

Review of Causes and Prevention of Food Waste in Collective Catering Entities

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ABSTRACT

Food waste is a big problem for the environment, the economy, and society around the world. The catering business is a big part of this problem. This paper looks at why food goes to waste in joint catering businesses and how to stop it or prevention. The study looks at meanings of wasted food and ways to cut down on it using secondary data analysis. It does this by focusing on information from reliable sources such as the Food and Agriculture Organization and the European Community. It lists things that are usually thrown away in catering and focuses on why they are thrown away and what that means for how trash is managed. The paper also talks about the different reasons why catering businesses waste food, such as overproduction and bad customer behaviour, and looks at both internal and external factors that affect waste production. Food waste prevention measures like amount control, menu optimization, and training programs for employees are also tested to see how well they work at cutting down on food waste. Lastly, it is emphasized how important it is to keep an eye on changes on a larger scale. This is done by focusing on the part that governing bodies and foreign groups play in promoting environmentally friendly ways of managing waste. Achieving sustainability goals and lowering the environmental effect of food production and consumption can be done by figuring out how complicated food waste is in catering and putting in place targeted interventions.

Keywords: Food waste, catering industry, prevention measures, waste reduction strategies, overproduction, consumer behaviour, monitoring, sustainability goals, regulatory bodies.

INTRODUCTION

Modern society has major challenges with losing food and waste, which puts the natural world and food safety at risk. The entire logistics network loses and wastes more than one-third of the food supply for people to eat each year. In contrast to wasted food, which is known as suitable food that is thrown out after rotting or stored over its expiration date, food loss is the reduction in mass or value of food that was originally grown for people to eat. Crop cultivation, processing, transportation, and place of storage issues, as well as insufficient leadership, lead to losses. In medium- and high-income countries, food waste occurs mostly at the level of retailers and customers. Food waste from wealthy consumers approaches that of Africa's sub-Saharan region's total net agricultural output. South and Southeast Asian nations, as well as the African continent, dispose of just 6–11 kilograms of garbage annually per person, compared to 95–115 kg in North American and European countries (Dhir, et al. 2020). Among the 17 sustainable growth goals that the UN General Assembly established is the emphasis on responsible spending and manufacturing in the 2015–2030 Strategy for the Development of Sustainability. It is crucial to provide tools that are suitable for minimizing the use of energy. The amount of food thrown and lost has a significant influence on the amount of food produced, the amount of farming, and the availability of renewable resources. To identify the primary causes of food waste in catering enterprises, research was done in these settings. Waste generation, especially food waste, has risen in Poland as a result of the catering sector's rapid expansion. Food waste rankings place the catering services industry

third, after commerce and transport. Although more publications are addressing the topic of food waste in families, there is less professional research discussing the subject of wasting food.

Aims and objectives:

Aim: The study aims to focus on the causes and prevention of food waste in collective catering entities.

Objectives:

- To analyse the definitions of wasted food and how to reduce it.
- To know the items that are most often thrown away in catering.
- To discuss food waste causes and prevention measures.
- Monitoring changes on a broader level.

2. LITERATURE REVIEW

Definitions of wasted food and how to reduce it:

Food waste lacks an ongoing issue description and is frequently seen as a “cruel issue” since it is an unorganized issue. There is substantial diversity in the meaning of food spoilage, which results in various figures and possible solutions to the issue. The Food and Agricultural Organization, or FAO, makes a difference between losing food and wasting food, highlighting a reduction in food both in number and quality brought about by food service providers, merchants, and customers. Wasted foods are any food and not edible portions that are taken out of the food distribution system and either collected or gotten rid of, according to the Fusions assignment, which is supported by the European Community. “Preventable,” “probably preventable,” and “unavoidable” waste from food are all included in the category of edible waste (Malefors, 2022).



Fig 1. Food loss and waste at different stages of the food supply chain

However there is a lot of variability involved in determining what is eatable, and limited resources often prevent the collection of accurate data on food waste. This may affect canteen supervisors and cultivators, who may not be aware of the specific uses of products or the importance of wasting food. Given that between 30 and 50 per cent of every food item supplied is never eaten by humans, it will have a significant impact on whether feed for animals is included as wasted food or not. There’s absolutely nothing to stop or decrease if wasted food is not specified. The physiological waste management systems, recycling excess food for feed for animals, and food donations to charitable organizations are a few examples of ways to prevent them. However, this thesis only addresses lowering sources in the case of food that is used to feed consumers at a dining facility.

