

Towards a Cohesive Circular Food Economy: An MOA Approach to Understanding Stakeholder Perspectives in Metro Vancouver

**by
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Abstract

Over half of the food produced in Canada is lost or wasted leading to negative environmental impacts and rising levels of food insecurity. The circular food economy (CFE) has been proposed by stakeholders and policymakers as a potential framework to solve the food waste issue through a variety of business and non-profit food-related waste reduction and prevention initiatives. This research asks: How do individuals working in the food sector mobilize CFE practices within their work?; and what are the motivations, opportunities and abilities influencing those working in the CFE sector in Metro Vancouver? To answer these questions, this research analyzed interview data from food sector stakeholders (n=22) who are contributing to the CFE in Metro Vancouver. This study applies the Motivation Opportunity Ability (MOA framework) as a framework for data analysis. The findings from this study indicate that there are conflicting priorities to CFE approaches in Metro Vancouver, leading to a lack of cohesion among initiatives and barriers to a more equitable CFE.

Keywords: circular economy; circular food economy; food waste; MOA framework; Metro Vancouver

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Chapter 1.

Introduction

In Canada, 58% of all food produced is lost or wasted (Nikkel et al., 2019) making a significant contribution to climate change. The growing levels of food waste are harming the environment and contributing to food insecurity (Santeramo, 2021), making it critical that food resources are managed more sustainably (Göbel et al., 2015). Reducing food waste can ensure more people are fed while making the food value chain more sustainable and resilient (Garrone et al., 2014). The 35.5 million metric tonnes of food being lost or wasted per year in Canada is expensive, costing \$49.5 billion (Nikkel et al., 2019). In the province of British Columbia, it is estimated that \$516.5 million worth of food from the retail sector is wasted (Ministry of Environment & Climate Change Strategy, 2019). Food makes up 15% of Metro Vancouver's solid waste sent to landfills (Tri Environmental Consulting, 2019). A circular economy (CE) attempts to solve the broad problem of waste by eliminating waste and pollution, circulating products and materials, and regenerating nature (Ellen Macarthur Foundation, n.d.). A circular food economy (CFE) is focused on addressing waste in the food supply system and seeks a sustainable destination for food products that is restorative, healthy and offers financial benefits for stakeholders (Lungo et al., 2022). A CFE designs waste out of the food system (Soma, 2022) by using circular loops to reuse, recycle, recover and reprocess edible and inedible food (Lungo et al., 2022). This practice is growing in popularity among policymakers to advance sustainable development (Ashton et al., 2022).

The attention towards CFE is expanding, with the Federal Government (Government of Canada, 2020), the Vancouver Economic Commission (Varney, 2021) and the National Zero Waste Council (NZWC) (NZWC, n.d.), among others, all supporting the development of a CE and a CFE. Within Metro Vancouver, there is political will to make the shift towards a CFE. Many municipalities are integrating the goals of a CFE into plans and policies (City of Richmond, 2021; City of Vancouver, 2018). For example, through the City of Richmond's Circular City Strategy, they are planning to shorten the food chain from farm to fork by encouraging food service establishments to prefer locally sourced foods (City of Richmond, 2023). The region of Metro Vancouver encourages restaurants to prevent and donate food waste before

recycling it into compost (Metro Vancouver, 2018). Although governments may seek to make this shift, businesses and other stakeholders are taking the responsibility of innovating new ideas to prevent loss (Leipold et al., 2021). However, there is no broadly recognized definition, or singular practice within the CFE (Lungo et al., 2022). As a result, stakeholders including non-profit organizations and food businesses, with different and often competing interests and varying levels of influence, take a range of actions (Lungo et al., 2022) that may or may not be consistent with government policies aimed at advancing a CFE.

In the dominant food system we see today, it is easy to waste, resulting in a throwaway society (Evans, 2012). Food waste prevention can be difficult within the food sector due to food safety concerns, confusing date labelling, lack of staff training or marketing that encourages over-purchasing (Huang et al., 2021). With heightened regulations in the food system, we see a throwaway culture where it is normal for nutritional food to be discarded (Gollnhofer, 2017). Although food retailers are in a powerful position to influence food waste (Huang et al., 2021), interacting with food that would otherwise be wasted is not seen as normal (Gollnhofer, 2017). Therefore, it is important to understand why stakeholders in the food sector are engaging with the CFE.

The objective of this research is to determine how those working in the food sector perceive circular food practices within Metro Vancouver. To understand what circular food practices are happening within Metro Vancouver, this research draws on key informant interviews with 22 stakeholders working in the CFE. This study applies the Motivation, Opportunity, and Ability (MOA) theoretical framework to analyze circular food initiatives. The MOA framework states that when an individual has the motivation, opportunity, and ability, they can mobilize these elements to accomplish their goal (van Geffen et al., 2020). This framework helps explain individual behaviours (Soma et al., 2021b) linked to goals that require resources, technical means, abilities, and direction. If the MOA among these stakeholders is different, this could result in a range of goals and objectives in circular economy work, potentially making government policy development more difficult. Understanding stakeholder motivations, opportunities, and abilities can provide a better picture of what is happening with the CFE and layout relevant information to policymakers. This study focuses on the CFE in Metro Vancouver, the metropolitan region of the lower mainland of British Columbia (BC). Municipalities are governed independently within the region however share distinct commonalities in food

waste reduction and circular initiatives. The food system within Metro Vancouver relies on its provincial regulatory contexts but needs a cohesive circular plan for success. This study provides the data that can help align CFE actions and fill the policy gaps with opportunities to reduce and or prevent food waste. Policymakers cannot develop a useful definition of a CFE, let alone devise effective policy, within silos. They must understand what the community is already doing and what may hinder them from accomplishing their circular food goals.

This study addresses the following research questions:

1. How do individuals working in the food sector mobilize CFE practices within their work?
2. What are the motivations, opportunities and abilities influencing those working in the CFE sector in Metro Vancouver?

The following Chapter (Literature Review) will provide an overview of food loss and waste, and waste management, followed by the need for innovation through a CE, CFE, and the MOA framework. Chapter 3 (Methods) provides the rationale and context for why this research is relevant. The collection and analysis of data are also described in detail in this section. Chapter 4 (Findings) provides a breakdown of the research findings in four categories: CFE practices, motivations, opportunities and abilities. Chapter 5 (Discussion) explores the impact of the research findings by connecting them to potential policy and planning opportunities while responding to the main research questions. Finally, Chapter 6 (Conclusion) will offer a summary of this research.

Chapter 2.

Literature Review

2.1. Circular Economy

2.1.1. What is the Circular Economy?

The CE is an alternative economic model that incorporates resource efficiency, regeneration of natural systems and recycling or recovering materials at the end of their life cycle (Bolger & Doyon, 2019; Mukherjee et al., 2023). It has replaced the take-make-use-dispose system that exists within a linear economy (Bolger & Doyon, 2019; NZWC, 2021) (Figure 1). Morsetto (2020) adds that a CE reduces the use of primary resources and closes the loop of materials within the limits of environmental protection and socioeconomic benefits (see Figure 2). The CE model meets the needs of the growing population within the boundaries of our ecological systems (Smart Prosperity Institute, 2021). The CE transforms resource usage through design, sharing, reuse and innovation within two categories, micro and meso (Kirchherr et al., 2017). Micro CE initiatives exist among products, firms and consumers whereas meso initiatives happen on the city, nation and global scale. Ghisellini et al. (2016) argue that the CE calls for radical alternative design solutions at the intersection between the life cycle process, environment and the economy. More recently, the concept of the CE has received attention from the United Nations (UN) (Mukherjee et al., 2023; Temesgen et al., 2023). Although the phrase “circular economy” is not used within the UN’s Sustainable Development Goals, similar themes have emerged such as the use of resources and reducing waste in Goal 12 - sustainable production and consumption (Temesgen et al., 2021).



Figure 1. The linear economy adapted from the NZWC (2021)

The CE has emerged within the last decade to advance sustainable development through supply chain management and managing products at the end of their life (Ashton et al., 2022). Kyriakopoulos et al. (2019) have identified a variety of activities

that could be used in CE initiatives including, increasing awareness of product consumption, incorporating renewables, eliminating toxic chemicals within production and adopting circularity for the life cycle of materials. It is believed that this is a reliable way for businesses to support environmental integrity and regenerate eco-industrial development (Ghisellini et al., 2016). The concept appeared in response to the dissatisfaction of the linear economic model (Bolger and Doyon, 2019). The linear economy threatens environmental and public health due to its increased waste production and resource extraction (Mukherjee et al., 2023). Mukherjee et al. (2023) state the CE model can overcome the downfalls of the linear economy and improve economic outcomes by reducing energy and resource consumption.

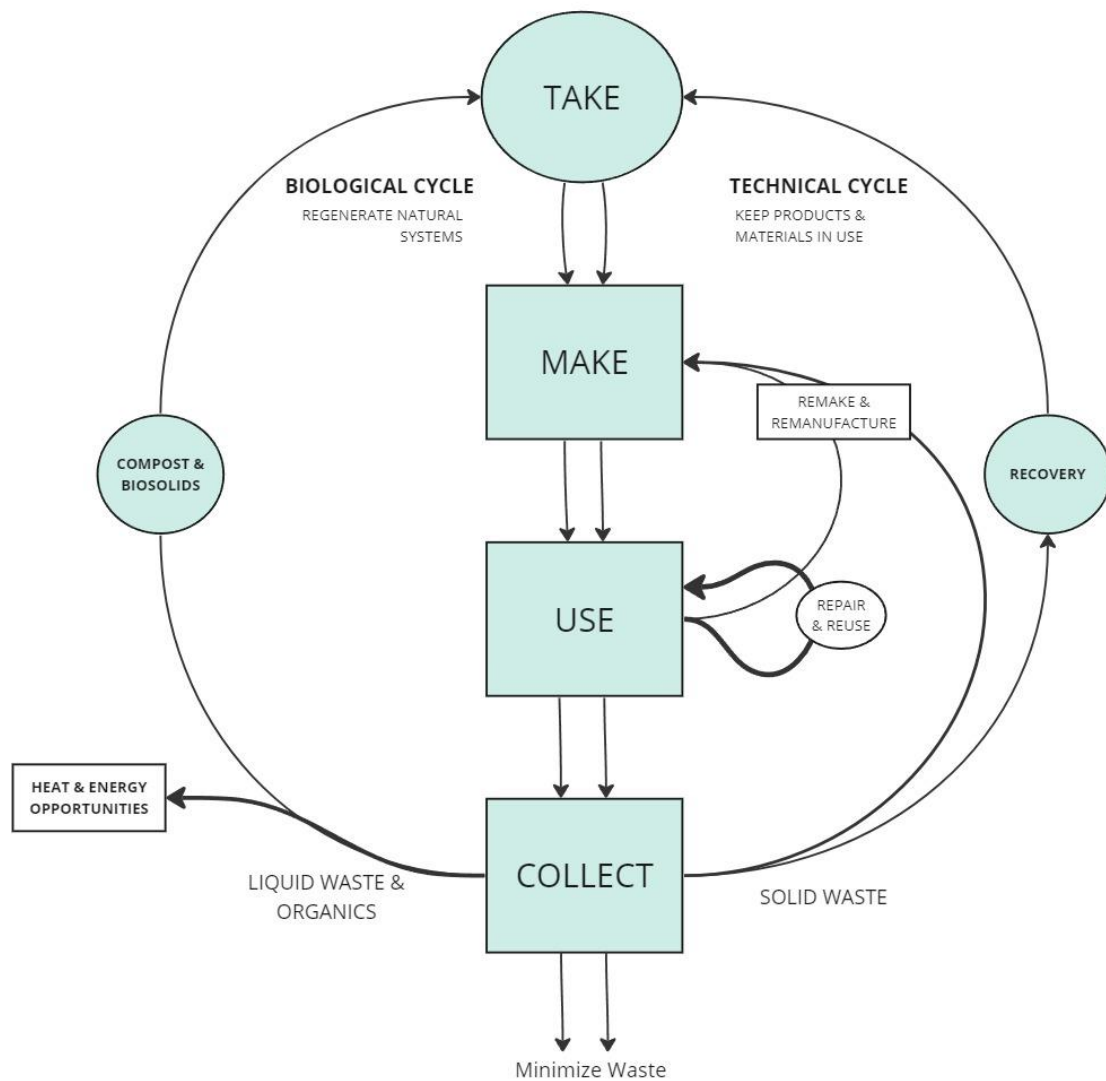


Figure 2. The circular economy adapted from NZWC (2021)

Although the CE is open to a variety of interpretations (Morseletto, 2020), Temesgen et al. (2020) argue the CE does not answer the ontological and epistemological questions needed to address the complex environmental, economic and social problems existing in society. This is perhaps because the CE is practice-based, and led by businesses, consultants, policymakers, and political think tanks (Ashton et al., 2022; Temesgen et al., 2021). If the CE had a stronger worldview, ontology, epistemology and axiology, it would create long-term, sustainable changes (Temesgen et al., 2021). For example, through the Chinese's CE promotion Law, China has an overarching approach to CE waste management, which differs from the Canadian, EU and US CE models which are often bottom-up (Ghisellini et al., 2016). China's top-down approach has dissolved any confusion or ambiguity around what constitutes a CE.

