Considering and Addressing Equity Concerns for Foodware Reuse Systems in Seattle

June 2022

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ACKNOWLEDGEMENTS

GLOSSARY OF TERMS & ACRONYMS

BIPOC: an acronym representing Black, Indigenous, and People of Color that is specific to the United States. It is intended to center the experiences of Black and Indigenous groups and demonstrate solidarity between communities of color.

Break-Even Point: the number of uses at which a reusable product has an equal environmental impact as a single-use product.

Cascadia Consulting Group (Cascadia): a consulting firm that offers a broad range of interdisciplinary expertise across environmental, health, and community sectors. Cascadia uses science to shape meaningful, defensible, and durable solutions that governments, organizations, and institutions can own now and into the future.

Circular Economy: an economic system where resources are continuously recirculated from the end-of-use back into production by way of recycling, reusing, or repurposing resource materials. This system eliminates the current linear consumption-to-disposal economy where finite resources are extracted for production and items are disposed of through landfilling or incineration.

Closed-Loop System: a set of interconnected and cyclical processes internal to the operations of a single business or venue. In the context of foodware reuse systems, some examples include concert venues, food courts, and cafeterias.

Compostable: a product that disintegrates into non-toxic, natural elements.

Durable: a product that is designed to be reused.

Environmental Coalition of South Seattle (ECOSS): a Seattle-based nonprofit organization that specializes in bridging knowledge and cultural gaps, serving the interests of residents, industry, and government. ECOSS delivers environmental education, resources, and technical assistance in the areas of stormwater permit compliance, recycling and food waste, electrical vehicles and solar energy, Brownfields, Green Stormwater Infrastructure and outreach to multicultural communities and businesses.

ESL: an acronym representing English as a Second Language.

Equity: distribution that is regarded as "fair," even if it contains both equalities and inequalities.

Equity Barrier: a systemic issue that prevents fairness from being achieved.

Equity Concern: a potential systemic issue that may prevent fairness from being achieved. For the purposes of this report, an equity concern is a likely barrier identified in a non-representative subsample of a population.

Food Service Business (FSB): a locally owned enterprise currently in operation that offers takeout food within Seattle city limits. International and national chains, restaurants and cafés housed on corporate campuses, food courts, gas stations, mini marts, event venues, catering businesses, grocery stores, and other food service enterprises are not considered FSBs under this definition.

Foodware: all containers, bowls, plates, trays, cups, lids, napkins, and other like items that are designed for one-time use for prepared foods, including, without limitation, service ware for takeout foods and/or leftovers from partially consumed meals prepared by food vendors. Also referred to as "food service ware."

Foodware Reuse System: a system in which foodware used for takeout is collected, cleaned, and redistributed back to restaurants, preventing anything from being thrown away, recycled, composted, or littered. Also referred to as a "reuse system."

Geographic Information System (GIS): "a spatial system that creates, manages, analyzes, and maps all types of data" (ESRI, 2022); 'GIS data' refers to data with specific geographic attributes that can be read by a GIS program, such as ArcMap.

LGBTQIA+: acronym representing the Lesbian, Gay, Bisexual, Transgender, Queer and/or Questioning, Intersex, and Asexual. Adding a "+" to the acronym is an acknowledgment that there are non-cisgender and non-straight identities that are not included in the acronym.

Open-Loop System: a set of interconnected processes amongst several businesses that feed back into each other. In the context of a foodware reuse system, this is exemplified by multiple FSBs using third-party service providers to supply and wash reusable foodware.

Pilot Program: small-scale operation conducted by a single business or multiple businesses in a confined food service business area for a set period of time. This is done to gather data and assess the economic feasibility of a reusable system at food service businesses. It can be done independently or with support from local governments.

Recyclable: a product that is made solely from material that can be separated from a waste stream and processed for remanufacture into the same or other products. Per the regulations established by the City of Seattle, for a product to be considered recyclable it must be accepted by and able to be processed by local programs and facilities.

Reusable: any product that is designed for more than a single use.

Reusable Foodware: foodware that is manufactured of durable materials. It is specifically designed and manufactured to be washed, sanitized, and used repeatedly over an extended period of time. It is safe for washing and sanitizing according to applicable regulations.

Reuse: the action of using a product designed for multiple uses, more than once, in the same form.

Reuse System: a system in which foodware used for takeout is collected, cleaned, and redistributed back to restaurants, preventing anything from being thrown away, recycled, composted, or littered. Foodware would be made of durable materials that would stand up to frequent washing and reuse. Also referred to as a "foodware reuse system."

Seattle Public Utilities (SPU): this report's client. SPU is the publicly owned Utility for the City of Seattle, managing water, wastewater and drainage systems, and solid waste management.

Third-Party Service Provider: an individual or company that provides a service such as foodware distribution and washing. Also referred to as "service provider."

EXECUTIVE SUMMARY

The growing prevalence of single-use packaging waste produced by food service businesses (FSBs) is increasingly recognized as a major source of waste that has negative consequences for our community, our natural environment, and our climate. To address this issue, Seattle Public Utilities (SPU) is considering ways to support the transition to a foodware reuse system where durable foodware, such as cups, clamshells, and utensils, are distributed to customers for takeout orders, dropped off by customers at collection bins around the city or collected back through other channels, and distributed back to FSBs. Implementing a foodware reuse system would deliver climate benefits and further Seattle's zero-waste goals. However, there are concerns about potential equity barriers for FSBs and customers to participate in a reuse system. To ensure that the transition to a foodware reuse system in Seattle is equitable and inclusive, these potential barriers must be proactively identified and addressed. As an initial step in this process, this project focused on the potential barriers specifically for FSBs. In addition, we developed preliminary recommendations for considering and addressing these barriers in pilot projects and other efforts in support of the transition to a foodware reuse system.

Research Questions

1. What are the equity barriers associated with implementing a reuse system in the City of Seattle for food service businesses?

2. How can the City of Seattle create a foodware reuse system that effectively addresses and alleviates the equity barriers faced by food service businesses?

Methods

For our research, we defined FSBs as businesses that serve food excluding venues, international and national chains, food courts, gas stations, corporate campuses, catering, grocery stores, or minimarts. We conducted a survey and interviews with FSB owners to gain insight into their concerns, interests, and desired support from the City regarding a reuse system. SPU provided data on FSBs in Seattle, which were overlaid onto the City's Social and Racial Equity Index. This index, derived from the American Community Survey, assigned each FSB an equity priority score based on racial identity, language(s) spoken, education levels, and other socioeconomic factors. After creating a map using ArcMap, we selected a diverse group of nine FSBs to interview based on the equity priority scores, cuisine, location, and owner demographics. We performed interviews with FSB owners in English, Chinese, and Korean in-person and via Zoom. We also distributed surveys electronically to 1,280 FSBs and received responses from 62, a 4.8% response rate. In addition, we conducted nine interviews with reuse and recycling service providers to discuss their business models, equity concerns, and how they work with local municipalities. We performed qualitative, quantitative, and geographic analyses to determine common themes in FSB owners' and service providers' responses.

Results

The qualitative analysis of service provider interviews highlighted the opportunities for public-private partnerships to help facilitate the transition to a foodware reuse system. Primary concerns for service providers included changing consumer behavior, lack of awareness around reuse

systems, and cost. Service providers would like local municipalities to provide financial, logistical, educational, and marketing support.

The qualitative analysis of FSB interviews indicated interest in a foodware reuse system. However, many FSB owners also expressed concerns about the costs associated with implementation, management, education and training resources in various languages, lack of trust in local government, and accessibility and cleanliness of collection points. Most FSBs want the city government to manage a foodware reuse system and handle logistics, as well as provide financial and technical assistance.

While the survey had a limited sample size, we were able to identify potential patterns. The vast majority of FSB owners who responded expressed interest in a foodware reuse system. However, similar to the interviews, owners' concerns included high cost and unknown government support. The most desired help from the City included foodware pickup and drop-off from FSBs, washing services, and financial assistance.

We conducted geographic analysis using survey responses from FSBs throughout Seattle. Results indicated variation in their desired timing of participation and their preferences for replacing foodware types with reusables. However, it is important to note the paucity of replies from each neighborhood and how that impacts the robustness of our analysis.

Recommendations
While the data gathered through this project are limited and not fully representative of FSBs in Seattle, the findings nonetheless provide some initial insights into the potential equity barriers for FSBs in a foodware reuse system. Our goal for the recommendations is to highlight the equity concerns and challenges expressed through interviews and the survey by identifying methods SPU may consider addressing these potential barriers in pilot projects and other efforts as it moves forward in support of the transition to a foodware reuse system that is equitable and inclusive. We chose to focus on procedural equity (including stakeholders' voices in decisions) and distributional equity (ensuring that benefits and resources are equitably distributed) to inform our recommendations.

- **Build trust between FSBs, the City of Seattle, and SPU** to serve as a basis for establishing an equitable and inclusive foodware reuse system. Open communication, transparency, and involving FSBs in the planning and implementation process will increase buy-in for a reuse system.
- **Explore grant programs and identify potential funding partners to support FSBs** to reduce the financial burden of participating in a reuse system. Cost was one of the highest concerns of FSBs. Lowering the financial barriers to entry will make a foodware reuse system more accessible and equitable.
- **Define and establish standard vocabulary associated with reuse systems and reusable foodware** (i.e., service providers, durables, reusables) to clarify terminology for reuse system participants, especially for those with English as a second language. Standard vocabulary will be built using feedback from a diverse set of stakeholders.
- **Work with service providers and connect them to FSBs.** Good relationships between the City, FSBs, and service providers is critical for a successful reuse system. This may

include partnering with service providers to help with implementation and system oversight.

- **Work with reusable foodware service providers to train FSB employees on reuse systems.** This will ensure the competency of employees about reuse systems, promoting their success. Training must be done in multiple languages, with pictures and graphics, and in simple, standard wording to ensure accessibility to all FSB employees.
- **Identify incentives for service providers** to help fund research and development in reuse system technology and organization. This will improve aspects of reuse systems in the future, making them more accessible for FSBs.
- **Mitigate physical limitations to participation of FSBs** such as storage space and washing capacity. By addressing these constraints and making a reuse system more accessible, FSBs may be more likely to successfully participate.
- **Facilitate placement and servicing of collection bins in centralized locations** throughout the City, considering equity and accessibility of placement. This would increase customers' access to reuse systems. Overseeing collection bins will also ensure safety and cleanliness of drop-off points.
- **Coordinate with the Seattle & King County Health Department** to offer guidance and promote safety and cleanliness in a reuse system. This includes a collection system and sanitization which will benefit all FSBs and customers.
- **Develop educational and marketing materials for customers** so the general public learns about reuse systems, increasing understanding and buy-in. This must be done in multiple languages, with pictures and graphics, and avoid jargon to ensure accessibility to all customers.
- **Establish feedback channels** to gather opinions from participating FSBs and customers. This feedback can inform changes in subsequent pilot programs or a permanent reuse system as well as increasing trust and transparency with stakeholders.

Finally, as SPU moves forward with pilot projects and other efforts to support the transition to a foodware reuse system, we recommend that SPU center equity considerations in the following:

- **Location & scope.** This encompasses deciding where a pilot program or other support activities will occur and what types of food containers will be replaced. Considerations could include analysis of cuisine types among FSBs in a given area or FSB density in relation to general neighborhood interest.
- **Program design.** This includes whether funding sources and activities will be a public-private hybrid, fully private, or fully public.
- **Logistics.** This includes allocation of responsibilities for purchasing reusable foodware, collection bin location and management, collection and redistribution of reusable foodware, dishwashing and sanitization services, storage, technology development and management, and marketing, education, and outreach materials.

Overall, considering and addressing the equity concerns identified in our research is imperative for successful development of a foodware reuse system that is equitable and inclusive. As foodware reuse systems are tested through pilot projects and other preliminary efforts, SPU should seek additional feedback from FSBs and further assess feasibility, cost, and equity considerations to inform future expansion to a complete foodware reuse system in Seattle.

CHAPTER 1: INTRODUCTION

1.1 Project Overview

Reuse systems in the food service industry are at the forefront of sustainability efforts for municipalities and companies alike as they move to reduce solid waste production. Solid waste production contributes to climate change and environmental degradation, both of which Seattle is keen on mitigating. Additionally, the COVID-19 pandemic rapidly increased demand for takeout and food delivery, escalating solid waste production from single-use containers (Balk, 2021). Within this context, Seattle Public Utilities' (SPU) interest in establishing a foodware reuse system is timely as it seeks to achieve its zero-waste goals.

A foodware reuse system requires foodware used for takeout – such as cups, soup cups, and clamshell containers – to be collected, cleaned, and redistributed back to food service businesses (FSBs) (See Appendix A for more information on foodware). Successful implementation prevents and reduces the creation of solid waste in the forms of trash, recyclables, compostables, and litter. Reusable foodware is made of durable materials that stand up to frequent washing and use.

Foodware reuse systems are either closed or opened. Closed foodware reuse systems are internal to the operations of a single business or venue (e.g., concert venues, food courts, cafeterias). Open foodware reuse systems operate across multiple, unrelated businesses where reusable foodware is distributed to customers by FSBs when the customer purchases food and then collected through different methods. These methods may include third-party collection, public pickups and drop-offs, and collection through individual FSBs. The reusable foodware is then washed, sanitized, and redistributed to FSBs based on their needs. In open systems, the reusable foodware are often provided by third-party service providers – businesses that manufacture, sell, wash, and distribute reusable foodware for use by FSBs.

SPU is interested in supporting the transition to a foodware reuse system in Seattle that is equitable and inclusive for all FSBs and customers. As an initial step in this process, this project aims to identify and address potential equity barriers related to FSBs participating in an open foodware reuse system. Specific focus is given to identifying the potential financial, cultural, language, and resource barriers that may prevent FSBs from participating in a foodware reuse system. This project also aims to develop preliminary recommendations for considering and addressing these potential barriers in pilot projects and other efforts moving forward.

1.2 Background

1.2.1 History & SPU

Seattle has a noteworthy history of working toward solid waste reduction. In 1988, Seattle was an early adopter of curbside recycling programs as part of their *On the Road to Recovery* solid waste plan. This included a goal of "reducing, recycling, or composting 60% of all wastes by

1998" (Bagby, 1999). At the end of the 1990s, SPU engaged in long-term waste reduction strategic planning by creating the Seattle Waste Management Plan (Seattle Public Utilities, 1998). Solid waste production continued to grow and hit an all-time high in 2007, spurring considerable overhauls to existing systems (Seattle Public Utilities, 2021). In the late 2000s and early 2010s, Seattle and SPU took steps toward banning single-use disposable food service containers and plastic bags, requiring single-use items to be recyclable or compostable and encouraging the use of durable reusable options where appropriate, as seen in the key ordinances listed in Table 1.1.

Table 1.1. *List of recent Seattle Ordinances related to reforms to solid waste management.*

Ordinance Number	Year Adopted	Relevant Section
122751	2008	"Prohibiting the use of expanded polystyrene food service containers, requiring food service businesses to transition from disposable plastic food service ware to compostable and recyclable alternatives."
123307	2010	"Providing for the collection of compostable and recyclable food service ware from certain food service businesses."
123775	2011	"Regulating the distribution of single-use plastic and biodegradable carryout bags and requiring retail establishments to collect a pass-through charge from customers requesting recyclable paper carryout bags."
123880	2012	"Providing the Director of Seattle Public Utilities additional rulemaking authority to grant waivers and other relief from requirements relating to single-use food service ware and packaging."

1.2.2 Increasing Focus on Waste Prevention & Reuse

In recent years, there has been growing awareness around the importance of moving "up" the waste management hierarchy—with greater focus on waste prevention and reuse—to further the City's zero-waste goals, as exemplified below:

● The 2020 Waste Prevention and Recycling Report suggests that Seattle saw a 6% decrease in total solid waste production. Counteracting the benefits of a 20% decrease in commercial solid waste production, there was **a 10% increase in residential solid waste production compared to 2019.**

● The 2014 Residential Waste Stream Composition Study found that 1.4% of all solid waste in residential customers' garbage bins in Seattle is single-use food containers; given the increases in residential solid waste and demand for takeout during the COVID-

19 pandemic (Balk, 2021), the percentage of single-use food containers has likely increased.

- The Solid Waste Management Plan is currently being updated by SPU, and early drafts suggest a specific emphasis on developing reuse systems. In this update, "Seattle's vision of a zero-waste future builds toward an inclusive and **circular economy**, where all materials with value are reused or recycled, and nothing is wasted" (p. ES.2) (Seattle Public Utilities, 2022). Further, "SPU seeks to **eliminate unnecessary single-use products by replacing them with refillable, reusable, and durable options**" (p. 4.20). In keeping with these statements, this plan makes numerous recommendations including, but not limited to, the following:
  - "[Expand] analyses around circular economy, such as the potential environmental and economic impact of sharing, reuse, and repair of durable items if used more broadly citywide" (p. 4.6).

  - Promote "returnable, reusable, and refillable take-out container systems, including all system elements such as standardized cups and containers, collection systems, commercial wash facilities, and transport systems for redistribution to participating retailers" (p. 4.31).

  - "Encourage customers to use reusables, such as by offering discounts for customers who bring their own mugs or by participating in reusable cup and take-out container programs when available" (p. 4.20).

  - "Explore and expand market opportunities for reused material and repair services" (p. ES.3).

1.2.3 Reuse Seattle & Current Opportunity

SPU has taken a first step in support of greater reuse through the establishment of Reuse Seattle, a new public-private partnership between the City of Seattle, restaurants, entertainment venues, and PR3.[1] The goal of Reuse Seattle is "to create practical solutions and standardized systems to help Seattle's businesses and residents move from single-use to reuse." The development of Reuse Seattle signifies that there is support for adopting a foodware reuse system across a variety of businesses and business types in Seattle.

With the COVID-19 pandemic waste production patterns, the creation of Reuse Seattle, and the update to solid waste prevention strategy, as well as the general growth in interest in waste prevention and reuse, there is an opportunity for SPU to support the transition to a citywide foodware reuse system that centers equity to ensure all FSBs and customers can participate. Establishing a foodware reuse system is a logical step for the City to take considering the need to find considerable reductions to residential solid waste. An established foodware reuse system

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[1] PR3 is a public-private initiative hosted by RESOLVE, a non-governmental organization, that is working towards standardizing reusable foodware.

also lays the foundation for the development of a circular economy, which reduces resource exploitation and overuse.

1.3 Research Questions

Given the unique opportunity SPU has to redesign waste management for decades to come, adopting an equity lens for analysis is critical. Our project focuses on two equity-oriented research questions:

1. What are the equity barriers associated with implementing a reuse system in the City of Seattle for food service businesses?

2. How can the City of Seattle create a foodware reuse system that effectively addresses and alleviates the equity barriers faced by food service businesses?

1.4 Report Layout

Chapter 1: Introduction
The Introduction provides an overview of the project, a brief history of solid waste management in Seattle, the opportunity to introduce a foodware reuse system, the underlying research questions being asked, and the layout for the report.

Chapter 2: Literature Review
The Literature Review defines what a foodware reuse system is in detail and develops the justifications for a foodware reuse system in Seattle. Chapter 2 also identifies barriers, equity considerations, and criticisms related to implementing reuse systems.

Chapter 3: Methodology
The Methodology details how the research questions introduced in Chapter 1 are answered. Furthermore, the methodology explains why the selected methods are appropriate.

Chapter 4: Results & Analysis
The Results & Analysis chapter documents this project's qualitative and quantitative data. A thorough analysis of the data is provided, which informs Chapter 5: Recommendations. Ultimately, Chapter 4 provides an answer to Research Question 1.

Chapter 5: Recommendations
The Recommendations provide SPU with guidance as to how it can best design an equitable foodware reuse system that reduces barriers for FSB participation. Chapter 5 answers Research Question 2.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

To inform our analysis of potential equity barriers around reuse foodware systems, our research consisted of a literature review, a survey to food service businesses in Seattle, and interviews with food service businesses and reusable service providers. The literature on reusable food and beverage container systems largely focuses on the environmental or economic justifications or implementation considerations. Few assessments on the equity implications or impacts of reuse systems on different communities or business types exist. To identify potential equity barriers, we considered Non-Governmental Organizations (NGOs) and reusable service provider reports on reuse systems, literature on sustainable and circular economy models, and assessments of the impacts of single-use plastic and bans and fees.

2.2 Reuse System Overview

Reuse systems are part of a broader global push towards a circular economy. Current economic models are linear; materials are taken from the earth to make products, then thrown away as waste (Ellen Macarthur Foundation, n.d). A circular economy is designed to stop waste from being produced in the first place (Ellen Macarthur Foundation, n.d). The Ellen Macarthur Foundation, an NGO working to facilitate a worldwide transition to a circular economy, defines the circular economy as a "systems solution framework" that gives people the tools to tackle climate change, transform our current throwaway economy, and generate economic opportunities (Ellen Macarthur Foundation, n.d).

There is a growing recognition that current global consumption, in particular the increasing volume of waste made from nonbiodegradable plastic, is unsustainable (World Economic Forum, 2021, Gordon, 2021a, & Ellen Macarthur Foundation, 2019). The food and beverage industry is a major contributor to increasing rates of plastic waste (Gordon, 2021a). Current efforts to reduce foodware and packaging waste resulted in a large-scale uptick in recyclable and compostable replacements for single-use plastics. However, neither recycling nor composting is enough to increase sustainability; recycling often struggles to be profitable, and the production and disposal of compostables often have large carbon footprints (Gordon, 2021a). Experts believe reuse systems are the best way to reduce single-use waste from food and beverage packaging (World Economic Forum, 2021, Gordon, 2021a, & Ellen Macarthur Foundation, 2019).

NGOs such as Upstream, the Ellen Macarthur Foundation, Clean Water Fund, and World Wildlife Fund have published reports offering guidance to governments, businesses, and the public to accelerate the scaling and adoption of reuse systems. Countries around the world have signaled strong support for reuse systems. The European Commission adopted a new Circular Economy Action Plan (CEAP) in 2020 to guide the European Union's transition towards a circular economy; specific measures on reusable products in food services are currently under consideration (European Commission, 2020). France, Romania, Spain, and Portugal have

employed reuse laws and waste reduction strategies, while Chile, India, and Indonesia are committed to extreme reductions in plastic waste (Plastic Smart Cities, 2022).

Literature indicates that reusable food service ware and packaging have fewer environmental impacts than their single-use counterparts including lower greenhouse gas emissions after consistent use and reduced litter in communities and ecosystems (Gordon, 2021a). The scope of our project focuses on the development of a system that integrates reusable food service wares and packaging (herein referred to as "foodware") for takeout food and beverages.

