A Food Recovery Strategy for Catered Events on the UBC Campus

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Executive Summary

Global food systems contribute to 21-40% of global greenhouse gas emissions, presenting significant opportunities for climate action. Food waste, in particular, has significantly contributed to climate change through methane emissions in landfills, therefore, reducing food waste is crucial to decarbonizing the food system. One strategy is to recover and redistribute surplus food to prevent it from becoming food waste. Food recovery can potentially contribute to progress towards multiple UN Sustainable Development Goals, addressing climate change and zero hunger.

The UBC SEEDS Sustainability Program (SEEDS) has identified leftovers at catered events as one source of food waste on campus. This project investigates the prevalent food waste issues from catered events across the UBC campus and examines a recovery strategy to reduce food waste and enhance sustainability in food systems. Using primary and secondary data from document analysis, observations, and interviews, the project encompasses the identification of barriers and opportunities to reduce food waste from catered events on the UBC Vancouver campus through a food recovery strategy.

The project finds that the debate on the magnitude of food waste from catered events on the UBC campus persists, raising concern about how food waste from catered events is seen as less of a concern by relevant stakeholders. The project also identifies policy and regulation gaps and perceived risks and costs associated with the safety aspect of the food as the key barriers to recovering food from catered events. Further, the project recognizes resistance to recovering food using free food alert initiatives, and the recoverability of leftover food depends not only on related regulations but also on the type of food and how easily it can be packaged and transported.

The project, therefore, suggests the following actions. *First,* there is a need to foster collaboration between relevant departments on the UBC campus to develop a mechanism that can systematically collect, manage, and report food waste data from catered events to understand the scope of the issue and guide interventions. *Second,* fostering partnerships with established food security initiatives (e.g., AMS Food Bank, Agora Cafe, UBC Sprout) is also essential to streamline the recovery and redistribution of surplus food. *Third,* regarding policy and regulation barriers, engaging food safety experts to address regulatory concerns and establish clear guidelines for food recovery from catered events is inevitably crucial.

This project has a limited number of participants, suggesting the need for further research with broader participants to understand better the perceived risks and costs associated with food safety in food recovery efforts.

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List of Abbreviations

Abbreviation	Definition
AMS	Alma Mater Society
BC	British Columbia
BCDC	BC Centre for Disease Control
BREB	Behavioural Research Ethics Board
FAO	Food and Agricultural Organization of the United Nations
FDO	Food Donor Organizations
FWRRP	Food Waste Recovery and Reduction Plan
GHG	Greenhouse Gases
LFS	Land and Food System
RSVP	Répondez s'il vous plaît
SBC	Statutes of British Columbia
SEEDS	Social Ecological Economic Development Studies
SGD	Sustainability Development Goal
UBC	University of British Columbia
UBC V	UBC Vancouver
UN	United Nations
UNEP	United Nations Environment Programme
UO	University of Oregon
US	United States
USEPA	United States Environmental Protection Agency
ZWAP	Zero Waste Action Plan

Introduction

Global food systems contribute to 21-40% of global greenhouse gas emissions, presenting immense opportunities for climate action. According to a study by Tubiello et al. (2022), from 1990 to 2019, agri-food system emissions have increased in total by 17%, primarily driven by a doubling of emissions from pre-post production, such as the use of chemical fertilizers and intensive manufacturing, and post-production processes such as food waste. Food waste, in particular, has contributed significantly to climate change through methane emissions at landfills (Adhikari et al., 2006).

Reducing food waste is thus crucial to decarbonizing the food system outside the production stage. One primary strategy to reduce food waste is by directly recovering and redistributing surplus food and making it available to food-insecure populations (Damiani et al., 2021). This strategy, also known as food recovery, could simultaneously contribute to the progress towards multiple UN SGDs: addressing climate change and zero hunger. However, public perception of surplus food and concerns regarding the safety of food surplus may hinder the strategy of such initiatives. Research suggests consumer willingness to waste is higher if there is a perceived food safety risk (Zagorski et al., 2021).

The UBC SEEDS Sustainability Program (SEEDS) has identified leftovers at catered events as one source of food waste on campus. Accordingly, this study aims to identify and explore the barriers to preventing food waste in catered events and opportunities to overcome these barriers. Despite lacking data on GHG emissions from food waste across the UBC campus, literature has suggested that food waste can contribute to methane emissions (Adhikari et al., 2006). Hence, investigating the UBC campus food systems offers an opportunity to move the dial forward following the University's climate emergency declaration to reduce GHG emissions from the local food systems, including surplus food at catered events. For this study, we define catered events as any events organized by a UBC department office or affiliated unit, where food is provided and served to university members as event

attendees. These catered events include those hosted by UBC departments or offices where takeaway food (e.g., pizza, wrap, lunch box) or meals in a buffet setting (e.g., placed in carts for event attendees to pick up) are served.

Therefore, in this project, we ask:

1. What are the barriers and opportunities to reduce food waste from catering events on the UBC Vancouver campus?
2. What are some possible surplus food recovery strategies to reduce food waste while serving other social sustainability goals among members of the UBC Vancouver campus?

Background

A. Food Waste and Food Recovery

In recent years, much attention has been given to food loss and food waste, which has been linked with negative environmental and societal consequences (Ciulli et al., 2020). UNEP (2021) estimated that in 2019 alone, around 931 million tonnes of food, or 17% of total food available to consumers, went into the waste bins. In North America, the Commission for Environment Cooperation (2017) estimated that about 170 million tonnes of food produced for human consumption are lost and wasted annually. As food waste can occur at any point in food supply chains and for different reasons, scholars have provided various definitions and classifications of food waste (Alexander et al., 2013). The common distinction of the classification is *food waste* and *food loss* – food loss occurs between post-harvest and pre-consumption waste, while *waste* only refers to waste arising in the consumption stage (Grolleaud, 2002). On the other hand, Parfitt et al. (2010) refer to food loss and food waste as food waste. For this study, we follow Grolleaud's concept of food waste.

