresses that the upcoming project of Clarion Hotel Helsinki is to apply the weighing system for food waste. The data from food waste weighing does not only let them know how much it costs financially and environmentally. The figures can be used in raising awareness among customers. The message with real figures will be a realistic and educational way to help the customers realise their role in sustainability.

Along with food waste measurement, regular food plan review should also be carried out to keep track of food flow in and out the kitchen so that less waste will be created.

Restaurant staff (R2)

“Reviewing progress on the food plan and keep track of the waste of food each month is a good way to get an attention of food waste issue.”

Staff training is imperative to handle food waste and keep it under control. A synchronised food waste prevention and reduction plan should be created and made available to the employees. Conduct codes and rules should be discussed and followed for the common sake of food wastage prevention in the kitchen, during and after the service.

Restaurant staff (R2)

“Staff training and communication are necessary to raise awareness among employees.”

In order to prevent and minimise food waste footprint at the hotel, efficient forecasts of customers and strong communication between the restaurant and the kitchen should be maintained. When the flow of customers becomes a noticeable pattern, it is easier to control the amount of food that needs to be served. Restaurant staff members should stay alert and get the kitchen well-informed so that the kitchen knows the limit of food preparation. Otherwise, if the kitchen keeps making the food without knowing the demand, food can be left uneaten.

Breakfast shift manager (M1)

“So if there is not strong communication between the front office and the kitchen, they will still be cooking and throw away a lot of food. From my experience, I try to give the chefs a lot of information so that they can cut down the amount of food we throw out per day. [...] We have to be more conscious about the forecast so that we are not bringing too much food out more than we need. And we have to check the flow of the customers, how many people are coming, how many are going out and you can tell as early how many people are left to come so that you know how much food you have to bring out.”

However, it is inevitable that food waste is created after from the buffet or another type of service. In those cases, recycling can be brought into use. Leftovers which are still safe and in good condition can be used for another round such as staff’s meals or reuse on the next day, suggests the main chef (C1) and one of the restaurant staff members (R1).

Restaurant staff (R2)

“Composting food waste into other forms of economical and eco-friendly fertilizer for the own use of hotel’s plants is another sustainable suggestion for hotel operating.”

4.5.2 Whom should get involved in reducing food waste

4 out of 5 respondents go along with the answer that everybody should get involved in the process of reducing food waste at Clarion Hotel. According to the breakfast shift manager (M1), “it’s a team effort”. Everyone including restaurant managers, employees to customers should step in and take their responsibilities, says the restaurant staff member (R2).

Another important proposal is for the restaurant staffs to stay active and observant of the flow of food in the service. When the service is almost near closing time, it is wise to provide real-time information to the kitchen so that the kitchen knows when the food preparation should stop and how much food should be brought out.

Restaurant staff (R1)

“The buffet staff at the end of the shift should be aware of the amount of food they should bring out. They should align and reduce the amount of food they bring out.”

Apparently, there are many approaches to prevent and reduce food waste. It is suggested that the very first implementation to be made is a food waste measuring system. It is true that statistics can enable the operations to quantify the amount of food waste they produce and calculate the costs food waste creates, accordingly. The other recommended strategies to deal with food waste are regular food plan reviews and a thorough food waste prevention and reduction plan. For the kitchen, efficient forecasts of customers and strong communication between the restaurant and the kitchen should be maintained. As for the other employees, staff training should be carried out regularly, and certain conduct codes and rules should be followed. Awareness should be created among both the customers and the hotel employees. Last but not least, when food waste is unavoidable, it can be reused and recycled for other uses or even compost on-site to run a green hotel operation. It is very important that everyone should be engaged in order to reach the same goal of food waste prevention and reduction.

5 Conclusions

Food waste remains one of the most complicated issues in the food service industry since it is caused by various factors and at every stage of the food supply chain. While food waste has so many serious impacts on the environment, finance and society, there are still many obstacles for food service providers when dealing with food waste.

The thesis was designed with the purpose of analysing the overall management of food waste at Clarion Hotel Helsinki. The questions of what causes food waste, what impacts food waste make and what challenges when dealing with food waste in the kitchen of the hotel were answered. From the findings, it is clear that there are numerous reasons why food waste is created at Clarion Hotel Helsinki. Notable causes of food waste include inefficient forecast of food production, incorrect estimation of ingredient purchase, over-merchandising, customer behaviour and food safety rules. The groups of stakeholder who contribute to food waste are both the kitchen and the customers. Strikingly, the customer profile is considered the biggest influence on the food wastage footprint created. Food waste is believed to be generated the most in the breakfast buffet, especially when there is a crowd. Food waste is also created when customers reserve for meals but failed to show up, resulting in uneaten food. The causes of food waste listed by the hotel's employees are similar to the food waste causes mentioned by Baldwin, Shakman, and Hogan in chapter 2.2. This suggests that food waste is caused by many factors and in every stage of the food chain, however, thorough planning and forecast can prevent further costs that food waste may create.