The general reuse system model is as follows (also mapped in Figure 2.1):
1. Food service business puts takeout food into reusable foodware.
2. Customers pick up or get delivered their takeout meal in reusable foodware.
3. After use, the customer drops off the reusable foodware at a participating business or collection bin or has the foodware picked up.
4. The reusable foodware is washed, sanitized, and redistributed back to food service businesses. This can either be done in-house by a food service business or through a third-party service provider. (Gordon, 2021; Lendal et.al., 2021).

Figure 2.1. *Model of a generic foodware reuse system.[2]*

2.3 Justifications for a Reuse System

The following sections summarize the environmental, economic, and social benefits of reusable foodware systems.

2.3.1 Environmental Justifications

Upstream's *Reuse Wins* (2021a) report provides a synthesis of recent studies on the environmental impacts of reusable foodware. According to the report, the majority of life cycle assessment (LCA) studies found reusable food ware to be better for the environment than single-use options. LCAs consider the environmental impacts of a product from extraction to disposal and are regularly used by businesses to assess the environmental impacts of products. The greenhouse gas (GHG) emissions from reusable products are dependent on the materials used (glass, ceramic, stainless steel, etc.), type of reusable product (cups, clamshells, plates, etc.), washing method, energy sources, and transportation model. Despite this variance, numerous studies confirm that reusable products have lower GHG emissions than disposables once a reusable product reaches the "break-even point," or the point at which the GHGs from production are offset by its use. The primary emissions impact for reusables comes from washing and sanitizing (Gordon, 2021a). Continued improvements in energy efficiency in dishwashing and water usage will further reduce emissions impacts (Gordon, 2021a).

Recycling and Composting System Challenges
The primary argument of Upstream and other organizations advocating for reuse systems is not that compost and recycling systems have failed but rather that compost and recycling alone cannot create a sustainable future (Gordon, 2021a). Recycling has become less efficient and more costly; businesses are increasingly looking for alternative packaging options (Srivastava, 2020). While the COVID-19 pandemic has caused staffing issues and operational difficulties at recycling plants, recycling woes have plagued governments and businesses for years (Srivastava, 2020). After countries such as China stopped accepting plastic waste from the United States and Europe in 2018, municipalities in developed nations were left with a surge of plastic waste that ended up in landfills (Srivastava, 2020). As a result, reuse systems have become increasingly attractive to businesses across industries for their cost- and waste-saving capabilities (Srivastava, 2020).

There are also challenges with composting systems and compostable packaging. Composting facilities and infrastructure are much less widespread than recycling systems, meaning that compostable products often end up in landfills (Gordon, 2021a). The environmental impact measures of compostable products are also higher than alternatives; Upstream reports that even when properly composted, the environmental impacts from producing, using, and disposing of compostable products typically outweigh the advantages (Gordon, 2021a).

2.3.2 Economic Justifications

The literature on the economic benefits of reuse systems is robust; texts on sustainable business models and circular economies include reuse systems within broader discussions of shifting current economic models away from traditional production and consumption patterns (Dijkstra et al., 2020). Bellone (2021) highlights the success of historic refill systems, like milkmen, which operated at large scale while keeping both cost and waste low. The World Economic Forum (2019) furthers this argument, noting that "the reuse ethos" is still present in modern economies, evidenced by everyday reusables like lunch boxes, coffee mugs, and cloth shopping bags. Increasing attention from governments, businesses, and nonprofits have not only demonstrated the viability and practicality of reuse models but also signal a broader revival and expansion is underway (World Economic Forum, 2019 and Gordon, 2021b).

Closed Loop Partners (2021) estimates that "converting 20% of global disposable plastic packaging into reusable packaging is a $10 billion opportunity." As a result, sustainable packaging startup companies have boomed. The NextGen Cup Initiative, a partnership with Closed Loop Partners and large-scale chains including Starbucks and McDonalds, recently conducted several reusable cup pilot programs, a sign that reusable foodware systems have caught the attention of both large- and small-scale businesses. Chilean startup Algramo packages small quantities of essential goods in reusable containers; the containers are marked with a code that allows customers to earn credits every time the products are refilled (Srivastava, 2020). In addition, smaller startups like Czech-based MIWA and US-based Loop are partnering with larger companies like Procter & Gamble, Nestlé, and Unilever to reduce packaging waste and invest in reusables (Srivastava, 2020).

2.3.3 Business Justification

Adoption of reuse systems provide food service businesses with ample opportunities to boost customer loyalty while lowering their own costs. Upstream (2021a) estimates that small food service businesses can save an average of $3,000 to $22,000 per year if they switch to reusables with cost savings coming from reduced waste hauling costs and not constantly repurchasing single-use foodware. Clean Water Fund's *ReThink Disposable* program has demonstrated the short-term payback of switching to reusables in over 166 cases of small, independently owned restaurants, cafés, food trucks, and caterers around San Francisco (ReThink Disposables, n.d). Featured case studies also provide insight into the diversity within the program; FSBs represented include BIPOC- and women-owned businesses, as well as case studies translated into Spanish and Mandarin (ReThink Disposables, n.d). The case studies presented by Upstream and the Clean Water Fund provide evidence that concerns over increased costs from hiring additional workers to handle washing and sanitizing (if the foodware is cleaned in-house) are unfounded (Gordon, 2021a).

If FSBs utilize a reuse system model where customers return containers to the participating business, customer participation and brand loyalty can be encouraged through rewards programs or other incentives (Lendal, 2021). FSBs can also optimize their operations by standardizing packaging or working with other businesses to share the costs of cleaning and delivery of reusables (Lendal, 2021).

2.3.4 Community Justifications

There are environmental justice implications for reusable foodware systems. Increasing the use of reusables helps keep communities free from pollution and litter while also protecting vulnerable ecosystems and waterways. The International Coastal Cleanup found that eight of the top ten most commonly found plastic debris in oceans comes from food and beverage packaging (Gordon, 2021a). Upstream (2021a) reports that a large portion of litter cleanup in the U.S. – roughly 20 billion pieces – consists of disposable food service ware and packaging. Investing in reusable products would lower the cost of cleanup efforts for both governments and communities; in the United States, litter cleanup costs $11.5 billion annually (Gordon, 2021a).

Reusable foodware reduces the exploitation of natural resources during the production of single-use products, which require high volumes of water, oil, trees, and energy (Gordon, 2021a). This in turn helps protect frontline communities that live near extraction, processing, and waste disposal sites. There is also an opportunity for job creation within the reuse service market. Upstream (2021a) estimates in the U.S, a reuse economy would generate 193,000 jobs, creating infrastructure and employment opportunities on a community level.

Upstream's *Reuse Policy Playbook* offers guidance to policymakers for using a justice and equity lens when developing and implementing reuse systems. Indigenous communities, communities of color, and lower-income communities are disproportionately impacted by climate change, pollution, and resource extraction (Gordon, 2021b). Their voices have also historically been excluded from the development of waste and waste prevention policies. To center equity and inclusion within a reuse system, it is critical that policymakers include diverse voices throughout the development, formation, decision-making, outreach, and implementation of a policy (Gordon, 2021b).

2.4 Barriers

The infrastructure to shift to circular economy models – including reuse systems – does not yet exist on a broad local, state, or national scale (Pouliot, 2021). Businesses interested in introducing more sustainable models face numerous barriers, including uncertain transition costs, changing behaviors or relationships from customers, employee resistance (Dijkstra et al., 2020), implementation of new technology, affordability and safety of reusable packaging, and stakeholder trust in systems (Gordon, 2021a and World Economic Forum, 2021).

Implementation Costs
Transition costs are one of the most critical barriers to the widespread adoption of reuse foodware systems. Examples from California highlight how local governments can reduce barriers to entry for businesses by alleviating their transition costs. StopWaste, a public agency in Alameda County, helps businesses and schools reduce waste through reusable foodware pilot program grants, which cover start-up costs including inventory, hiring, and training (StopWaste, n.d). Reducing costs to customers requires major upfront FSB buy-in. A key finding from Closed Loop Partner's (2021) pilot programs with large-scale chains was that to "compete with the convenience of single-use plastics, the burden of cost must not fall on the customer."

Logistical Challenges & Feasibility

As with many new systems, logistical and feasibility challenges can result in massive barriers to implementation. Lendal (2021) indicates that it could be difficult for businesses to organize drop-off or pickup systems for soiled reusables, efficiently wash and sanitize without the aid of a third-party service provider, or work with a third-party provider generally. These logistical challenges could occur if businesses are acting independently, are required by law or mandate to participate, or working with other local businesses in a partnership. Businesses, too, may need to develop incentives for customers to participate, ensure that drop-offs for customers are simple to participate in, and somehow reduce theft of reusable containers (Lendal, 2021). Finally, businesses will likely need to increase their storage capacity for reusables, particularly if they are operating an on-site system without the participation of a third-party service provider (Lendal, 2021).

Customer Behavior

Dijkstra et al. (2020) differentiate strong sustainability, when environmental impact is the main driving force of the business model, from weak sustainability, where economic outcomes supersede environmental goals. Strong sustainability requires reframing traditional production and consumption patterns. Changing customer behavior has been identified as a critical challenge in the transition to a circular economy and requires either fees or incentives (Dijkstra et al., 2020 and Pouliot, 2021). Despite this, customers are increasingly interested in reuse systems and programs. In a 2021 consumer survey, 70% of respondents indicated that they would be willing to pay more for products in sustainable packaging (Ducharme, 2021).

There is much discussion in the literature around the effectiveness of ordinances mandating single-use cup fees or plastic bag bans in changing behavior. ReThink Disposables (2016) surveyed café owners and customers in San Francisco to assess both business owner comfort instituting single-use cup fees and customer perspectives on a citywide fee ordinance. The results found that café owners would not consider charging customers if customers could simply go to any other store and get the same beverage without paying a fee. Customers indicated strong support for a mandated disposable cup charge. These results indicate the potential challenge for business owners introducing any sort of fee-based reuse system without coinciding local government ordinances.

2.5 Equity Considerations

The following sections summarize equity considerations for both businesses and customers. There is little existing literature on specific food service business equity challenges, let alone regarding reuse systems. We identify equity issues outlined through case studies about similar topics as well as outline a list of potential equity barriers we anticipate finding throughout our interviews and surveys.

2.5.1 For Businesses

To understand what equity challenges food service businesses may face to participate in a reuse system, we looked at literature on sustainable business models and NGO reports on implementation considerations for reuse systems. For more context on the specific challenges facing businesses due to the COVID-19 pandemic, we considered NGO reports on the Small Business Green Recovery Fund and other federal policies.

Upstream's *Reuse Policy Playbook* (2020b) offers guidance on providing economic support and incentives for businesses with high financial barriers to participation in a reuse system, such as small or minority-owned businesses. The report stresses prioritizing innovation in "underserved areas and by businesses entrepreneurs who often have a hard time raising capital" (Gordon, 2020b). Economic support and incentives are critical for encouraging businesses to participate and invest in more sustainable practices and businesses models; presently, women- and minority-owned small businesses risk being left behind in the transition to more green economy (Lashitew, 2021),

It is also important to recognize the equity challenges businesses are experiencing due to the COVID-19 pandemic. A Brookings report (2021) on the Small Business Green Recovery Fund details how small businesses continue to face severe economic impacts, necessitating federal policy to provide financial and technological assistance to business owners that would otherwise lack the resources, credit history, or assets to access external financing (Lashitew, 2021). A key aspect of the policy is aimed at facilitating climate transition in women- and minority-owned small businesses, with the goal of "counteracting income inequalities across businesses and communities that accelerated during the pandemic" (Lashitew, 2021).

Reports from NGOs and reusable service providers provide additional insight into expected logistical, economic, and equity challenges businesses face in transitioning to reusables:

- High upfront costs to scale inventory, hiring and training (World Economic Forum, 2021)
- Lack of local government support and infrastructure (Pouliot, 2020)
- Inventory replacement costs from theft of containers (Lendal, 2021)

2.5.2 For Customers

As there are no studies on equity impacts of reuse foodware systems, we considered literature on the implementation and impacts of single-use plastic fees or bans. The available literature focused primarily on two inequities: cost for low-income individuals and accessibility for individuals with disabilities.

In 2019, the City of Berkley passed an ordinance mandating compostable foodware for to-go orders, reusable dine-in foodware, and a $0.25 charge for disposable cups (Li, 2019). The ordinance contained an opt-out option for financially burdened businesses and exemptions for individuals on food assistance or with individuals with disabilities. Other municipalities have included exemptions for individuals on government food assistance programs in single-use

plastic fee mandates; however, these exemptions leave out a large portion of low-income residents (Li, 2019).

Jenks et al. (2020) discusses the equity impacts of plastic straw bans on individuals with disabilities. These included requiring individuals to disclose personal disability or medical conditions to receive a straw and further marginalizing individuals at the nexus of poverty and disability by expecting them to be able to access and afford plastic straw alternatives. According to Jenks et al. (2020), plastic straw bans are an example of "the inequities that can occur when environmental problems and solutions are constructed without input from marginalized communities."

Additional equity challenges have been identified from NGO and reusable service provider reports, including:

- Customer participation in a reuse system typically requires a "fee for services" via an initial deposit, monthly subscription, or per-use cost (Closed Loop Partners, 2021)
- Accessibility and frequency of drop-off or collection points (Gordon, 2021a)
- Increased costs of takeout food, as food service businesses may pass off increased costs to customers (Ellen Macarthur Foundation, 2021)
- Increased traffic and emissions associated with third-party vendor operations in certain communities (Ellen Macarthur Foundation, 2021)
- Degree of burden the system places on customers as compared to businesses (Closed Loop Partners, 2021)

2.6 Reuse System Critiques

Though modern reuse systems have yet to be implemented on a large scale, they are not immune to critique or criticism. The most common of these concerns the "break-even point" or "payback period" (Gordon, 2021a; Ducharme, 2021). As mentioned in Section 2.1, the break-even point refers to the moment when a reusable has been used enough times to be considered more environmentally friendly (Gordon, 2021a; Ducharme, 2021). Ducharme (2021) argues that payback periods should include any emissions associated with customer returns and returns to businesses after washing or sanitizing (if a third-party service provider is involved). To reach the break-even or payback point, customers must return and reuse as instructed; theft of reusables, improper disposal, and other mishaps could increase costs and make the break-even points difficult to achieve (Ducharme, 2021; Lendal, 2021).

Another critique concerns the material type of reusables and the subsequent emissions released through production and cleaning. A 2019 European study compared the environmental impacts throughout the life cycles of different takeout containers: aluminum containers, polystyrene containers (i.e., Styrofoam), and polypropylene containers (i.e., Tupperware or hard plastic takeout containers) (Gallego-Schmid et.al, 2019). The authors found that for emissions during production, Styrofoam or polystyrene containers had the lowest environmental impact, and single-use polypropylene containers had the highest (Gallego-Schmid, 2019). They also argued that those materials could be efficiently recycled if proper technology was invested in, thus

reducing their impact on litter and marine waste (Gallego-Schmid, 2019). Though polypropylene containers could reach a break-even point before their life cycle is over, they are challenging to recycle once they are no longer useful and use more raw materials in their production (Gallego-Schmid, 2019). It is worth noting, however, that Upstream (2021a) has found that reusables not made of plastic outperform single-use containers on every environmental metric. More research must be done to determine the true environmental footprints of each reusable material type.

CHAPTER 3: METHODOLOGY

3.1 Introduction

The literature review involved investigating gray literature from government and nonprofit reports, reuse service providers, case studies of similar implemented or proposed reuse systems, and Seattle ordinances concerning single-use plastic and policies for food service businesses (FSBs).

This project employed a mixed methods approach to answer the posed research questions. Our two strands of inquiry, interviews with reusable service providers and FSB owners (qualitative) and a survey of Seattle FSBs (quantitative and qualitative), were designed and implemented simultaneously. Equal weight is given to both datasets, which together allowed for a more comprehensive analysis than either quantitative or qualitative frameworks could alone (Creswell et al., 2018). Several analysis methods were deployed to thoroughly understand and interpret the data collected, including thematic coding and summary statistics.

3.2 Service Providers Sample Selection

We also used purposive sampling to identify and reach out to service providers. Similar to our FSB interviews, the selection process was iterative and required continued reevaluation based on which service providers were available to speak with us.

We used Upstream's reusable service provider business directory to find 45 companies operating in cities across Canada and the United States. To narrow this list, we considered various factors, including clientele (FSBs, Universities, corporations, events, etc.), system design (open or closed), scale of operations (number and diversity of clientele), and services offered (types of reusable foodware, technology, dishwashing, collection, etc.).

Service providers known to SPU or with existing working relationships, such as GoBox and r.Cup, were sought out for interviews to ensure that relevant, regional knowledge and interest in reuse systems is reflected in our findings. At the request of SPU, we included Ridwell, a recycling company, in our interview sample due to their Community Supported Memberships, a new approach to advancing equity among waste reduction service providers.

3.3 Food Service Business Sample Selection

SPU provided data on 5,610 food service enterprises across Seattle, including location, names, basic contact information, and addresses. These enterprises consist of restaurants, gas stations, cafés, grocery stores, food trucks, entertainment and event venues, bars, and specialty stores. For the purpose of this research project, **an FSB is a locally-owned enterprise currently in operation that offers takeout food within Seattle city limits**. International and national chains, restaurants and cafés housed on corporate campuses, food courts, gas stations, mini marts, event

venues, grocery stores, and other food service enterprises are not considered FSBs under this definition. Using this definition centers small and locally-owned FSBs, as well as FSBs with operations that would be seriously impacted by a foodware reuse system. Of the 5,610 food service enterprises operating across all Seattle neighborhoods, less than half (2,487) met our definition of FSBs.

The City of Seattle's "Racial and Social Equity Index" dataset uses American Community Survey (ACS) data on race, language, education, and other socioeconomic factors to create a composite equity index across Seattle's census tracts. The census tracts are separated into five categories based on their score: *Highest Priority/Most Disadvantaged, Second Highest, Middle, Second Lowest, and Lowest.* Using Esri's ArcMap program, FSBs were assigned the composite equity index priority based on their respective census tracts and overlaid onto neighborhood data published by the City. 30 FSBs were not assigned scores because their geographic data indicated they were not within city boundaries, decreasing the total FSB selection pool to 2,457. FSB addresses were assigned geographic coordinates using the Geoapify program, enabling the use of geographic data analysis tools. A map of these FSBs can be found in Figure 3.1.
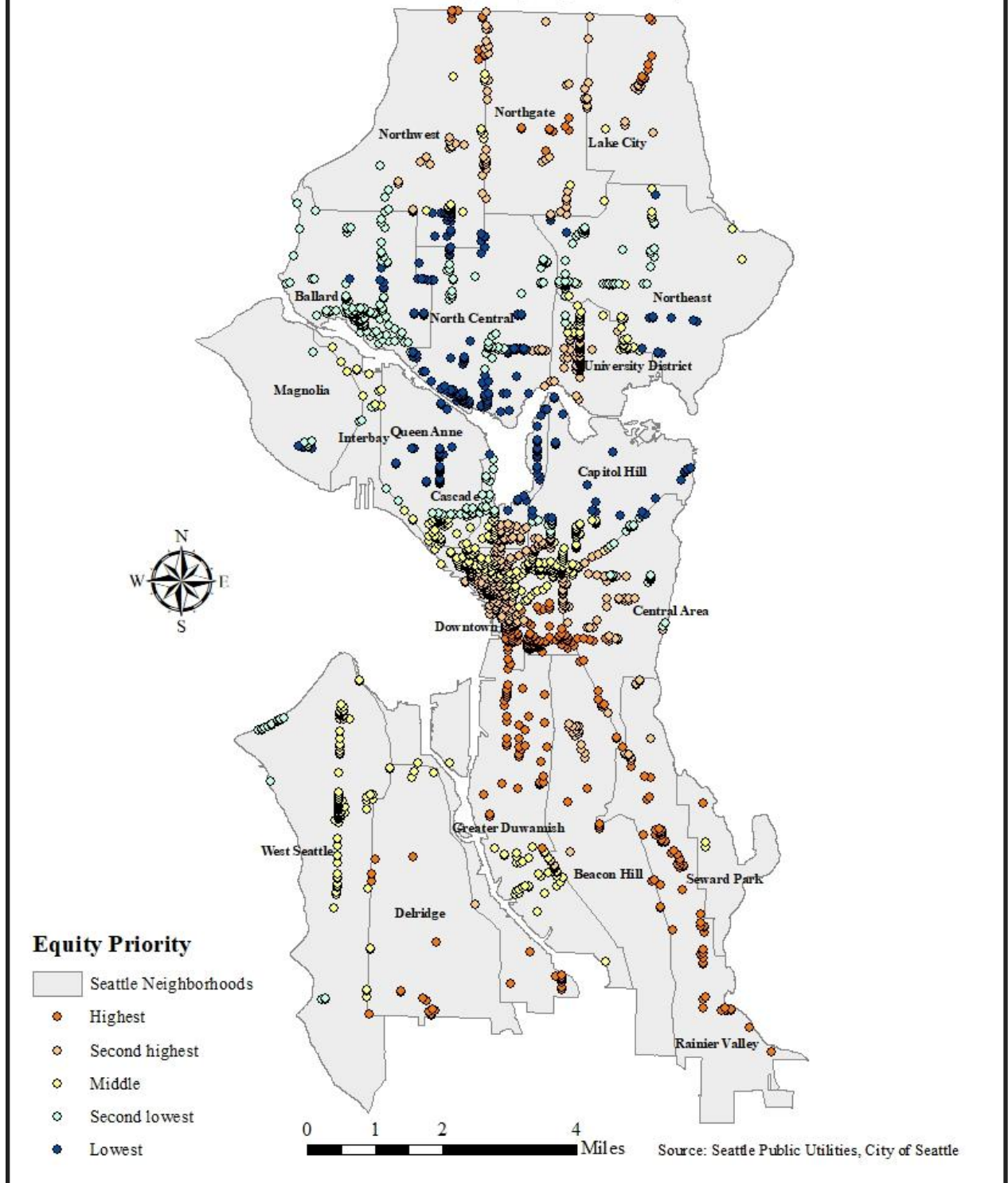
Figure 3.1. *Map of FSBs across Seattle with their equity score ranking.*

Figure 3.1 shows that the FSBs with the highest and higher equity priority statuses are likely found in Seattle's neighborhoods to the south, southeast, and north. These neighborhoods include Beacon Hill, Delridge, Greater Duwamish, Lake City, Northgate, Northwest, Rainier Valley, and Seward Park. The neighborhoods surrounding Lake Union and the connected bodies of water tend to be those with the lowest priority. Specifically, these are the Ballard, Capitol Hill, Cascade, Magnolia, North Central, Northeast, and Queen Anne neighborhoods. Central Area, Downtown, Interbay, University District, and West Seattle have either a mix of equity priorities or are about middle equity priority on average.