There are also a variety of types of CE models. In particular, this diversity arises among business models in different sectors. These sectors include agriculture and food products (where this research is situated), furniture, textile and apparel, electronics, equipment and machinery (Bocken et al., 2019). Mukherjee (2023) explains how the CE can exist among businesses that adopt a variety of structures and contributions to the economy. These include upstream solutions such as value creation, partnerships or collaborations, and downstream solutions such as revenue mechanisms, offerings, valued delivery and products.

2.1.2. Circular Economy in Government and Planning

Although businesses play a large role in CE implementation, governments can play a supportive role through strategic planning (Bolger and Doyon, 2019). Local government planning departments interviewed by Bolger and Doyon (2019) indicate their desire to promote sustainable development in the built environment. However, since there is difficulty defining CE in urban systems, it is challenging for local governments to measure their success in using CE as a tool to reduce waste. Bolger and Doyon (2019) suggest ways that local governments can encourage CE. These include encouraging citizens to share ideas and resources while incorporating waste reduction objectives within planning and strategic documents. Further, they believe municipalities could make participating in the CE easy and accessible while making poor waste management expensive and inconvenient. Local governments should also advocate for CE to be incorporated at all levels of government (Bolger and Doyon, 2019). Morseletto (2020)

adds that CE policy must have specific targets to adopt, such as phasing out the use of virgin materials. However, said targets should differ among consumers, corporations, governments and parks (Morseletto, 2020).

2.1.3. Critiques of the Circular Economy

As the CE aims to advance economic prosperity, ecological integrity and social well-being, Ashton et al. (2022) recognize that in practice, one of these pillars always wins, while another loses. With this, they identify the need for social implications to be better considered in the CE, including how the model impacts human development, the roles of citizens in the labour force and the tensions that arise between grassroots circularity and corporate movements. Ashton et al. (2022) criticize the current approach to this economic model for not addressing social inequalities and power structures that exist within circular practices while also neglecting the aspirations of community members, particularly those who are marginalized. Further, the CE currently does not engage in worldviews or values and can dismiss the real issues they are attempting to address for economic profit (Temesgen et al., 2021). Temesgen et al. (2021) state that CE practices can be implemented for “feel-good” reasons or for greenwashing, further implying a consumerist culture. To avoid this “feel-good” approach, CE initiatives must make pragmatic changes while incorporating culture and values. Otherwise, CE attempts will be watered down to avoid any attempt at systemic change (Temesgen et al., 2021). Mukherjee et al. (2023) argue that CE initiatives are surface level among G20 countries. These initiatives are not innovative and incorporate trade, technical advancements or financial markets which are also critical components to circularity.

There may also be paradoxical tensions when two of the three pillars of sustainability, economic, social and environmental, conflict (Daddi et al., 2019). De Angelis (2021) explains a CE paradox to be “competitions versus collaboration in innovation for circularity; efficiency versus resilience” (p. 4). The contradictions in CE could be large scale instead of small scale, concentration instead of decentralization, or separation instead of integration.

When a paradox is present, tensions and contradictions arise within CE initiatives (De Angelis, 2021). Companies within the circular economy pursue environmental outcomes, such as reusing and recycling raw materials, while raising the quality of such

products and simultaneously increasing the competitiveness of products (Daddi et al., 2019). The increase in production may therefore contradict the environmental objective of reducing waste. Since the CE is rooted in traditional economic growth-oriented ideology, Ashton et al. (2022) have pointed to the divide that has developed between CE initiatives that are grassroots, and those seeking economic growth. In corporate sustainability, a paradox is common when there are competing goals of sustainability and economic growth (Daddi et al., 2019).

2.2. Circular Food Economy

2.2.1. Why we need a Circular Food Economy

Scholars within the food loss and waste field have a variety of definitions for these terms. Kafa and Jaegler (2021) state that although food loss and waste research is relevant, it has yet to be fully explored, resulting in an assortment of definitions. Food loss and waste according to the Food and Agriculture Organizations (2019) “is understood as the decrease in quantity or quality of food along the food supply chain” (p. 4).

Food loss according to Kafa and Jaegler (2021) and Parfitt et al. (2010) can be defined as the loss of or damage to food that exists in earlier stages of the supply chain, for example during production, postharvest, or transportation. However, others would define it as edible food lost along any stage of the supply chain, such as unserved restaurant-prepared food, or food ineligible for markets due to aesthetic purposes (Kantor et al., 1997 as cited by Garrone et al., 2014). On the other hand, food waste is often defined as food wasted at the later stages in the supply chain by consumers' behaviour rather than infrastructure issues (Partiff et al., 2010; Soma, 2022). Garrone et al. (2014) identify food waste to be food not recovered to feed people, and animals or produce new materials such as fertilizers or energy. However, Lee and Soma (2016) define food waste to be food that was considered for human consumption but was wasted, regardless of its end use in composting or anaerobic digestion.

Further defining food waste, scholars have categorized products into avoidable and unavoidable waste. Avoidable food waste is food that was edible before being disposed of, such as overstocked, over-purchased or spoiled food (Nikkel et al., 2019;

Soma, 2022). Unavoidable food waste is food that is inedible such as animal bones, which was planned waste (Nikkel et al., 2019). Soma (2022) identifies a third category of potential food waste which is food that is consumed by some, but not others. Examples include bread crusts or broccoli stalks.

Regardless of decided definitions, it is clear that food loss and waste happen all along the food supply chain (Göbel et al., 2015; Vilariño et al., 2017). Göbel et al. (2015) conducted interviews with food sector stakeholders to determine why waste exists along the supply chain. Respondents identified clear issues in the food supply chain including the guaranteed supply and high quality consumers require while not guaranteeing demand. As well, Göbel et al. (2015) point to the need to review food safety regulations and best-before dates to be more in line with human safety and not lead to unnecessary waste. They conclude that there is not a single culprit who can be blamed for waste along the supply chain (Göbel et al., 2015).

Perhaps the difficulty in defining food waste exists because this issue looks very different in all parts of the world. Food waste in the global north is classified differently than in the global south (Evans et al., 2012). Food waste is particularly high in developed countries (Garrone et al., 2014), perhaps because more things are taken for granted and, therefore, deemed wasteful (Evans et al., 2012). In industrialized countries, there is a high expectation of constant availability of fresh products, resulting in waste along the supply chain (Göbel et al., 2015). However, in the global south, certain food products have different values. Soma (2020) identifies corn smut (a type of fungus on corn) as an example. Corn smut, although visually unappealing, may be classified as unavoidable waste in some countries, however, in Mexico it is considered a delicacy (Soma, 2020).

Food waste contributes significantly to global climate change (Garrone et al., 2014; Göbel et al., 2015; Vilariño et al., 2017). It uses a significant amount of the world's limited natural resources including cropland and groundwater. Food waste causes unnecessary greenhouse gas emissions and decreases biodiversity (Garrone et al., 2014).

The food recovery hierarchy, adapted from US EPA (2023) and Papargyropoulou et al. (2014) in Figure 1 offers guidelines for preventing and managing food waste most appropriately (Papargyropoulou et al., 2014), with the most preferred method at the top,

to the least preferred at the bottom. Although Soma (2022) identifies limitations within this hierarchy, including limiting innovation, lack of consideration of scale, and the lack of distinction between types of food (Soma, 2022). Regardless, food waste prevention is the highest and most important of this hierarchy, followed by using food to feed people, then animals, before recovering nutrients and energy (Varney, 2021). Leaving food for landfill and incineration is the least preferred method.

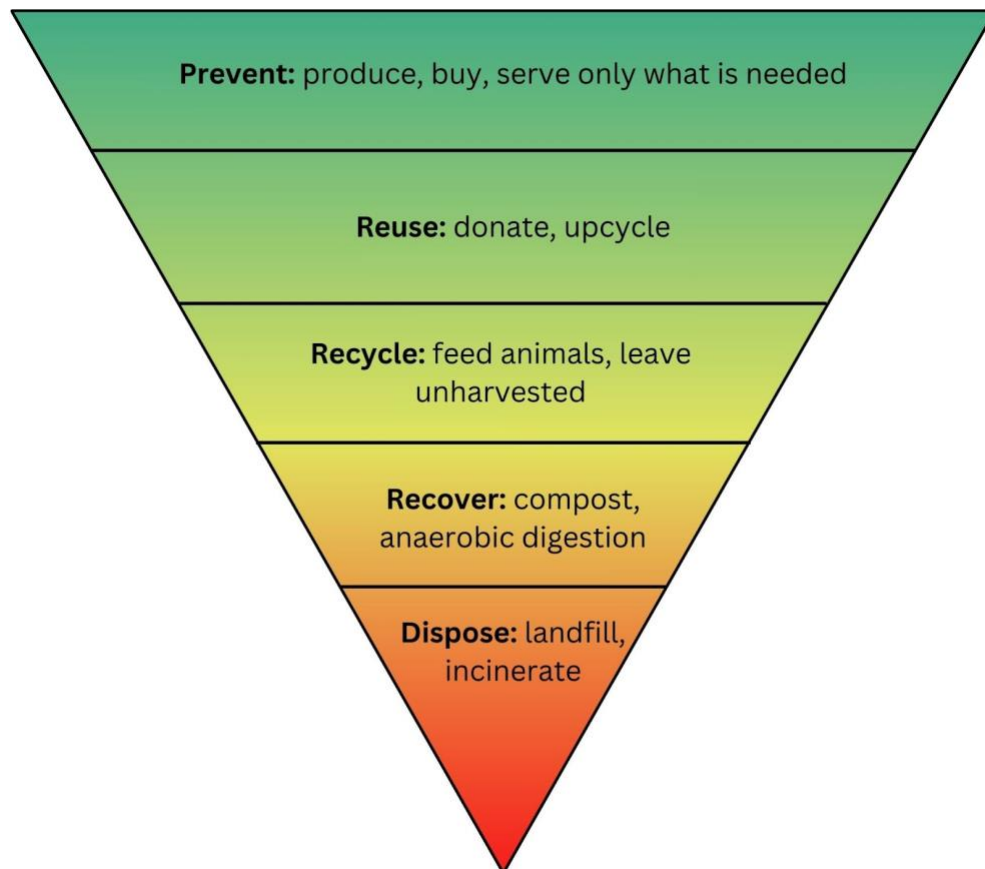


Figure 3. The food recovery hierarchy, adapted from US EPA (2023) and Papargyropoulou et al. (2014)

Food waste reduction has emerged as a priority on global food policy agendas because of its environmental impact (Evans et al., 2012) and because of its impact on food security. Food waste increases food insecurity (Santeramo, 2021) and exacerbates poverty in developing countries (Vilariño et al., 2017). Reducing food waste can improve world hunger since more people are fed instead of going without. This has been leveraged as an opportunity in the global north, where food is recovered and donated to help those in need (Vilariño et al., 2017). Garrone et al. (2014) state that although

surplus food management and recovery can mitigate food insecurity in the global north, food reduction at the source must also be a key element in the global food security effort. Soma (2020) encourages scale to be considered when focusing on food waste outputs and the importance of prevention. When wasting food becomes commodified and creates value, there will always be a demand for more waste, and less of an effort to reduce at source (Soma, 2020).