As reducing food waste can positively impact climate change action and address other social problems, such as food insecurity (Munesue et al., 2015), there has been strong interest among scholars and policymakers. There are two main ways to address food waste: (i) preventing it from happening, or as Eriksson (2015) refers to as '*source reduction,'* and (ii) handling it beneficially if it is happening (Eriksson et al., 2017). Compared to waste management, a strong prevention initiative is considered to have the most significant impact on reducing GHG emissions (Eriksson et al., 2016; Mourad, 2016). A similar idea is manifested in the Wasted Food Scale developed by the United States Environmental Protection Agency (2023), in which the prevention of wasted food is prioritized over all other ways to minimize the environmental impacts of food waste. Donating or redistributing surplus food to people is the second most preferred option.

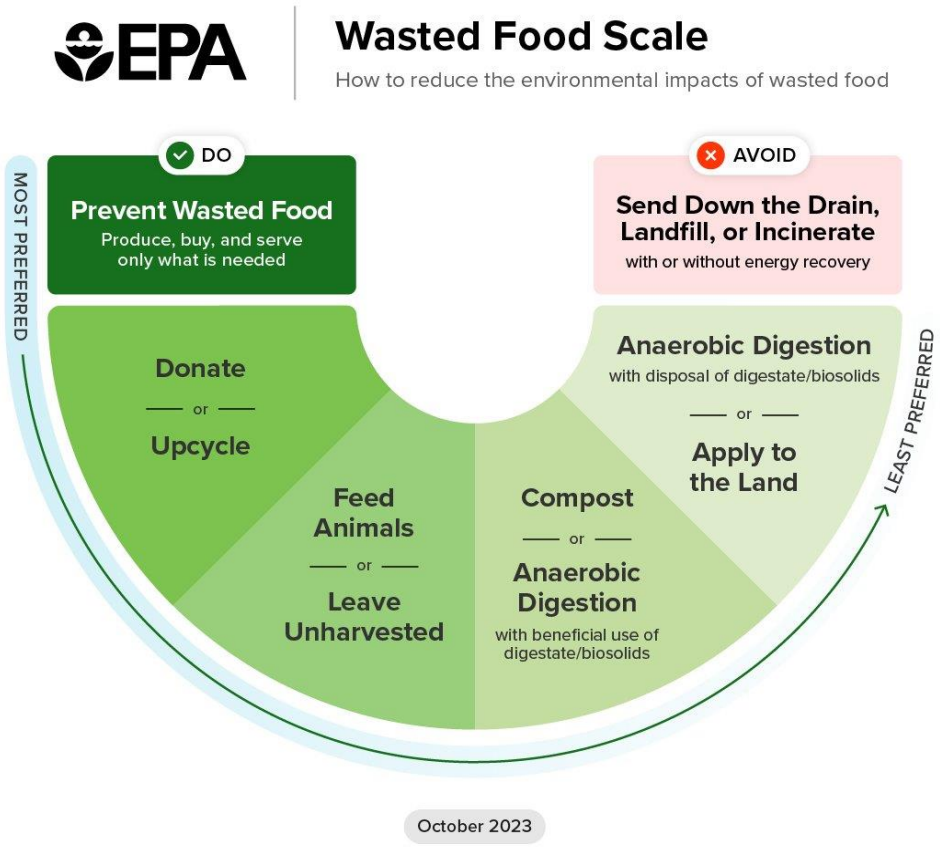

Figure 1 Wasted Food Scale (USEPA, 2023)

One strategy for preventing food waste is, therefore, by redistributing surplus food to food-insecure populations. Garone et al. (2014) define surplus food as safe food that, for various reasons, at any stage of the supply chain, is not sold to or consumed by the intended consumers. This initiative, also referred to as '*food recovery,' is considered a powerful strategy to relieve food poverty and meet food waste reduction targets (Garrone et al., 2014; Damiani et al.*, 2021). Garrone et al. (2014) further introduced the term 'degree of recoverability' to imply the relative ease of recovering surplus food for human consumption. The higher the degree is, the more likely a surplus food can be consumed and not go to waste. For example, food like cooked broccoli should have a higher degree of recoverability because people can collect and consume them immediately, compared to food that requires specific storage conditions, such as dairy products.

To date, food waste arising at the *consumption* stage has received the most attention (Alexander, 2013). However, despite its promising impact on economy, social, and environment, food

recovery remains challenged with moral, social, and technical issues (Weymes & Davies, 2019). Concerns about food safety, for instance, are one of the prominent challenges in maximizing the impact of food recovery initiatives. A study by Prescott et al (2019) confirmed that potential food safety concerns hindered food recovery in schools that may potentially expose negative publicity once it is linked to a foodborne disease outbreak. In a similar vein, Zagorski et al (2021) also concluded that willingness to waste is higher if there is a perceived food safety risk.

This study attempts to contribute to the growing literature by identifying barriers and opportunities to reduce food waste at catered events, particularly with the goal of redistributing surplus food to food-insecure populations.

B. Government Regulations

At the provincial level, institutional support is offered to initiatives regarding food donations and food recovery. In 1997, the Provincial Government of British Columbia unanimously passed the Food Donor Encouragement Act to encourage food donation by protecting donors from the liabilities of damages resulting from injuries or death caused by the consumption of the food unless donors have the intention to cause injuries or death, or the food was unfit for human consumption (B.C. Government, 1997). In Canada, no reported court decision has ever imposed liability on industry for problems caused by donated foods (BC Centre for Disease Control, 2019). The BC Centre for Disease Control under the Provincial Health Services Authority published an Industry Food Donation Guidelines, which specifies that "*foods intended for a public buffet can be donated if they have been held back and not served on the buffet.*" (BC Centre for Disease Control, 2019, p.35)

C. Strategies by Universities

There have been initiatives in place in some universities to redistribute meals to other members of the society. For example, MealCare Guelph, a student-led organization from the

University of Guelph, donates leftover meals from dining halls to community partners across the City of Guelph (University of Guelph, 2024). Three universities in the United States are members of the Free Food Alert initiative, which sends out notification emails and text messages when free meals are available on campus (Free Food Alert, n.d.).