Items that are most often thrown away in catering:

According to the poll, foods that have been started and begin to turn bad are the ones that are thrown away from catering businesses the most often. Some of those products go to waste every day, by 28% of those polled. Products that are in between, such as breaded, uncooked meat and opened goods that show no symptoms of spoiling, are thrown away most often. Most often, things that are opened and show no symptoms of spoiling are thrown away. Cold sweets and warming dishes that are ready to eat are thrown away every day or almost every day (23.7% and 20.5% of the responses, respectively). The foods that are thrown away very often are cooked and uncooked vegetarian salads, which are followed by vegetable-based meals (23.3%) (Ouro-Salim,

and Guarnieri, 2022). The freezer is usually where excess food is kept until the following day. Additionally, 23.7% of catering facility workers said they often or fairly regularly throw away both warm and cold-prepared meals.

Reasons behind catering-related food waste:

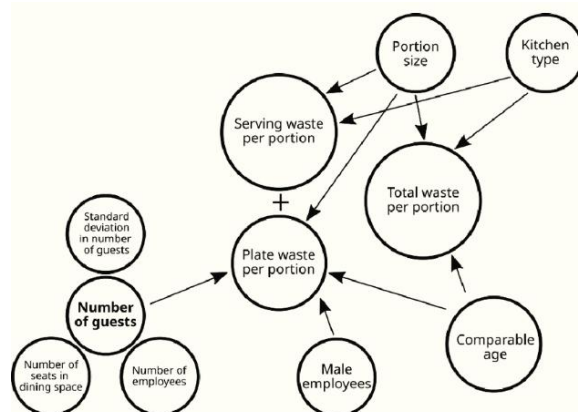


Fig 2. Effects of numerous factors on food waste

According to the survey, over 25% of those surveyed said that a lot of food is thrown off “all the time” or “generally” in catering settings, which indicates that wasted food is mostly caused by cooking excessive food. But the responses were occasionally extreme; the most rarely mentioned ones were buying cheap goods and running out of ideas for recycling the things into different dishes. The majority of those polled (73.8%) said that providing meals with excessive portions is the primary cause of waste on tables; however, more than forty cents of catering facility staff stated that customers “all the time” or typically left wasted food on the table (Garske, et al. 2020). Inappropriate food taste, an uncomfortable environment, placing an excessive number of meal orders, and identifying unwanted parts in meals were among the other concerns mentioned. According to 17.1% of responses, raw plant-based salads are continuously or generally left on dishes, making them the most often mentioned food left on dishes by customers.

Food waste causes and prevention measures:

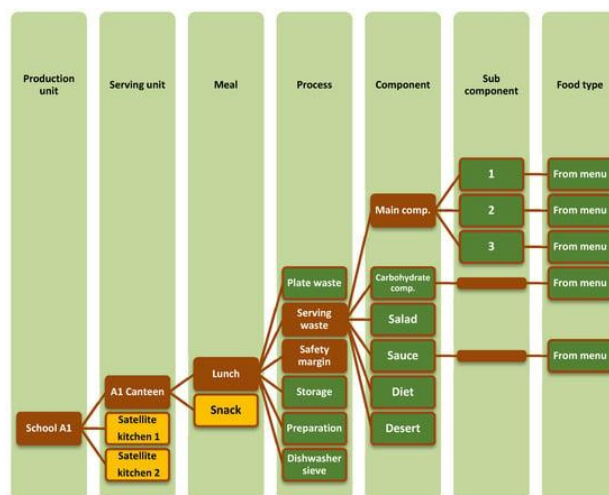


Fig 3. Habit changes in food waste

Several variables, including facilities, sociodemographic and psychological characteristics, and views on religion, may have an impact on wasted food in kitchens. A manual and a guide have been created by the Swedish National Meal Authority to support canteens in preventing or minimizing food waste. Reduced degrees of food waste has been linked to several factors, including a peaceful dining atmosphere, awareness of diners, quantity size, loudness, the amount of time allowed for eating a meal, and the ages of customers. Food

waste, especially wasted plates, is significantly influenced by their sexual orientation, with women in universities and outside the home wasting more meals than men. Plate waste may also be caused by competitive choices, such as restaurants near the dining room. Research indicates that scheduling some time off before lunch may minimize food waste by around 10 per cent. Public relations campaigns are often used to fight food waste; however, only 40% of pupils choose to take part. Another choice to consider is the use of encouragement in combination with a data collection program. According to research, electronic communication, getting rid of dishes, and lowering plate sizes in hotels and dining establishments may all help cut down on eating plate waste (Somlai, 2023). Encouragement is an effective strategy for decreasing wasted food within educational canteens.