There is a shared responsibility for innovation in food waste reduction across the supply chain. This change needs to exist within governments, companies, and markets, as well as the social environments that appreciate food (Göbel et al., 2015). The term 'waste' according to Evans et al. (2012) comes with negative connotations, associated with being unproductive, distancing us from waste. Therefore, how we categorize waste, or how it is managed, deems what innovation can come of it (Evans et al., 2012). It can be categorized as a problem that needs to be managed, or as a potential for recovering materials through recycling. Borrello et al. (2017) offer the CE to be the source of radical change. In the food system, radical change must include a regenerative system. This includes the principles of a closed-loop food system, such as health, environment, and education from production, to processing, distribution, consumption and disposal (Soma, 2020; Soma 2022).

2.2.2. What is a Circular Food Economy?

The CFE is an emerging proposed solution to the growing food waste and loss challenge. Lungo et al. (2022) define CFE as:

a co-creative food ecosystem that enhances food safety, food security, and biodiversity conservation, preventing food losses and waste, managing perishability, and using regenerative agriculture through reusing, recycling, recovering, and reprocessing edible food and inedible parts into circular loops and alliances (p.29).

In a CFE, the aim is to close the loop along the supply chain line and ideally reuse food, minimize surplus and avoid waste (Jurgilevich et al., 2016). The Ellen MacArthur Foundation is a leading non-profit organization in the CE space working to solve global challenges through circularity (Ellen MacArthur Foundation, n.d.-a). They identify three ambitious pillars in creating a CFE: sourcing food grown regeneratively and locally where appropriate; making the most of food; and designing and marketing

healthier products (Ellen MacArthur Foundation, 2019). Jurgilevich et al. (2016) argue that a CFE involves three interconnected stages: food production; food consumption; food surplus and waste management. This includes reducing food waste generated within the food system, reusing food, using by-products and regenerating nutrients (Jurgilevich et al., 2016). Research conducted by Soma (2022) proposes a new framework for a CFE that is also based on justice, reconciliation, and innovation. Above all, transitioning to a CFE is complex and multi-dimensional, requiring systemic innovative solutions (Smart Prosperity Institute, 2021).

Most notably, the CFE had unique characteristics from other CEs due to its perishability. In the food supply chain, there are varying levels of production, availability, and seasonality, which results in different conditions than other CEs where materials could be used in a variety of ways (Lungo et al., 2022). Therefore, some of the barriers and opportunities we see in the CFE may be specific to the food sector.

2.2.3. Barriers and Opportunities in a Circular Food Economy

There are a variety of social benefits and challenges within a CFE as it is a complex problem with a variety of stakeholders involved. Some scholars identify a CFE to be important because it gives people the opportunity to value food (Leipold et al., 2021; Sharma et al., 2019) and value waste (Coghlan et al., 2022; Mor et al., 2021). This can help reduce food waste, reduce consumption, and connect buyers with the resources available. On the contrary, Coghlan et al. (2022) identify critics that suggest that within a CE, social benefits are not valued. Particularly, it is unclear how diverse voices would be represented in a CE, especially within policy. Leipold et al. (2021) found that in CE narratives in France, social issues are often excluded from political conversations, leaving the conversation to be solely economics-based.

The social sector is complex in a CFE as there are several stakeholders, with competing interests and varying levels of influence (Lungo et al., 2022). These opposing interests raise new questions about our ability to plan for a future with the common good (Barry et al., 2018). Mourad (2016) identifies these competing interests to be either contributing to “weak” or “strong” sustainability. Where recycling and recovery may support incremental change, they are considered “weak” solutions compared to waste prevention, or “strong” solutions (Mourad, 2016). To go beyond these weak solutions,

Mourad (2016) argues the governance structure around food systems needs to be rethought, including the power relationship between producers, manufacturers, retailers, food banks and other actors.

A CFE aims to transform the economy, presenting new, innovative business opportunities. Within this new framework, food would be reused, recycled, recovered and reprocessed (Lungo et al., 2022). Businesses would have the opportunity to redirect food, perhaps giving it to people in need (Leipold et al., 2021). They can take on the responsibility of innovating new ideas of how we can prevent the loss, which could include moving away from empirical food production planning. A CFE leads to new business models, which would create innovative jobs (Lungo et al., 2022) and involve new technological innovations to approach sustainability models (Springle et al., 2022).

Ensuring that diverse stakeholders support a CFE is critical to its success. Coghlan et al. (2022) argue that businesses may be more interested in adopting a circular economy business model without feeling like they are doing something too radical as it promotes the Sustainable Development Goals (SDGs), laid out by the United Nations. A CFE needs to become mainstream and targeting the SDGs approach could lead to more buy-in from stakeholders. Borrello et al. (2017) hypothesized that getting consumers' participation in a closed-loop food economy may be difficult as it will include non-traditional technologies (such as vermicompost). However, they found that consumers reacted positively to the scenarios presented to them when there were incentives, such as reduced food costs.

The CFE is an opportunity for our food system to reduce waste, support innovative businesses, and regenerate our environment. Researchers have found that although there are challenges and barriers to this new approach, there are many ways of approaching CFE through a range of alternatives such as redirecting food to those affected by poverty through food banks (Papargyropoulou et al., 2014), creating added value from a material that would otherwise be wasted (Jurgilevich et al., 2016) or creating fuel and energy through anaerobic digestion (Usmani et al., 2021). All of these alternatives fall on various points of the food recovery hierarchy which could contribute to initiative's motivations, opportunities and abilities.

2.3. Motivation Opportunity Ability (MOA) Framework

The MOA theoretical framework is used throughout this study to analyze data. The MOA framework states that if an individual has these three elements; motivations, opportunities, and abilities, they can change a behaviour (ölander & Thøgersen, 1995). When an individual's motivation, opportunities, and abilities align, they can mobilize these elements to accomplish their goal of supporting pro-environmental behaviour (van Geffen et al., 2020). **Motivation** can be understood as someone's desire, readiness, intention, values or willingness to make the change; **Opportunities** refer to the extent to which preconditions or limitations impact someone's actions to make the change; and **Abilities** are the skills, knowledge, proficiencies and habits available to make the change (MacInnis et al., 1991; ölander & Thøgersen, 1995). Soma et al. (2021b) identify how motivations can go beyond personal interests to include values. For example, if someone wants to reduce their household food waste because they value environmental conservation, they have a high motivation; if they are educated on ways to reduce waste at home such as through meal planning they have a high ability; however, if their refrigerator is set to the wrong temperature, spoiling their food, they have a low opportunity (National Academies of Sciences, Engineering, and Medicine [NASEM], 2020).

Various scholars have adopted the MOA framework to better understand environmental or sustainability behaviours (de Jonge et al., 2014; ölander & Thøgersen, 1995), including reducing food waste (Soma et al., 2021b). De Jonge et al. (2014) and Soma et al. (2021b) both point to the use of nudging in the MOA framework. A nudge can advance one's motivations or ability, but not change structural systemic factors involved in opportunities. However, nudges can support opportunities by learning about what others are doing, enrolling in programming automatically, or increasing the convenience of an opportunity (Soma et al., 2021b). An example of a nudge could be a fridge magnet, reminding you to not waste food. Although this study does not use nudges, it could be considered a viable option for reducing some of the MOA barriers outlined in the Findings (Chapter 4) below. However, the novelty of this paper is that it explores the CFE practice of an emerging group of CFE practitioners using the MOA framework.

Chapter 3.

Methods

3.1. Research Context

This research seeks to better understand the CFE in Metro Vancouver to support long-term policy. A CFE is a critical topic emerging within waste management due to growing food waste challenges. There are a variety of policy conditions that support the need for this research. A CE aims to achieve a variety of Sustainable Development Goals put forward by the United Nations (Schroeder et al., 2019). Federally, the Canadian Government has also expressed support for a CE and CFE in several ways (Government of Canada, 2021). For example, in line with their zero plastic waste agenda, the Canadian Government has committed to a national strategy to encourage remanufacturing and other value-retention processes (Government of Canada, 2021). Provincially, the CleanBC Roadmap to 2030 plan targets the goal of reducing waste and turning it into resources (British Columbia, 2018). The province's goal is to keep 95% of residential food and yard waste out of landfills by 2030 (British Columbia, n.d.). Regionally, Metro Vancouver's Climate 2050 Strategy commits to a CE transition to reduce greenhouse gas emissions (Metro Vancouver, 2020). On a local level, municipalities are integrating CFE into their plans and policies (City of Richmond, 2021; City of Vancouver, 2018). For example, through a large communication and engagement campaign, the City of Richmond is encouraging residents to rethink waste as part of a long-term transition to a CE (City of Richmond, 2021).

The NZWC, an initiative from the region of Metro Vancouver, is committed to achieving zero waste across Canadian cities and businesses for economic, social and environmental benefits (NZWC, n.d.). The NZWC created the "Love Food Hate Waste" campaign, a national initiative that works with businesses, government, and community groups to support food waste reduction (Love Food Hate Waste Canada, n.d.). Further, research institutions and innovators are focusing their work on the CE. Circular Economy Leadership Canada (CELC) is a national organization dedicated to advancing CE in Canada and acting as the national hub on CE work (Circular Economy Leadership Canada, n.d.). The Smart Prosperity Institute (SPI) is a national research think tank

advancing practical policies and market solutions for a stronger, cleaner economy (Smart Prosperity Institute, n.d.). SPI has called for a variety of public policy interventions for a more CFE (Smart Prosperity Institute, 2021). In partnership with CELC, SPI and other national circular leaders, a coast-to-coast landscape scan identified many circular food solutions in Canada (National Zero Waste Council, 2021).

Locally, the former Vancouver Economic Commission (VEC) was acting as an external agency of the City of Vancouver, leading projects to strengthen the city's economic future while prioritizing supporting local, climate action, reconciliation, and prosperity for all (Vancouver Economic Commission, n.d.). Through the VEC, Varney (2021) describes a vision for the CFE in Metro Vancouver through a "Right to Food" framework. Recently, the Circular Food Innovation Lab, a project co-lead by VEC, the City of Vancouver and Emily Carr University of Art + Design, gathered a variety of businesses and organizations in the food system to come up with various prototypes of potential solutions for increasing circularity in Vancouver's food system (City of Vancouver, 2023). In addition, the City of Vancouver has employed a Zero Waste 2040 strategic plan which is completely devoted to transition to a CE through food & packaging, but also the built environment and disposals (City of Vancouver, 2018).

This enabling policy environment should, in theory, lead to the successful implementation of a CFE that aligns with the values of all those working in the food sector; however, this research shows that there are still a variety of challenges and limited opportunities within the CFE in Metro Vancouver.

3.2. Research Design and Methodology

This study obtained research ethics approval from The University Research Ethics Board of Simon Fraser University in January 2023 under the title "Reducing, Recovering and Preventing Food Waste in Metro Vancouver: An Initiative Review". The participants targeted for this study were working on various CFE initiatives in Metro Vancouver. A list of those meeting the criteria was created based on researchers' networks or found through an internet search. There was a conscious effort to ensure that a diversity of voices was included as research participants (see further comments on challenges in the limitations section).