At UBC, several past SEEDS projects focused on catering on campus. Some past projects investigated opportunities of catering waste reduction from the perspective of food ware by evaluating an existing charging scheme on single-use catering materials (Chew, Chin & Wong, 2019) and maximizing composting and recycling rates of these materials (Gallet, 2014). A study conducted by Beakhouse et al. (2023) proposes ways to implement a Food Waste Recovery and Reduction Plan within the AMS Nest, which is managed by the UBC Alma Mater Society (AMS) and operates outside of UBC's authority. The ultimate purpose of the project is to promote food recovery, reduce food waste, and improve food security at UBC.

Instead of proposing how a Food Waste Recovery and Reduction Plan might actually be implemented (i.e., recovering prepared food from Nest outlets to clients of AMS Food Bank, which could be students or members of the wider university community), this study focuses more on highlighting the points for considerations as the AMS implements such a plan. For example, Beakhouse et al. (2023) recommend clear communications between various parties for the logistics and scheduling of surplus food pickups, launching pilot programs, and establishing evaluation mechanisms. However, the study lacks clarity as to what the Food Waste Recovery and Reduction Plan actually is about. . In a project study conducted by Woo et al. (2020), there is a solid potential for distributing unserved food (food that is cooked and still held back in the kitchen and not served to clients yet) from AMS catering to AMS Food Bank, which currently only accepts donations of canned food, food with longer shelf life and produce. However, the study found that there are three key barriers to conducting such initiatives: lack of policy at different government levels, perceived costs and perceived risks.

UBC Food Services (n.d.) is the business entity that provides food services to members of UBC through three major business segments. These include residential dining (dining halls for student residents across campus and open to the public), retail operations (over 30 restaurants, cafes, markets and franchises) and catering. However, a food waste reduction plan designed considering the business segments of UBC Food Services is not yet available.

In January 2020, UBC introduced a Zero Waste Food Ware Strategy that promotes the use of reusable food and beverage containers through charging feeds on single-use items (UBC Campus + Community Planning, 2023). However, there is no strategy or reduction target launched specifically for food waste on campus. The UBC Vancouver campus' Climate Action Plan 2030 states that the campus will develop a Food Waste Reduction and Recovery Strategy by 2024 (UBC, 2021). This research can provide insights into the food recovery strategy for the UBC Vancouver campus' implementation of its Climate Action Plan.

Our proposed research, therefore, fills in the gap in recovery strategies for surplus food that belongs to the food being served in catered events, particularly in the context of the UBC Vancouver campus.

Research Methodology and Methods

A. Research Methodology

We designed the methodology for this study to reflect the concept of crystallization, which combines results from multiple research methods to demonstrate a study's validity. Different from the more commonly referred to triangulation, which requires three or more data points for the sake of validity, crystallization offers great flexibility and emphasizes self-reflexivity from researchers as they collect and interpret data for the research (Ellingson, 2009, as cited in Marshall & Rossman, 2016).

B. Research Methods

1. Document Review and Desktop Research

The main purposes of the document review and desktop research were to (1) identify conceptual framework(s) used by regulators, the food and beverage industry and academia regarding food waste and food recovery, (2) review existing food waste reduction and food recovery initiatives in university or non-profit settings or in North America, where the regulatory and cultural contexts would be more relatable to UBC, and (3) understand what are the existing regulations that would affect the generation of food waste in the catering industry. Some past relevant projects under SEEDS were included in our document review. Gathering this information could also facilitate our drafting of interview questions to learn more about the interviewees' opinions on the existing landscape, as well as any discrepancy between the regulations and actual practices.

2. Observations

Participant observation refers to the research method of gathering data with the researcher being present and participating in the activities of the research subjects (Sanchez-Janowski, 2002). Conducting participant observations and being aware of our own experiences

could offer more insights into how food is consumed and not consumed at these catered events on campus from the perspective of UBC students.

In March, we searched for public events hosted by organizations under UBC via university websites and checked if any catering was involved. Through connections of the SEEDS project manager, we were able to schedule a nonparticipant observation at a catered event served by a catering service provider on campus. Eventually, we observed three separate catered events on campus. We observed the entire event as long as it was possible to gather rich data and develop a more holistic understanding of the event's logistics and the guests' behaviours.

Date & Time	Location	Duration	Type of observation	Event description	Exclusivity
March 25 (Mon) evening	Lobby of a research center on campus	1.5 hours	Participant observation	An event promoting Asian culture. Sharing platters were put on dining tables for guests to help themselves. Guests were either standing or sitting on couches.	Open to the public. RSVP required.
March 27 (Wed) evening	Lounge of a college on campus.	2 hours	Participant observation	A sharing session for an external scholar's recent publication, followed by a reception Sharing platters were available for guests to help themselves. Guests were standing. Drinks and booze were available.	Open to the public. RSVP not required.
April 4 (Thur) night	Lounge of a catering service provider's venue on campus.	20 minutes	Nonparticipant observation	An appreciation dinner for volunteers of an initiative on campus. Food was served in buffet inserts and guests were sitting in roundtables.	Exclusive to the initiative's volunteers and organizer.

Table 1 List of Observation

3. Interviews

A total of four semi-structured interviews were conducted to gather opinions from different stakeholders that would be involved in catered events on campus. These stakeholders

include event organizers, catering service providers, and students as the usual guests of these catered events. Other than the interview with a catering manager, which we were able to schedule through the SEEDS project manager's connections, the researchers scheduled the remaining interviews through our personal networks at UBC.

Date	Location	Duration	Interviewee(s)	Recorded	Main topics
March 28 (Thur)	A meeting room of a department's office.	30 minutes	A program support staff member of a department of UBC.	Yes	Past experience of coordinating catered events, considerations when selecting food vendors and types of food, general thoughts on food waste on campus.
April 2 (Tue)	A meeting room of a department's office.	15 minutes	A UBC grad student, who is a friend of the researcher as interviewee, one researcher.	Yes	Past experience of attending catered events and ordering food for events on campus, general thoughts on food waste on campus.
April 5 (Fri)	A staff room for a catering lounge.	70 minutes	The catering manager of an on-campus catering service provider as interviewee, two researchers.	No	Major shifts in business operations before and after the pandemic, the workflow from event reservation to service delivery, amounts and sources of food waste, how regulations affect daily operations.
April 7 (Sun)	A restaurant	30 minutes	Group of UBC Students, Interviewer.	Yes	Thoughts on food recovery initiatives from catered events (e.g. how do they feel about consuming 'leftover food'), thoughts when attending catered events on campus, describing experiences and consideration when organizing events on campus that provide food.