As shown in Table 3.1, Downtown has the most FSBs located within its borders at 500. The surrounding neighborhoods – Capitol Hill, Central Area, Greater Duwamish, and Queen Anne – have over 100 FSBs within their boundaries; the exceptions are Cascade (92) and Beacon Hill (42). To the north, the Ballard, North Central, University District, and Northeast neighborhoods each have over 100 FSBs within their boundaries. The only other neighborhood with over 100 FSBs in its borders is West Seattle. Beacon Hill, Cascade, Delridge, Interbay, Lake City, Magnolia, Northgate, Northwest, Rainier Valley, and Seward Park each have fewer than 100 FSBs within their boundaries.

Table 3.1. *The number of FSBs within each Seattle neighborhood.*

Neighborhood	Number of FSBs
Ballard	168
Beacon Hill	42
Capitol Hill	206
Cascade	92
Central Area	108
Delridge	50
Downtown	500
Greater Duwamish	127
Interbay	16
Lake City	39
Magnolia	23
North Central	370
Northeast	107
Northgate	60
Northwest	88
Queen Anne	118

Rainier Valley	94
Seward Park	4
University District	121
West Seattle	124
Total	**2,457**

Interview Selection

This investigation utilized purposive sampling to identify FSBs to contact for interviews. The selection process was iterative and required continued reevaluation based on which FSBs responded to interview requests.

From the list of 2,457 FSBs, about 130 were contacted for interviews. We reached out to FSBs via email, phone call, on-site visits with our team, and on-site visits with the Environmental Coalition of South Seattle (ECOSS) with Korean, Chinese, and Vietnamese translators. The process to determine which FSBs to contact considered various factors, including type of cuisine, service type (i.e., takeout only, dine-in only, take-out and dine-in), priority status on Seattle's racial and social equity index, and neighborhood in Seattle. We used the Intentionalist, an online guide designed to facilitate intentional spending at businesses owned by women, people of color, veterans, LGBTQIA+, families, and disabled people (Intentionalist, n.d), to ensure our sample of FSBs represented a diversity of communities and identities across Seattle. Our intention in reaching out to BIPOC-owned and women-owned businesses, among other minority demographics, was to identify whether different barriers or opportunities for reuse system adoption existed across ownership demographics.

Roughly half of the FSBs in our dataset did not have publicly available email addresses, and language barriers limited our ability to connect with many FSBs. These challenges required us to continually adjust our outreach methods to ensure we were able to contact FSBs across a diverse range of cuisines, locations, and demographics.

Survey Selection

The FSB survey was designed to reveal citywide trends by reaching a greater number of FSBs from our target population. A larger, more representative sample of FSBs in Seattle would help corroborate, expand upon, or reveal differences in trends identified in interviews with FSB owners. Email was the most efficient way to contact the 2,457 FSBs previously identified; however, only 1,424 had publicly available email addresses. We electronically distributed the survey to all the email addresses we had as opposed to selecting a random sample or subsample, which would reduce the response rate.

3.4 Data Collection

Service Provider Interview Protocol
We conducted seven interviews with service providers and received two written responses. For consistency between interviews, our team followed an interview protocol. See Appendix B for interview script and questions.

Interviews were scheduled for between 20-30 minutes and took place over Zoom. Each interview was attended by two of our team members; one acted as the lead interviewer and the other as a note taker. We requested permission at the beginning of each interview to include the name of the service provider in our report. Some interviews were modified due to not all questions being relevant to all service providers because of differences in their business models, and time constraints for several interviews necessitated determining key questions beforehand as a team.

Food Service Business Interview Protocol
We conducted nine interviews with FSBs. To accommodate the varied schedules, locations, and time constraints of food service business owners, interviews were conducted in person, over the phone, and via Zoom. Interviewees were also given the option to submit written responses. For consistency between our interviews within this flexible format, our team followed an interview protocol. See Appendix B for our interview script and list of questions.

In recognition of the limited time of many FSB owners, interviews were scheduled for 15-30 minutes. Each interview was attended by two of our team members; one acted as lead interviewer and the other as a note taker. We requested permission at the beginning of each interview to include the name of the food service business and owner interviewed within our report. Team members debriefed and reviewed the notes after each interview.

To further facilitate the inclusion of ESL (English as a second language) FSB owners in our project, we received assistance from SPU, ECOSS, and the Evans school. SPU translated our interview questions into six languages: Thai, Amharic, Korean, Chinese, Spanish, and Vietnamese. ECOSS employees accompanied us to in-person visits to FSBs in the University District and International District to deliver written questions in the owners' preferred languages. Upon consultation with ECOSS, we requested funding from the Evans school for incentives, to compensate ESL FSB owners who gave interviews with translation assistance.

Food Service Business Survey Protocol
We created the FSB survey using Google Forms. The survey consisted of 19 multiple choice, multiple selection (e.g., selecting multiple neighborhoods or owner demographic identities), yes/no, and open-ended questions. Survey questions asked about respondents' general perception of reuse systems, concerns about barriers to participation, logistics around system design, vendors, and desired city involvement. Questions pertaining to different foodware reuse system scenarios were designed to gauge whether respondents preferred certain systems. Though no specific identifying information was gathered (i.e., respondent or FSB name), the survey collected general demographic information such as business location by neighborhood(s), cuisine type, and ownership demographics. The complete survey can be found in Appendix C.

Cascadia Consulting Group, a partner of SPU, distributed the survey to the 1,424 available email addresses our team provided. Cascadia granted us access to the Green Business Network email address, an ideal mode of distribution due to its reputable appearance. The survey was distributed on March 7, 2022; after receiving few initial responses, the survey was redistributed on March 14 and closed March 20, 2022. Of the 1,424 emails sent, 144 were recorded as undeliverable, leaving our total number of emails sent at 1,280.

We received 63 total responses to the survey; this equated to a 4.9% response rate. Upon reviewing the individual responses, we chose to omit one respondent's answers, as they demonstrated a poor understanding of the questions. That decision dropped our total number of responses to 62, resulting in a 4.8% response rate.

3.5 Data Analysis Methodology

Qualitative Data
Our qualitative data consisted of both interview responses and responses from two open-ended survey questions. We used thematic content analysis to identify and report patterns and themes within our qualitative data (Braun & Clarke, 2006) related to potential equity barriers, reuse system logistics, and desired government support. Using Microsoft Excel, responses were coded twice to ensure accuracy (DeCuir-Gunby et al., 2017), with a third review to resolve any remaining discrepancies in our analysis. We created two codebooks, one for service providers and one for food service businesses, based on a set of shared inductive themes (environment, barriers to participation, accessibility) and different inductive themes that emerged during the coding process (for example, business model for service providers and cleanliness for FSBs). The coded responses provided a tool to identify potential equity barriers.

Quantitative Data
Our quantitative data strand consisted of FSB survey responses. We calculated summary statistics from the survey responses for yes/no, multiple choice, and some open-ended questions that summarized FSBs owners' opinions and concerns regarding reuse systems. We also conducted geographic analyses to identify geospatial trends related to potential equity barriers and opinions expressed by FSBs. This analysis allowed for new insights and more nuanced recommendations in addition to the qualitative analysis, as discussed in Chapters 4 and 5.

3.6 Design Limitations

Numerous limitations impacted the methods and findings:

- *Literature.* Because reusable foodware systems are a relatively new practice, there are limited literature sources about this topic. Few companies and municipalities in the United States have applied a reuse system to FSBs, so there is a finite amount of available data about detailed implementation measures or successful systems. In addition, there were few sources discussing equity considerations when implementing reuse systems in FSBs. This gave us little background knowledge to base our project on.

- *Background Data Sources.* We gathered data for FSB selection from two sources: Seattle Public Utilities (SPU) and the American Community Survey (ACS) via the City of Seattle.
  - The data from SPU provided us with almost 2,500 FSBs, but it is possible that this dataset is inaccurate; numerous businesses had to be excluded due to temporary or permanent closures. Phone numbers, addresses, or owners' names had to be independently verified before inclusion in our interviews or survey sample.
  - The City of Seattle's Race and Social Equity index calculated equity priority status based on social and economic factors collected in the ACS, but the exact algorithms and weighting of factors used to create these scores are unknown. Additionally, priority rankings broadly categorize quantitative and qualitative data, so we were unable to determine specific characteristics of FSBs from the priority rankings.
  - Seattle's Race and Social Equity index, rooted in data collected in the ACS, does not consider spatial variability within each census tract; the index score and ranking assigned to each FSB may not be reflective of the physical reality of an FSB. For example, a FSB in a predominantly English-speaking area may be owned and operated by non-English speakers.
  - Citywide data do not exist on the cuisine type of FSBs, limiting our ability to identify possible cuisine-specific equity concerns. Without these data, we were unable to define what constitutes representative samples for each cuisine and unable to come to statistical conclusions.

- *Geospatial Integrity.* While the use of ArcMap and geoprocessing techniques made for efficient preliminary data selection and analysis, it may have also unintentionally eliminated some FSBs from consideration. FSBs may have been eliminated for multiple reasons:
  - The geographic coordinates assigned by Geoapify are not entirely accurate, pushing 30 FSBs outside of Seattle city limits.
  - Assigning a geographic coordinate system to the FSB data may have misinterpreted the geographic coordinates.
  - SPU's initial dataset includes FSBs outside of Seattle's city limits.
  - Seattle's neighborhood data or ACS index data do not capture the entirety of Seattle's city limits.

- *FSB Interview Selection.* FSBs were selected for interviews to obtain a diversity of neighborhoods, cuisines, and equity priority statuses. However, we could only select FSBs if they had an online presence and were within the SPU and ACS data. The categorization of cuisine type and availability of to-go options was dependent upon information published online, possibly introducing bias.

- *FSB Interview Language & Cultural Barriers.* We wanted to interview people from many different cultural backgrounds to get a more representative sample of equity barriers and thoughts on a reuse system. However, it was not until working with ECOSS that we were

able to reach some non-English-speaking FSB owners. We were also only able to offer incentives to FSBs we reached out to with ECOSS, as they were a key demographic that had been missing from our original interviews.

- *Data Collection Barriers.* The COVID-19 pandemic forced numerous FSBs to temporarily or permanently close. As money is a concern for foodware reuse system operation, it is important to collect data from FSBs in a diversity of financial situations. Additionally, using email and phone calls for survey distribution and interview requests might limit data quality. Emails may be ignored, deleted, or sent to spam, and phone calls or messages may go unreturned, especially if a FSB owner is busy or unable to participate.

- *Survey Distribution.* Due to time constraints, we were unable to widely publicize and distribute the survey, nor were we able to offer incentives to participate. We also did not have enough time to find appropriate contact information for all FSBs (we had 144 "undeliverable" emails). We were unable to distribute the survey through means other than email due to time constraints.

- *Response Bias.* Surveys and interviews take a considerable amount of time to thoughtfully and thoroughly complete. This means that we could only receive data from FSBs with adequate available time, possibly during business hours. In addition, we could not control for people other than managers or owners (e.g. employees) answering the survey. We also could not verify the accuracy of answers. Given the current pressures on FSBs and existing inequitable resource allocation in the food service industry, taking the time to respond to interview requests and surveys is not something that many managers or owners can afford to do.

- *Low Survey Response Rate.* Because our response rate was so low, it was difficult to draw solid statistical conclusions or demonstrate statistical significance across any groups. Therefore, analysis from the survey is limited to qualitative coding and simple, summary statistics.

- *Limited Time.* There was a narrow window of time to conduct surveys and interviews which was further truncated by scheduling conflicts amongst involved parties. This limited our team's ability to interview FSB owners and service providers. Slow responses from some FSB owners and service providers reduced the efficiency and reach of this investigation.

- *Trust.* Researchers can struggle to build trust with their communities of interest. Researchers often approach studies with a clinical mindset and can sometimes fail to properly acknowledge a community's challenges. While we have taken steps to increase our understanding of people's challenges, there are certain, unavoidable factors complicating this effort. American society has fostered racial, cultural, and economic divisions for centuries, and a team of white/white-presenting, English-speaking, American-born graduate students cannot fully comprehend the experiences of people from different demographics. Some FSB owners may be understandably disinclined to

trust us to understand them. The five-month time period of this project is not conducive to the time-intensive process of building trust. Furthermore, our team is working on the behalf of the government, and some may distrust the government or want it to stay out of the private sector.

- ○ *Trust from Community to the Government.* There are concerns that trust between the government and the community may be strained, particularly amongst FSBs who are struggling or are otherwise disenfranchised. Recent bans on plastic bags and mandatory composting regulations have placed a burden on FSBs, who in turn have begun to harbor resentful feelings towards government involvement and regulation. As a result, it could be that FSB owners were not willing to participate in our research as we were contracted by a government agency and could not guarantee that their opinions would be heard by government actors.

CHAPTER 4: ANALYSIS

4.1 Introduction

For our data collection, the team interviewed nine FSBs and nine service providers. The online survey received 62 responses from the 1,280 active FSB emails, putting the response rate at 4.8%.

4.2 Qualitative Analysis

4.2.1 Service Provider Interviews: Content Themes

We interviewed eight reusable service providers (Cano, Earthware, GoBox, Okapi, r.Cup, Reusables.com, Sparkl Reusables, and Suppli) and one recycling service provider (Ridwell) for this analysis. See Appendix D for more detailed information on each service provider. Companies interviewed range from smaller startups working in cities, to larger companies active across states and countries. Some service providers focus on single products, such as cups, while others offer various reusable food and beverage containers. Alongside the variation in products, the business model and services offered range from full-service, end-to-end technological and logistical support, to select services, such as dishwashing or collection. Service providers listed their clients as a mix of corporations, governments, event venues, the public, food service businesses, community organizations, and universities.

Our interview analysis identified four main thematic categories under which related subthemes emerged: **environment, business model, general concerns,** and **government support**. The analysis also revealed some equity concerns that will be addressed in Section 4.2.3.

Environment
Each service provider interviewed mentioned sustainability and waste reduction as primary motivations behind the company, alongside a personal interest in environmental issues such as climate change and pollution. All interviewees expressed concern over the increased use of, and waste caused by, single-use plastics and packaging, especially as a result of the COVID-19 pandemic. Cano, Reusables.com, and Earthware all pointed to startling statistics around the single-use packaging "crisis" as the inspiration behind their companies. The interviewee for Suppli noted that while she had pitched the idea for reusable foodware 13 years ago, the market was not ready; more recently, the necessity of reducing single-use packaging has acceptance and support among entrepreneurs and investors. Several service providers, including Earthware, Sparkl Reusables, and r.Cup, felt that reusables can address inadequacies in existing recycling and compost systems, providing an alternative strategy to mitigate waste. All service providers discussed the potential for the emerging reuse market to facilitate cooperation rather than competition. GoBox, Earthware, and Ridwell see the current moment as an opportunity to build coalitions and increase community support around shared goals of reducing waste and transitioning to a circular model of production and consumption.

Business Model

Service providers offer a range of logistical services to support and encourage businesses to transition to a reuse system. We asked specifically about fees, dishwashing, and collection, to assess how service providers consider both environmental impacts and accessibility within their business models. System design, products, and environmental impact goals varied by company, influencing whether storage, washing, collection and drop-off services were offered.

GoBox is full service, meaning they provide end-to-end support to their clients. This includes education and training, technical support, physical inventory and inventory management, storage, and dishwashing. Ridwell, the recycling service provider, employs a pickup model, customer service staff, and local partnerships with nonprofits to provide end-to-end education, support, and at-home collection services to customers. All reuse service providers offer technological support in the form of an app or software platform for tracking inventory, as well as onboarding and training materials for clients.

Earthware, Sparkl Reusables, Reusables.com, Suppli, and r.Cup have dishwashing services; reasons included ensuring the safety and cleanliness of their products, addressing logistical barriers for clients, and supporting reuse at scale. Comparatively, Cano's system is designed for larger institutions, such as universities or corporate campuses with existing dishwashing infrastructure. The goal of this service provider is to target institutions with high volumes of waste, while keeping labor costs and environmental impacts low. Earthware, r.Cup, Reusables.com, Ridwell, and Suppli have collection built into their business model, either through at-home collection or return bins at participating businesses. This model increases the accessibility of their systems and encourages participation from businesses with limited physical capacity to support a reuse system. Like the decision to include dishwashing services, collection involves increased costs, environmental impacts from transportation, and greater logistical support, which not all service providers had the capacity to pursue, or such services did not fit with their organizational goals.

All service providers were thinking about the scalability and adaptability of their systems, in particular as some of the financial and logistical challenges due to the COVID-19 pandemic have begun to dissipate. Labor shortages and mandatory closures impacted both service providers' internal operations and the capacity of many potential clients, such as FSBs, to participate in a reuse system. For example, Sparkl Reusables shifted from working with events and small FSBs to working with nonprofits operating senior meal programs. Several service providers, including Sparkl Reusables and r.Cup, noted that events provide an important source of revenue, and they anticipate switching back as soon as possible.

All service providers relied on marketing and outreach to attract new clients. GoBox, r.Cup, Reusables.com, Ridwell, and Suppli reported receiving inbound interest and sales through recommendations, word of mouth, partnerships with food service associations, and coalition building with cities, organizations, and individuals. Sparkl Reusables, Suppli, and Okapi discussed conducting targeted user engagement, via outbound sales and outreach to specific businesses or neighborhoods. Earthware and Reusables.com mentioned the importance of social media sites, delivery apps, and signage in participating businesses as marketing strategies.

The way service providers spoke about accessibility and inclusion within their business models varied. Cano, Earthware, and r.Cup offer grants or investments via pilot projects to ease the initial transition costs for small businesses and facilitate participation. Several service providers discussed the challenges of designing a fee system that decreases the financial barriers for all stakeholders. Ridwell keeps their membership fee as low as possible, offers community supported memberships to facilitate inclusion, and partners with local nonprofits to donate recycled items. GoBox, Okapi, Reusables.com, and Suppli are considering shifting their current fee systems and noted that iterative testing and pilot programs have been useful tools to assess different membership, subscription, or deposit models. The emerging nature of the reuse market requires a high-level of flexibility and thoughtful consideration from service providers. Okapi, Reusables.com, and GoBox spoke about the need to acknowledge that profit margins, rather than the environment, is usually a higher priority for businesses, necessitating the development of products and fee structures that effectively compete with alternatives.

Service providers also discussed accessibility around technology, products, and system design. Earthware had recently become aware that some of their container lids were difficult for people with disabilities to use; the company was already in the process of product redevelopment and is working to ensure future products are more accessible. The company also has plans for a QR code on their products with different language options, to better meet the needs of a multicultural food service industry. In another example, the service provider Cano is in the process of research and development for vision impaired adaptation of their app.

General Concerns

All service providers spoke about changing behavior as a primary challenge to the success of reuse foodware systems. Convenience, ease and cheapness of disposables, status quo bias, and lack of awareness were all identified as barriers to participation in a reuse system. Reusables.com is incentivizing behavior change through their customer-facing app, with a customizable loyalty program that gives participants access points to engage in a low-waste lifestyle. All service providers mentioned lack of awareness around what reuse systems are, the environmental benefits, how the system works, and where to buy products as a barrier, both for their company and for the reuse market generally. Suppli, Sparkl Reusables, Earthware, Okapi, and Cano spoke about the hesitancy many FSBs or other potential clients feel about transitioning to a reuse foodware system. Getting new clients to fully commit to implementing a reuse system is a challenge, as many would prefer to transition one product at a time rather than replace their entire inventory. All service providers spoke about easing the burden on new clients by providing some degree of educational information and signage, training, and direct customer engagement.

Cost was repeatedly brought up by all service providers as a barrier to participation. There are financial barriers for service providers, their potential clients (FSBs, universities, etc.), and customers. On the service provider side, Sparkl Reusables and Okapi spoke about competition with compostable or single-use products, which many FSBs are already using. Compostable food and beverage containers come in a much greater variety of shapes and sizes than reusable foodware, while single-use products are typically cheaper. For FSBs and customers, Suppli and Reusables.com noted the difficulty of splitting the cost of reusable foodware between businesses and customers; FSBs adjusting menu prices is one solution, but costs are offset on to customers.

Government Support

Overall, service providers reported having positive, ongoing partnerships with local municipalities and other private companies working in the zero-waste market. These partnerships help with marketing, expanding access and awareness about reuse and recycling opportunities, and providing funding, coaching and communication to achieve shared waste reduction goals. Despite these ongoing partnerships, service providers had suggestions for additional support they would like to see, both for themselves and their clients.

All service providers discussed increased financial support from local governments. Grants and investments in pilot programs were mentioned repeatedly as critical to help scale reuse systems and reduce financial barriers to participation for FSBs. Earthware mentioned cash for facilities and inventory, while Okapi and Reusables.com discussed direct purchasing of reusable products by cities and municipalities. The service provider Reusables.com is working with SPU to launch grants for small- and medium-sized businesses, as well as provide opportunities for BIPOC and women-owned businesses to test out a reuse system.

Educational campaigns, marketing, and communication with the public were identified as important government services which would expand awareness around reuse systems, increase market demand, and bring in new clients for service providers. Cano and r.Cup mentioned legislation, policies, or subsidies to facilitate funding and scaling of foodware reuse systems. Suppli noted that policies should center around incentives for FSBs to adopt reuse systems, as well as incentives for customer participation, rather than penalties.

Service providers would also like to see local governments take a more active role in the logistics of a reuse system. Suggestions included integrating the collection and sanitization of reusable foodware into existing waste management infrastructure. Sparkl Reusables and Cano spoke about the challenges faced by smaller startups, which have less time and resources to dedicate to compete for sole government contracts or conduct marketing and outreach. Several service providers discussed how logistical support is needed to implement and manage reuse systems on a citywide scale; one service provider reported that local governments have expected them to handle logistics at a scale that was not feasible for them. The same service provider spoke about how city governments could better value the time and expertise of service providers, rather than taking information from them on reuse systems without building relationships via partnerships or contracts.