From January 2023 to March 2023, 22 semi-structured key informant interviews were conducted with various stakeholders working in the CFE space in Metro Vancouver. It is important to note that several groups declined the interview invitation due to capacity constraints and some organizations noted for their CFE work in the region ceased to exist upon the commencement of this study. Interviews were conducted online via Zoom or over the phone and recorded via a handheld voice recorder for privacy purposes. Each interview was on average 45 minutes. All participants were offered a modest honorarium for their time.

Among the 22 stakeholders interviewed, 10 represent businesses, entrepreneurs or for-profit enterprises, 9 represent non-profit organizations, 2 represent farms and one Indigenous Knowledge Keeper, Leona Brown [who expressed consent and preferred to be fully named]. The sectors of those they represent are shown in Figure 4. Although many stakeholders (10) are in the city of Vancouver, representatives were interviewed from Abbotsford, Burnaby, Delta, Langley, Maple Ridge, North Vancouver, Richmond and Tsawwassen, and three groups operate throughout Metro Vancouver. This distribution is shown in Figure 5. Further details of those interviewed are included in the Findings (Chapter 4).

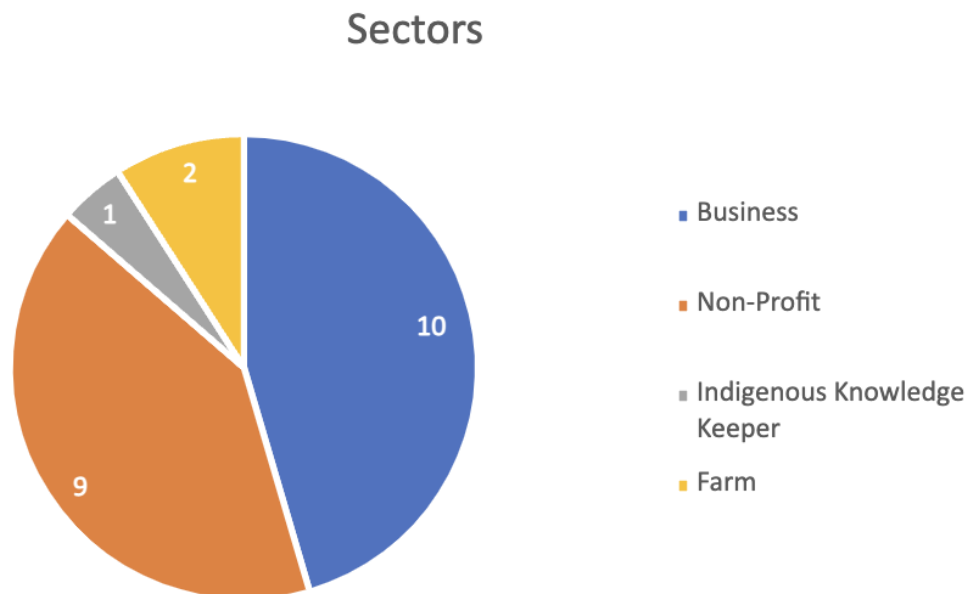


Figure 4. Sector distribution of those interviewed

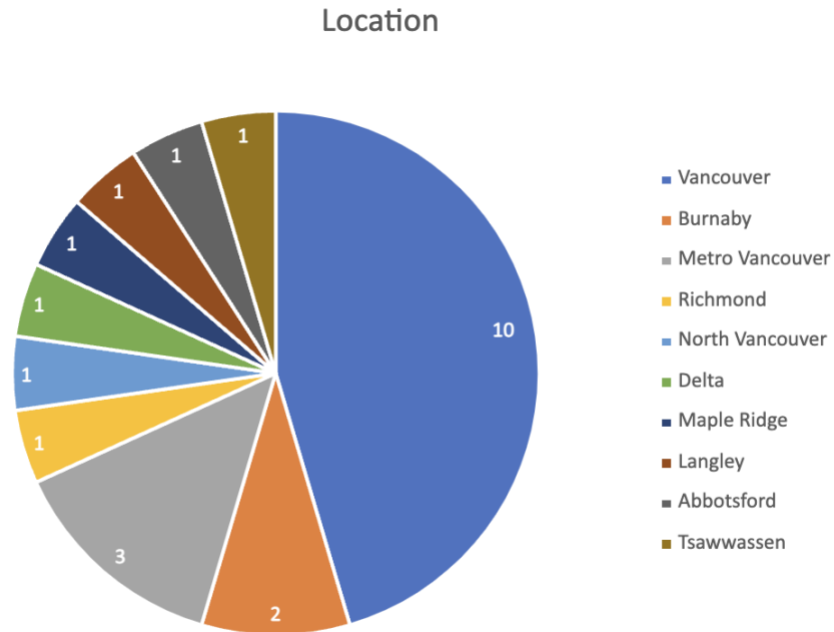


Figure 5. Location distribution of those interviewed in Metro Vancouver

Interview questions were open-ended, semi-structured and focused on participants' motivations, opportunities and abilities working in the CFE sector in Metro Vancouver (see Appendix A). The questions were designed to better understand why people do their work, what supports or barriers they face, what values underpin their work and how they define a CFE. Interview questions attempted to avoid using the terms CE or CFE to avoid any confusion around this emerging jargon and to ensure accessibility. Instead, questions focused on food waste reduction and prevention, as well as food-related efforts in sustainability.

The interviews were transcribed using Otter.ai software and coded using NVivo software. Interview responses were categorized based on corresponding themes of motivations, opportunities or abilities and sub-themes based on the particular question. The breakdown of these coding themes is provided in Appendix B and the analysis of themes is provided in the Findings section.

3.3. Limitations

There are a variety of limitations to this study. Firstly, despite circular food efforts from large grocery chains in the region, they were not contacted. Their motivations and

values in a CFE would be useful in future studies. Further, the participants contacted were not an exhaustive list of CFE initiatives in the region due to personal network limitations, or they were not identified through online searches. Although there were a variety of attempts to diversify the group of those interviewed, this was met with challenges, especially with capacity constraints in smaller initiatives. A major limitation of this study is out of the 22 participants, very few were of minority groups and only one identified themselves as Indigenous. This can be considered a significant limitation of this study. However, the lack of representation of racialized communities in the sustainable food sector may be representative of the variety of barriers to entering into the CFE space and green innovation in Metro Vancouver. Finally, this paper focuses on the MOAs of individual practitioners in the CFE and the broader systematic aspects of CFE is beyond the scope of this paper.

Chapter 4.

Findings

This section summarizes the main findings from the key informant interviews. The findings from this study explain the complexity existing around a CFE in Metro Vancouver that will be considered in the Discussion (see Chapter 5). The following sections outline how individuals working in the food sector mobilize CFE within their work, followed by their motivations, opportunities, and abilities.

4.1. Circular Food Economy Mobilization Practices

Figure 6 outlines how those interviewed in this study mobilize the CFE in their work. Many (n=10) of the groups interviewed use the CFE to rescue and/or redistribute food. This includes non-profit organizations that acquire food from grocery stores that would otherwise be wasted and redistribute it to those in need within the community, following a food banking type model. For example, one rescue non-profit stated they run “a program where we separate and sort the product [that we receive from the grocery store] and then redistribute it” (Non-Profit 9). Many of the food rescue non-profits receive their donated food from the same large grocery store company. Other rescue groups take food that would otherwise be wasted from farms, and either distribute it to those in need or turn it into a value-added product.

Stakeholders interviewed contribute to the CFE through value-added initiatives, through their food retail businesses. Value-added producers receive food waste from other streams, such as other businesses. As one business owner explained, “We work with food producers to collect pre-consumer food waste and turn it into useful ingredients” (Business 7). Food retail businesses sell food in various forms, through alternative grocery stores such as zero-waste grocery, or markets. Those working in the composting sector mobilize in a variety of different ways, such as through non-profit and community education, consulting services, or soil restoration.

A variety of these stakeholders, particularly the farmers, reduce waste at the source and contribute to the CFE by circulating nutrients back into the soil. One farmer explained that their small-scale operations allow them the ability to contribute to a

regenerative system by not using plastic, feeding pigs with waste, or bringing unsold food “back to the farm to go back into the cycle” (Farm 1).

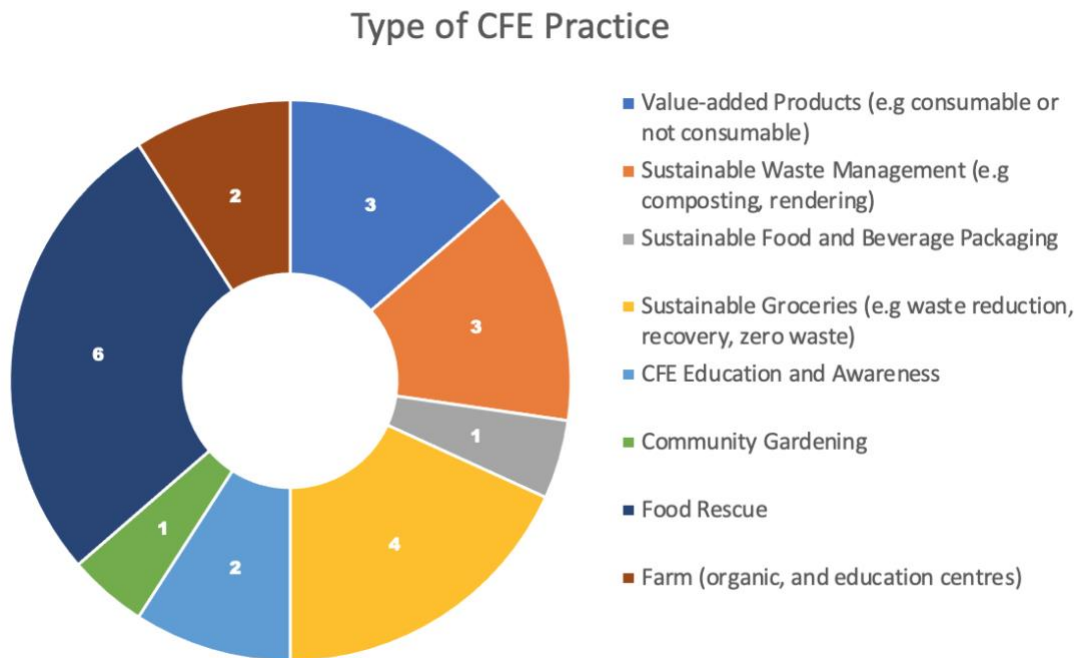


Figure 6. Overview of circular food economy mobilization practices of those interviewed

4.1.1. Conflicting Landscape and Competing Visions of Circular Food Economy in Metro Vancouver

There was a clear divide between CFE approaches, which at times led to tensions between the approaches. There was frustration among stakeholders who have circularity already built into their operations. For example, one farmer described food waste to be a “hot topic” but felt that small-scale operations are not to be compared to large corporations. This farmer mentioned: “Like Whole Foods, ... or Save On Foods, they have food waste, we don’t have food waste” (Farm 1). This was further questioned by one non-profit when they asked, “Why are we wasting food in the first place?” (Non-profit 10). This questioning of the origins of food waste, and the division between solutions has led to conflicting and competing visions of a CFE in Metro Vancouver.

Participants alluded to the dependency on the charity model in food waste reduction work. Big grocery stores have food rescue charities to fall back on when they produce a lot of waste, it is their “get out jail card”, as one non-profit mentioned (Non-

profit 3). Grocery stores can overproduce cheap bread that smells great to bring people into the grocery store and then dump the inevitable waste onto charities, according to some interviewees (Non-profit 3; Farmer 2). This led one business to question the mission of food charities, who asked if their work is based on social services and societal needs, or a way to let companies producing waste off the hook. Charities are having to pay for companies' (often grocery stores) inability to manage inventories (Business 5). This same business owner noticed the growing focus of food rescue within organizations in the region. They mentioned non-profits focusing on food rescue are the ones receiving much of the grant money which is "setting up infrastructure for all of these other companies to compete against each other. And that's not solving the problem" (Business 5). Further, they alluded to how this approach is reducing the supply of food waste. "These companies that are now starting to be in the upcycling business, they are competing against non-profits, for feedstock, guess what that does? It drives down the supply for these not-for-profits" (Business 5). A non-profit organization also noticed the shrinking supply of food waste due to the growing number of organizations committing to redirecting waste (Non-profit 8). They were disappointed that these initiatives are a lot less grassroots, and with the shrinking supply, the people who need food may find more difficulty in accessing these resources.