Table 2 List of Interviews

The sets of interview questions for different stakeholders can be found in the Appendix.

4. Informal Conversations

At each of the three catered events that we observed, we were able to have informal conversations that contributed to the data richness of our study.

Date & Time	Location	Duration	Setting	Individuals involved	Main topics
March 25 (Mon) evening	Lobby of a research center on campus	5 minutes	During the social networking session of the event.	An event assistant, both researchers.	The organizer's selection of vendors and kinds of food to be served.
March 27 (Wed) evening	Lounge of a college on campus.	10 minutes	Towards the end of the event.	A banquet server, both researchers.	How common it is to have leftover food and drinks; regulatory concerns.
April 4 (Thur) night	Lounge of a catering service provider's venue on campus.	10 minutes	Towards the end of the event.	A banquet manager, both researchers.	The logistics of serving the food from the kitchen to the dining venue. How leftover food is handled. Regulatory concerns.

Table 3 List of Informal Conversation

5. Data Collection, Processing and Analysis

After each observation, the two researchers wrote individual field notes, which were combined to minimize the chance of missing information. All recorded interviews were transcribed using OneNote's built-in transcription function with manual corrections. For the only interview that was not audio-recorded at the interviewee's discretion, field notes written by the two researchers were exchanged, reviewed and combined into one interview summary. The same approach was adopted for informal conversations. The two researchers individually coded the transcriptions and summaries from observations, interviews and informal conversations to enhance the intercoder reliability of the study. For anonymity and simplicity, individuals who participated in our interviews / informal conversations were denoted as follows:

A	Assistant of an event promoting Asian culture on March 25.
B	Server at a reception on March 27.
C	Department Event Planning Staffer, interviewed on March 28.

D	UBC Student, interviewed on April 2.
E	Banquet Captain of a catered event on April 4.
F	Catering Manager, interviewed on April 5.
G	Group of five, international UBC Students, interviewed on April 7.

Table 4 Participants Denotation

Content analysis of all processed data from the above research methods was conducted.

6. Ethical Concerns

Before any interview, we sought consent and completed a consent form from the interviewees. According to the preferences indicated by the interviewees, all except one interview were recorded. Per BREB requirements, all records were deleted once they were transcribed.

During participant observations of the two public events on campus, we did not deliberately jot down field notes to avoid raising questions from the event's participants or affecting their experience at the events. We obtained permission from the catering service provider, which also sought consent from their client, before carrying out nonparticipant observation at the event on April 4. Although the catered event lasted for more than two hours, we were permitted by the catering service provider to observe at the end of the event to minimize the disturbance to the guests.

All informal conversations occur in natural settings, and some researchers reckon that obtaining informed consent is obtrusive and impractical (Swain & King, 2022). That said, to the best of our ability, we ensured the anonymity of the individuals we conversed with by making their identities and the events unidentifiable. Our conversations with all individuals did not involve any confidential information about the events or event organizers.

In the analysis, we only proceed with data that has been provided with written and verbal consent. Any information discussed during the interview that had not been given consent by the

interviewee was not to be taken into analysis. This is particularly related to personal opinions and views on sensitive issues. As researchers, we fully respect the participant's choice by not including such information in the analysis.

Results and Discussion

A. Document Review

1. Policy and Regulation Gap

Food businesses operating in B.C., including catering providers, must comply with at least three layers of regulations: the federal government food safety laws, the B.C. provincial food safety laws, and local municipal regulations. At the federal level, there are two acts and regulations related to food safety: the *Food and Drugs Act* and the *Safe Food for Canadians Act*. For B.C., the food safety laws are regulated by the *B.C. Food Safety Act* and *B.C. Food Premises Regulation* (Canadian Institute of Food Safety, n.d.).

However, all these regulations do not explicitly regulate any matter related to the food recovery initiative, such as how to redistribute leftover food safely. The closest clause is Article 15 of the B.C. Food Premises Regulation (B.C. Government, 2022a), which states that food served to a customer must not be served to another customer unless it is served in a container that prevents contamination. It is unclear, however, how this would be applied to food served in a public buffet on catering premises, particularly related to the use of "*the container that prevents contamination*" as catered food is served in a buffet setting.

Further, although reducing food waste is one of the action areas under the Food Policy for Canada, a national guideline developed by the Ministry of Agriculture and Agri-Food Canada in 2019 to guide any food-related decisions and action, it does not elaborate on any further action that can be taken to address such issues, let alone introduce the concept of food recovery initiatives, despite targeting to reduce food waste within federal government facilities and operations (Ministry of Agriculture and Agri-Food Canada, 2019).

Similarly, British Columbia's Ministry of Environment and Climate Change Strategy already has a food waste prevention toolkit (B.C. Government, 2022b). However, it has not introduced the concept of food recovery from uneaten served food nor provided the how-to method to do that. The toolkit focuses solely on improving operations and practices (i.e. planning, preparing, serving) to reduce food waste generation, overlooking the food recovery strategy that business actors can potentially undertake.

A more precise guideline for the food service industry regarding food recovery for businesses in the City of Vancouver is found under the Industry Food Donation Guidelines and Guidelines for Food Distribution Organizations. Under this guideline, it is considered unsafe for a Food Distribution Organization (FDO) to use or distribute food that has been part of a public buffet where people have served themselves. Foods intended for a public buffet can be donated if prepared in an inspected kitchen, held back and not served on the buffet, cooled safely and refrigerated at 4^{o}C or colder, and handled by cooks with food safety training and certification. Caterers donating should also, at a minimum, apply a date of preparation and ensure the specific food item can be traced back to the company (BCDC, 2019).

In a more localized context at UBC, UBC has set the Zero Waste Action Plan (ZWAP) and the Climate Action Plan), which include elements of waste reduction, including food waste. However, neither of these plans explicitly includes a context for food recovery to reduce food waste, except for a brief mention in the ZWAP's background information section (UBC Campus + Community Planning, 2023).