4.2.2 Food Service Business Interviews: Content Themes

The following key themes were developed based on preliminary analysis of food service business interviews. We interviewed the managers or owners of nine FSBs in total: Kabul (Afghani cuisine – Northeast), Jemil's Big Easy (Cajun cuisine – West Seattle), Kaffeeklatsch (German Bakery and Café – Lake City), Lassi & Spice (Indian cuisine – Northeast and S. Lake Union), Mojito (Latin American and Cuban cuisine – Lake City), Phnom Penh Noodle House (Cambodian cuisine – International District), Mei Mei Café (Chinese cuisine – University District), Timeless Tea (Chinese cuisine and tea – University District), and The BoB (Korean cuisine – University District). It is important to stress that because our sample size was small, our

findings should not be considered representative of the entire Seattle FSB owner or manager community.

Both the survey and the FSB interviews were designed to complement each other by providing two avenues by which to capture cuisine types and evidence. Specifically, our FSB interview goal was to obtain at least one interview from all major cuisine types in Seattle, in neighborhoods across the City, in order to investigate the foodware needs of different cuisines. This would have ensured that no particular cuisine type or neighborhood would be markedly overrepresented; however, due to the limitations outlined in Chapter 3, we were unable to achieve it. We were, however, able to focus specifically on gathering interviews from non-English-speaking FSB owners and managers to guarantee some representation in our data collection from traditionally underrepresented voices in the FSB community.

When asked if they would participate in a reuse system, six of the nine interviewed FSB owners expressed interest; the same number of interviewees were also interested in participating as customers. Only two of the interviewees said their businesses would not be interested, with one business owner stating that they needed more information on reuse systems before participating. Continuing to the greater analysis, we identified four main thematic categories under which important subthemes emerged: **environment**, **general concerns, government support**, and **community and customers**. The analysis also revealed equity concerns that are addressed in Section 4.2.3.

Environment

Nearly every FSB owner or manager interviewed expressed awareness as to the importance of addressing the ongoing climate and environmental crisis. Most were also aware of the negative impacts of waste generated from single-use packaging as well as the toxicity of plastic and single-use production emissions. Further, many acknowledged that environmental sustainability is important to address now for various environmental reasons; one FSB owner even pointed to the eventual depletion of raw production materials as a primary motivator to change. Although most of the FSB owners interviewed wanted to invest more in compostables or reusables, they were hindered by the COVID-19 pandemic and the rising costs of containers.

Many FSB owners turned to single-use takeout containers during COVID-19 to protect customers, ensure cleanliness and safety, and stop the spread of the virus. Due to the increase in takeout order volume, FSB owners had to purchase more single-use foodware containers. The subsequent increase in demand resulted in compostables becoming too expensive and difficult to find, forcing FSB owners to purchase less sustainable foodware. Increased prices due to COVID-19 demand constraints made it difficult for FSB owners to fulfill their environmental commitments to reduce waste. Though many interviewees valued sustainability, they stressed repeatedly that material costs needed to be reduced before FSB owners could feasibly invest in wholly sustainable options. Some FSB owners hypothesized, therefore, that businesses might be more willing to invest in reusables if the costs of compostables and other single-use products remained high.

As mentioned previously, many FSB owners were interested in participating in a reuse system. Some pointed to the importance of reducing litter and garbage in communities as a reason to participate, while others framed it as simply doing something good for the environment. The interviewees also thought their customers would be interested in participating as well, given

Seattle's progressive nature, knowledge of sustainability, and environmental conscientiousness. Despite their interest, some FSB owners wanted more information on the impacts of reuse in the environment, particularly regarding positive returns on investment, transparency in spending on a reuse system, and the break-even point of reusables. FSB owners pointed to issues with the current waste management system as a reason to be wary of a reuse system. They noted general unawareness pertaining to the current system's processes and impacts of participation, particularly in immigrant communities and amongst individuals facing language barriers. While a foodware reuse system interested many FSB owners, a lack of data surrounding its success and issues with understanding the current waste management system caused some hesitancy.

General Concerns

Though the concept of a foodware reuse system was generally appealing for FSB owners, all interviewees had serious concerns. The biggest concern by far for FSB owners was cost. Some highlighted the costs of purchasing sustainable or environmentally friendly products as a potential hindrance. Others pointed to the overall cost of participating in a foodware reuse system and wanted to know how much restaurants would pay for durables and how much the service itself would cost FSBs. As mentioned in the previous section, many FSBs identified supply chain issues as a driver of increased costs; because of this, any additional costs incurred would likely make starting a new system challenging for FSBs to implement.

Cost, too, was discussed as a component of the lasting impacts of the COVID-19 pandemic. The pandemic caused the cost of single-use and compostable containers to increase for many FSB owners. Federal government grants kept many FSBs afloat, and many have yet to recover. Because of this, some FSB owners worried that long-lasting fear and fatigue – coupled with supply chain issues, personnel and hiring constraints, and costs broadly – could dissuade participation.

Other elements of cost that concerned some FSB owners were fines and incentives and their relationships with government laws, regulations, and trust. Some interviewees had incurred fines for trash contamination in the past and experienced difficulty in enforcing or participating in city bans on plastic bags. They were concerned, therefore, that they could be fined even more in a reuse system, as there could be penalties if foodware was not returned or was lost. Further, due to the expected high startup and management costs of a new system in an already expensive city, some FSB owners asked about the possibility of incentives to encourage business participation and cover the costs of reusable products.

Some of the FSB owners interviewed expressed concerns with the city government, believing that it does not provide adequate regulatory guidance, nor does it help business owners follow regulations. One FSB owner cited the restrictions during the pandemic as an example and stated that many FSBs struggled to keep track of changes; this was particularly true if owners or customers had language barriers. Another FSB owner discussed how difficult it could be to connect directly with someone at the government for assistance. As an immigrant, this FSB owner found it intimidating to verbally communicate their needs through murky government outreach mechanisms. Other owners expressed frustration with ongoing regulations such as those in place for compostables and bag bans. Though most interviewees believed that a foodware reuse system, if implemented, would likely become a regulation or law, they stated that the

heavy investments the City would need to make in system marketing, education, and training could inhibit its success.

Education and training specifically were two major concerns brought up in the interviews. FSB owners discussed the importance of educating customers and FSBs on the logistics and benefits of a reuse system, particularly in communities that face language barriers, stigma, and have low-income residents. This was especially important to business owners that believed education on the current waste management system and bans were lacking. Many interviewees mentioned a need for education for themselves, particularly regarding third-party service providers and suppliers of various reusables and durables. They also wanted more education on existing data regarding foodware reuse system functionality and logistics, success rate, and long-term impacts. One FSB owner recommended utilizing social media as a tool to educate communities and other FSBs, while others highlighted traditional outreach, marketing, and staff training techniques as important to pursue. Overall, many FSB owners feared that taking on education and training on their own would add to strain FSBs already feel.

Many FSB owners had concerns about the reusable products themselves, particularly regarding safety, cleanliness, and logistics. Some FSB owners were supportive of reusables from a durability perspective, citing flimsy and poorly constructed single-use products as a nuisance and a driver of increased costs. Others were concerned that reusables would not stand up to constant use and wondered if it would be better to simply reduce the number of containers used overall. Logistically, some FSB owners cited a lack of storage space in their business as a challenge, particularly as it pertained to keeping them separate from in-house foodware. Another storage concern dealt with dirty reusables, with some FSB owners wanting to know how long they would have to keep used reusables before they were collected and cleaned (if reusables were being collected by a third-party service provider). Most interviewees requested more transparent information regarding foodware reuse system functionality, options, and operations, particularly regarding foodware transportation frequency and the location of drop-off and pickup stations.

Cleanliness, specifically, was a notable concern, particularly as it pertained to reusable drop-off locations. Interviewees highlighted rodents and fruit flies as concerns, as well as possible trash contamination in drop-off bins. Some FSB owners were hesitant to participate without explicit agreement from the health department, as they were worried about the cleanliness and sanitization of reusables, storage, and collection zones. Many FSB owners wanted to see data on third-party washing and sanitizing services to ensure that they worked, though some were happy about not having to take on an extra dishwashing burden.

The final major concern FSB owners discussed was customer participation. Though many owners believe their customer bases would be interested, some were curious as to whether there would be an option to participate or not, as this could impact FSB participation broadly. Many discussed the necessity of drop-off zones to be numerous and located in many different parts of Seattle to increase participation. A few FSB owners worried that some customers would not return reusables (either because of theft or forgetfulness). Others were worried that customers would pay for a foodware reuse system through increased prices, making it challenging to encourage participation. Finally, some interviewees thought an incentive of some sort might be necessary to get customers involved.

Government Support

All FSB owners interviewed wanted some level of assistance from the government to help with the implementation and management of a foodware reuse system, as well as to reduce any equity barriers they believed they could face. Most interviewees said they would want to see some form of financial assistance from the government, particularly for small businesses. Some mentioned pilot programs and grants to assist with implementation, while others discussed the costs of implementation and maintenance more broadly. Logistically, most FSB owners said they wanted the City of Seattle to handle drop-off, pickup, and distribution of reusable foodware to businesses. Some, too, highlighted dishwashing being done off-site or by another party as a benefit of pursuing reuse. One business owner specifically addressed a hesitancy to work alone with third-party service providers, saying that the city government needed to handle those logistics for a foodware reuse system to work. Another FSB owner indicated that Seattle should consider a program that would not be app-dependent as a means to increase accessibility. Overall, FSB owners generally wanted city support for logistical guidance and maintenance.

Nearly all FSB owners interviewed highlighted marketing, education, and training as an area where government support was needed. Marketing assistance in particular was highly supported, with FSB owners requesting strong FSB and small business engagement aid. FSB owners that expressed a desire for marketing assistance stated that the government must clearly communicate the drop-off, pickup, return, and delivery mechanisms to business owners and the general public. The government should also be responsible for training staff and educating FSB staff and customers on the foodware reuse system process. Finally, some interviewees pointed out that education, marketing, and training should be available in multiple languages to help non-ESL FSB staff and customers better understand a reuse system.

Some FSB owners had thoughts on what the government could do through legal action and policy to enforce a reuse system. There were conflicting views: some owners believed the government should not give people the option to opt out of a foodware reuse system, while others said FSBs and customers should have the choice. Some interviewees said that though government mandates have helped galvanize the public into using or being aware of environmentally conscious packaging, they could be difficult to follow. Overall, the FSB owners interviewed were split on how a foodware reuse system should be enforced.

Community & Customer

Many FSB owners saw the value in strong community ties and accessibility for customers when discussing foodware reuse system implementation. Some interviewees believed reuse systems could be good for and help build communities, particularly if drop-off and pickup locations were numerous and easily accessible. Community participation in a reuse system could only occur, however, if customers were not held to high expectations; it will be important to meet community members where they are. Additionally, some FSB owners felt more comfortable participating in a reuse system if they knew they had strong buy-in from customers, though many believed their customer base would be interested in participating.

FSB owners also cited business collaboration as another way to build community. Some broached the idea of having collection zones in larger area restaurants that had more space, while others suggested restaurants work together to find supplies. Another idea was to establish a network of participating FSBs in neighborhoods so they could work on a reuse system together.

Finally, an FSB owner suggested partnerships with delivery apps such as Grubhub and UberEats to streamline the transportation of reusable foodware and containers.

Overall, most owners interviewed believed their customer base would be interested in participating in a reuse system. The "liberalness" of Seattle's citizens, coupled with general community awareness of its environmental benefits, was encouraging to business owners. That said, many FSB owners pointed out that the cultural, socioeconomic, and language differences present throughout the City could make it challenging to attract mass customer participation without tailored approaches to reuse system implementation and development.

4.2.3 Service Provider & Food Service Business Equity Concerns

The FSB and service provider interviews revealed many potential equity barriers. However, because we were unable to interview a representative sample of FSB owners in Seattle, we could not call these concerns definitive equity barriers; thus, we have referred to them as equity concerns. More research must be conducted to determine the true scope and impact of these potential barriers on the greater FSB population. Despite this, we wanted to discuss the equity concerns we identified in-depth, as they may provide a guideline by which future researchers could conduct further data collection and analysis on this topic.

The FSB and service provider interviews revealed six primary equity concerns: **trust, awareness, accessibility, cost, safety and cleanliness, and participation**. Many FSBs currently struggle with increased costs due to supply chain constraints, the COVID-19 pandemic, and existing regulations. The introduction of, and participation in, a foodware reuse system itself will be a major equity concern for FSBs, particularly those that are struggling financially, that cannot afford to lose customers, and that are owned, operated, or staffed by immigrants or non-English speakers. There is a risk that the purchase of reusables, the handling of system logistics, system start-up and maintenance, and education, marketing, and training would be too much for FSBs to handle in terms of financials, awareness, and participation. Additionally, FSBs that operate in low-income neighborhoods run the risk of losing customers if the cost of a reuse system is reflected in their menu pricing, impacting participation. FSBs located in financially stable neighborhoods and who themselves are financially well-off would have a greater ability to afford reusables and dedicate the resources to implementing a reuse system. FSBs that lack the necessary storage and dishwashing capacities for a reuse system would have to either pay for third-party services or upgrade their infrastructure, both of which impose a cost burden. FSBs who are struggling in any way or who do not have a strong relationship with or understanding of government mandates, functionality, and sustainability will likely face tremendous hardship if implementing a reuse system.

As discussed previously, customers who do not speak English as their first language and recent immigrants struggle with understanding the current waste management system, impacting system accessibility. The addition of a new system – especially if there is little-to-no government aid for multicultural outreach, education, and marketing – would add an undue burden on those customers and impact their trust in government. The stigmatization of marginalized groups over cultural differences or language barriers, too, may contribute to a lack of trust in the greater community and the government, lowering the likelihood of mass community participation.

Hands-on education and outreach materials will be needed in multiple languages to break down stigma, cultural, and language barriers and make the reuse system process clear.

Accessibility is also an equity concern for the FSBs themselves. Many FSBs have employees who face language barriers, making training and education more challenging if the materials are not produced in various languages. FSBs struggling financially may have difficulty providing education for staff, particularly if the government is hands-off during implementation. This, again, places an undue burden on diverse FSBs, as they may not be able to train their staff appropriately, which may result in fines that add to that burden.

The products or system design of a reuse system will also impact accessibility. Some foodware products, especially those with lids, are difficult for people with disabilities to use, making them inaccessible. App-based systems have the potential to exclude people without smartphones, older individuals that are not comfortable with technology, people with disabilities, and individuals without access to a credit card. The frequency and location of collection stations is important to ensure customers are not overburdened when using the reuse system: they must be centrally located and easily accessible by all participants. Further, drop-off and pickup stations must be clean and safe so as not to overburden a community with trash contamination, rodents, and emissions from collection. Finally, sanitization must be taken seriously and validated by the health department so as not to cause illness or attract pests.

4.3 Quantitative Analysis

Because interview questions were open-ended, the quantitative data were taken from survey responses (n=62).

4.3.1 Data by Demographics

One of our objectives was to determine if there were notable differences in survey answers between demographic groups. Of the respondents, 41.3% identified themselves as BIPOC (n=26), 23.8% as immigrants (n=15), 38.1% as women (n=24), 17.5% as LGBTQIA+ (n=11), 4.8% as veterans (n=3), 3.2% as someone with a disability (n=2), and 39.7% as "other" (white male or selected "prefer not to say"; n=25) (Figure 4.1).
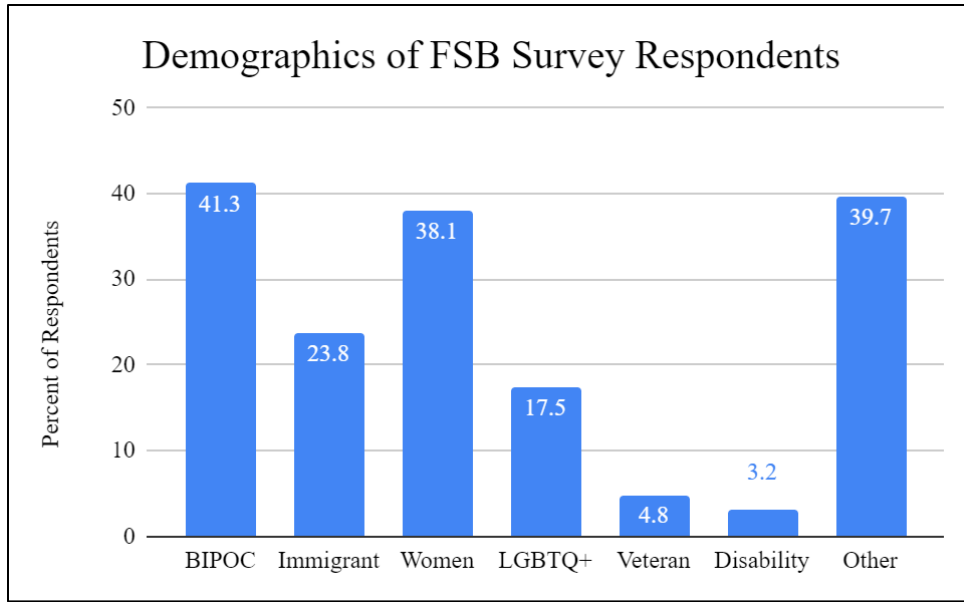
Figure 4.1. *Demographic data from FSB survey respondents.*

Due to the small sample size from each demographic group, the fact that these identities are not mutually exclusive, and the inability to extrapolate that everyone who selected "prefer not to say" did not identify as any of the other discrete options, we were unable to do statistical analysis or compare groups as if they were discretely different from each other. However, we calculated the percentages for each answer for BIPOC, immigrants, and women FSB owners.[3]

Dishwashing Capabilities
To understand if FSBs could wash reusable foodware in-house without a third-party dishwashing facility, we asked if they had a three-basin sink or commercial dishwasher. Of the respondents, 12.9% (n=8) reported they only had a three-basin sink, 21% (n=13) had only a commercial dishwasher, and 59.7% (n=37) had both a three-basin sink and a commercial dishwasher. Overall, 95.2% of FSBs surveyed had a three-basin sink and/or a commercial dishwasher (Figure 4.2).

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[3] LGBTQIA+, veteran, and disability demographics had too low of a sample size to analyze with any meaningful results. Analyzing the "other" category as a demographic was ruled out due to a lack of resolution of the identities of those who selected that answer.
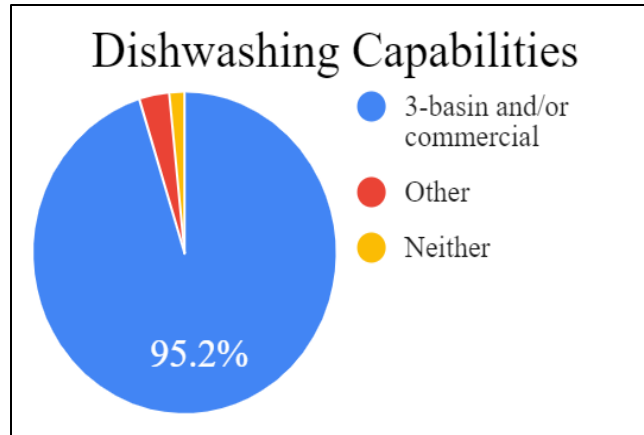
Figure 4.2. *Dishwashing capabilities of surveyed FSBs.*

Financial Stability

While financial analysis was not a primary goal, financial stability of FSBs is important to gain an understanding into how readily FSBs could adopt a reuse system without external financial support. In total, 33.9% (n=21) stated they were stable and profitable, 27.4% (n=17) were somewhat profitable, and 33.9% (n=21) were just getting by. It is important to note that of the three "other" responses, two of them mentioned the COVID-19 pandemic as a hardship (Figure 4.3a).