This tension has led to the call for collaboration between the for-profit and non-profit sectors. One food rescue non-profit recognized its survival depended on a small operating budget but mentioned if the CFE is going to work, there needs to be revenue from private businesses to support these programs (Non-profit 4). It was mentioned that sharing of data could be one mode of collaboration (Business 2) and perhaps this collaboration would lead to efficiencies within CFE approaches. However, despite this call, a non-profit participant was skeptical of for-profit businesses because of the lack of perceived values entrenched in their approach (Non-profit 8). They stated that there is a range of people doing CFE work for environmental sustainability, however, in the last 5 years, they've seen more approaches entrenched in profit-making.

4.2. Motivations

The motivations of stakeholders working in the CFE in Metro Vancouver can be categorized into four main themes: environmental, social equity and health, economic motivations and integrating values into their work including Indigenous values. These

themes emerged when participants were asked, “Why do this work? What are some of your main motivations?”.

4.2.1. Environmental Motivations

Reducing food waste for environmental and sustainability reasons were the primary motivations of most of the participants. Food waste is a large contributor to greenhouse gas (GHG) emissions, and although GHG emissions can be a divisive issue along political lines, one individual from a food rescue organization indicated that reducing food waste is a “very apolitical way to dramatically cut emissions because it doesn’t matter what side of the political spectrum you’re on, nobody likes food waste” (Non-profit 1). For-profit stakeholders see the need for businesses to behave more responsibly within the food industry where there is a lot of waste. Further, individuals from non-profit and for-profit organizations alike both found personal reasons to contribute to a CFE. For example, an industry leader working in composting indicated:

I've got three kids, and I want them to have a future that is not the way it's going right now. The trajectory we're on right now, if you're paying attention, is scary. And I want to contribute to reversing whatever the hell is going on right now and creating this for the next 15 years so that they have a thriving future (Business 5).

Another participant indicated that contributing to a CFE to protect the environment is a moral responsibility (Business 10). Environmental-related motivations are a common theme among the majority of stakeholders (n=14) who felt proud of being able to contribute to something that supports environmental protection, especially with the growing pressures of climate change in the agri-food system. There was a sense of accomplishment and gratification among those who felt good about contributing to a different type of business practice and challenging the status quo. A variety of stakeholders made it clear that although their efforts were rooted in environmental sustainability, they also recognized that they were motivated by the desire to contribute toward more equity among people as well.

4.2.2. Social Equity and Health Motivations

Interview participants were also motivated by social justice considerations such as solving food insecurity. One non-profit participant identified low income and high

costs of living to be the cause of food insecurity and stated that their food rescue programs give people the resources needed to move towards food independence (Non-Profit 4). Another non-profit participant was adamant that the reasons they participate in the CFE are for food justice and ensuring food access among low-income communities (Non-profit 2).

For one industry participant, CFE practices can be used as a tool to support marginalized communities:

I see waste as a whole being concentrated in communities who are marginalized in some way. And so if we're able to find value in that waste, then we're able to uplift those communities to be able to flip the switch on waste. So I really see the circular economy and waste valorization or adding value to waste as a mechanism to support community to empower and uplift communities as a whole (Business 3).

Several interviewees recognized the health benefits their initiative presents to community members, for example, through upcycled food with added nutrients or providing healthy food to people in need. For-profit participants were motivated by the opportunity to include impact metrics, and social benefits in their business model. While some may be motivated to measure their success by profit, this is balanced by quantifying environmental sustainability efforts as well.

4.2.3. Economic Motivations

Participants were motivated when they felt that their initiatives were providing something different, that is not as common in the current linear economy. One farmer identified how the CFE can be a model for cooperative economic development (Farmer 2). Another group felt that through direct sales from farm to consumer, they are developing an alternative economy, thus removing the “middle-man” or intermediary (Non-profit 3) and reducing the risk of waste. In addition, one farm business added that they are motivated to be a quality employer to people, paying living wages.

We're a living wage employer, we started that last year to get the certification. So like the social priorities of the farm in terms of providing quality employment to people, we have a range of ecological practices that go beyond the baseline for organic (Farm 2).

They believe in going above and beyond with their business practices and adding value to their work. Non-profit and for-profit participants alike were motivated by the educational opportunities that a CFE presents. One non-profit participant noted that they bring food waste knowledge and education into people's homes. They observe the value of education and the potential for long-term systemic change.

4.2.4. Indigenous Values

The majority of stakeholders were motivated to reduce food waste by various values they felt underpin the CFE. Circularity in the case of Leona was motivated by Indigenous values. For example:

Circular food is something that Indigenous people lived by. We had no waste, there was no waste of anything. Every part of food or plant medicines was used in some shape or form, whether we're eating it, or we're wearing it or, we pray and we give it back to the land, to the trees [and] we never had a garbage, we never had a landfill pre-colonization. So what did we do? We actually would bury food by a tree. If it's bones or something, we leave it out, and we pray and give it back to the land. So another animal will come along and finish off those bones or whatever meat that we didn't eat. We give it back to the land, and the land feeds back with what we need. So it's a circular motion (Indigenous Knowledge Keeper).

4.3. Opportunities

4.3.1. Supporting Opportunities in the CFE

To understand the structures that support their work, CFE stakeholders were asked: "Are there opportunities such as programs, regulations, and incentives in Metro Vancouver and the province of BC, in general, that support the work that you do? Is there any regional infrastructure that supports your work? What helps you achieve your goals?" The responses to these questions can be categorized into the following themes: partnerships/collaboration, existing systems/structures, and political and economy opportunities.

Partnerships/Collaboration

The majority of stakeholders interviewed highlighted the support they receive from community or business partnerships, collaborations and various relationships. One

non-profit participant shared an internal motto they have which is: “do what we do best and partner for the rest” (Non-profit 1). This was common among organizations that identified their limited capacity. Since a lot of their work includes a diversified skillset, many groups hired out or outsourced various needs.

Collaboration was deemed important moving forward with the CFE in Metro Vancouver. Two non-profit participants believed that collaboration is the method to a successful CFE (Indigenous Knowledge Keeper and Non-profit 4). Groups were interested in building a food hub, or a centralized “mother centre” for circular food services. For example, if one group receives a large donation of one food type, they can distribute it to where it is needed. It was clear how partnerships can streamline operations. Reliable partners can help move products or potentially provide cold storage which is often needed in food rescue (Business 5). Three business interviewees shared how they used the services of food rescue non-profits in their operations (Business 8, 9, 10). As mentioned by one retail business “Obviously, using [food rescue organization name redacted] was a really, really big asset. I think they’re doing really good work” (Business 9).

Stakeholders found opportunities through various partnerships they had. This includes government partnerships that are supported with funding (Non-profit 4, 5; Business 7) and academic partnerships that are supported with research work (Non-profit 1, 5; Business 8). Lastly, collaborative learning opportunities helped support stakeholders’ opportunities such as the Circular Food Innovation Lab through the City of Vancouver.

Existing Systems/Structures

Regionally, provincially and nationally, there are existing systems and structures that have helped CFE initiatives. Organizations that have charitable status found certification critical when applying for grants. The green bin or composting system within municipalities was critical to many organizations that did not want to see food go to the landfill (Non-profit 7; Business 4, 7; Farmer 2). The Buy BC logo, an identification that exists on packaging that identifies the product that was produced in BC was recognized as important to consumers, and therefore important to stakeholders (Business 1; Farmer 2). Similarly, a BCorp certification was also deemed important to consumers and therefore to businesses (Business 10). Existing within a port city helps to support

distribution (Farmer 2). Canada Helps, a system that streamlines donations administration for non-profits was helpful in operations (Non-profit 9). One interviewee's business exists within the Agricultural Land Reserve, a reserved set of land within British Columbia specifically for agriculture and the food industry. They stated that having this land and the farm designation was helpful to their operations because they would not have been able to find similar space in Metro Vancouver (Business 5).

Political and Economic Opportunities

Participants noticed a political and public window of opportunity with more emphasis on CFE. They stated the CFE can be at the will of political leaders, therefore organizations feel supported if leaders are interested. "It depends on what the interests of policymakers are, these initiatives could be important or not," said one interviewee working with farmers (Non-profit 3). A non-profit participant remembered many decades ago when there was "suddenly a provincial mandate to keep waste out of landfills" and composting became of interest to the government (Non-profit 5). Multiple stakeholders noted how the public has been paying more attention to food and environmental issues over the last few decades. As one interviewee noted, "20 years ago, nobody even cared about local food" (Non-profit 3). Some stakeholders working on CFE initiatives in Metro Vancouver saw a gap, or opportunity within the market to advance a circular initiative. For example, one participant identified that "[t]here's not a lot of great solutions out there to really smash the needle" (Business 2).

With the prioritization of CFE, participants have observed an economic window of opportunity due to some changes in behaviour in the food industry that support the CFE. Overall, stakeholders are seeing more of a market for ugly produce, dehydrated food and frozen foods that reduce food waste (Non-profit 3, 5). In addition, businesses are noticing that suppliers are more open to circular packaging or reducing plastic packaging than they were five years ago (Business 8, 10). One business interviewee finds hope in the growing number of upcyclers, academics, and food rescue groups contributing to the CFE (Business 4).

4.3.2. Lack of Opportunities in the CFE

To understand the barriers, or the lack of opportunity stakeholders face, they were asked the following questions: "Are there programs, regulations, and incentives in

Metro Vancouver and the province of BC in general that do not support the work that you do? Are there any infrastructural barriers to your work? What are some of the main challenges that arise in your work towards a more sustainable food system?" Responses can be categorized into the following themes: industrial/conventional food system, lack of funding and high operational costs and the lack of government support.

Industrial/Conventional Food System

The main challenge stakeholders face in their CFE work is the conventional food system. This includes the root causes of food waste and the "big five" grocery store system that exists in Canada. Stakeholders pointed to the root causes of food waste being a major issue that challenges their work. For example, high aesthetic consumer standards and over-purchasing to fill grocery shelves (Non-profit 1, 3, 4, 7, 8). Others pointed to how easy it is to waste food with the current expiration date system (Non-profit 4), or because of how time-consuming processing and cooking food can be (Non-profit 8). As one interviewee believes "Waste costs are too cheap and reinforce the status quo of food ending up in our waste streams" (Business 4). This interviewee also noted that there is a lack of regulation for businesses to report their food waste.

Next, for-profit participants pointed to the high barriers to entering the retail/grocery markets within Canada due to the few dominating companies with the largest buying power. This makes it difficult for innovative alternatives to exist in grocery shopping. One company mentioned that it is difficult to incentivize the CE because the end product can be expensive to consumers (Business 8). Finally, one interviewee sums up a potential underlying cause of this:

In the food industry, in particular, there's constant fighting for margin. And it's like, how can we not fight for margin, but maybe just, let's take back a look at these thresholds? And are they still working? I think that's the biggest thing that needs to be done. Are the current margins still working for everybody? I think we're gonna get there in the next few years. Because honestly, the most unsustainable thing has been our food prices, I think our foods been subsidized for so long (Business 1).

Lack of Funding and High Operational Costs

Perhaps unsurprisingly, the lack of funding and high operational costs was considered a key barrier among stakeholders working in the CFE. Table 1 shows the frequency of these barriers identified by the 22 participants interviewed.