In summary, preventing food particles in kitchens needs a complex approach that takes into account facilities, sociodemographic and psychological factors, and practical tactics. Canteens may reduce food waste and improve the standard of food served in their facilities by putting these suggestions into practice. Restaurants' attempts to reduce food waste sometimes focus on a small portion of the issue while ignoring possible adverse reactions. Research indicates that there may be a 4% decrease in wasted food by enhancing the eating experience, enabling meal orders to be placed ahead of time, and increasing the comfort and enjoyment of classroom meals. Nevertheless, there is no significant distinction in the efficacy of these treatments.

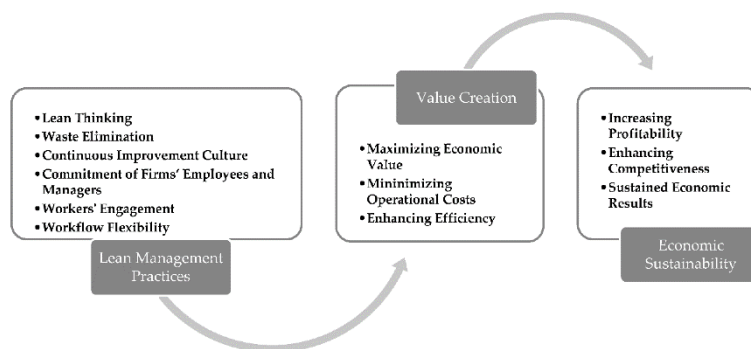


Fig 4. LEAN philosophy in food waste

Due to inadequate waste measurement, the concept of LEAN philosophy provided by Barr et al. (2015) was tried in Swedish institutions but was not evaluated. To evaluate efforts to reduce food waste, uniform waste measurement is crucial. According to Eriksson et al. (2016), providing more than one choice resulted in the largest amount of wasted food, although providing an adjustable lunch choice somewhat lowered waste as restaurant capacity rose. According to some experts, employees increase meal supply rates to prevent food shortages, which might put kitchen workers in a bad light. Although techniques for predicting have been proposed as a solution to this problem, their impact on reducing wasted food remains unclear. When people who measure food waste become conscious of the problem and begin to modify their behaviour, the calculation process might be a solution. Sixty-one per cent of catering facilities have decreased waste, with the greatest change being the beginning wastage per visitor, according to tests conducted in 735 restaurant and hotel establishments. Managers and comparable personnel should consider how they contribute to the development of food waste and the difficulties in implementing successful prevention. Managers' attitudes toward wasteful food control are influenced by their perceptions of its importance and advantages.

Monitoring changes on a broader level:**Fig 5. UN Sustainable Development Goal 12.3**

To achieve worldwide goals like UN Sustainable Development Goal 12.3, which calls for halving the world's food waste by the year 2030, tracking food waste is essential. Still, there may be difficulties when collecting data on a national scale and evaluating outcomes. A standard technique and minimal quality controls have been set in the European Commission-signed directive (EU) 2019/1597 for regular measuring of food spoilage rates. The secret is finding a deal between huge method-to-method differences and strict and realistic measurement. Thanks to the Swedish Openness to Records and Secrets Act, publicly catering businesses in the country provide a singular chance to measure food loss via personal experience and publicly accessible data. For the general public catering industry, the Swedish National Meals Service has developed a measurement standard that contains uniform terms and recommendations for measuring waste. This standard outlines waste activities such as restaurant trash, service waste, and trash from plates and enables kitchens and businesses to measure themselves on the same basis (Dou, and Toth, 2021). Additionally, it has to be noted how many people attended and how much garbage was disposed of for every step. But the guideline leaves out certain foods and doesn't account for liquid trash.