It is a fact that food waste costs in many aspects of the environment, finance, and society. The interviewees widely agreed that food waste brings adverse effects on the environment, finance, and society. As stated in chapter 2.3, food waste does not only damage the environment in terms of land, water, and air, but also generates greenhouse gases and contribute to climate change, and releases toxicity from pesticides and leachate. Since climate change is directly having negative impacts on all lives on Earth and the future of mankind, food waste should be prevented and reduced in the first place in order to avoid all the associating harms. In addition, as Baldwin and Shakman mentioned in "Greening Food and Beverage Services" (Baldwin & Shakman, 2012), one of the interviewees confirms that food waste builds up the financial burden on the business due to the waste of raw materials, labour costs during food storage and preparation, plus the costs for food waste disposal post-service. This financial burden eventually falls on the customers' shoulders when the hotel has to increase the overall price that they charge their customers. Hence, it is obvious that food waste is not advantageous for both the business and

the consumers. Not to mention the fact that if food waste can be recovered properly, it can save the people and animals in need.

However, there are still many diverse obstacles that keep the hotel from food waste reduction. Chapter 2.4 points out that common obstacles range from barriers to food recycling and donation, to the diversity in food service operation concepts, not to mention customer behaviours. According to the interviewees, the noticeable challenges to food waste handling at Clarion Hotel Helsinki include Food Safety and Hygiene Law restrictions from keeping food has been on display over two hours, buffet service type, customer behaviours and difficulties in food demand measurement and forecast. As suggested, in order to overcome these challenges, awareness among customers and the hotel's employees and staff should be raised. Besides, it is advised that a change in operation concept should be made, which is a switch from buffet to à la carte service.

Chapter 2.5 provides some potential suggestions to approach food waste in a better way such as daily food waste tracking, better ingredient purchase and storage, smart food merchandising, flexible and low-waste menu design, employee training, customer engagement, portion control, food recycling and donation, and composting. Surprisingly, all of these approaches were mentioned in the interviews. It seems that the hotel's employees are aware of food waste and they have good intention to contribute to a better food waste management system at the hotel. The hotel is planning a food waste measuring system in the near future, which is very beneficial for the whole process of food waste prevention and reduction. Other recommendations include regular food plan reviews, efficient forecasts of guest's demand, strong communication between the restaurant and the kitchen, staff training and certain conduct codes and rules, raising awareness among the staff members as well as the customers, food waste reusing, recycling and composting.

One of the interviewees regarded to an application called ResQ as one of the new potential ways to recover food excess and prevent them from being thrown away. ResQ is a new web-based and mobile platform for food waste recovery in Finland. ResQ Club has come up with the idea of being an intermediary that helps customers to buy leftovers from restaurants and coffee shops. The website and mobile application of ResQ were created to show the locations where the customers can come and rescue the food. This is a very brilliant idea to save the food because the food is of decent quality and offered at cheap prices for people who need them. It is a good suggestion for Clarion Hotel Helsinki to redistribute the food items when there is no-shows or foods that are still in perfect condition to potential consumers and save them from being discarded.

The aim of the thesis was achieved since the findings provided an insight of the food waste management at Clarion Hotel Helsinki and some suggestions to improve the system were proposed by the interviewees. The four main themes consist of the causes, impacts, challenges of food waste and approaches for better food waste handling were covered both in the literature review and the empirical parts. Together with the advice from the professionals in the theories, the interviews' results enable the author to form a list of suggestions for a more sustainable food waste management Clarion Hotel Helsinki.

The thesis project was a valuable learning experience for the author. The study was a personal project, which was an opportunity to sharpen interpersonal skills. Project management skills such as planning, time management, personal organization, and communication skills which are very beneficial for the author were successfully practiced and obtained. The topic of the study, food waste, is a very important and current issue. Since food waste was a topic of interest to the author, it motivated the author to work constantly on the project in order to gain more knowledge on the subject.

One of the most challenging parts of the study was to form the questions for the theme interviews. After receiving constructive feedbacks from the thesis supervisor, the authors came up with interview questions in accordance with the themes in the theories. In this way, data collection and data analysis got easier since the findings were aligned and framed into different themes. Nevertheless, the study could have been richer and exquisite if the author could use a better mix of methodology and the questions were designed in a way that gains a deeper knowledge of the phenomenon.

One of the biggest limitations of the thesis project was a lack of an implementation plan for Clarion Hotel Helsinki. Since the hotel is very new and the author did not have an access to the statistics of food waste in the hotel's kitchen, it was difficult to come up with specific solutions to target food waste there.

Further studies can be done later on when Clarion Hotel Helsinki implements a food waste measuring system. Other researches that use more comprehensive observation and data collection tools to achieve accurate and detailed data can benefit the future case studies of Clarion Hotel Helsinki.

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Appendix 1. Theme interview questions

GENERAL QUESTIONS

15. What is your position at Clarion Hotel Helsinki? Could you tell me where you are from?
16. Can you describe briefly your experience in the hospitality industry?
17. What do you think of food waste?
18. Do you have to deal with food waste on a daily basis?
19. How much food waste does Clarion Hotel Helsinki produce per day?

CAUSES OF FOOD WASTE AT CLARION HOTEL HELSINKI

20. What are the causes of food waste at Clarion hotel?
21. Which group of stakeholders are responsible for food waste?
22. When does the food go to waste?

IMPACTS OF FOOD WASTE

23. What are the consequences when food get wasted?
24. Who will have to take the aftermath of wasted food?

CHALLENGES OF FOOD WASTE

25. What are the challenges of reducing food waste?
26. How should we overcome these challenges?

APPROACHES TO FOOD WASTE

27. Do you know or suggest any good approaches to reduce food waste?
28. Who should get involved in reducing food waste?