Table 1. Frequency of Barriers Identified

Barrier	Number of Participants
Lack of funding	9
High staff turn over/Reliance on volunteers	7
Limited ability to grow the organization	5
High cost of land or real estate	5
High cost of labour	5
High cost of living, supplies, food	6

Some individuals from businesses felt limited in the support or opportunity to grow within the CFE. For example, one interviewee stated that because they do not make edible products, they have been eliminated from food funding sources despite their usage of waste from food (Business 6). Two individuals from businesses separately participated in business development programs or received innovation awards and described their experience as being “the weird one at the party” (Business 6) or “the ugly duckling of the group doing CE” (Business 1). It was clear that CFE businesses wanted investment to move towards circularity and business model innovation. The lack of funding limited organizations’ ability to grow, summed up by one participant who stated it was “really hard to do system change whilst doing operational stuff” (Non-profit 1).

While most non-profit and for-profit participants identified negative issues around funding, various stakeholders have received funds from municipal, provincial, or federal grants including the Canada Summer Jobs program and two non-profits have ongoing funding (Non-profit 2, 5). However, businesses and non-profits called on more government support through funding, investments, and subsidies. Investments may include incubators for innovations with facilities and supplies. For example, a farmer identified an incubator for emerging businesses or groups training the next generation of farmers (Farm 1). Participants were curious about the possibilities for tax incentives for reducing carbon footprints or generating carbon credits (Non-profit 9; Business 7, 8). It was noted by one business owner that running a CFE business must be more accessible financially as there are so many barriers to entry, despite being a green innovator (Business 8).

Although running a small business is difficult no matter where it is located, businesses stated that “one of the biggest problems is doing this in Metro Vancouver”

(Business 2). It was mentioned that it is difficult to break into the market when few companies dominate so much of the industry. “It makes it really hard for the little guys to make it work” (Business 9).

Lack of Government Support

Non-profit and for-profit interviewees alike are finding difficulty advancing their CFE initiative due to the lack of government support. For example, one business rents space from the City of Vancouver and stated the City would have been “very happy to put a Tim Hortons in that space” (Business 8) instead of supporting their circular business. Another business interviewee notes:

On one side, the City of Vancouver, Metro Vancouver has these climate goals and zero waste goals and circular economy goals. But on the other side, we have very stringent and difficult to update policies around waste management. So it's just really about how do we ease those tensions and allow a bigger space for innovation and piloting to really happen? (Business 3).

Further, interviewees experienced challenges due to restrictions with red tape, bureaucracy, and business permits. One farm identified the extensive health restrictions and guidelines small farms have to follow to access bigger grocery markets (Farmer 2). Two participants noted the restrictions they faced during the COVID-19 pandemic when they were unable to reuse plastic containers (Business 9) or redistribute food from open packages (Non-profit 7).

Businesses are also frustrated by the lack of regulation around reporting amounts of food waste, leading to greenwashing. Currently, businesses are not obliged to share their waste reduction techniques, and many for-profit stakeholders believe this lack of transparency has led to greenwashing.

There are so many companies now boasting “we don't waste anything”. And I'm like, “show me, show me how you don't waste anything”. Because we are a food waste company. And we still have waste. Not much. But we still have a little bit (Business 1).

Another participant from a business pointed to the common theme among green innovators to measure success by “how big the exit is”, in other words, they are creating companies to sell them (Business 6). One participant is waiting to see how the region of Metro Vancouver will support the CE and green entrepreneurs as they find they talk

about supporting, but there is no action. Therefore, they are considering moving their business elsewhere (Business 1).

Multiple stakeholders advocated for a platform to promote the CFE from governments. One business interviewee emphasized the need for this to be at the municipal or regional level due to the nature of CE work. They noted that unlike the Silicon Valley model, where businesses try to scale as big as possible, scale in the CE is about localization and locally derived waste streams (Business 3). A non-profit participant noted that the government needs to take a leadership role in the food system (Non-profit 4) instead of businesses having to convince the government of its importance. One business participant noted how government regulation can inhibit innovation by using compost as an example. They mentioned that Canada has very strict regulations for processing organics which is good for creating healthy soil but does not create a space for innovation in waste management (Business 3).

Finally, CFE stakeholders want to see stronger food policy from governments. The food waste issue and supporting a CFE must be tackled now, as in 10 years it will be much more expensive (Business 1). Multiple interviewees stated that having a policy around food not going to waste could be an effective way to support the CFE (Non-profit 7, 8; Business 10).

4.4. Abilities

The abilities in the MOA framework refer to the skills and education an individual has available to accomplish their goal (MacInnis et al., 1991; ölander & Thøgersen, 1995). To understand the interviewee's abilities, they were asked: "How did you learn about this issue? How did you identify solutions? Was there any education or technical expertise that helped you address this issue?" Responses to these questions can be categorized into the following themes: education, relationships and previous experiences.

4.4.1. Education and Training

Among the stakeholders interviewed, many stated that their university degrees and certificates have helped them navigate their work in the CFE. Some had

environmental or business degrees that were directly related and some had more general or unrelated degrees that gave them enough knowledge or experience to support their work. One non-profit employee identified the learnings they have received from Elders and First Peoples (Non-profit 4). These teachings and values resonated enough to integrate them into their work and circular initiatives. Some stakeholders were motivated to acquire their own education and conduct research. They saw the value in informing themselves on the matter before diving in. One business owner shared that “I will go read peer-reviewed articles to understand what I’m reading and go back to primary sources and not believe whatever” (Business 8).

Many interviewees entered their current role with previous relevant experience that led them to learn about food waste. For example, many non-profit participants had previous volunteer experience. Others had worked in the food industry and in restaurants as chefs. Some interviewees had been employed in the nutrition, science, or healthcare sectors. Lived experiences outside of formal education were relevant. For example, one participant learned so much about the waste that existed when they had young children. Another participant experienced food insecurity which propelled them to do the work they do.

One grocery business employee identified the need for more education around food waste as it is profitable for businesses to create the conditions to reduce waste. For example, when food is wasted, more labour is needed to sort through products for compost. They stated that “[t]he last thing we want to do is have someone spend their shift emptying product out of its packaging into the compost or something like that. That’s not good for anyone” (Business 10). This interviewee made it clear that there is a gap in the food industry to reduce waste. Another interviewee stated that despite there being a lot of research in this area, not many people are working on the ground to close the loop in the food system (Business 3).

4.4.2. Professional Networking and Resources

After education, the most frequent “ability” to arise was the organizational relationships and collaborations that exist within the CFE in Metro Vancouver, both for-profit and non-profit alike. One non-profit participant stated that their organization was “literally built upon connections” (Non-profit 7). Non-profit organizations frequently found

that community events allowed them to learn from experts within the field and learn about what is possible for a CFE. Many stakeholders felt that the relationships they have developed have been critical to their success. This includes the return on networking and getting the word out about programs. Many groups found that connecting with other organizations, sharing resources, and collaborating on ideas have been an effective way to reach goals. Further, stakeholders identified how some of these relationships have turned into either formal or informal mentorship relationships and having that network has helped overcome some of the more technical challenges in their work. One business stated: “We rely on a network of professionals across the food supply chain - in policy, technology, hunger relief, food systems, data analytics, and community development space to help us do what we do” (Business 4).

Chapter 5.

Discussion and Recommendations

5.1. Address Competing Priorities

The findings of this study highlight the deep tensions and competing priorities that exist within Metro Vancouver's CFE. Although competition could lead to enhanced innovation, Ashton et al. (2022) state that a CE cannot exist without justice. These competing priorities force us to question whether there is sufficient consideration for justice and equity in how CFE is mobilized in the Metro Vancouver agri-food system. Many of the stakeholders interviewed mobilized the CFE through food rescue efforts. Unfortunately, some of these practices may fall into the critiques of the CE identified above (Chapter 2).

Ashton et al. (2022) point to the CE's goals of advancing economic prosperity, ecological integrity and social well-being but in practice one of these pillars wins when others lose. This is seen in Metro Vancouver's CFE as many of the organizations interviewed work countless hours to feed their community with rescued food, there is a clear overlap with their economic challenges, indicated by a lack of funding. Even for the businesses who wanted to turn this non-profit model on its head and were motivated to reinvent an economically profitable solution to food rescue, they were doubted by the non-profits who felt they were not addressing the social inequalities that arise within circular models (Ashton et al., 2022). However, on either side of the debate of food rescue, non-profit or for-profit approach, both could be criticized for diluting their efforts by not addressing systemic change (Temesgen et al., 2021) or the root cause of the food waste problem. Ignoring the food recovery hierarchy which prioritizes waste prevention above all (Papargyropoulou et al., 2014) could be a lost opportunity to improve financial performance (Nikkel et al., 2019). Messner et al. (2020) have identified how among these types of initiatives it is normal to redirect food waste once it is already wasted, instead of focusing on prevention. Long-term sustainability efforts such as prevention could be difficult to quantify for CFE initiatives as they lack tangible characteristics, such as recycling or diversion (Messner et al., 2020).

One clear tension arose between businesses questioning the motives of the non-profit model, or vice versa. Some participants from businesses recognized tensions in food rescue organizations; although they did provide social services, some businesses thought non-profits were compensating for the lack of better inventory management by grocery stores (Section 4.1.1). Krones (2020) found that private companies were motivated to contribute to food rescue initiatives because donating food was cheaper than throwing it out. Within a study conducted by Mourad (2016), this act by grocery stores was called “charity washing” which is along the lines of greenwashing. Charities also recognize this to be a problem, as businesses may “download all of the costs and the labour onto charities” (Non-profit 1). On the other hand, non-profit staff questioned if there were motivations beyond financial among rescue businesses when there was a fee attached to their food rescue services.

Further tensions arise when all the CFE initiatives in Metro Vancouver are competing for the same supply of food surplus/non-marketable foods from corporate donors. When there is competition for food waste as a feedstock, there are real concerns that the food recovery hierarchy of prevention will be prioritized (Soma, 2022). Food waste should be avoided or prevented, then recovered for human consumption, followed by recycling and recovery efforts including feedstock (Papargyropoulou et al., 2014). When feedstock becomes the solution for food waste, the recovery hierarchy could be easily ignored. With a lack of direction or control over the supply of food waste, it is unclear who should be responsible or deserving of it. One non-profit acknowledged that the supply ends up with businesses or non-profits with connections to major grocery chains, which can be difficult to acquire for small-scale, local initiatives (Non-Profit 1). The commoditization of food waste (Mourad, 2016) that exists within the CFE of Metro Vancouver aligns with Messner et al. (2020) “prevention paradox” which exists when initiatives want to end food waste, but their responses focus on management instead of prevention of waste.

Promoting the commodification of food waste in Metro Vancouver and advancing these competing priorities will not support the CFE for a variety of reasons. Krones (2020) describes how competition in the food waste market has led to a commodity frontier, that will eventually exhaust itself and force initiatives to move on to the next commodity. A commodified CFE takes opportunities away from innovators, causing a barrier to entering the CFE. The competing solutions in the CFE do not challenge the

underlying power relations between food system stakeholders, pushing food waste further away from national political attention (Mourad, 2016). In a CFE, scale must be considered to avoid the commodification of waste (Soma, 2020). Without the consideration of scale, initiatives will continue to be pinned against each other, competing for the same resource, instead of acting against the root causes of food waste.

The findings of this study are consistent with the paradox theory that is often found within circular approaches (Daddi et al., 2019; De Angelis, 2021). The competition between various initiatives for food waste has led to a paradox within Metro Vancouver's CFE. Even among the non-profit models, their economic goals, or needs to acquire grants, or to have large outputs of food are pitted against their environmental motivations. In Metro Vancouver, an organizational paradox (De Angelis, 2021) is present which exists when organizations compete instead of collaborate, and aim for efficiency in their circularity instead of resiliency. Various businesses interviewed aim for economies of scale, instead of small-scale operations.

5.2. The Need for Systems-based Solutions

Despite the commonalities in individual motivations, environmental, social equity, and economic, the competing priorities within Metro Vancouver's CFE have led to a lack of waste prevention which frustrated several stakeholders. One non-profit interviewee was very adamant in their frustration towards the CFE because they felt initiatives were not addressing the root cause of the issue (Non-profit 10). Despite the varying levels of business practices, no one has been able to truly disrupt the neoliberal system and challenge the status quo, for which there are several possible explanations.