Trends varied slightly for BIPOC, immigrant or women-owned FSBs. For BIPOC-owned FSBs, 36% (n=9) stated they were stable and profitable, 44% (n=11) were somewhat profitable, and 20% (n=5) were just getting by (Figure 4.3b). Immigrant-owned FSBs indicated that 40% (n=6) were stable, 20% (n=3) were somewhat profitable, and 33.3% (n=5) were just getting by (Figure 4.3c). Women-owned FSBs responded that 27.3% (n=6) were stable, 36.4% (n=8) were somewhat profitable, and 36.4% (n=8) were just getting by (Figure 4.3d).
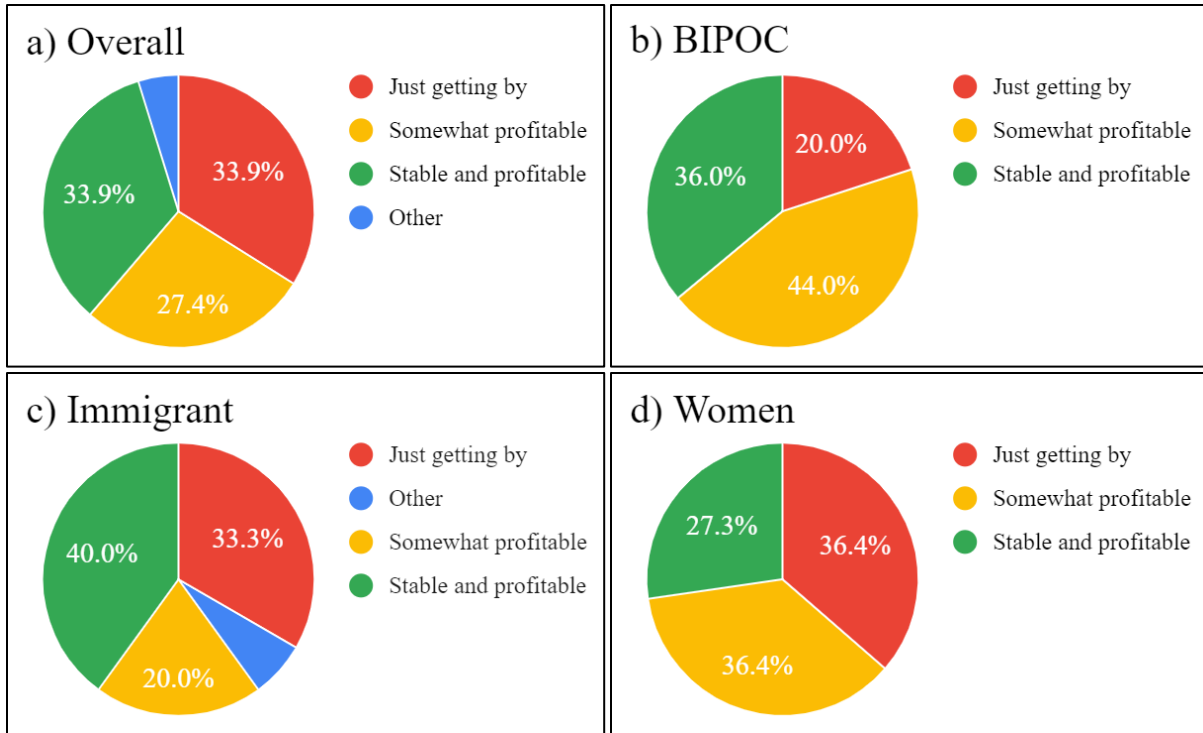
Figure 4.3. *Financial status of surveyed FSBs: a) Overall, b) BIPOC-owned FSBs, c) Immigrant-owned FSBs, and d) Women-owned FSBs.*

Interest Level

Of the 62 respondents, 91.9% expressed interest in a reusable system (Figure 4.4). Interest seemed to be higher in BIPOC (100%), immigrant (93.3%), and women (100%) respondents. This is a promising figure for a possible reuse system implementation.
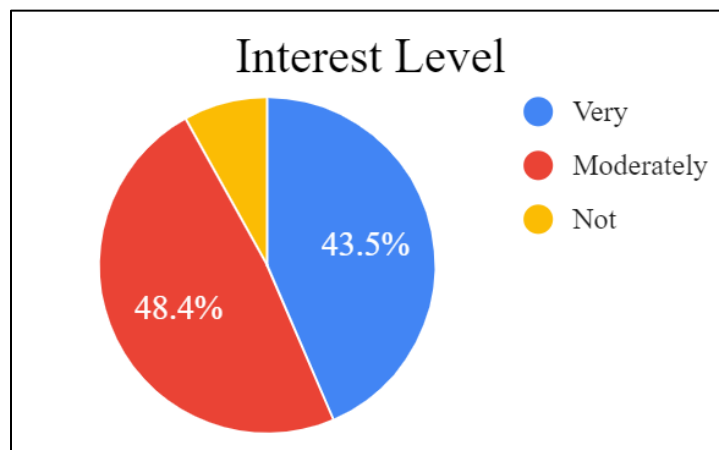

Figure 4.4. *Percent of total respondents by interest level in a reuse system.*

While the interest level was high overall, 57.4% of respondents who indicated interest stated that they would participate only after the reuse system demonstrated success. In addition, 31.2% indicated that they would participate immediately, and 11.5% said they would participate after other FSBs participated (Figure 4.5).
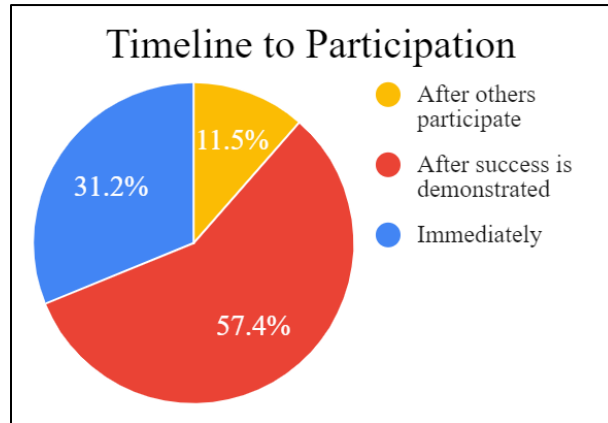

Figure 4.5. *Percent of total respondents by participation timeline.*

Concerns with Reuse Systems

The greatest concern for FSB owners was the high cost to entry (79.0%). This is consistent with food service business owners' hope for financial support from the city government. Overall support from the City was the second-highest answer; 67.7% of respondents expressed worry about the uncertainty of whether Seattle would provide help in any way. Storage (58.1%), supply chain issues (56.5%), and customer acceptance (51.6%) were other noticeably high responses. Logistics with third parties (33.9%), new technology (17.7%), and participation of other FSBs (14.5%) were the lowest responses (Figure 4.6). These patterns were consistent across demographic groups.
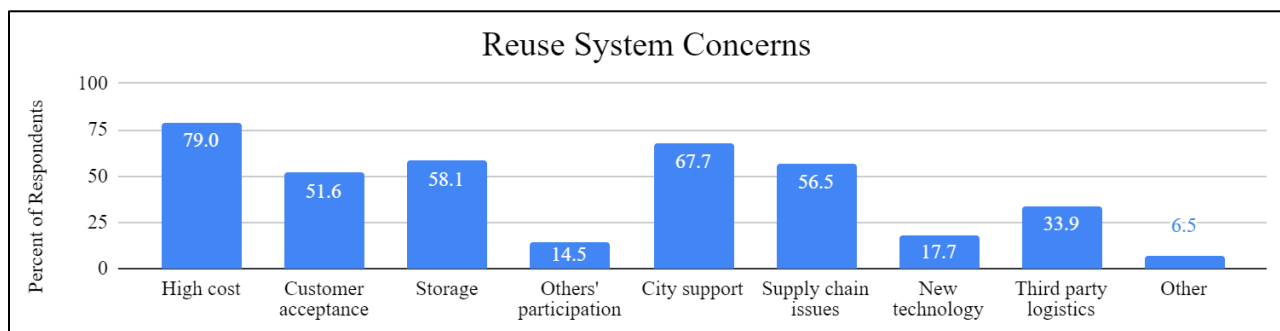

Figure 4.6. *Overall concerns of the respondents regarding reuse system implementation.*

Desired City Support

The majority of respondents expressed that they wanted assistance with foodware pickup and dishwashing services, both of which could be provided by a third party. The second highest selected answer was financial help, which has been a common theme throughout our discussions with FSB owners, SPU, and service providers. Technological assistance and education were also notable issues (Figure 4.7). These trends were consistent across demographic groups.
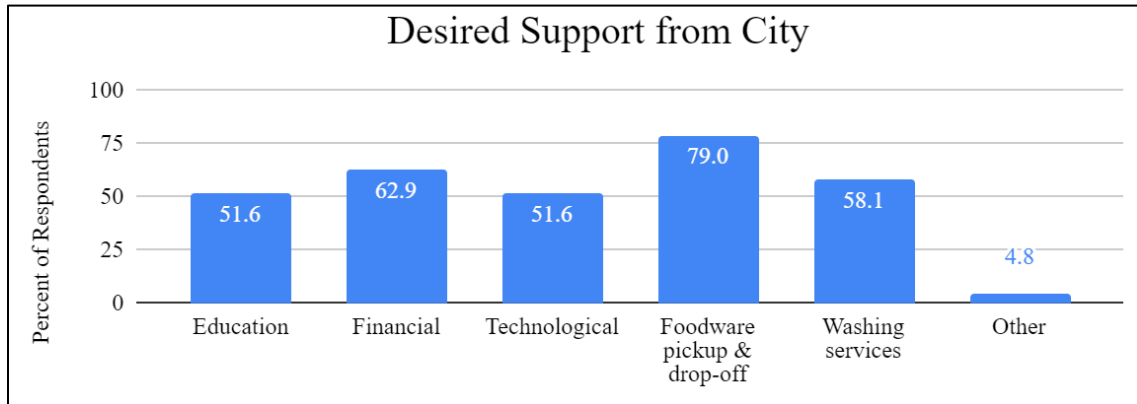

Figure 4.7. Overall respondents' desired help from the City/SPU.

Handling Logistics

In the survey, FSB owners were asked if they were willing to participate in a reuse system if they had to handle logistics that would otherwise be the responsibility of third parties. Most responses (62.9%) from the different demographic groups expressed an unwillingness to handle logistics (Figure 4.8). This is reflected in the desire for help with foodware pickup and drop-off and washing services.
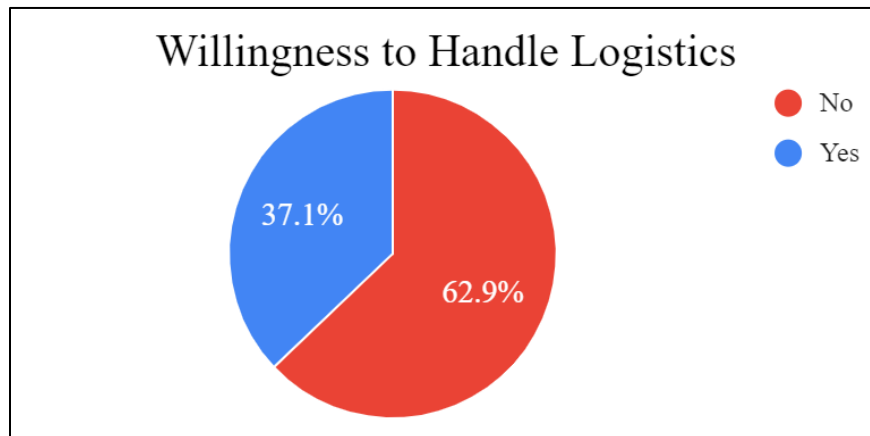

Figure 4.8. Overall willingness to handle logistics such as partnering with service providers, washing foodware, and handling collections.

4.3.2 Data by Cuisine

Dividing by cuisine, the research team analyzed differences in the percent of orders as takeout and container types that FSBs would be most likely to replace. The most common cuisines were American (32.3%, n=20), Asian[4] (16.1%, n=10), and cafés and bakeries (16.1%, n=10). Because the sample sizes were too small for all other cuisines, we chose to compare these three.

Container Type

Overall, clamshells were the most popular (61.9%), followed by bowls with plastic lids (46.0%), utensils (36.5%), soup or pho containers (34.9%), boxes (34.9%), and cups (31.7%) (Figure 4.9a). The most notable differences from the overall responses were Asian FSBs' willingness to replace soup/pho containers more (50%) (Figure 4.9b) and cafés' and bakeries' willingness to replace cups (68.8%) (Figure 4.9d).
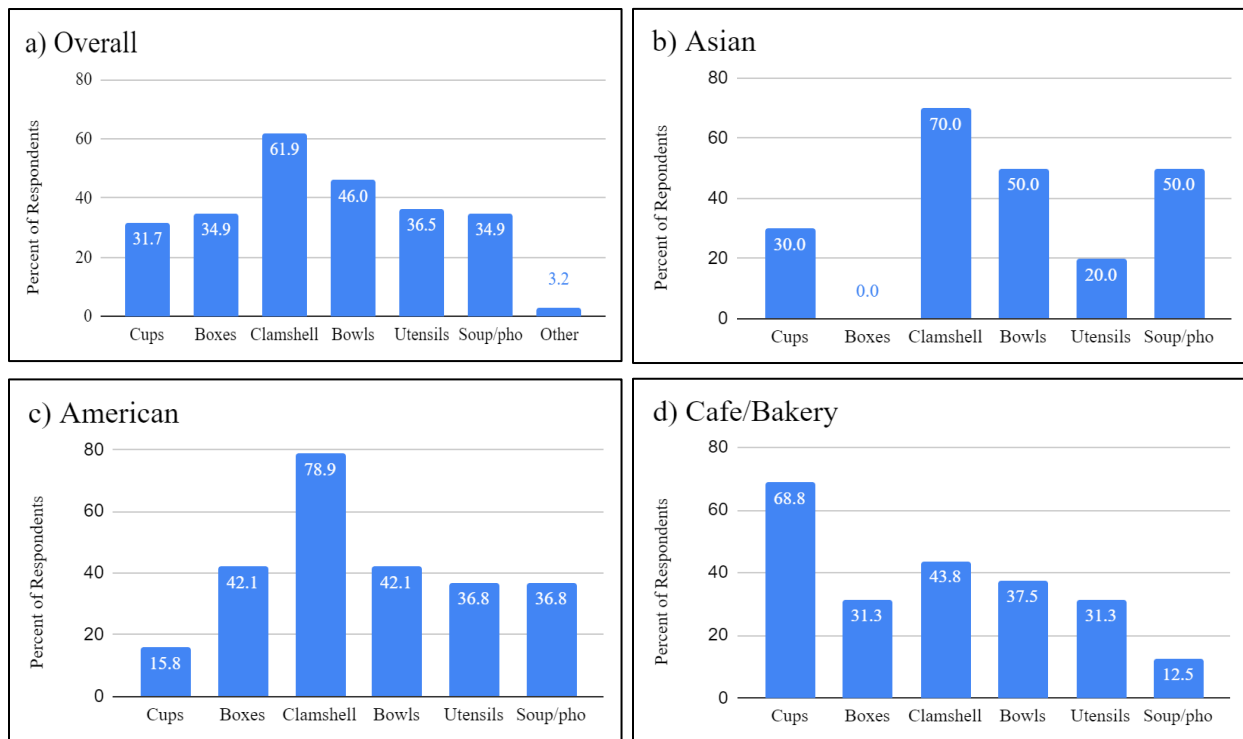

Figure 4.9. *Percentage of FSBs that would replace different container types: a) Total FSBs, b) Asian cuisines, c) American cuisine, and d) cafés and bakeries*

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[4] Asian cuisine group was created by compiling Asian fusion, Cambodian, Filipino, Japanese, Thai, and Vietnamese. We wanted a diversity of cuisines represented, and this was the best way to ensure that not only American and cafés and bakeries were analyzed.

Percent Takeout Orders

We also analyzed the differences in the percent of orders at FSBs that are takeout. The majority of FSBs answered that takeout orders comprised less than 20% of their orders (41% of respondents). On the other end, 22.9% of FSBs indicated that over 80% of their orders were takeout (Figure 4.10a). Asian FSBs (50%) (Figure 4.10b) and American FSBs (63.1%) answered that less than 20% of their orders were takeout (Figure 4.10c). Cafés and bakeries had higher percentages of takeout orders; 37.5% of café and bakery respondents said that more than 80% of their orders were for takeout (Figure 4.10d).
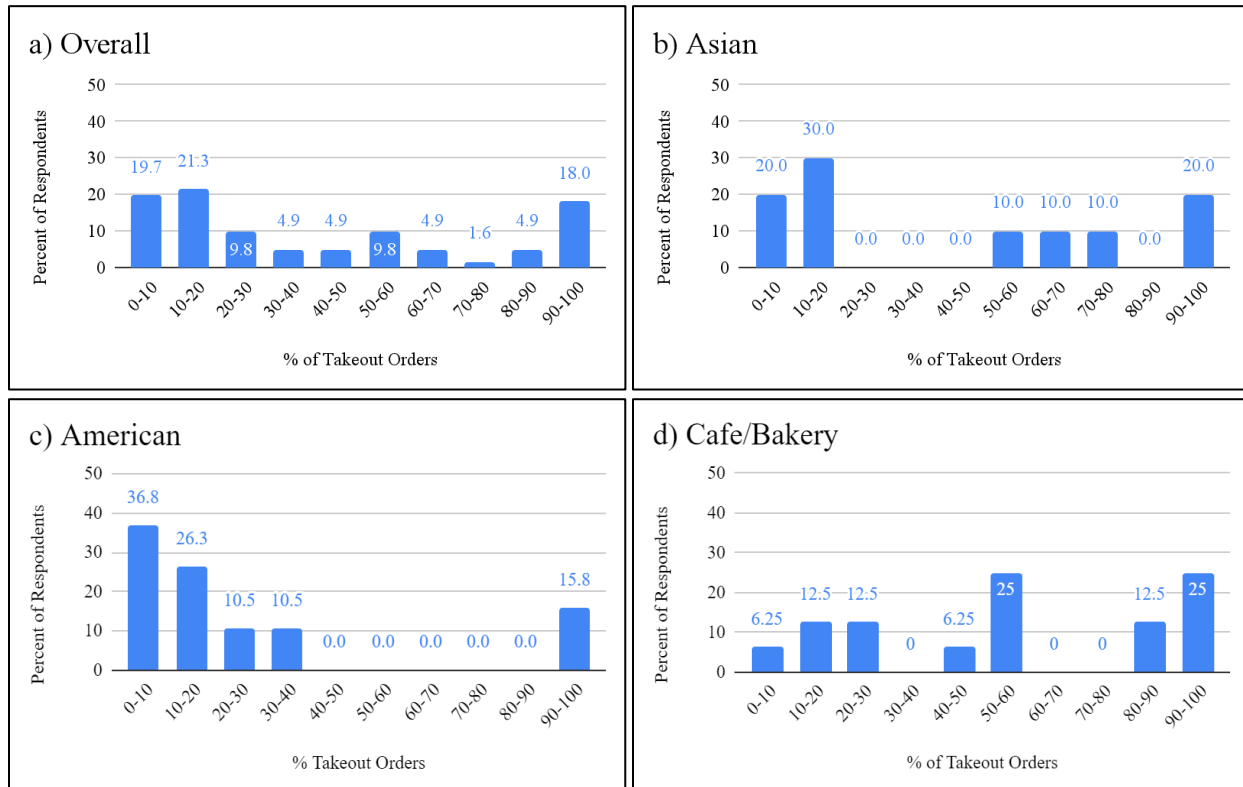

Figure 4.10. *Percent of takeout orders. a) Total FSBs, b) Asian cuisines, c) American cuisine, and d) cafés/bakeries.*

4.4 Geographic Analysis

Using the results from the survey, the team conducted geographic analysis to identify possible spatial patterns. Despite the distribution of the survey to FSBs across Seattle neighborhoods, the low response rate of the survey makes it difficult to draw precise conclusions about the spatial patterns. Additionally, the geographic data collected from the survey do not match the data in Section 4.5; the quantitative analysis is based on the number of survey responses while the geographic analysis is based on the minimum number of businesses operating in each neighborhood, as reflected in the respondents' answers.

To be clear, the minimum number of businesses operating in each neighborhood does not equate to the total number of unique businesses. This results from ensuring respondents' anonymity, as

the survey does not ask for specific address information. The survey only asks for the neighborhood(s) of operation. Most respondents – 42 of 62 – stated that they only represented one business in a single neighborhood; however, there were three respondents that operated a single FSB in multiple neighborhoods. Similarly, there are respondents that have multiple FSBs operating within one neighborhood, and some operate more FSBs than the number of neighborhoods in which they operate. For example, one respondent operates five FSBs in three neighborhoods, making it impossible to determine which neighborhoods have multiple FSBs. As such, this section uses the neighborhood-based unit of the minimum number of businesses operating in each neighborhood.
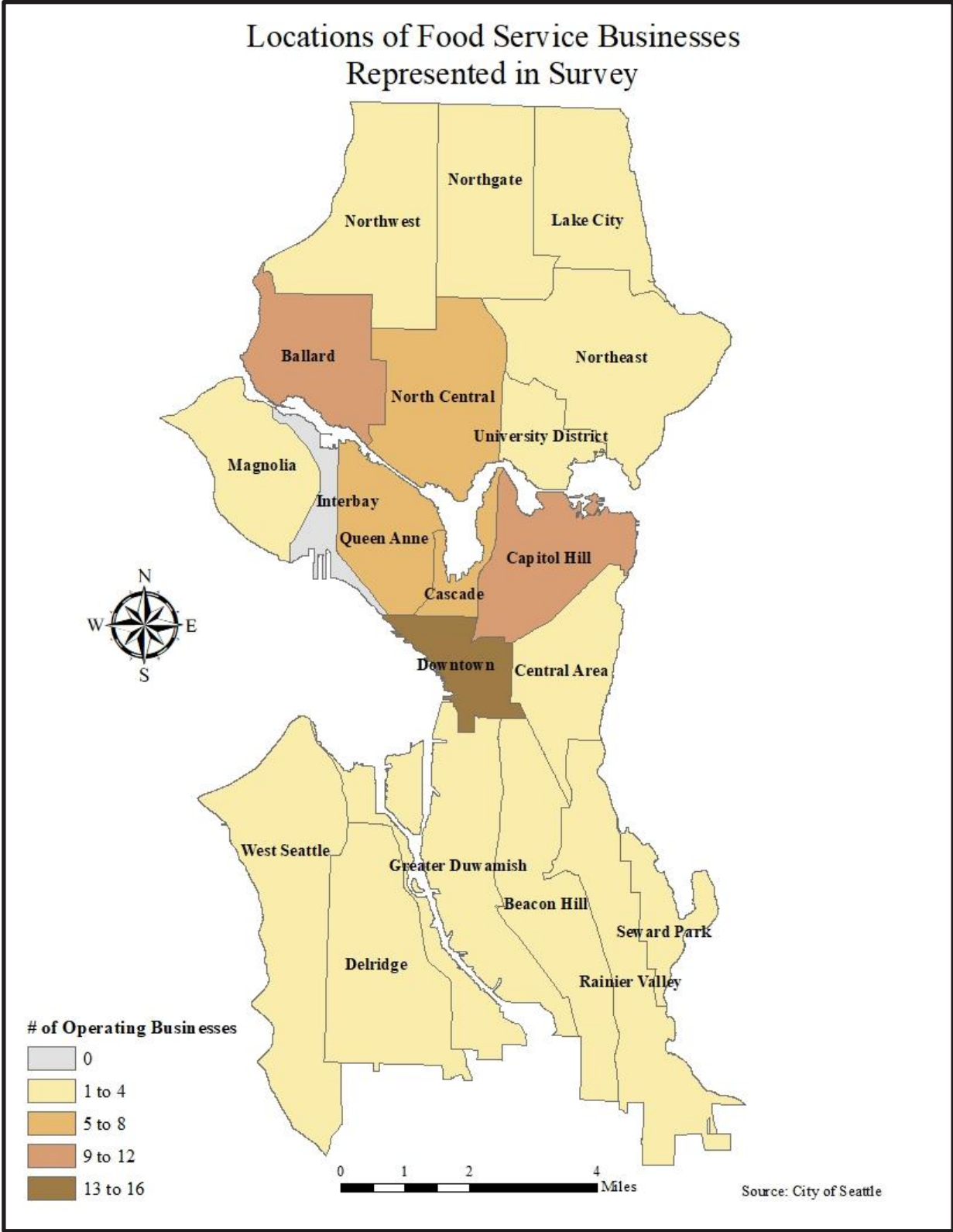
Figure 4.11. *The number of FSBs operating in each neighborhood according to survey data.*

Figure 4.11 shows the geographic distribution of respondents by neighborhood. Only six neighborhoods assuredly have more than four operating FSBs that responded to the survey within their boundaries. Downtown, in dark brown, represents the most FSBs operating in any neighborhood with at least 16. Capitol Hill and Ballard both stand for 11 FSBs operating within their boundaries, as shown in medium brown. Represented in an orangish brown, Queen Anne and Cascade both represent eight, and North Central stands for seven. None of the survey respondents indicated that they operate in Interbay.