2. Perceived Risks and Cost

The literature highlights that the main barriers to recovering leftover food are mainly related to risk perception regarding the safety aspect of the food (Prescot et al., 2019; Zagorski et al., 2021). Customers are more hesitant to consume leftover food as it is more prone to contamination. For catering providers, liability from potentially harmful health effects is the primary barrier. However, to date, no reported court decision has ever imposed liability on the industry or caused any problems with donated foods (BCDC, 2019). *The Food Donor Encouragement Act* protects corporations and their directors, agents, and employees from liability when donating food or distributing donated food.

> *"This bill means that hotels, restaurants, food chains, private caterers, grocers, etc. may donate good-quality surplus food to food banks and agencies without fear of liability – good-quality food that would otherwise have been slated for landfill."*
>
> Hon. Ida Chong, BC Liberal MA (cited in BCDC, 2019)

However, business owners are still deemed liable if, in donating or distributing the food, the person *"acted in reckless disregard for the safety of others*" (Canada Law, 1997, Chapter 8). Further, the Food Donation Guidelines state, "*Food intended for a public buffet can be donated if they have been held back and not served on the buffet*" (BCDC, 2019, p.35).

This suggests that business owners, despite their intention to recover leftover food, remain constrained by the burden of proof that such intentions are not reckless disregard for the safety of others. Business owners must also comply with specific burdensome requirements to donate food. Ensuring certain temperature requirements, appropriate food safety training, certification, and traceability can be costly and timely. Business owners are also prevented from donating or recovering food served at public buffets as it is deemed unsafe.

3. Existing Food Recovery Initiatives

In the absence of binding regulations to promote food recovery from potential leftover food, many initiatives on food recovery are voluntary, particularly in the food service industry, such as hotels, restaurants, and institutions. For instance, Aramark Canada Ltd. and Sodexo Canada have made public commitments to reduce food loss and waste, while other organizations are attempting to develop resources and tools to support food waste reduction in food service operations (Ministry of Environment and Climate Change Canada, 2019).

Some initiatives have also been taken at the university level to recover food from leftovers and distribute it to other members of society. For instance, students at the University of Cincinnati launched a program called “Free Food UC,” an unofficial club with over a thousand members that connects students who seek free food with organizations that provide free food (Connock, 2021). The University of Oregon also has a similar program, “Leftover Text Over,” which alerts students via text message when leftovers or free food is available on campus. The leftovers are mostly from campus events where food was ordered from the University of Oregon (UO) catering, but not all was consumed.

Another initiative, known as “Free Food Alert,” currently runs in three universities across the United States. Free Food Alert is a company that provides a digital solution and platform that centralizes and spreads messages of free food content in a university community. To join, university administrators must purchase an alliance membership so that the university members, from students, faculty, staff, and others, can sign up for a Free Food Alert account and receive an alert whenever free food becomes available on campus. Conversely, any member can opt-in as a host and send out alerts. The alliance comprises the Johns Hopkins University, Upstate University of South Carolina, and the University of Wisconsin-Madison (Free Food Alert, n.d.).

B. Observation and Interview

1. Is there a concern about food waste?

In two of the three observations, we observed no leftover food, hence no food waste. Further, our informal conversation with a catering staff member, whom we identified as Mr. Server or Interviewee B, also highlighted that the guests always finished the food and drinks served during the event.

> "*People are really hungry these days*!" claimed Mr. Server as he cleaned up all the empty plates from the table. His face showed what seemed to be something between excitement and curiosity. My colleague and I turned our heads to him, and after seconds of silence, we decided to approach Mr. Server and started a conversation with him. With his broken English, he told us how, nowadays, no food was left after events. It was always gone as if people were starving when they were here.

In the other event, where the nature of the event is more private, and guests are by invitation, leftover food was observed, but only a small portion, mostly starches such as rice and potatoes. Among both the catering manager and department organizer that we interviewed, although food waste is something they are trying to avoid, having insufficient food for the guest is much more of a concern, as stated by the catering manager in our interview: "*We are more concerned of* ***having not enough food***" (*Interviewee F*). Similarly, the department organizer that we interviewed also shared a similar thought, "*You do not want to* ***under order***" (Interviewee C), emphasizing that although it is always tricky to balance just the correct number, having not enough food is less preferred as that could mean that both the organizers and the catering providers are not well prepared and well planned. Further, having leftover food that turns into waste rarely happens (*Interviewees C and F*).

The observation and interview shed light on how food waste is less of a concern for the catering providers and department organizers. It is also challenging to determine how much food waste is from catered events, let alone to suggest a growing concern about food waste from catered events. A food waste audit on catered events with nutritionists' expertise would greatly facilitate the

evaluation of food waste from catered events with a nutritional perspective. For example, whether a certain kind of commonly wasted food is of lower or excessive nutritional value.

However, our study reveals what could be the potential factors that cause the number of leftovers, which are attendees' preferences, attendance rate, and food affordability issues. The first two events we observed were free public events open to all students, faculty, and staff. Reservations are not required, although they are encouraged. As such, we observed many participants in both events, resulting in all food being consumed by the end of the event. Further, a conversation with *Interviewee B* also informed us that similar public events happen every night, and no leftover food was observed for each night. This observation suggests that affordability issues might be experienced by students seeking free food across campus through attending public and catered events. This is also suggested by the catering manager, who feels that affordability issues nowadays likely affect how guests are more cautious about food and do not want it to be wasted (*Interviewee F*).

On the other hand, the last event is private; guests are by invitation only, and reservations are highly encouraged. By the end of this event, the pasta and dessert were all gone, and only a small portion of protein was left. According to the catering manager, most leftovers are starchy food like rice and potatoes, but proteins are rarely left over (*Interviewee F*). Further, preferences toward certain types of food are also likely relevant to the possibility of food becoming leftover, as suggested by the department organizer: "*There are always so many sandwiches leftover, and the wraps are always gone."* (*Interviewee C*).

Interviewing the catering manager highlights several important factors in determining how often or how much leftover food can happen. Some factors that are brought up during the interview include the guest's demography. For instance, in events attended by athlete students, they must assist staff in portioning and ensuring enough food for everyone. Staff and faculty spend more time socializing and talking than enjoying the food, so most likely, there is more leftover food at events attended by this type of guest (*Interviewee F*).