Mourad (2016) has identified the need for a collective CFE to go beyond "weak sustainability" solutions, such as upcycling, and implement "strong sustainability" which would tackle the root causes, and major contributors to food waste. This dual approach to food waste reduction contributes to a two-tiered food system, which leaves so many people in Canada dependent on food charities and food banks (Riches and Tarasuk, 2014). This approach allows grocery stores to have a "get of out jail card" (Business 7) with their large surplus as described in the Findings of this study (Chapter 4). This two-tiered food system forces us to question what the motivations of the CFE are. One non-

profit participant summed up their struggles with the two-tiered food system by questioning their approach to “change the world or keep people alive” (Non-profit 1). This aligns with the Mukherjee et al. (2023) analysis that circular goals need to incorporate both upstream and downstream architecture. This has been a challenge for this non-profit participant who finds it is “really hard to do systems change whilst doing operational stuff” (Non-Profit 1). Despite there being interest in strong sustainability among individuals, the lack of opportunities in CFE initiatives is causing a barrier to enabling systems change.

It seems possible that individuals working in this sector are forced to ignore system solutions because of the extreme pressures to survive within the Metro Vancouver region. The various types of business and non-profit participants included in this study face challenges mobilizing their vision due to the systemic issues accessing resources, land, and infrastructure, at times forcing them to cease operations. This includes the high operational costs included in the findings; high costs of real estate, supplies, food, living and labour. Perhaps to address these system-wide problems the CFE of Metro Vancouver must reassess its vision and foundations, as Temesgen et al. (2021) suggest.

5.3. Identify Pathways, Direction and Vision through Intersectoral and Intergovernmental Collaboration

It is unclear whether the goals of Metro Vancouver’s CFE are to stick with the status quo or create a long-lasting resilient food system. Although there is collaboration in various spaces of the CFE, many initiatives are working in a silo, independently fighting for resources, creating conflicts among their solutions. In addition, some initiatives have neglected the food recovery hierarchy (Soma, 2022) which indicates the importance of reducing waste at the source. Since there is no one pathway, a long-term vision would help support mobilized change. Temesgen et al. (2021) found that when circular initiatives prioritize reuse and rescue, instead of reduction, they do not critically engage with various worldviews and values. Diverse worldviews and values would be seen as a direction for gaining economic profit, further perpetuating the paradox explained above.

A long-term pathway through collaboration can help mobilize change. Although non-profits and businesses both identified various partnerships and collaborations that support their work, there is not a mutually beneficial, cooperative vision. This would be the first step to bring about change to the neoliberal food system, with cooperation rather than competition, increasing capacity. This study finds there are missing initiatives that aim to bring the sector together through governmental set CFE pathways. Temesgen et al. (2021) identify the need for successful CFEs to engage in the origins of CE, why it started, and what its purpose could be. An example of a collective shared pathway in the CFE was studied by Varney (2021) in the City of Vancouver. Varney (2021) used a theory of change model to help carve out what a collective pathway to a CFE could look like from different sectors. It is important to note that the theory of change model must be done collectively and engage with more community members to ensure clear, achievable targets (Varney, 2021).

To develop a clear vision and pathways, intergovernmental support in the CFE of Metro Vancouver is necessary. Mourad (2016) insists that varying levels of government rethink their authority around food systems. They should reconsider the power relations the government has with producers, manufacturers, retailers, food banks and other actors. Participants in this study identified that for an intergovernmental approach to happen, there needs to be political will. Organizations felt that they would receive support if leaders were interested in their cause. An intergovernmental approach would ensure the invested interest and prioritization of the CFE is not at the will of an election and is instead embedded into policy. There is a lot of potential for a progressive food policy that includes various levels of government, non-profits, private enterprises and local communities (Warshawsky, 2021).

Local governments and planners play a critical role in advocating for CE policy at other levels of government (Bolger & Doyon, 2019). An intergovernmental approach would incorporate actions from all levels of government and clarify whose jurisdiction various actions fall into. For example, scale is important when considering the impact of circular initiatives (De Angelis, 2021; Soma, 2020). One business in this study further elaborated that scale allows for localization and that CFE activities need to be derived from local waste streams (Business 4). Stakeholders are calling on various levels of government to be leaders for circular solutions. Leadership will help eliminate competing

solutions, devise a collective pathway and bring cohesion to the CFE of Metro Vancouver.

5.4. Strengthening Motivations, Opportunities and Abilities for a Circular Food Collective Pathway

When a stakeholder's MOA is lacking, they are more likely to revert to societal cues or social norms reducing their ability to make a behavioural change (NASEM, 2020). Increasing motivations among stakeholders can support the CFE movement to identify collective goals. Motivations in the CFE could be stronger if prevention was seen as a social norm (NASEM, 2020). For example, if food rescue as a means to decrease food waste was less popular, or less normal, initiatives could turn towards a more preventative circular approach. Further, limiting one's lack of motivation, by creating the right opportunities can support their shift to a stronger CFE. For example, the lack of opportunity with economic pressures such as the lack of funding and the high costs of rent can reduce one's motivation to continue with their CFE practices.

Various participants in this study are looking for better opportunities in Metro Vancouver's CFE. They are seeking collective action to improve efficiencies and increase capacity. There is a collective interest in the environmental and social concerns of food waste. It is critical to keep this momentum among initiatives to be able to hone in on the shared priorities which could in the long term change linear business models, and policy (Mourad, 2016). This can be done through government support in strategic planning (Bolger and Doyon, 2019). Specific targets, such as reducing amounts of raw materials (Morseletto, 2020), or increasing fees for composting and other solid waste (NASEM, 2020) could be incorporated into circular policy. NASEM (2020) recommends governments coordinate these CFE efforts including research support, providing resources, and developing evaluation and implementation guidelines for food waste reduction policies.

Increasing the abilities of CFE stakeholders in Metro Vancouver can bring this community to a collective pathway. Knowledge of the CFE will not solely change behaviours (NASEM, 2020). However, there are education opportunities to increase the

abilities of those working in the CFE. This could include collaborative meetings for businesses, non-profits, academics and public sectors to connect, learn and strategize around shared targets. Most importantly, CFE stakeholders in Metro Vancouver must increase education and skills to identify preventing food waste through their initiatives. Strengthen prevention education would support a collective pathway in the CFE.

Finally, since many of the stakeholders interviewed are leaders of their organization, their identity and their MOA can be strongly tied to the group they are representing, making it difficult to distinguish between their MOA and their organization's MOA.

Chapter 6.

Conclusion

The growing levels of food waste are expensive, environmentally destructive and leaving more people food insecure. The CFE receives a variety of policy attention from governments in an attempt to reduce food waste, however, businesses, non-profits and other stakeholders are taking on the responsibility to develop circular initiatives and prevent loss. This study interviewed 22 stakeholders working within the CFE of Metro Vancouver to better understand how the CFE is being employed. The MOA framework was used to analyze these initiatives, to better support future policy efforts by analyzing stakeholder motivations, opportunities, and abilities: This study asked the following research questions: 1) How do individuals working in the food sector mobilize CFE within their work?; 2) What are the motivations, opportunities and abilities influencing the practices of those working in the CFE sector in Metro Vancouver?

The findings of this study indicate a variety of ways that individuals working in the food sector support a CFE. Many initiatives are reducing waste through operations and production, minimizing ordering, growing in smaller volumes and redistributing excess. Numerous organizations interviewed support a food rescue model, where food that would be wasted is donated or purchased from various sources and redistributed. Other organizations follow a food bank-style system. Many businesses interviewed contribute to the CFE through upcycling and value-added products. However, within this diverse landscape, there is conflict and competing visions leading to tension in the CFE.

Further, stakeholders were motivated to contribute to the CFE for environmental, social equity, and economic reasons, as well as to incorporate Indigenous values. Stakeholders found support in partnership, existing structures in the food system and through windows of opportunity. However, their opportunities lacked due to the conventional food system, lack of funding with high costs of operations, and lack of government support. Participants indicated their abilities to contribute to the CFE due to education and professional networking or resources.

The findings of this study indicate competing priorities within the CFE, leading to a paradox among motivations, often pinning environmental and economic motivations

against each other. This has caused food waste to be commodified. The CFE in Metro Vancouver has moved away from a regenerative, just circular system, and fallen into similar pitfalls that exist within a linear, neoliberal economy. Various initiatives struggle to follow the food recovery hierarchy, which prioritizes reducing food waste at the source, potentially because there is a lack of shared, collective vision among these groups. Strengthening the motivations, opportunities, and abilities of CFE practitioners in Metro Vancouver can help identify a collective pathway. Governments and policy leaders should also direct more efforts to ensure an intergovernmental approach that is collaborative, systemic and just CFE for all.

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Appendix A.

Key Informant Interview Questions

1. Can you tell me about your work in Metro Vancouver's food system?
2. How does your work contribute to sustainability or aim to reduce food waste in Metro Vancouver?
3. What problem are you trying to solve with your work? Why do you do this work? What are some of your main goals?
4. How does this work contribute to sustainability?
5. How did you learn about this issue?
6. Was there any education, or technical expertise that helps you address this issue?
7. Are there opportunities such as programs, regulations, and incentives in Metro Vancouver and in the province of BC in general that supports the work that you do? Is there any regional infrastructure that support your work? What helps you achieve your goals?
8. Are there opportunities such as programs, regulations, and incentives in Metro Vancouver and in the province of BC in general that doesn't support the work that you do? Is there any infrastructure that cause a barrier to your work? What are some of the main challenges that arise with your work towards a more sustainable food system?
9. Can you describe the landscape for food waste reduction work, in your experience?
10. What is the role of infrastructure in reducing food waste in Metro Vancouver? What processes are currently in place that you think should be removed, expanded, or left alone? What are the gaps in infrastructure that you think need to be addressed?
11. How might various food system stakeholders and levels of government support reducing food waste in Metro Vancouver? Are there barriers/limits to participation that you think should be addressed? Is there capacity or incentive to participate in these practices (for example, reducing waste)?
12. Any additional comments?

Appendix B.