Participation

After reading a brief description of foodware reuse systems, survey respondents were asked if they were interested in participating. Five respondents representing seven FSBs indicated that they were not interested; the other 57 respondents were interested in participating to some degree. Of those interested, 30 respondents representing 51 FSBs were moderately interested, and 27 respondents representing 44 FSBs were very interested.

Figure 4.12 demonstrates the relative interest of the FSBs with a presence in each neighborhood. Again, because the specific distribution of FSBs is unknown in several circumstances, Figure 4.9 represents the minimum number of FSBs operating in each neighborhood.

Out of the six high-response neighborhoods, four of them – Downtown, Capitol Hill, Cascade, Queen Anne – have more operating FSBs that are very interested than those that are moderately or not interested. North Central's operating FSBs are equally very interested and moderately interested, apart from one that is not interested. Ballard is the only high-response neighborhood where the moderately interested operating FSBs outnumber the very interested operating FSBs. Cascade, Capitol Hill, Downtown, North Central, and West Seattle all register a small number of not interested operating FSBs.

Most FSBs share some level of interest in participating in a foodware reuse system, but they differ in when they foresee themselves participating. Figure 4.13 demonstrates the timing as to when FSBs would participate in each neighborhood.

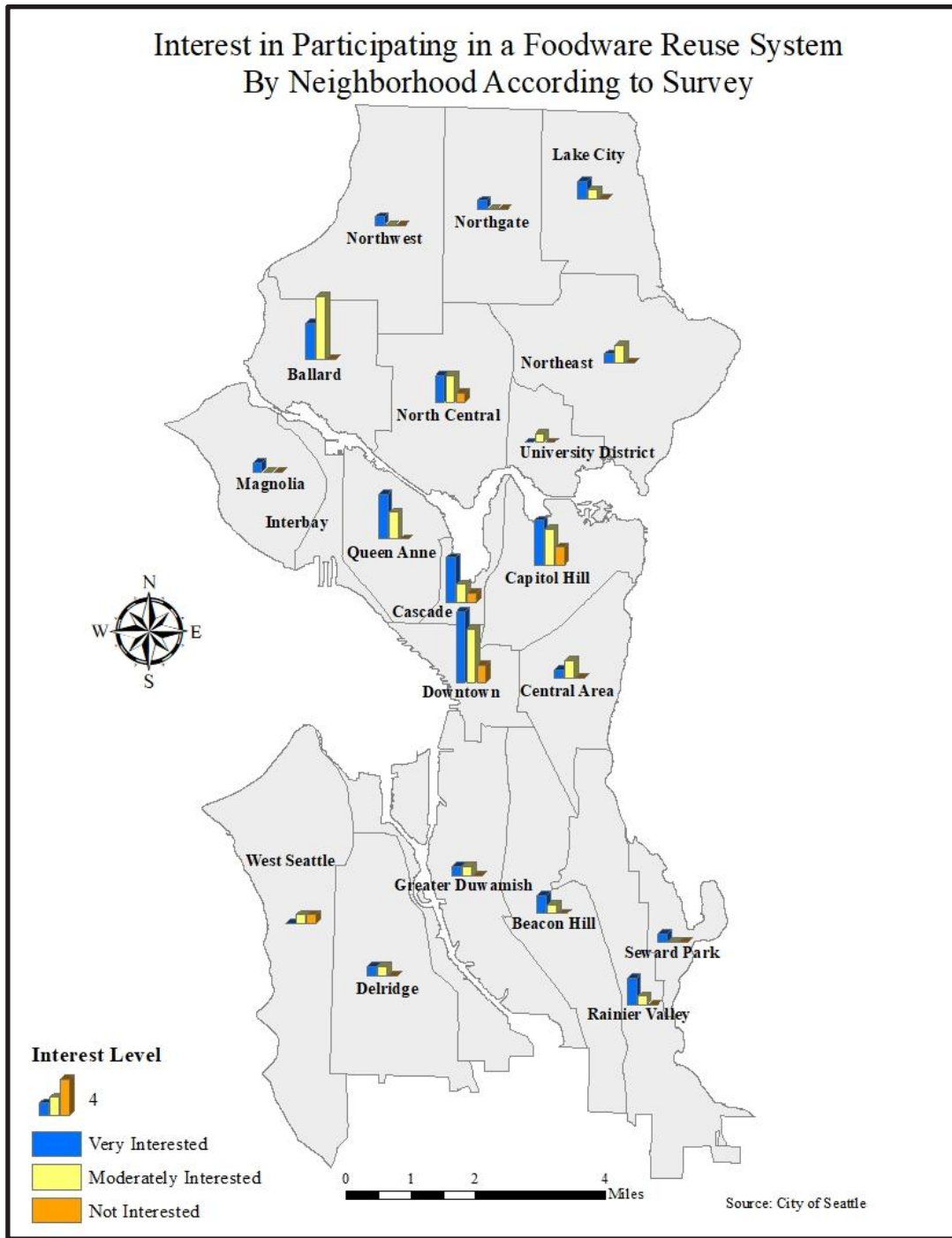***Figure 4.12.*** *Interest level of FSBs operating in each neighborhood according to survey data. Note that the '4' next to the bar chart in the legend serves as a scale to estimate the number of FSBs selecting each choice in each neighborhood.*
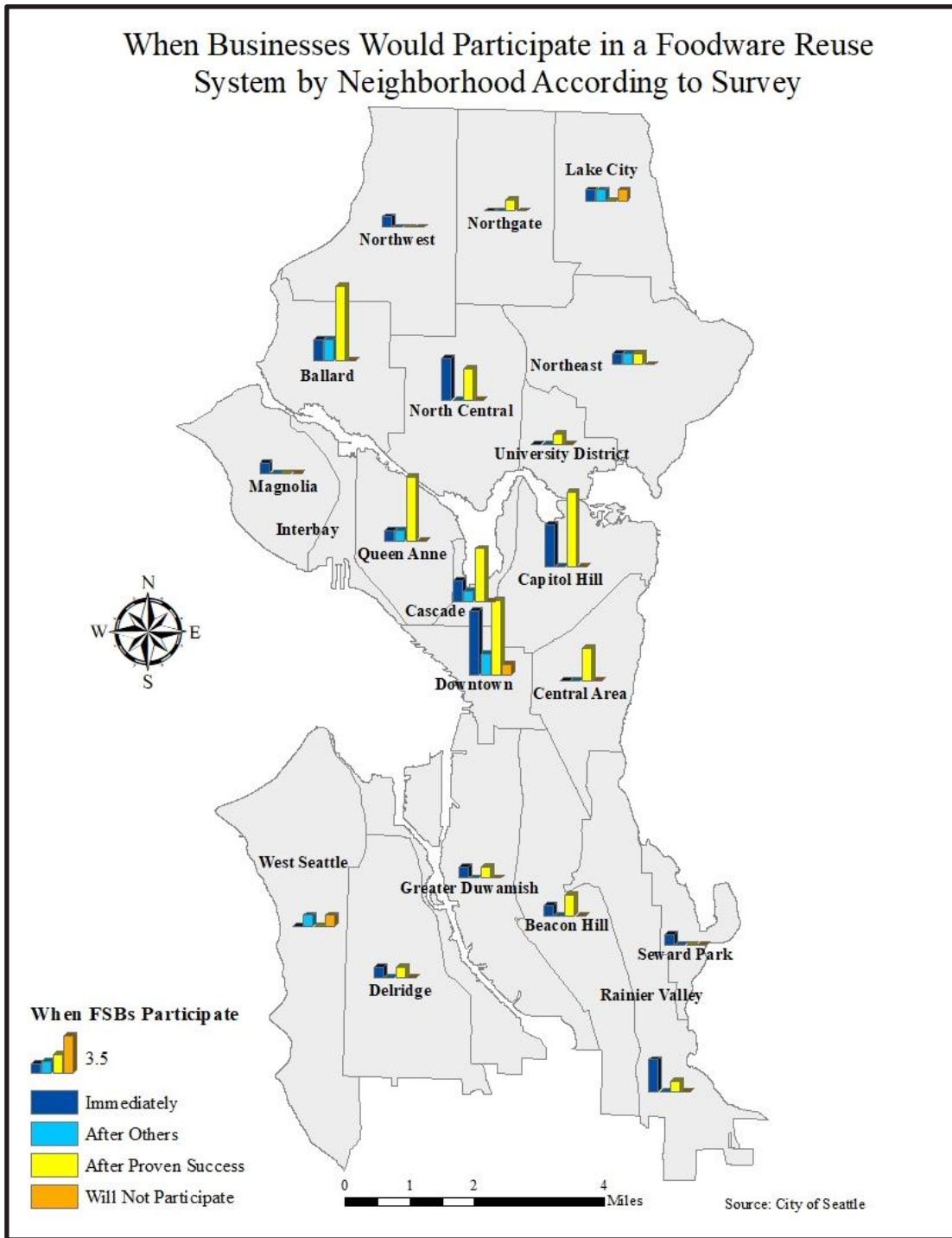
Figure 4.13. *The relative timing of when food service businesses would be willing to participate in a foodware reuse system according to survey data. Note that the '13' next to the pie chart in the legend serves as a scale to estimate the number of FSBs selecting each choice in each neighborhood.*

In five of the six most responsive neighborhoods, the largest proportion of operating FSBs foresee themselves joining a foodware reuse system only after it demonstrates success. The exception is North Central, where the majority of FSBs would immediately participate. Downtown serves to be the most complex, where there is no single majority. After those waiting for demonstrated success, the next largest response in Downtown was that FSBs would immediately participate. Some FSBs in Downtown would be more willing to participate after others engage, and some will not participate. Ballard, Cascade, and Queen Anne also have some FSBs that would not participate until others participate first. The FSBs initially uninterested in participating, as shown in Figure 4.13, in North Central, Cascade, and Capitol Hill would still participate, and one of the FSBs in Lake City would not participate, despite their interest. One FSB in West Seattle would not participate either.

When asked to identify the single-use foodware that they would like to replace, clamshells and bowls with plastic lids were the two most popular choices. By neighborhood, as shown in Figure 4.14, there is no common trend from neighborhood to neighborhood. This is in part due to the ability for respondents to select multiple options. Some respondents selected multiple options while others only selected one option.

Clamshell containers were the single most popular choice in Downtown, Capitol Hill, Queen Anne, Northeast, Beacon Hill, Delridge, and West Seattle. In Downtown and Capitol Hill, bowls with plastic lids also received broad support.

Beyond the broad support of clamshells in five of the six most responsive neighborhoods, Cascade, Capitol Hill, Downtown, Queen Anne, and North Central differ in what their operating businesses would like to replace with reusable materials:
- *Cascade* saw equal support for replacing bowls with plastic lids and clamshell containers, with cups and utensils being the next preferred.
- *Capitol Hill* received broad support in replacing clamshells, while bowls with plastic lids, utensils, and boxes received moderate support.
- *Downtown's* support for replacing clamshells and bowls with plastic lids far outweighs the support for replacing boxes and soup and pho containers. Utensils and cups received a moderate amount of support.
- *Queen Anne* respondents preferred to replace clamshells the most with a moderate preference for boxes, cups, soup and pho containers, and bowls with plastic lid.
- *North Central* FSBs preferred to replace cups and clamshells the most, and support for other options was comparatively low.

The last of the six most responsive neighborhoods – Ballard – differed from the others in that it saw broad support across all options. Additionally, neither clamshells nor bowls with plastic lids was (one of) the most preferred options. Utensils and boxes (not pizza) received the most support, though this preference only slightly outmatched that for bowls with plastic lids. Preference for bowls with plastic lids was slightly higher than for cups, clamshell containers, and soup and pho containers.
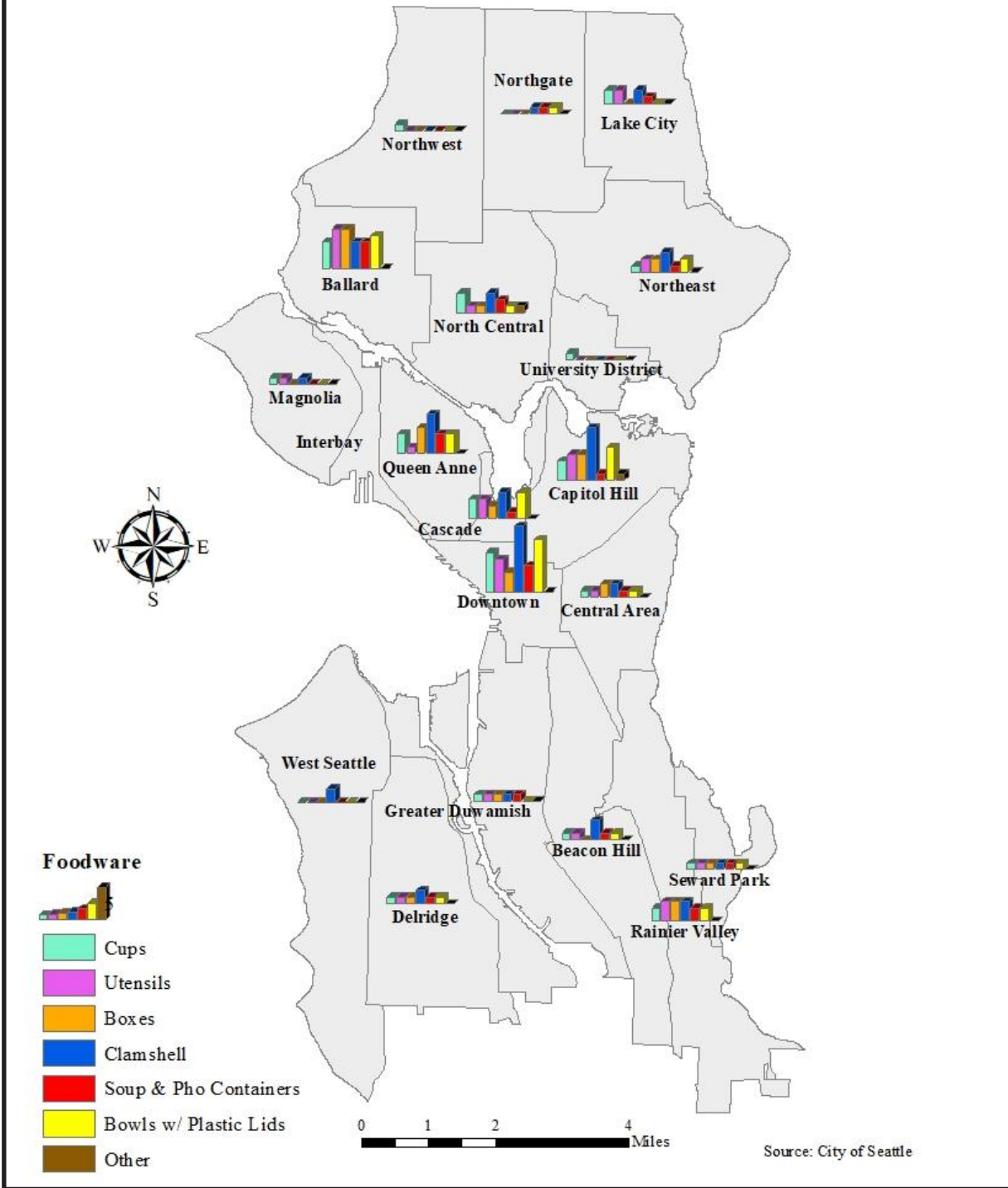
Figure 4.14. *Overall desired reusable foodware to replace single-use foodware by neighborhood. Note that the '5' next to the bar chart in the legend serves as a scale to estimate the number of FSBs selecting each choice in each neighborhood.*

FSB Characteristics

Survey data indicated that there was a diversity of cuisine types, though two cuisines far outnumbered the rest: American and cafés and bakeries. As discussed in Section 4.6, the research team grouped similar cuisine types in an attempt to add analyzable groups beyond American and cafés and bakeries. The team assumed that cuisine types from the same geographic regions share similar foodware needs and uses. The only large enough group to emerge from this process was "Asian," which is the amalgamation of multiple East Asian cuisines. Figure 4.15 shows the distribution of the cuisine types of FSBs operating in each neighborhood according to survey data.

Based on the survey results, American FSBs operate across Seattle. The highest number of American FSBs operate in Downtown and Capitol Hill. Only six neighborhoods have operating Asian FSBs, four of which are the high-response neighborhoods; Downtown has the highest number of Asian FSBs. Cafés and bakeries are found throughout Seattle with their highest number in North Central, where they outnumber each of the different cuisine categories. In five of the six high-response neighborhoods – Ballard, Capitol Hill, Cascade, Downtown, and Queen Anne – other cuisines outnumber each of the different cuisine categories.

The survey also sought to understand the current financial situation for FSBs. Respondents were asked about their current financial health and profitability. Most FSBs are only semi-profitable or limited in profitability. Figure 4.16 shows the financial health of FSBs operating in each neighborhood.

FSBs in Downtown and North Central skew towards being only semi-profitable and limited in profitability. Capitol Hill, Ballard, and Queen Anne have a roughly equal distribution of being stably profitable, semi-profitable, and limited in profitability. Cascade is the only high-response neighborhood that skews towards being stably profitable, as no respondents indicated their business(es) are limited in profitability.

In comparison to Figure 2.1, which shows the Social and Racial Index ranking of FSBs in Seattle based on census tracts, Figure 4.16 does not seem to follow the geographic trends, especially in the northern and southern neighborhoods. This is not contradictory, as Figure 2.1 was a proxy for social and financial health that was used to identify areas of interest. Census tract data do not necessarily apply to the individual, and financial health inevitably varies within each neighborhood.

Likewise, the survey responses are in no way representative of the northern and southern neighborhoods. The survey attempted to reach businesses across all Seattle neighborhoods, but responses remained low in the northern and southern neighborhoods, thereby limiting the scope of the analysis.
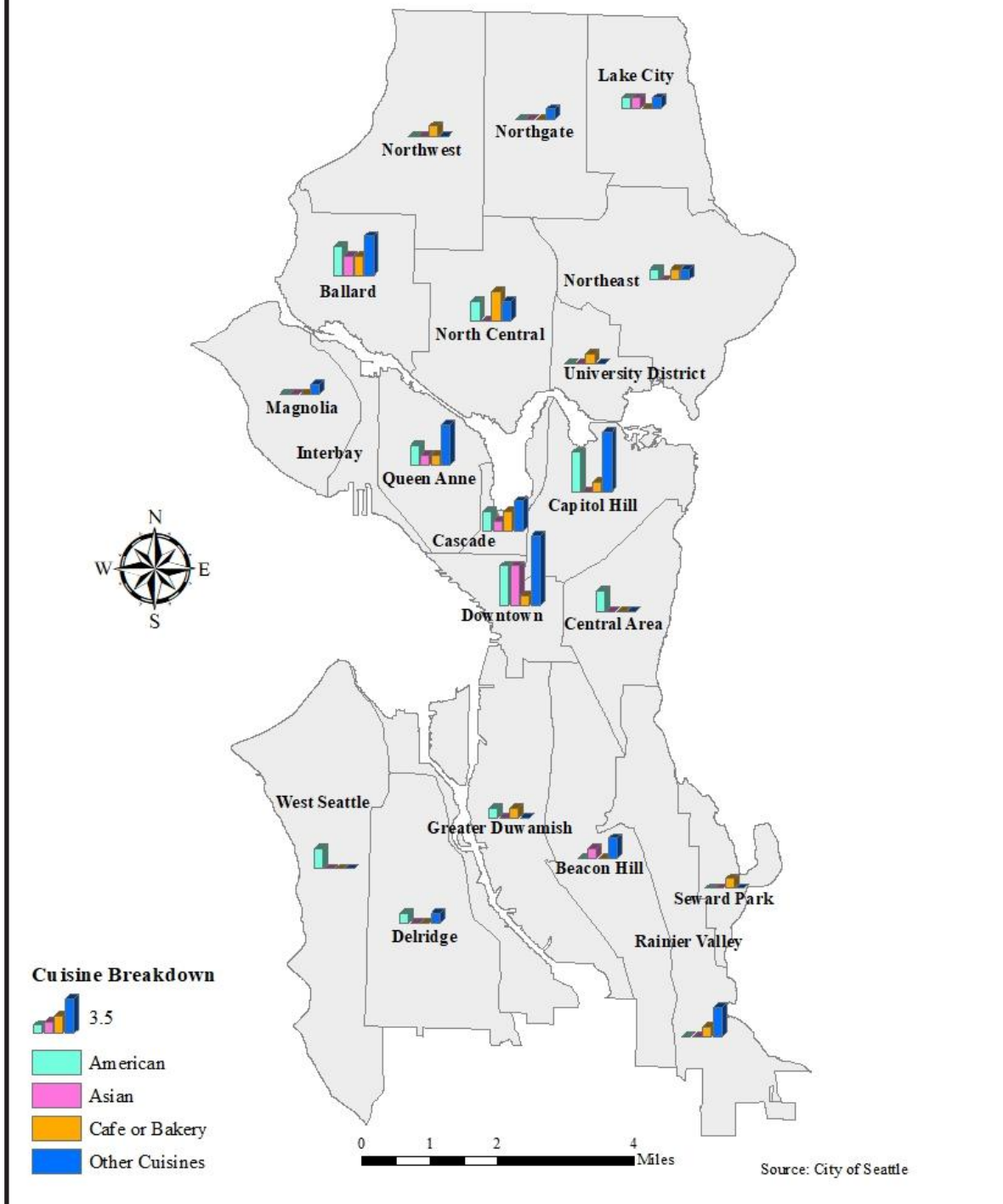
Figure 4.15. *The cuisine type of operating FSBs by neighborhood according to survey data. Note that the '3.5' next to the bar chart in the legend serves as a scale to estimate the number of FSBs selecting each choice in each neighborhood.*