2. To what extent can we recover food from catered events?

While taking us through the buffet setting, the banquet captain informed us that the regulation only allowed public buffets to be served in two-hour windows at temperatures above 60^{o}C for hot food. When asked what happened after the two-hour window, the banquet captain said all left food was deemed unsafe and must go to waste. Further, the banquet captain also informed us that guests could only eat the food in the designated areas or venues (*Interviewee E*).

A more critical piece of information is that the BC food safety regulation requires that it cannot be consumed outside of the catered events once prepared food is taken out from the kitchen to the buffet areas. This means that any food served on a public buffet cannot be taken in a to-go container for immediate or later consumption, even if the food was served within less than a two-hour window. As stated by the catering manager, "*Some colleagues see some nice food after an event, but they cannot take them home"* (Interview F).

Similarly, our interview with the catering manager revealed a similar thing: food safety regulations in B.C. are among the most stringent, leaving no room for catering providers to recover food once it has been served in the buffet setting. "*B.C. Regulation is not like everywhere else,*" claimed *Interviewee F*, emphasizing how related food safety regulations in B.C. have hindered caterers' ability to recover food once served in the buffet setting. However, food held back in the kitchen can still be recovered by repurposing it for either staff meals or donations. The latter, however, is very rare, as either the volume of the leftover food was too little to be donated or it was too challenging for packaging and transportation (*Interviewee F*). Therefore, repurposing the leftovers from the kitchen for staff meals is preferable. Staff can only consume them in the designated area and not consume them outside or take them home with them.

As the catering manager stated, "Some colleagues see some nice food after an event, but they cannot take it home" (Interview F). Guests can also not eat or bring food outside the venue, as it could

violate the regulation (*Interview E*). This means that any food served on a public buffet cannot be taken in a to-go container for immediate or later consumption, even if the food was packed during the two-hour window.

Donating kitchen leftovers has been done in the past, but it is not a priority as the number of leftover foods remains small and can barely keep up with the demand for staff meals. If there are massive leftovers from the kitchen, not all food can be donated. Only those easily packed and transported without requiring specific handling, such as wraps, sandwiches, and whole fruits, can be donated (*Interviewee F*). Similarly, when UBC students were asked for their opinions regarding leftover food from catered events, they displayed interest as long as "*it's nicely packed*" (*One of the Interviewees G*), suggesting that how the food is packaged and can be easily grabbed plays a crucial factor in recovering leftover food.

Our study identified that the recoverability of leftover food from catered events depends on relevant regulations, the type of food, and how it can be transported. Regulation is the most prominent factor that can hinder food recovery initiatives, as it strictly forbids any leftover food from the public buffet to be donated, and only food held back in the kitchen that can be repurposed for other meals or donations. What remains unclear is whether the regulation also applied to take the public buffet in to-go containers during the two-hour window to use for later consumption. Other factors are related to the type of food and how easily that food can be grabbed and transported.

3. Do we need free food alerts?

Our desk study suggests several good initiatives for recovering leftover food, mainly using a mass alert notification system. We brought up this issue during our interviews with the key stakeholders, to which one commented, "*I don't see why we need a new initiative*" (*Interviewee F*), claiming that the catering provider has already teamed up with a food donor organization (FDO) to distribute any leftover food from the kitchen. However, the researchers are not aware of the corresponding statistics available online.

Further, the catering manager emphasized that donating food can only work if there is considerable leftover food. If the volume were too small, it would be a waste of time and energy for the FDO to pick up at the catering premises. The catering manager also reminded us that most leftover food from the kitchen has been repurposed for staff meals, so rarely does the leftover food go into a donation.

Similarly, our group interview revealed concern that such notification would be ineffective, mainly if there is not much leftover food available for grabs, quoting, "*I am not sure If I got there, the food would still be available*" (*One of the Interviewees G*). The same concern was also raised by the department organizer, who sees that such mass alert notification would be highly challenging "*unless you have like a lot (of leftover food)"* (*Interviewee C*).

Thus, the food recovery initiative involving mass alert notification was not seen as a necessity at this point, given the fact that not much was leftover food from catered events available for donation, which led us back to the initial finding of whether there is food waste from catered event happened at an alarming rate in the campus.

4. Limitations

The study's limitations can be attributed to the need for more interviews, observations, and time available to conduct a thorough analysis. Initially, we aimed to interview two representatives from catering providers, two from department organizers, and at private-catered events. Due to limited time, we could not get the initial number we aimed for.

The lack of interviews restricts our ability to compare perspectives, experiences, and insights of individuals involved in the food service industry across campus. The lack of observations, in terms of number and length per observation, limits our ability to observe how the food is treated in the kitchen and during the event. This resulted in limited data on guests' behaviours toward the food or how the food was served. This lack of context may hinder the depth of analysis and interpretation of findings.

Thus, limited data, both from interviews and observation, is likely affecting the generalizability of our findings. We solely gain data from a single sample of each category, limiting our ability to capture the diversity and complexity of real-world phenomena. It also limits the applicability of our results to broader contexts.

Lastly, our study cannot conclude whether there has been an actual issue of food waste from catered events, suggesting the need for a quantitative study to measure the extent of food waste occurring from catered events across the UBC campus.

Recommendations

A. Recommendation for Action

To manage and reduce food waste, the first significant action is to measure the extent of the problems. That can be done by conducting a comprehensive audit of food waste generated from UBC Food Service across campus. As mentioned in our interview with Participants E and F, measures to record the amount of food waste are in place after every catered event. Yet, the corresponding aggregate data is not publicly available based on our review of the past UBC Sustainability Reports. UBC Food Services and the UBC Sustainability Unit could collaborate and establish a streamlined mechanism to collect, record, manage, and disclose data relating to food waste from different sources across the campus. Such a food waste audit may engage the expertise of food nutritionists, who can provide insights from health and nutritional perspectives.

Second, when coming up with food recovery strategies in the future, UBC may consider to take the following action:

1. Engaging food security initiatives (e.g., AMS Food Bank, Agora Cafe, UBC Sprout) on campus to identify room for collaboration specifically for recovering prepared food.
2. Learning best practices from universities that have implemented food recovery initiatives to understand the difficulties they faced and how to address them.
3. Consulting food safety experts in BC to clarify the regulatory requirements for food eligible to be donated in catering events and restaurant contexts.