**Fig 6. Menu planning in Sweden School Meals**

In Sweden, the practice of measuring food waste is still fairly new. According to a study conducted by School Meals Sweden, just half of the 290 towns and half of the schools in the country have done so. Measuring food waste was initially implemented in 2000, but before 2010, just 17 municipal governments had done so. Two significant maps of Sweden's food waste issue for general occurring during the Time the National Foods Agency's meal measuring standard was introduced. The two maps showed significant differences in the amounts of wasted food stated by various groups. The National Foodstuff Agency asks towns to fill out a survey to gather statistics on food waste; however, this procedure may result in a shortage of important data. In Sweden, regulators and the food business are trying to reach a deal; tracking its impact and pinpointing hotspots would require gathering data.

3. METHODOLOGY

Secondary data were used in this study to look into why and how companies that cater to groups waste food. This kind of data is gathered, checked, and shared by other experts, groups, or schools. Secondary data for scholarly articles, study papers, reports, and publications came from reliable sources like academic journals, government agencies, NGOs, and international organizations (Omukuti et al. 2021). These sources were

picked because they give correct and useful details about food waste in catering. There was an exacting method used to choose the right extra sources. These search engines were used to find details about food waste in the catering business, the food service sector, why it happens it, how to stop it, and methods to make it last longer. The European Commission, WHO, FAO along with UNEP websites were also looked at to find more data and information (Mekouar, 2020).

4. ANALYSIS

Analysis of Definitions of Wasted Food and Strategies for Reduction:

Food that ends up being thrown away at any point in the production chain, whether it's as it goes bad, expires, or is made, distributed, or eaten inefficiently, is generally included in these definitions (Garske et al. 2020). Businesses can fully understand the issues that come up because of food waste if they understand the various meanings. If you want to reduce food waste, you should look into programmes that keep food from going to waste, give food to other people, and recycle food.

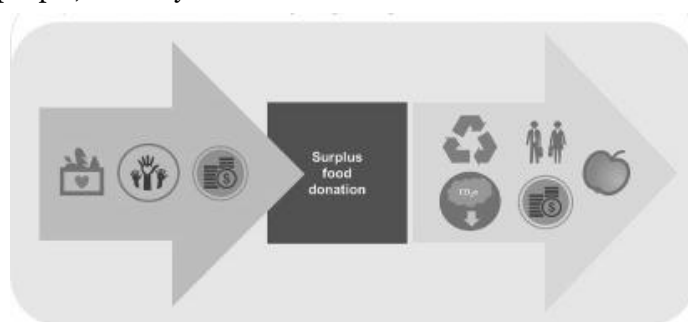


Fig 7. Surplus food donation

Getting rid of the things that cause food waste, like too much manufacturing, bad storage, and bad behaviour among consumers (De Moraes et al. 2020), is the only way to stop it. This could mean keeping better track of stock, making sure amounts are just correct, and teaching people how to eat healthily. Redistribution programmes give extra food to people in need. Food banks, shelters, and other charitable help groups get it. The extra food won't go to waste this way. People who do these things help the earth and make sure there is enough food for everyone. As part of recycling programs, food waste is turned into useful things like compost or bioenergy. This helps reach goals for a circular economy and less trash. Stakeholders in the food business can make interventions that are more effective at certain points in the supply chain by looking at definitions and strategies (Bhattacharya & Fayezi, 2021). Policymakers, businesses, NGOs, and consumers need to work together to find effective solutions to the complicated problems caused by food waste. Focusing on preventing waste, redistributing it, and recycling can help the environment and people by reducing the amount of food that is lost.

Identification of Most Commonly Thrown Away Items in Catering:

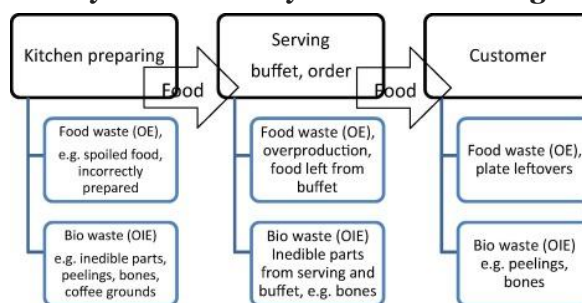


Fig 8. Food waste origin

To find the items that are thrown away most often in catering, a thorough study into the types of food that are thrown away most often in collective catering entities is needed. By observing things in real life and looking at data, it becomes clear that some types of food are more likely to go to waste than others. Overproduction, which usually happens when forecasting or estimating demand is wrong, creates too much stuff that isn't