Figure 4.16. *The profitability of FSBs operating in each neighborhood according to survey data. Note that the '4' next to the bar chart in the legend serves as a scale to estimate the number of FSBs selecting each choice in each neighborhood.*
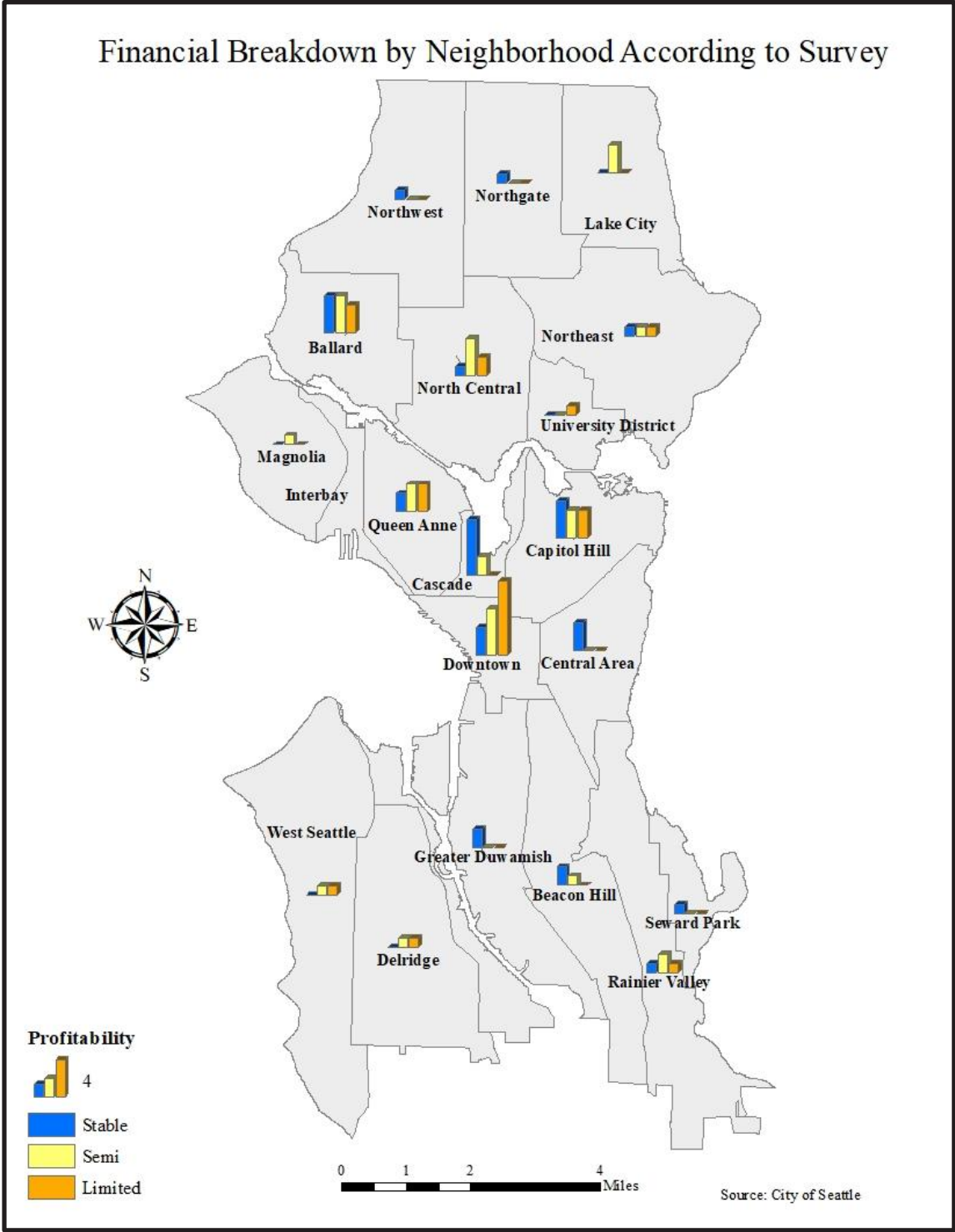
CHAPTER 5: EQUITY CONSIDERATIONS & RECOMMENDATIONS

5.1 Introduction

This section begins with a discussion of equity, including our selected equity criteria and identified equity concerns. Immediately following are the recommendations we developed based on our literature review and analysis of interview, survey, and GIS data.

5.2 Equity

For the purposes of this project, we defined "equity" as the distribution of goods or services in a manner regarded as fair, even if that distribution includes both equalities and inequalities. Due to a lack of data, we were unable to identify formal, representative equity barriers; however, we were able to identify numerous equity concerns. Though equity concerns, like traditional equity barriers, are systemic problems that prevent fairness from being realized, they are not representative of a population. Thus, we determined that our recommendations should center equity concerns, as our data were not representative of all FSBs in Seattle.

By using existing King County equity materials, we measure each recommendation option below by two equity criteria: distributional (or distributive) equity and procedural (or process) equity:

Distributional equity is defined as the "fair access to resources, benefits, and determinants of equity" (King County, n.d.). More specifically, policies or recommendations that fulfill distributional equity are those that fairly distribute benefits and burdens across all segments of a community, prioritizing individuals or areas with the highest need. Examples of distributive equity include policies that highlight government support and infrastructure development.

Procedural equity is defined as "inclusiveness in the decision process [that highlights] more than just mainstream voices" (King County, n.d.). Policies or recommendations that achieve procedural equity are those that focus on fairness in the political process for resource allocation and dispute resolution by centering representation and inclusion. Examples of procedural equity include stakeholder engagement, government communication and engagement with service providers and FSBs, public outreach, and the establishment of trust.

In order for our recommendation options to be considered equitable, **they must fulfill at least one of our criteria options without making the other criterion worse.** Because we and SPU believe a foodware reuse system is inherently better than a single-use world, achieving only one component of equity is acceptable. That said, we have attempted to fulfill both procedural and distributive equity in our chosen recommendations.

5.3 Potential Equity Concerns

Through our qualitative and quantitative analysis, we identified six equity concerns that could impact reuse system implementation:

- *Trust.* Several FSB owners and service providers expressed that lack of trust impacted their willingness to communicate or share information with local governments.

- *Awareness.* In the survey, 51.6% of FSB owners indicated that they were worried about customer acceptance and buy-in to reuse systems.

- *Accessibility.* FSB owners expressed concerns about the accessibility of reuse systems for both themselves and their customers. They mentioned internal training and education, uncertainty over cost, and logistical challenges such as storage space and collection bins.

- *Cost.* Cost and unknown financial support from local government were top concerns expressed by FSB owners in the survey and interviews. This was further emphasized by the 63.5% of survey respondents who desired financial help from the City.

- *Safety and cleanliness.* Multiple FSB owners indicated in interviews that they were concerned about the safety and cleanliness of reuse foodware and collection bins. Service providers also indicated that cleanliness was a priority for their systems.

- *Participation.* With these challenges, some FSB owners were hesitant or not interested in participating in a reuse system. In the survey, 8.1% of respondents indicated that they were not interested. While this is a small percentage, it demonstrates that there may be push back from FSB owners when a reuse system is implemented.

5.4 Recommendations

While the data gathered through this project are limited and not fully representative of FSBs in Seattle, the findings nonetheless provide some initial insights into the equity concerns for FSBs in a foodware reuse system. Our goal for the recommendations is to identify possible ways SPU may consider and address these potential barriers in pilot projects and other efforts as it moves forward in support of the transition to a foodware reuse system that is equitable and inclusive.

Our recommendation section is broken down into subsections that indicate each recommendation category. Those categories are primary recommendations, pilot program considerations, and program management recommendations.

5.4.1 Primary Recommendations

To clearly present the impacts each primary recommendation has on distributional equity, procedural equity, and specific equity concerns, we have outlined each recommendation in the following table (Table 5.1).

Table 5.1. *Primary recommendations and how they promote equity and address potential equity concerns.*

Recommendation	Distributional Equity	Procedural Equity	Concern(s) Addressed
Build trust between FSBs and government	Reduces undue burdens and intentionally includes FSBs	Centers voices and increases transparency	Trust, Accessibility, Participation
Explore grant programs for FSBs	Reduces or eliminates financial barriers to participation	Incorporates feedback from FSBs and service providers	Accessibility, Cost
Define and standardize vocabulary	Provides a basis for marketing and educational materials with accessible vocabulary	Incorporates feedback received from FSBs	Trust, Awareness, Accessibility
Connect FSBs and service providers	Relieves the burden on FSBs to seek out service providers	Allows FSB owners to pick the reuse system according to their needs	Trust, Accessibility, Participation
Work with service providers to train FSB employees	Training will be given to all participating FSB employees	Includes feedback channels to improve training	Trust, Awareness, Safety & Cleanliness, Participation
Identify incentives for service providers	Increases accessibility through time	Could include feedback from FSBs	Accessibility, Participation
Mitigate FSBs' physical limitations	Identifies and alleviated for all FSBs	Incorporates feedback received from FSBs	Accessibility, Participation
Facilitate placement and servicing of collection bins	Bins placed in centralized and frequented locations		Accessibility, Safety & Cleanliness
Coordinate with Health Dept. for guidance and approval	Ensures safety and cleanliness for all FSBs and customers	Incorporates feedback received from FSBs	Trust, Safety & Cleanliness
Develop educational and marketing materials for customers	Materials will be available and accessible for all customers	Incorporates feedback received from FSBs	Awareness
Establish feedback channels	Allows voices of diverse FSBs and customers to be heard	Incorporates of stakeholders' opinions into reuse system improvements	Accessibility, Trust, Participation

Build trust between FSBs, the City of Seattle, and SPU. FSB owners, operators, and staff – particularly those facing language barriers, are from marginalized communities, or are immigrants – are often hesitant to engage with government officials and do not trust that their concerns are addressed sufficiently via government action. Partnerships with community organizations like ECOSS help SPU hear from FSB owners who otherwise might not engage with the City. Involving community organizations with language and translation capacities (as well as strong ties to local businesses) in the planning and implementation process would facilitate dialogue and feedback amongst Seattle agencies, community organizations, and a diverse array of FSB owners. The feedback should then be shared with and consulted by policymaking agencies and decision makers throughout policy development and implementation, and the decision-making process itself should be shared with the public. Transparency and communication through relationships and contact adequately addresses trust and accessibility and, by extension, participation.

Increased efforts to reach out and hear from businesses and communities will help ensure a citywide reuse system does not cause an undue burden or leave certain businesses and communities behind in the transition, positively impacting distributional equity. Additionally, voices from diverse communities and businesses across Seattle will be centered in the development, decision-making, outreach, and implementation phases of a reuse foodware system, positively impacting procedural equity. Finally, increasing transparency throughout the policy development and implementation process and specifically utilizing community feedback further addresses procedural equity. *As both equity criteria are fulfilled by this recommendation, it can be considered equitable as per our equity definition in Section 5.2.*

Explore grant programs and identify potential funding partners to support FSBs transitioning to a reuse foodware system. In part, this effort could include the possible expansion of the Waste-Free Communities Matching Grant program to expand the accessibility of a foodware reuse system. Both service providers and FSB owners identified cost as a primary barrier to participation – in particular, the high startup costs associated with purchasing inventory and training employees. Many FSBs are already financially burdened due to the economic impacts of COVID-19 and the high price of compostables compared to alternative products. The recommendation fulfills our distributional equity criterion by reducing the costs associated with implementation, making reuse foodware systems accessible to FSBs that would not participate otherwise. To fulfill the procedural equity component, successful grant programs will require engagement and outreach to ensure FSBs are aware of the resources available to them. *As this recommendation positively impacts both equity criteria, it can be considered equitable.*

Define, clarify, and standardize the vocabulary associated with reuse systems and reusable foodware with the help of FSB owners, service providers, PR3, and community advocates. PR3, the public-private initiative hosted by RESOLVE previously mentioned in Chapter 1.2, is already working towards standardizing reusable foodware systems and committed to applying their standards to Seattle. Given PR3's role in standardization, it should expand its scope to setting the language and terminology standards surrounding foodware reuse systems as well.

Reuse systems are relatively new to the United States, and terminology varies across organizations, businesses, and governments. SPU should specifically emphasize ESL, BIPOC,

immigrant, and LGBTQIA+ voices in the development of this terminology to ensure it is accessible to many, often-discounted communities. Involving these communities will bolster trust between Seattle and its residents and its FSB owners. With the inclusion of these voices, SPU will achieve procedural equity as it guides the future of foodware reuse systems. *As this recommendation positively impacts both equity criteria, it can be considered equitable.*

Work with, and connect FSBs to, reuse service providers. To facilitate a smooth transition to reuse systems, resources should be made available for FSB owners and reuse service providers to interact. Reuse service providers differ in their products, business models, and services offered, and FSB owners will need to know what options exist and what options best fit their needs. By providing these resources, SPU will make foodware reuse systems accessible for FSB owners. Further, SPU will ensure service providers act in an equitable and inclusive manner by partnering with service providers directly or by emphasizing PR3's work; PR3's standards will provide for equity and inclusion. This design will establish trust amongst SPU, FSBs, and service providers while also empowering FSBs to participate in the foodware reuse systems that best fits their needs. Granting FSB owners access to the various service provider options will facilitate distributional equity, as all FSB owners will have access to service providers. Likewise, FSB owners will be able to have a say in which reuse systems they will use, thereby facilitating procedural equity. *As both equity criteria are fulfilled, this is an equitable recommendation.*

Work with reusable foodware service providers to train FSB owners and employees in reuse system logistics. Required training will include information about relationships with service providers, interactions with local municipalities, and educating and helping customers with a reuse system. FSB owners and employers will also be taught how to answer customer questions and clean reusable foodware (if applicable). Providing training material in standardized vocabulary, multiple languages, and at a sixth-grade reading level will facilitate distributional equity, as the reuse system will maximize accessibility to FSBs and customers. Proper training will also prevent costs to FSBs from developing over time, increase public awareness, and ensure the safety of employees. Over time, proper training will ensure the system retains participants and will develop trust amongst FSB owners, service providers, and the government. A feedback mechanism should be included to allow FSB owners and employees to help optimize the efficacy of the training, facilitating procedural equity in turn. *As both equity criteria are fulfilled, this recommendation is equitable.*

Analyze strategic planning practices to identify possible incentives for service providers. Grant programs should be developed to help service providers conduct research and development in reuse system products, technology and organization. Supporting innovation aimed at improving the accessibility of reuse systems by addressing barriers to participation (such as product cost or storage) will increase FSB engagement. Additionally, grants and other possible incentives will likely reduce costs to FSBs and service providers. Incentives will also develop trust and build relationships amongst parties, which will be key to the long-term sustainability of a foodware reuse system. Distributional equity is achieved through increasing the accessibility of reuse systems over time, through research and development to reduce barriers to participation. The grant program and other incentives will also create the opportunity to achieve procedural equity, but this is highly dependent on what type of work service providers conduct and what

support is ultimately offered by SPU. *With this consideration in mind, both criteria are fulfilled; thus, this is an equitable recommendation.*

Mitigate the physical limitations to participation for FSBs. Throughout the interview and survey data, FSB owners expressed concerns with storage of reusable foodware, especially if both reusable and single-use foodware will be in use simultaneously. FSBs often lack the space necessary to house large supplies of foodware, making a reuse system inaccessible. Likewise, foodware reuse systems that put the responsibility of sanitization of reusable foodware on FSBs also put additional costs, time constraints, and safety risks on FSB owners and employees. Identifying and alleviating common physical limitations of FSBs, such as storage and dishwashing capacity, will ensure the reuse system is accessible and retains participation over time. Workarounds to the physical limitations must be accessible to all FSBs to ensure distributional equity. Similarly, the process of developing workarounds must include the voices of FSBs across Seattle and of FSBs owned by groups historically ignored in policymaking; this ensures that the workarounds are procedurally equitable. *As both equity criteria are fulfilled, this recommendation is considered equitable.*

Facilitate placement and servicing of public foodware collection bins in frequented and centralized locations, considering equity and accessibility of placement. Placement should consider geospatial variables, including FSB location, population density, regional socioeconomic status, and frequented areas. In doing so, logistical and possible cost burdens on FSBs will be reduced, enabling many FSBs to access and participate in the foodware reuse system. FSBs owner's health and safety concerns will be reduced through SPU's active management, collection, and sanitization of the public collection bins and reusable foodware. Ensuring all FSBs and customers have access to the reuse system will necessitate city involvement, which will increase the scalability of the reuse system and advance distributional equity. The placement of the public collection bins can further augment distributional equity by placing the public collection bins in accessible locations for all. *Though procedural equity is not specifically addressed under this recommendation, it is also not harmed; thus, this recommendation can still be considered equitable as per our equity definition in Section 5.2.*

Coordinate with the Seattle & King County Health Department to offer guidance and approval for FSBs participating in a reuse system. It is critical for FSB owners and customers to know their reusable foodware is being washed and sanitized correctly. FSB owners expressed concern over safety and cleanliness, in particular around the logistics of customers returning dirty reusable foodware and the frequency of collection and sanitization. Guidance must cover both third-party and in-house collection and sanitation processes, in recognition that FSBs may work with a third-party service provider, wash in-house, or a combination of both. Approval could take the form of on-site visits for certification, a visible sticker indicating compliance, or other visible markers that show customers and staff that the reuse system is operating safely. This recommendation meets our distributional equity criterion by providing clear requirements and approval processes for third-party service providers or FSBs that guarantee the highest level of cleanliness for both customers and employees. The procedural equity component is fulfilled by addressing an expressed concern of FSB owners. *This recommendation fulfills both equity criteria; thus, it is an equitable recommendation.*

Develop educational and marketing materials for customers. Educating those directly involved in a reuse system is crucial for its success. Educational materials should focus on two aspects: how a reuse system works and its environmental benefits, and how to directly participate (collection bins, any fees involved, etc.). These materials should be accessible; this includes being written in standardized vocabulary, multiple languages, and at a sixth-grade reading level, accompanied by pictures and graphics, and posted in critical places in participating FSBs and collection bin locations. This will address the challenge of the public's awareness of reuse systems. This recommendation fulfills our distributional equity criterion by giving accessible educational resources to all customers. The procedural equity component is fulfilled by incorporating FSB owner's concerns about customer education into this recommendation. *As both equity criteria are fulfilled, this recommendation is considered equitable.*

Establish feedback channels and outreach between service providers and SPU to reach FSBs and customers. Service providers and the city government should work together to develop outreach protocols to participating FSBs and customers. Outreach should occur monthly, be either in-person or virtual depending on individual FSB circumstances and be provided in multiple languages and simple prose. Additionally, service providers and Seattle should establish direct lines of communication via email or phone to be used between the monthly outreach periods. Streamlined and consistent communication and outreach protocol ensures that FSBs have a clear, consistent means of expressing any issues they are experiencing or improvements they would like to see, improving accessibility and trust while also encouraging participation.

This recommendation achieves both distributional and procedural equity. By ensuring outreach goes to all FSBs (where applicable), providing various means of contact, and streamlining outreach protocol, the benefits of infrastructure improvement are fairly distributed. Giving FSBs the option to contact the government or service providers and providing outreach materials in multiple languages ensures that FSBs facing language or cultural barriers are properly engaged. This gives marginalized voices a chance to shape policy in a way that benefits them as well as the overall goals of a reuse system and addresses the accessibility equity concerns discussed in Chapter 4. *As both equity protocols are fulfilled, this recommendation can be considered equitable.*

5.4.2 Pilot Program Considerations

In lieu of developing and analyzing multiple pilot program options, we discuss their developmental considerations. The data we collected throughout this project do not support a proper, comprehensive policy analysis. As such, we are unable to adequately evaluate pilot program designs by criteria such as feasibility or cost, thereby rendering any specific pilot program designs we would have proposed as arbitrary rather than grounded in data. Instead, we propose considerations SPU or future researchers should address before developing pilot programs. The considerations are rooted in the data we collected, thereby building equity into the foundations of future pilots (and, subsequently, the future permanent foodware reuse system). This section provides a roadmap geared toward equitable program development and implementation and is broken into three consideration sections: *location & scope, program design,* and *logistics.*

Location & Scope Considerations

Future researchers will determine whether SPU should conduct **neighborhood-specific, citywide, or regional pilot programs.** As each pilot program will produce varying degrees of success across different geographic scales, some pilot programs may be more or less successful in specific neighborhoods, certain regions of the City, or citywide. Additionally, special consideration should be paid to neighborhoods that have high FSB profitability or neighborhoods that do not when considering pilot implementation. As we discuss in Chapter 4.3.1, a majority of FSB owners interviewed identified cost as a major concern when considering reuse system participation. Survey data corroborated this finding, with 79% of the 62 total respondents stating that high short-term or upfront costs are a concern and only 33.9% identifying as financially stable and profitable.

Future researchers should consider the cost implications of a pilot program, particularly if a pilot program is conducted with limited government support. According to our data, a majority of FSB owners interviewed and 62.9% of survey respondents desire financial support from the City. A majority of service providers interviewed also mentioned that financial support from local governments would help the private sector scale pilot programs. This, in conjunction with the cost concerns mentioned in the previous paragraph, may be used to determine pilot program location. If the City of Seattle limits its pilot program support, it may be prudent to implement a pilot in a neighborhood or region with more financially stable FSBs so as to not burden struggling FSB owners and customers with pilot costs. This is particularly true when we consider the findings from the service provider interviews in Chapter 4.2.1, which imply that many FSBs owners will be forced to pass increased costs to customers via increased food prices. However, if the City does choose to contribute financially, a pilot program conducted in a neighborhood with more varied FSB profitability may prove more viable than previously thought.

The geographic analysis in Chapter 4.4 determined that, based on our survey data, the most stable and profitable neighborhoods in Seattle are Ballard, Capitol Hill, Queen Anne, and Cascade. Due to data limitations highlighted in Chapters 3.6 and 4.3, we are unable to determine neighborhoods of low profitability; it cannot, therefore, be assumed that all other neighborhoods are low in profitability or affluence. Additionally, it cannot be assumed from our survey data that all FSBs in neighborhoods identified as profitable or less profitable are genuinely profitable: a component that must be considered if a neighborhood-centric pilot program is developed.

Other scope considerations include pilot programs that focus on **specific cuisine types or foodware container types**. As discussed in Chapter 4.3.2, survey results indicate that nearly 61.9% of all respondents prefer to replace clamshell containers with reusable options, followed by bowls with plastic lids (46%) and utensils (36.5%). Future researchers may consider citywide or neighborhood pilot program(s) that replace the containers FSBs have identified as being the most important. Conversely, they may decide to focus on replacing certain foodware with reusable options by cuisine type rather than neighborhoods.

If future researchers decide on a cuisine-specific pilot program scope, they should conduct further research to statistically analyze the anecdotal relationships we identified in our analysis between reusable foodware preferences and cuisine types. As we discuss in Chapter 4.3.2, we received response rates from FSBs serving Asian, American, and Café and Bakery cuisines.

These respondents, though statistically unsupported, highlight a willingness to replace clamshells and bowls with plastic lids, but also show increases in soup or pho containers and cup replacement willingness. However, as with neighborhood considerations, more research is needed to evaluate the economic stability of certain cuisines overall so as not to burden one FSB category with high costs and low support.