Lastly, UBC also needs to consider factors that we identified to be crucial for the effectiveness of potential strategies, including understanding the level of food security among students and identifying any correlation between that and other parameters (e.g., level of study, residence) to

locate better areas that are expected to have higher demand for recovered food items and portability, transportability and preferences of food to be redistributed.

B. Recommendation for Future Research

In terms of recommendations for future research, some areas that can be further studied are conducting the study with broader participants and more observations to harness more data and ensure robust data triangulation. To rationalize the food waste problem from catered events across UBC, a quantitative study is also encouraged to measure the metric number of food waste that occurred. Lastly, a study on perceived risk and costs associated with food recovery strategy both at the level of the university as an institution and at the level of the students as the targeted recipients of the recovered food is also necessary to understand the extent of how leftover food can be recovered before going into waste.

Conclusion

In summary, our project found that there has not been much-perceived concern about food waste from catered events. The lack of quantitative data on the number of food waste generated from catered events and whether those numbers are significant also implies the need for a quantitative study to measure the actual amount of food wasted from catered events.

Our study also identified two main barriers that likely hinder the initiative to recover leftover food from catered events: food-safety regulations that prevent food served in buffets from being recovered and perceived risks associated with public health concerns.

Lastly, the project also suggests that the recoverability of leftover food depends on related regulations, the type of food, and how easily it can be packaged and transported.

In terms of initiatives, we found that mass alert notifications are not preferred as it can be challenging, mainly when there is not much leftover food that can be donated in the first place.

References

Adhikari, B. K., Barrington, S., & Martinez, J. (2006). Predicted growth of world urban food Adhikari, B. K., Barrington, S., & Martinez, J. (2006). Predicted growth of world urban food waste and methane production. *Waste Management & Research, 24*(5), 421-433.https://doi.org/10.1177/0734242X06067767

Alexander, C., Gregson, N., & Gille, Z. (2013). Food waste. *The handbook of food research, 1*, 471-483.

Beakhouse, M., Hayward, K., Jamora, E.J., Karkon, P., Tai, C. (2023). Developing a Food Waste Recovery and Reduction Plan (FWRRP) within the AMS Nest. SEEDS Sustainability Program Student Research Report: UBC Vancouver

BC Centre for Disease Control, Environmental Health Services, the Greater Vancouver Food Bank, Metro Vancouver, and Food Banks BC, (2019). Industry Food Donation Guidelines. Available online here http://www.bccdc.ca/resource-gallery/Documents/Guidelines%20and%20Forms/Guidelines%20and%20Manuals/EH/FPS/Food/Food%20Donation%20Guidelines%20Complete.pdf

B.C. Government (1997) BC Food Donor Encouragement ACT, [SBC 1997] Chapter 8.

B.C. Government (2022a) Public Health Act: Food Premises Regulation

B.C. Government (2022b) Food waste prevention for business,

Available online here: https://www2.gov.bc.ca/gov/content/environment/waste-management/food-and-organic-waste/prevent-food-waste/prevent-business-food-waste

Canadian Institute of Food Safety. (n.d.) British Columbia Food Safety Laws and Requirements. Retrieved from https://www.foodsafety.ca/laws-requirements/by-location/british-columbia#:~:text=British%20Columbia%20food%20safety%20legislation&text=Every%20operator%20of%20a%20food,approved%20food%20safety%20training%20certificate (April 20, 2024)

Commission for Environment Cooperation. (2017). Case Studies on Food Loss and Waste in North America. Commission for Environmental Cooperation. https://canadacommons-ca.eu1.proxy.openathens.net/artifacts/1207901/case-studies-on-food-loss-and-waste-in-north-america/1761011/view/?page=2

Chew, R., Chin, E. & Wong, J. (2019). Scholar's Zero-Waste Catering. https://sustain.ubc.ca/sites/default/files/seedslibrary/LFS_450_ZeroWasteCatering_FinalReport.pdf

Ciulli, F., Kolk, A. & Boe-Lillegraven, S. Circularity Brokers: Digital Platform Organizations and Waste Recovery in Food Supply Chains. Journal of Business Ethics, 167, 299–331 (2020). https://doi.org/10.1007/s10551-019-04160-5

Connock, B. (2021). "Free Food UC" GroupMe alerts 1,000+ student members of free food on campus, accessed here: https://www.newsrecord.org/arts_and_entertainment/free-food-uc-groupme-alerts-1-000-student-members-of-free-food-on-campus/article_4cd49978-9c07-11eb-9974-f7b78e58dc2f.html

Damiani, M., Pastorello, T., Carlesso, A., Tesser, S., & Semenzin, E. (2021). Quantifying environmental implications of surplus food redistribution to reduce food waste. Journal of Cleaner Production, 289, 125813.

Eriksson, M., Osowski, C. P., Malefors, C., Björkman, J., & Eriksson, E. (2017). Quantification of food waste in public catering services–A case study from a Swedish municipality. Waste Management, 61, 415-422.

Eriksson, M., Strid, I., & Hansson, P. A. (2016). Food waste reduction in supermarkets–Net costs and benefits of reduced storage temperature. Resources, Conservation and Recycling, 107, 73-81.

Eriksson, M. (2015). Prevention and management of supermarket food waste: With focus on reducing greenhouse gas emissions. Acta Universitatis agriculturae Sueciae, Swedish University of Agricultural Science, Uppsala (Doctoral thesis 2015: 119).

Free Food Alert. (n.d.). Membership. https://freefoodalert.com/membership

Gallet, C. (2014). Best Practices for Zero Waste at UBC Catered Events. https://sustain.ubc.ca/sites/default/files/seedslibrary/finalFinalCamille419.2sml.pdf

Garrone, P., Melacini, M., & Perego, A. (2014). Surplus food recovery and donation in Italy: the upstream process. British Food Journal, 116(9), 1460-1477.

Grolleaud, M. (2002). Post-Harvest Losses: Discovering the Full Story, Overview of the Phenomenon of Losses During the Post-Harvest System. FAO: Italy

Marshall, C. and Rossman, G. (2016). Designing Qualitative Research. 6th Edition, SAGE, Thousand Oaks.