NVivo Coding Tree Diagrams

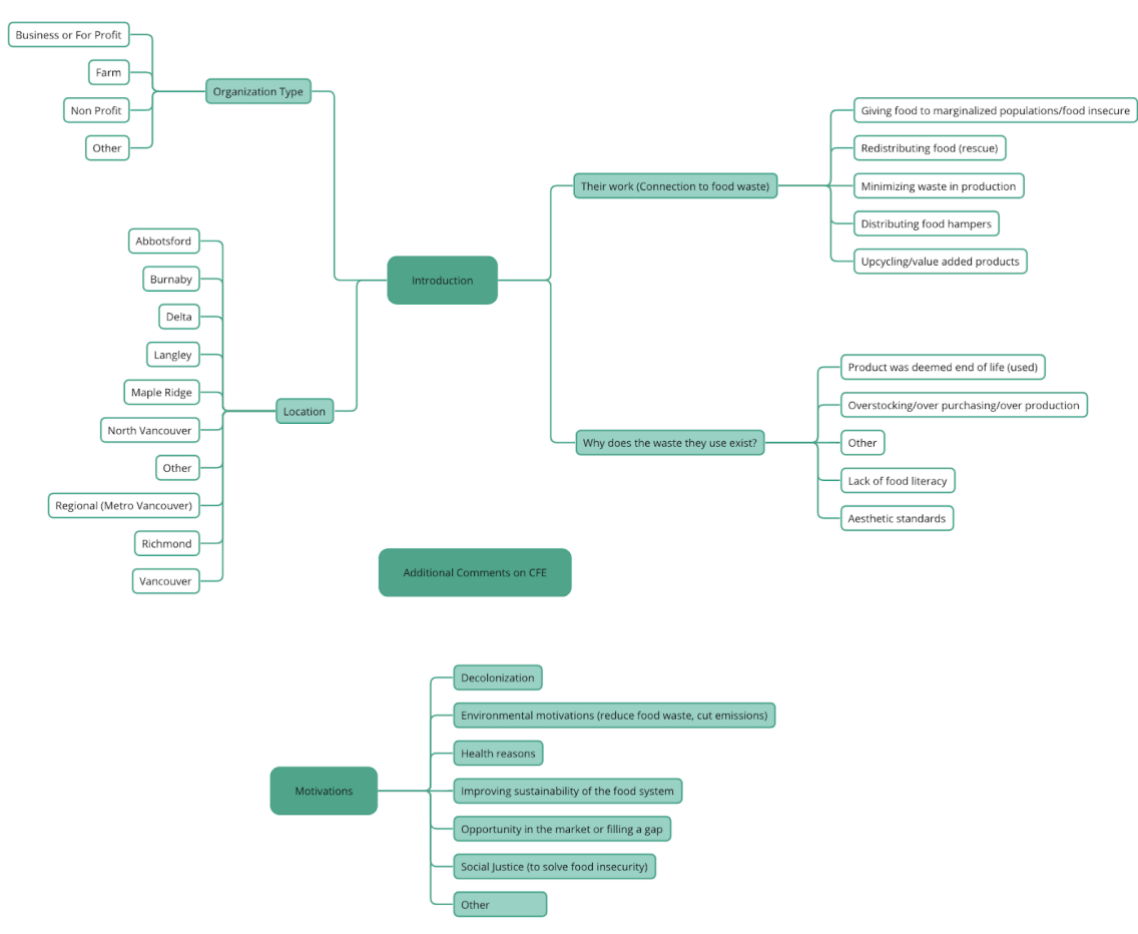


Figure B.1. Coding Tree: Introduction, Motivations and Additional Comments

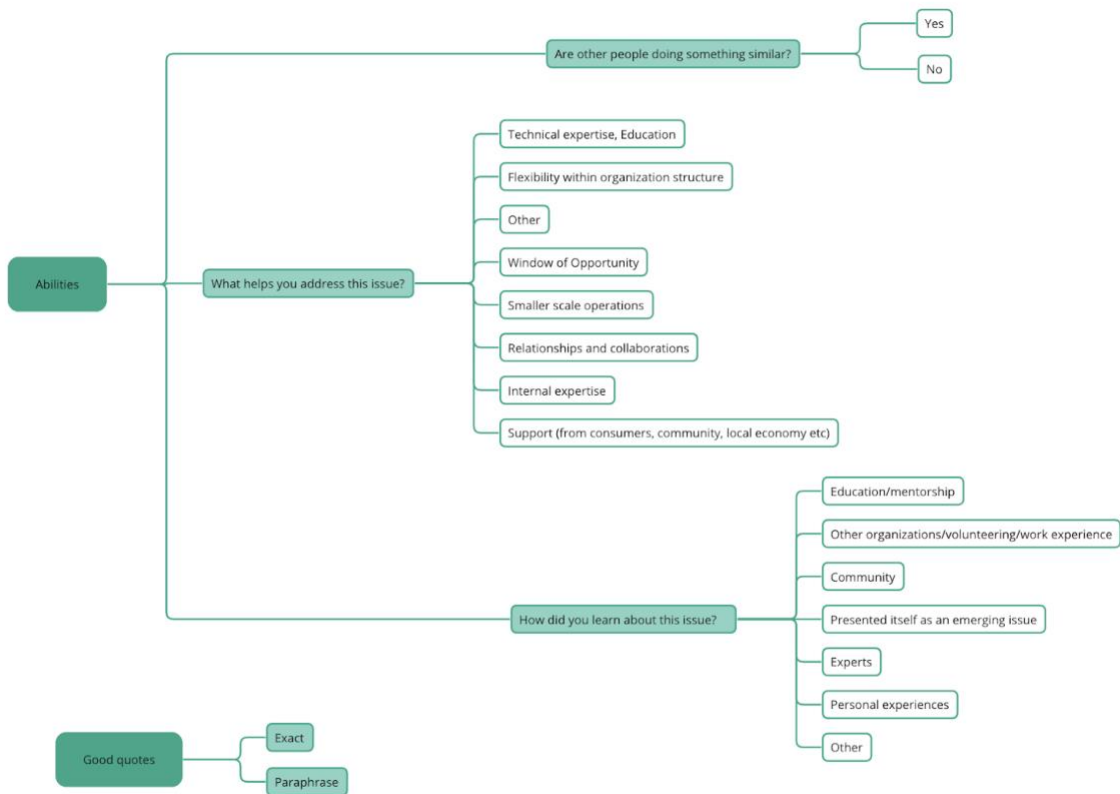


Figure B.2. Coding Tree: Abilities and Good Quotes

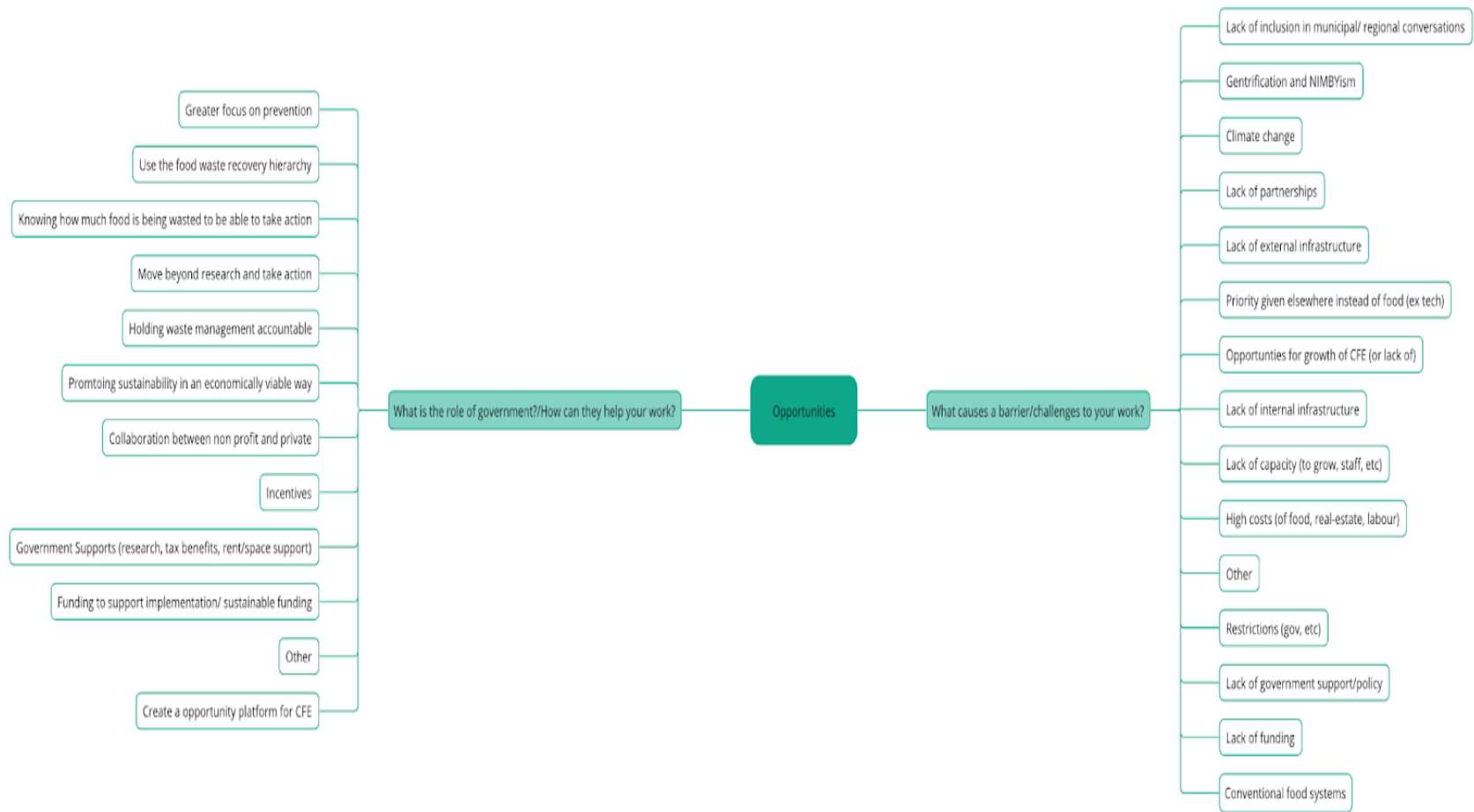


Figure B.3. Coding Tree: Opportunities

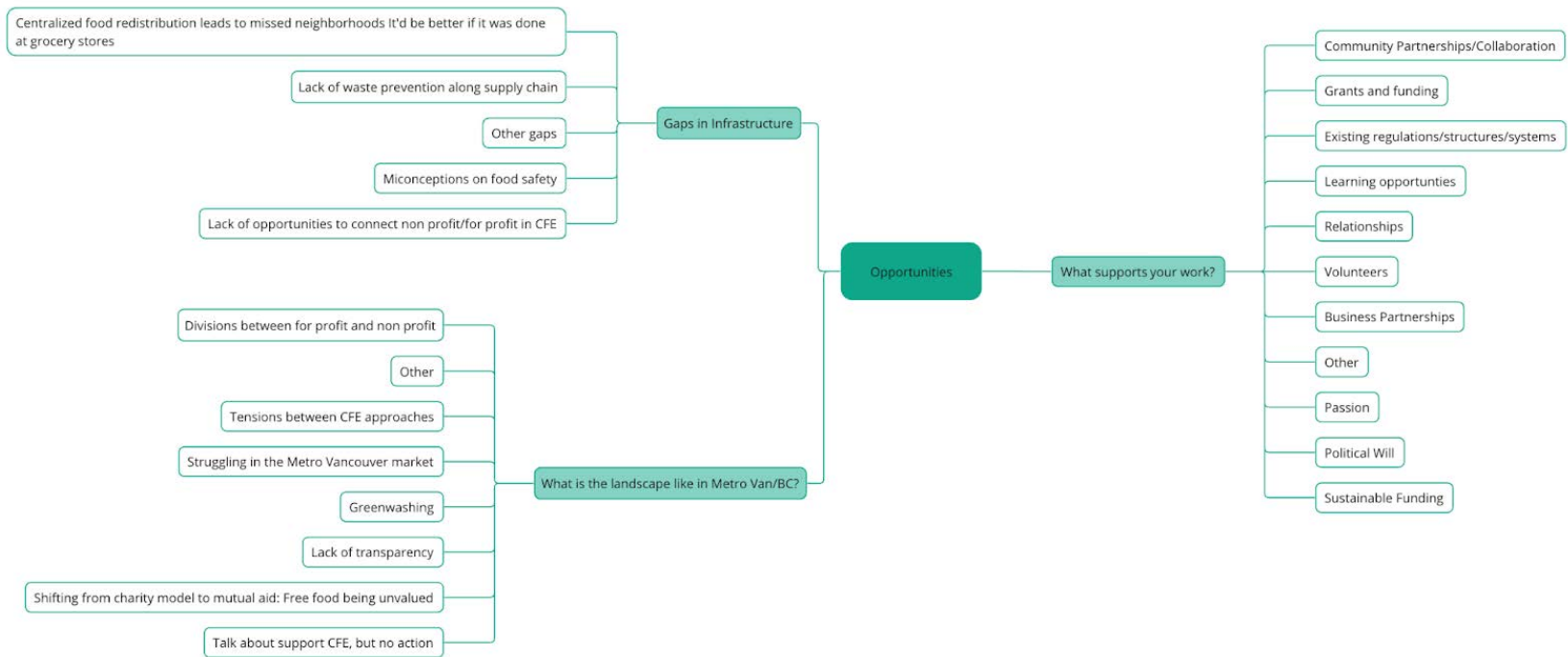


Figure B.4. Coding Trees: Opportunities