The final location aspect to consider is **FSB density in relation to general neighborhood interest**. Future researchers may choose to launch pilot programs in neighborhoods or regions with high FSB density, high participation interest, or both. Pilot programs in areas with high interest may encourage further participation and reduce implementation and cost burdens for FSBs in those areas. Chapter 3.2 identifies the Downtown, Ballard, North Central, University District, and West Seattle neighborhoods as having the highest concentrations of FSBs. As we discuss in Chapter 4.4, of the nearly 92% of survey respondents that are interested in participating in a reuse system, most interest stems from the Downtown, Capitol Hill, Cascade, and Queen Anne neighborhoods. It is important to reiterate that due to a low survey response rate, we cannot formally determine if a representative majority of FSBs in these neighborhoods have high interest in reuse system participation. Future researchers must further analyze the spatial patterns identified in our analysis to concretely identify the highest concentrations of "very interested" FSBs. They may then choose to cross-reference them with areas of high FSB density. Upon success, expansion will provide evidence as to how the system functions in areas with demonstrably less enthusiasm for the reuse system.

Program Design Considerations
The second major consideration future researchers should address is the role of the City, SPU, and service providers in various pilot program designs. It is important to identify and discuss the potential roles and responsibilities of reuse system actors, particularly if those actors include both public and private entities or groups. For the purpose of this report, we suggest thinking of program design in general privatization categories, which are presented as three model options: fully private pilot programs, fully public pilot programs, and hybrid pilot programs.

Public-private hybrid pilots will require the City of Seattle, SPU, and service providers to share ownership and management of a reuse system pilot. The City and SPU will work with service providers and facilitate their contact with FSBs involved in the pilot rather than require FSBs to reach out independently. Additionally, the City and SPU will work with service providers on behalf of FSBs to handle collection and distribution, dishwashing and sanitization services, and offer more financial assistance. They will also maintain their contracts with ECOSS to assist with marketing, outreach, and education services to FSBs and neighborhoods with language or cultural barriers. SPU, the City, and service providers will share technology development, marketing, and outreach duties as deemed appropriate.

Fully private pilots will operate with private businesses covering nearly all costs to participation, implementation, and reusable foodware purchase and dissemination. FSBs will contract directly with third-party service providers to handle all storage, dishwashing, and sanitization services; all or most collection and redistribution services; and all or most education services. The City of Seattle, therefore, will do little in logistical management and oversight of the pilot program, but may offer a range of financial support through grant programs.

Fully public pilots, in contrast, will require the City of Seattle and SPU to take full ownership of a reuse system, including full management and implementation. All costs to participate will be covered by government funds, and SPU will handle all sanitization, collection, distribution, and other logistical concerns previously identified. Finally, the City will be fully responsible for marketing, outreach, and education services.

We chose to use three general design examples to address the accessibility, trust, and participation concerns identified in our research. As previously discussed, interview data from FSB owners indicate that most FSB owners want the City to handle the collection and redistribution of reusable foodware, as well as provide financial support and dishwashing services. Survey data corroborate this (as illustrated in Chapter 4.3.1) with a majority of respondents (67.7%) expressing concern about the amount of city support they could expect. As such, we believe that some city involvement will be necessary to achieve an equitable foodware reuse system that addresses trust, accessibility, and participation concerns.

Logistical Considerations
The final section details the logistical and process components of a reuse system that will be managed or overseen by a government entity, SPU, or third-party service providers. Logistical considerations are particularly critical for future pilot programs to address, as nearly 63% of survey respondents are unwilling to participate in a reuse system if they have to handle logistics independently.

Future researchers should collect data from service providers and FSBs on **distribution metrics, including reusable foodware delivery frequency, material type, and storage potential**. If a pilot program focuses on replacing specific container types (as discussed in the Location & Scope section), data should be collected on container break-even points and the cost differentials between single-use and reusable foodware. Pilots should be designed to address and alleviate cost burden for FSBs wherever possible, as our research shows cost to FSBs as a potential equity concern.

Future researchers should also work with service providers or SPU to determine the appropriate **technology** that should be used. As discussed in Chapter 4.2, many service providers rely on an app-based system to track customer and FSB participation, as well as the physical location of reusable foodware containers. Some FSB owners interviewed, however, expressed accessibility concerns regarding app usage, as some customers or FSB owners may lack the technology skills or physical ability to use apps. Future researchers may want to consider other, more accessible means of tracking participation and reusable foodware in their pilot programs.

As discussed in Chapter 4.2.2, many FSB owners and service providers interviewed want to see **collection bins** in locations that aim to increase accessibility, ease pickup burden, and create a sense of community. Pilot programs should consider the appropriate locations for collection bins as well as pickup frequency and a plan to keep collection areas clean, safe, and sanitary. Future researchers should collect and analyze more data on how service providers currently handle **collection and redistribution**. They may also choose to evaluate how governments conduct pickup and drop-off operations for other waste management processes, as these models could

serve as templates for reuse systems. Pilot programs that specifically incorporate well-maintained bin management, collection, and redistribution processes will address many of the equity concerns we have identified; in particular, accessibility and cleanliness and safety.

Future pilot programs may explore different means of **dishwashing and sanitization**. Many FSB owners interviewed are concerned about taking on additional foodware to wash in-house, but they expressed delight at the prospect of having an external party handle washing and sanitization. Around 58% of survey respondents requested external dishwashing support, even though 95.2% of all respondents have three-basin commercial sinks or commercial dishwashing in-house. This is likely because of concerns about storage, cross-contamination, and cost; 58.1% of survey respondents indicated that storage is a primary issue, and many FSB interviewees worried about cleanliness. As discussed in Chapter 4.2.1, some service providers offer or contract with dishwashing services; pilot programs may consider pursuing this route if Seattle is unable to construct and maintain dishwashing infrastructure.

The final logistical consideration concerns **marketing, education, and outreach services**. FSB interview data from Chapter 4.2.2 suggest that a majority of FSB owners want to see assistance with marketing, particularly as it pertains to cost and ESL customers and staff. Survey data also indicate that around half of all respondents want to see support with education on reuse system functionality. Pilot programs must develop outreach and educational protocols to increase awareness about reuse generally and draw attention to the pilot programs development. Additionally, marketing and education materials must be available in various languages to ensure equitable access to the pilots and the eventual system from immigrant and linguistically diverse communities across Seattle.

Because we do not have a sense of their success, we are unable to measure the pilot program considerations against procedural and distributional equity currently. However, the considerations are rooted in the data we collected and analyzed through a lens that addresses our identified equity concerns. Once implemented, pilot programs will provide a critical source of data around cost and logistics, as well as feedback from FSB owners and service providers to address challenges to implementation and management of a reuse system.

5.2.3 Ongoing Program Management Recommendations

In order to carry out the above recommendations, the following recommendations **must** be continuously updated to ensure maximum data accuracy. Without accurate, up-to-date data that reflects FSBs and their needs, our identified equity concerns cannot be addressed effectively.

SPU should actively track the number of operating FSBs in Seattle as well as their contact information. Currently, SPU's FSB information is dated and inaccurate, limiting the department's ability to interact with FSBs and understand their circumstances. SPU should dedicate an internal team to gather and maintain FSB contact information and track new FSB openings and closures on a semi-annual basis. Collected contact information should include FSB addresses; phone numbers, email addresses, and social media pages; and the spoken language of the owners and their employees. This information will provide SPU with a more robust and accurate dataset to analyze as it seeks to develop a foodware reuse system.

An accurate FSB list will not only provide SPU with easy means of contact but could be used as an indicator of community health and prosperity by tracking business closures and openings. These data could be used to determine whether certain community areas need more assistance, particularly during the implementation of a foodware reuse system or pilot program. This recommendation, therefore, positively impacts distributional equity. Under the current structure, SPU has limited insight into the FSB environment, meaning that they are unable to interact with or reach the majority of FSBs. By keeping up-to-date contact information on FSBs, SPU will be able to incorporate the voices of FSBs directly into its work, thereby achieving procedural equity. *As both equity criteria are positively impacted, this recommendation can be considered equitable.*

The City of Seattle should standardize and regularly update GIS data. Seattle's geospatial datasets were key to identifying FSB location, socioeconomic variation, and analyzing findings in this report. However, the City's GIS datasets were often outdated, unavailable, and difficult to locate, and they required extensive cleaning before they could be properly utilized. These issues limit Seattle's ability to properly investigate issues related to the well-being of Seattle residents, as poor GIS data prohibit Seattle from knowing which areas may require more government support and from adequately tracking demographic information. Available, accurate, and well-organized data allow for Seattle residents and SPU to easily access information related to Seattle. More specifically, SPU will be able to conduct high-quality analyses related to FSBs, enabling SPU to implement a foodware reuse system that fairly distributes the benefits and costs. Thus, distributional equity is positively impacted. Additionally, with the ability to conduct high-quality geospatial analysis, SPU and its consultants will be able to quickly identify FSBs (and other groups) with limited involvement in the development and implementation of a foodware reuse system. Standardizing and regularly updating GIS data will facilitate procedural equity. *Because procedural and distributional equity are positively impacted, this recommendation can be considered equitable.*

SPU should develop a framework to maintain relationships with reuse system service providers to facilitate collaboration and partnerships. As all reuse service providers have highly similar goals, many see the reuse industry as a community rather than competitive space. There is an opportunity for increased collaboration between service providers, the City, and the Seattle food service industry. Service providers also bring a range of product and system designs and experience working across communities and clients. Developing a framework and maintaining relationships with service providers allows for streamlined communication, collaboration, and facilitation of a foodware reuse system. SPU should continue to develop and publish a list of service providers to their website. By providing a city-managed platform through which FSBs can contact service providers, the burden of researching and contacting service providers independently will be relieved, positively impacting distributional equity. Further, increasing channels for communication and capacity building with the local government provides more opportunities for service providers with less resources, funding, or marketing capacity (smaller startups), improving procedural equity. *As both equity criteria are fulfilled, this recommendation is considered equitable.*

5.5 Conclusion

Throughout this project, we have aimed to address the following research questions:

1. What are the equity barriers associated with implementing a reuse system in the City of Seattle for food service businesses?

2. How can the City of Seattle create a foodware reuse system that effectively addresses and alleviates the equity barriers faced by food service businesses?

Our data collection and analysis revealed six potential equity concerns: trust, awareness, accessibility, cost, safety and cleanliness, and participation. Due to data constraints, we were unable to name those six concerns as definitive equity barriers, and we acknowledge that more research should be conducted before formally identifying them as such. However, we strongly believe that these concerns merit significant consideration prior to the development and implementation of a foodware reuse system.

Our proposed recommendations center equity in their design and provide a pathway to the final foodware reuse system. The primary recommendations address all six equity concerns and are justified via distributional and procedural equity. Our pilot program considerations are grounded in our data, ensuring that equity will be built into the very foundations of future pilot programs. Future researchers or SPU will use our recommendations to develop pilot programs that can then be analyzed by feasibility, cost, and equity prior to implementation. Finally, feedback from those pilots will inform the final foodware reuse system.

More research is needed to fully inform a foodware reuse system recommendation to the City of Seattle, and equity itself may still be used as a metric for success. By weaving equity into every facet of this report, we have ensured that it will not remain merely a criterion to fulfill. If this report and its contents are accepted by SPU and future city decision-makers, equity will be at the core of Seattle's future foodware reuse system.

APPENDICES

Appendix A: Examples of Foodware

Cup		Includes cups for both hot and cold drinks with lids.
Box		Boxes with fold-in lids. Excludes pizza boxes.
Clamshell		Containers with an attached lid with a hinge.
Bowl		Bowl including lid.
Utensils		Includes forks, spoons, and knives.
Soup/pho container		Tub with lid, commonly used for hot liquids.

Appendix B: Interviews

Food Service Business Interview Script

To give some background on who we are and what we are doing: we are a group of four graduate students from the University of Washington working on our capstone project with Seattle Public Utilities. We are talking to food service businesses and restaurants all throughout the City to try and see how interested they would be in a foodware reuse system and see what, if any, equity barriers businesses might be facing to implementation. Foodware reuse systems are a pretty new concept so I will go ahead and give you some background.

A foodware reuse system, in general, is a system where foodware used for takeout (so cups, utensils, takeout containers, etc.) is made out of durable, reusable materials rather than single-use materials. That reusable foodware is then collected, cleaned, and sanitized and sent back to restaurants to be used again. This prevents anything from being thrown away, recycled, composted, or littered. The goal of a reuse system is to reduce waste and limit the environmental impacts of single-use materials on the environment and the community.

There are a couple variations of this system: third-party providers can collect and sanitize the reusable foodware, individual restaurants can handle collection and cleaning on their own, or local government can get involved in collection and redistribution. We are not pushing for any specific version at this time; we are merely gathering information from restaurant owners on whether or not a system like this seems interesting and what could prevent or encourage participation in the future.

Food Service Business Interview Questions

1. Do you have any clarifying questions about this kind of system, or does the definition make sense?
2. What is exciting about foodware reuse systems?
3. What concerns you about foodware reuse systems?
4. What equity challenges does your business face?
5. Do you see these equity challenges becoming worse, better, or the same by participating in a foodware reuse system?
6. What support would your business like to see from the City to help address equity barriers? (financial, marketing, education, training, etc.).
7. Do you have any equity concerns relating to your customers' access or experience with a foodware reuse system?
8. Do you feel that there is an expectation from your customers to provide more environmentally conscious packaging for food and beverage containers?
9. To what extent did environmental concerns factor into your business operations before and during the pandemic?
10. Would you be interested in participating in a foodware reuse system as a business? As a customer?

To give some background on who we are and what we are doing: we're a group of four graduate students from the University of Washington working on our capstone project with the City of Seattle's Department of Public Utilities. We are talking to food service businesses and restaurants throughout Seattle to try and see how interested they would be in a foodware reuse system and see what (if any) equity barriers businesses might be facing to implementation. But we also wanted to talk to existing companies that provide reusables to get a sense of how their businesses work and see how they could fit into a larger reuse system. We are not advocating for the use of any particular reusable business to the city; this interview is purely for background information on best practices and business models.

Service Provider Interview Questions

1. Can you talk about the inspiration behind this company - why reusables?
2. In your own words, who are your clients?
3. How many participants/clients do you currently have?
4. How do you attract new clients?
5. What challenges has your business faced entering the reusables market?
6. Does your business have support from or partnerships with local municipalities or cities? If so, what has been the impact of those partnerships?
7. What would your business like to see from municipalities/cities in terms of support (marketing, financial, legal, etc.)?
8. What factors are necessary for a business to successfully transition to reusables?
9. How does your business support restaurants/cafés, etc., transitioning to a reuse system?
10. Has your business identified specific challenges that may hinder restaurants, cafés, or individuals from participating in a reuse system?
11. Do you participate in a pickup/drop-off model? If so, how did you make that determination?
12. Are dishwashing services built into your business model and if so, why? If not, what do you recommend to new clients for dishwashing services?
13. To what extent does your business model consider accessibility and inclusion for restaurants/cafes? For individuals? (For example, technology-based challenges such as language barriers using an app)
14. What considerations did your business have when designing the fee-system (subscription, individual container charges, etc.)?
15. How did environmental trade-offs factor into your business model (i.e., choice of product materials, collection and dishwashing services, carbon footprint)?
16. How do you see your business evolving over the next 5 years (i.e. expanding to different reusable types, from closed-to-open loop, to different countries, etc.)?

Appendix C: Food Service Business Survey

Seattle Public Utilities

W EVANS SCHOOL OF PUBLIC POLICY & GOVERNANCE
UNIVERSITY *of* WASHINGTON

Reuse Systems Survey for Food Service Businesses

Hello!

We are graduate students at the University of Washington partnering with Seattle Public Utilities (SPU) to gather information about foodware reuse systems from food service businesses across Seattle.

Foodware is defined as all containers, bowls, plates, trays, cups, lids, napkins, and other like items that are designed for one-time use for prepared foods. A foodware reuse system is defined as a system in which foodware used for takeout is collected, cleaned, and redistributed back to restaurants, preventing anything from being thrown away, recycled, composted, or littered. Foodware in a reuse system is made of durable materials that stand up to frequent washing and reuse.

Your responses will help SPU develop an equitable and inclusive foodware service system that best serves the city's food service industry and community. This survey provides you, as valued members of the Seattle community, the opportunity to express your opinions. This survey is anonymous; we will not require your or your business's name, address, or other personally identifiable information. Data collected from your responses will be used to inform our research project.

Please answer all questions to the best of your ability. We request that you complete the survey by 5 PM Sunday, March 20th. If you have already completed this survey, please do not respond a second time. Thank you in advance for your participation!

Prior to reading the description above, were you at all familiar with foodware reuse systems? *

◯ Familiar

◯ Somewhat familiar

◯ Not familiar

After reading the above description, how would you gauge your interest in participating in a foodware reuse system at your food service business? *

◯ Very interested

◯ Moderately interested

◯ Not interested

Which of the following specifically interests you about a foodware reuse system? Select all that *
apply:

- [ ] Environmental sustainability

- [ ] Reduced carbon emissions from single use foodware production

- [ ] Less waste sent to landfills, recycling centers, and composting facilities

- [ ] Less waste at your place of business

- [ ] Reduced litter in communities

- [ ] Long-term cost savings

- [ ] Customer demand, loyalty, and support

- [ ] Other...

Which of the following factors may prevent you from participating in a foodware reuse system? *
Select all that apply:

- [ ] High upfront or short-term costs

- [ ] Unclear or unknown city support

- [ ] Learning or implementing new technology

- [ ] Working with third party service providers

- [ ] Supply chain or inventory concerns

- [ ] Lack of storage space to store reusable foodware

- [ ] Customer acceptance

- [ ] Lack of participation from other businesses

- [ ] Other...

Some reuse systems allow food service businesses to contract with a third party service *
provider, who then supplies the business with reusable foodware. Once the foodware has been
used by consumers, it is dropped at a collection point for the third party service provider to
wash, sanitize, and redistribute back to businesses. How likely are you to participate in this
system?

- ( ) Very likely

- ( ) Somewhat likely

- ( ) Not likely

Some reuse systems allow businesses to wash and sanitize reusable foodware on-site. Please *
select your business' capability to do this:

◯ I have a 3-basin commercial sink

◯ I have a commercial dishwasher

◯ I have both a 3-basin commercial sink and a commercial dishwasher

◯ I have neither a 3-basin commercial sink nor a commercial dishwasher

◯ Other...

A reuse system may allow customers to return reusable foodware to participating food *
services businesses. Are your customers likely to see this as valuable and participate?

◯ Very likely

◯ Somewhat likely

◯ Not likely

Please select one of the following: *

◯ My business would participate in a reuse system immediately

◯ My business would participate in a reuse system after other businesses participate

◯ My business would participate in a reuse system after the system has demonstrated success

◯ My business would not participate in a reuse system

Would you be willing to participate in a foodware reuse system if you had to handle logistics *
(i.e. partnering with service providers, washing foodware on-site, or handling collection, etc.)?

◯ Yes

◯ No

What support would you like to see the city provide? Select your top two choices: *

☐ Education and training

☐ Technical assistance (i.e. working with third party service providers)

☐ Foodware pickup and drop-off services

☐ Washing and sanitization services

☐ Financial support

☐ Other...

If the system was focused only on replacing only one type of foodware with a reusable version, * would you participate?

○ Yes

○ No

Which foodware examples would your business be most likely to replace with reusable *
options? Select all that apply:

☐ Cups

☐ Clamshell takeout containers

☐ Utensils

☐ Bowls with plastic lids

☐ Boxes (excluding pizza boxes)

☐ Soup or pho containers

☐ Other...

What percent of your current orders use single use foodware (estimated)? *

Short answer text

What steps do you think can be taken to ensure all your customers have equitable access to a *
reuse system?

Long answer text

How would you describe your food service business's financial status or health? *

○ Stable and profitable

○ Somewhat profitable

○ Just getting by

○ Other...

What type of cuisine does your food service business serve (i.e. Thai, Italian, bakery, etc.)? *

Short answer text

How many food service businesses do you operate *

Short answer text

What Seattle neighborhood(s) is your food service business located in? Select all that apply: *
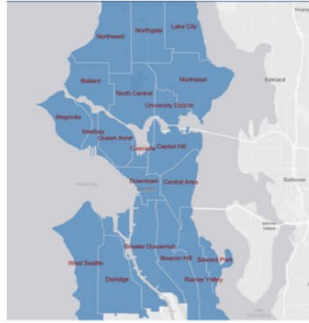
☐ Northwest

☐ Northgate

☐ Lake City

☐ Ballard

☐ North Central

☐ University District

☐ Northeast

☐ Magnolia

☐ Interbay

☐ Queen Anne

☐ Cascade

☐ Capitol Hill

☐ Downtown

☐ Central Area

☐ West Seattle

☐ Delridge

☐ Greater Duwamish
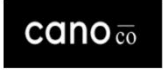
☐ Beacon Hill

☐ Rainier Valley

☐ Seward Park

Please select any of the following as they apply to your food service business: *

- [ ] My food service business is immigrant-owned

- [ ] My food service business is non-white owned

- [ ] My food service business is Black-owned

- [ ] My food service business is Hispanic or Latino-owned

- [ ] My food service business is Asian American or Pacific Islander-owned

- [ ] My food service business is Indigenous-owned

- [ ] My food service business is women-owned

- [ ] My food service business is LGBTQ+ owned

- [ ] My food service business is veteran-owned

- [ ] My food service business is disability-owned

- [ ] Prefer not to say

- [ ] Other…

Now that you have completed this survey and have more information about foodware reuse systems, please write any other thoughts or comments you may have:

Long answer text

Appendix D: Reuse Service Providers

cano co	Startup based in Quebec, Canada that replaces single-use packaging in cafeterias and food courts.
EARTHWARE	Calgary, Canada based company with a takeout container program for restaurants.
GO BOX	Business in Portland, OR offering takeout containers and cups to restaurants, food courts, cafes, and grocery stores.
OKAPI REUSABLES	Portland, OR based company working to make to-go coffee and boba cups.
reusables	Container sharing platform based out of Vancouver, Canada that supplies cafes, restaurants, and grocery stores.
r.Turn r.Cup r.Ware It's Our Turn	Minneapolis, MN based business with a reusable cup system for music and sporting events.
SPARKL REUSABLES	Startup based in the San Francisco Bay Area, California that offers sustainable circular systems for events, food vendors, companies, and institutions.
suppli	Toronto, Canada based company offering take-out containers for restaurants and food shops.
Ridwell	Business based in Seattle, Washington that collects hard-to-recycle items.

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