Ministry of Agriculture and Agri-Food (2019) Food Policy for Canada, retrieved from: https://agriculture.canada.ca/sites/default/files/legacy/pack/pdf/fpc_20190614-en.pdf

Ministry of Environment and Climate Change Canada (2019) Taking Stock Reducing Food Loss and Waste in Canada

Mourad, M. (2016). Recycling, recovering and preventing "food waste": Competing solutions for food systems sustainability in the United States and France. Journal of Cleaner Production, pp. 126, 461–477.

Munesue, Y., Masui, T. & Fushimi, T. (2015). The effects of reducing food losses and food waste on global food insecurity, natural resources, and greenhouse gas emissions. Environmental Economics and Policy Studies, 17, 43–77 https://doi.org/10.1007/s10018-014-0083-0

Parfitt, J., Barthel, M., & Macnaughton, S. (2010). Food waste within food supply chains: quantification and potential for change to 2050. Philosophical Transactions of the Royal Society B: Biological Sciences, 365(1554), 3065–3081. https://doi.org/10.1098/rstb.2010.0126

Prescott, M. P., Herritt, C., Bunning, M., & Cunningham-Sabo, L. (2019). Resources, barriers, and tradeoffs: a mixed methods analysis of school pre-consumer food waste. Journal of the Academy of Nutrition and Dietetics, 119(8), 1270–1283. https://doi.org/10.1016/j.jand.2019.03.008

Sanchez-Jankowski, M. (2002). Representation, Responsibility and Reliability in Participant-Observation. In T. May (Ed.), Qualitative Research in Action (pp. 144-160). Sage Publications.

Swain, J. & King, B. (2022). Using Informal Conversations in Qualitative Research. International Journal of Qualitative Methods, 21(3), 1-10. 10.1177/16094069221085056.

UBC Campus + Community Planning. (2023). Zero Waste Food Ware Strategy. https://planning.ubc.ca/zero-waste-food-ware-strategy. Accessed Jan 30, 2024.

Tubiello, F. N., Karl, K., Flammini, A., Gütschow, J., Obli-Laryea, G., Conchedda, G., Pan, X., Qi, S. Y., Halldórudóttir Heiðarsdóttir, H., Wanner, N., Quadrelli, R., Rocha Souza, L., Benoit, P., Hayek, M., Sandalow, D., Mencos Contreras, E., Rosenzweig, C., Rosero Moncayo, J., Conforti, P., and Torero, M. (2022). Pre- and post-production processes increasingly dominate greenhouse gas emissions from agri-food systems. Earth System Science Data, 14, 1795–1809, https://doi.org/10.5194/essd-14-1795-2022

UBC (2021). Climate Action Plan 2030. Vancouver.

UBC Food Services (n.d.). About. https://food.ubc.ca/about/

UN Environment Programme (2021) Food Waste Index Report 2021. Nairobi

Woo, S., Fong, N., Dhalla, A., and Becker, J. (2020) Alma Mater Society (AMS) Food Recovery Strategy, UBC SEEDS Sustainability Program Student Research Report

United States Environmental Protection Agency. (2023). Wasted Food Scale. https://www.epa.gov/sustainable-management-food/wasted-food-scale

University of Guelph. (2024). MealCare Guelph. https://sustainability.hospitality.uoguelph.ca/waste-reduction/mealcare-guelph

Weymes, M., & Davies, A. R. (2019). [Re] Valuing Surplus: Transitions, technologies and tensions in redistributing prepared food in San Francisco. Geoforum, 99, 160-169. https://doi.org/10.1016/j.geoforum.2018.11.005

Zagorski, J., Reyes, G. A., Prescott, M. P., & Stasiewicz, M. J. (2021). Literature review investigating intersections between US foodservice food recovery and safety. Resources, Conservation and Recycling, 168, 105304. https://doi.org/10.1016/j.resconrec.2020.105304

Appendices

Appendix A
Interview Questions for Event Organizer

1. Could you share how many events are usually organized by *[the event organizer]* throughout a year? And how many of them serve food to people that join the events?
2. How do you decide to serve food at one event or not?
3. Can you walk us through the process of arranging food catering for an event, for example, the process of choosing a catering service provider, deciding the kinds and amounts of food to serve?
4. Can you tell us more about how the costs related to catered events are managed at *[the event organizer]*?
5. How often will there be unfinished food after the event? How do you usually handle the leftovers? Why?
6. Some universities have launched initiatives that collect leftovers at catered events and give them away to students or other members of the university for free. What are your thoughts if UBC is to launch a similar initiative? As an event organizer on campus, what do you think would be some difficulties or benefits for that?

Appendix B
Interview Questions for Catering Service Provider

1. Could you tell us your main role and responsibility? How long have you worked for the *[name of catering provider]*?
2. Could you tell us how long has the *[name of catering provider]* served catering for events across UBC?
3. Could you briefly walk us through how *[name of catering provider]*'s staff prepare for a catered event from reservation to delivering the actual service?
4. How often do you encounter leftover food at the event you served? What do you think are the causes? For leftover food we mean those that are prepared and cooked, but not consumed by clients.
5. How about the food that has been prepared in the kitchen but not served to clients? Does that even happen?
6. How do you handle unserved or leftover food after events? Are there any procedures to keep track of the amount of leftover food?
7. We learnt that there is a two-hour window for food being served before they are discarded. How often is food being discarded because of the two-hour window practice at actual events?
8. Is there anything that you think *[name of catering provider]* could be done better in terms of preventing leftover food? What are the difficulties?

9. Some universities have launched initiatives that collect leftovers at catered events and give them away to students or other members of the university for free. What are your thoughts if UBC is to launch a similar initiative? Do you have any comments on the feasibility side?

Appendix C
Interview Questions for Students

1. Could you share some recent experience of attending an on-campus event that served food? What kind of event was it? What kind of food was served? Any unfinished food at the event?
2. Have you organized any event that involved serving food to attendees in the past? If yes, could you share the decision-making process for ordering food?
3. Some universities have launched initiatives that collect leftovers at catered events and give them away to students or other members of the university for free. What are your thoughts if UBC is to launch a similar initiative?
4. What are your general thoughts on food waste on campus?