being used up, so it needs to be thrown away before it goes bad or expires (Næss, 2020). A big part of how people get rid of certain foods is also determined by their tastes. People's different tastes, food needs, and cultural beliefs can affect how popular and how quickly certain menu items are eaten, which in turn affects how likely they are to be thrown away. People often say that prepared soups, desserts that go bad very quickly, and pre-packaged meals are some of the things that are thrown away the most in catering settings (Gibson, 2023). Their high discard rates are caused by the fact that they go bad quickly, have a short shelf life, and depend on changes in market demand. Businesses that cater can use this information to focus their efforts to reduce waste and make better use of resources by learning why certain foods are thrown away. Food waste can be reduced by addressing the underlying causes of disposal behaviours through strategies like menu optimization, portion control, inventory management, and customer education (National Academies of Sciences, Engineering, and Medicine, 2020). Catering businesses can improve their operational efficiency, reduce their impact on the environment, and support sustainability across the food service sector by figuring out and fixing the problems that lead to food waste.

Discussion of Food Waste Causes in Catering:

One major cause of food waste in catering is overproduction, which happens when businesses make or order too much food for what they need (Wu, Mohammed & Harris, 2021). This usually happens because of bad predictions, systems that don't work well for managing inventory, or ways of making things that put numbers over quality. Food waste is also greatly affected by portion sizes, since large amounts may be too much for some people, leaving them with leftovers that they then throw away. On the other hand, serving amounts that are too small could make customers unhappy or force them to place more orders, which could lead to more waste overall (Vizzoto et al. 2021). The complexity, variety, and seasonality of a meal can affect how much food is wasted by changing how ingredients are used and how long they last. Menus with a lot of different options may require bigger inventories and make it more likely that extra things will be thrown away. Consumer behaviour is a big outside factor that affects how much food is wasted in catering (Coşkun & Özbük, 2020). Demand changes based on people's tastes, dietary needs, and eating habits. These factors affect which menu items are bought, eaten, or thrown away.

Food waste is also affected by things that happen inside the business, like how the kitchen works, how the staff is trained, and how waste is handled.

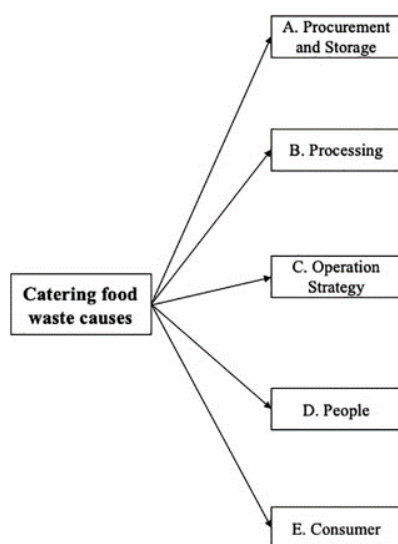


Fig 9. Catering food waste

Catering businesses may produce more waste because their workflow isn't optimized, employees aren't taught how to control portions or handle inventory well, and there aren't many ways to cut down on waste. Food waste can also be caused by things outside of food production, like problems in the supply chain, changes in the seasons, and government rules (De Moraes et al. 2020). These outside factors can affect the quantity, cost,

and quality of ingredients. By looking at these internal and external variables, catering businesses can learn more about why food goes to waste and make focused changes to reduce waste, make better use of resources, and encourage sustainability in the catering sector as a whole.

Examination of Prevention Measures for Food Waste:

The study of ways to stop food waste includes talking about different plans and actions that can be used to cut down on waste in serving businesses. They include preventative steps that are meant to cut down on waste creation all along the food service supply chain. A basic way to stop people from overeating is to carefully watch and control plate sizes so that they are in line with what people want and so that they don't eat too much (Sheen, 2020). By following guidelines for amount control, catering businesses can make the best use of their resources, avoid overproduction, and lower the chance of having food that isn't eaten. Food donation programs are another good way to stop this from happening because they let caterers give their extra food to neighbourhood groups, shelters, and food banks instead of throwing it away (Frank, Finkbinder & Powell, 2021). Catering businesses can help with food security and the environment at the same time by working with local charities and groups. Training programs for employees are very important for encouraging people to reduce trash and creating a culture of sustainability in catering businesses. Some training programs may teach people how to properly handle trash, how to control portions, how to keep track of supplies, and how important it is to save resources.

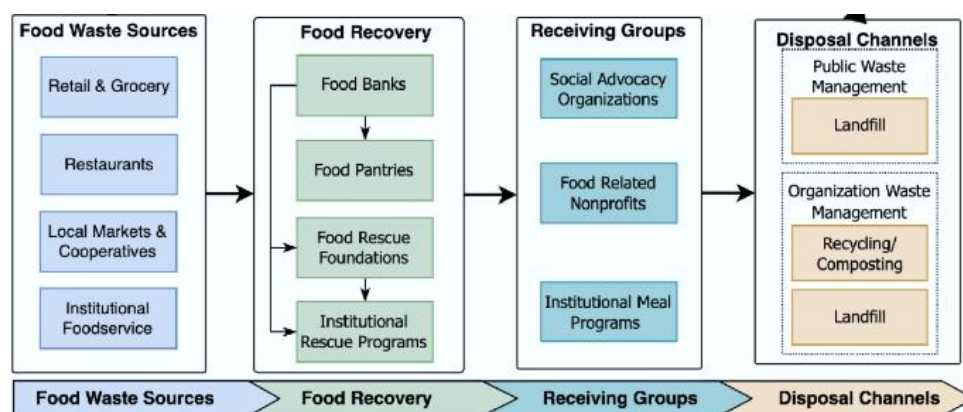


Fig 10. Inventory management for food waste

Inventory management software, waste tracking systems, and prediction analytics tools can assist track food supply levels in real-time, identifying waste sources, and informing choices (da Costa et al. 2022). To rate these safety measures, catering businesses have to look at how well they work, whether they're doable, and whether they can be expanded to fit larger food businesses. By regularly checking how well prevention tactics are working, catering businesses can find ways to make things better, make rules clearer, and keep up the optimization work that aims to cut down on food waste and encourage sustainability in the food service industry as a whole (Martin-Rios, Demen Meier & Pasamar, 2022).

Monitoring Changes on a Broader Level:

By looking at food waste trends on different geographical scales, lawmakers, researchers, and other interested parties can figure out the societal, cultural, and environmental factors that cause people to make waste and come up with specific ways to help. By looking at differences between regions and finding places where a lot of trash is made, resources can be strategically distributed to have the most effect and help those who need it the most (Sarangi et al. 2023). When looking into methods and frameworks for measuring food waste, it is important to use standard procedures and data collection methods to make sure that data is consistent, comparable, and reliable across different areas and jurisdictions. Some common methods are waste audits, lifecycle reviews, and figuring out diversion rates (Slutzman et al. 2023). These give a full picture of the whole food supply chain, from growing the food to eating it. Regulatory bodies, government agencies, and foreign organizations are very important for encouraging people to waste less food and keeping an eye on the progress made toward sustainability goals (Ni et al. 2023). These groups can encourage people to reduce their waste, set standards for reporting, and encourage stakeholders to work together to take action as a whole by making rules, enforcing those rules, and running public awareness campaigns. Forming partnerships, sharing best practices, and using new technologies can help regulatory bodies and international organizations exchange

and build capacity to improve waste management infrastructure, encourage circular economy principles, and advance the global agenda for sustainable development (World Health Organization, 2022). It is important to keep an eye on changes on a larger scale if people and catering businesses want to make real progress in lowering food waste, protecting the environment, and ensuring that future generations will have food security.

5. CONCLUSION

The problem of wasted food is made worse by global warming and the increasing scarcity of natural resources. Although homes throw away the majority of food, businesses that provide community usage are also impacted. The catering industry has not received enough research because proprietors often avoid data regarding wasteful food. Poland hasn't done any studies on this subject, so it will be difficult in the years to come. It's important to figure out the reasons for wasted food throughout the Polish catering business to solve this problem. The findings are crucial in reducing wasted food in catering businesses and may be used as a platform for more research. In order to decrease food waste, educational programs may enhance leadership and employee attitudes. Additionally, an arrangement of best practices for catering personnel can be created.

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