

Centering a Right to Food in the Vision for a Just and Resilient Circular Food Economy in Vancouver, B.C.: Theory of Change Application

**by
Jamie-Lynne Varney**

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Declaration of Committee

Name: **Jamie-Lynne Varney**

Degree: **Master of Resource Management (Planning)**

Project No.: **784**

Title: **Centering a Right to Food in the Vision for a Just and Resilient Circular Food Economy in Vancouver, B.C.: Theory of Change Application**

Committee: **Chair: Dina Sadeghi**
MRM Candidate, Resource and Environmental Management

Tammara Soma
Supervisor
Assistant Professor, Resource and Environmental Management

Meg O'Shea
Committee Member
Senior Manager, Economic Transformation
Vancouver Economic Commission

Ethics Statement

The author, whose name appears on the title page of this work, has obtained, for the research described in this work, either:

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Abstract

Food loss and waste occurs at an alarming rate while many households in Vancouver are food insecure; Meaning they go without stable access to sufficient food to fulfill the requirements for a healthy diet. This project incorporates a right to food framework in a circular food economy to centre justice and equity to address the issue of food loss and waste. Drawing upon interviews with n=20 agri-food experts, this study developed a theory of change which identified the challenges, needed interventions, and overall vision for a just circular food economy in Vancouver. Findings from this research identified the importance of dynamic governance system that targets critical points for change including regulation, funding, and capacity building. The novel approach taken to incorporate a right to food framework contributes to food systems planning by centring equity and justice in the development of a sustainable and just food system that fosters circularity.

Keywords: food loss and waste; food insecurity; right to food; circular food economy

Make no little plans; they have no magic to stir men`s blood and probably themselves will not be realized. Make big plans; aim high in hope and work, remembering that a noble, logical diagram once recorded will never die, but long after we are gone will be a living thing, asserting itself with ever- growing insistency. Remember that our sons and grandsons are going to do things that would stagger us. Let your watchword be order and your beacon beauty.

Daniel Burnham

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List of Acronyms

CFE	Circular Food Economy
CSA	Community Supported Agriculture
FLW	Food Loss and Waste
FSC	Food Supply Chain
FSLW	Food Surplus Loss and Waste
SMEs	Small and Medium Enterprises

Chapter 1.

Introduction

In Canada 35.5 million tonnes of food is lost and wasted each year across the food supply chain, costing \$49.5 CAD billion and producing 56.6 million mega tonnes of CO² equivalent (Logan, 2021; Nikkel et al., 2019). At the same time, 1 in 8 Canadian households experiences food insecurity (Tarasuk & Mitchell, 2020) affecting physical, social, and psychological wellbeing (Loopstra, 2018). Food loss and waste (FLW) and food insecurity are both systemic issues that require action at all stages of the food supply chain (Göbel et al., 2015), and both market and non-market/policy solutions. A circular economy of food/circular food economy (CFE) has been proposed as an innovative approach to transform a currently wasteful and unjust linear food system by incorporating environmental and economic incentives to reduce waste, and create opportunities to affirm a moral obligation to address hunger (Lehtokunnas et al., 2020).

This study focuses on the potential for a CFE to be implemented in Vancouver, British Columbia. While a CFE has been proposed to address FLW, it does not explicitly address issues of equity or justice. To ensure consideration for food justice, the study integrates the framework of the 'right to food': A framework for ensuring that all people have the means to access sufficient food in a stress free and dignified way. Centering the right to food with a CFE is a novel approach that aligns with the City of Vancouver's goals to shift to an economy that reduces material and energy resource inputs needed to produce, process, and distribute foods, prevents waste, and centres equity and justice. Integrating these frameworks contributes to an ongoing evolution of food system planning and academic work which centres justice, equity, and environmental, economic, and socio-cultural sustainability. The study addresses the following research questions:

1. How do diverse agri-food systems agents visualize an equitable and just circular food economy for Vancouver that prevents/reduces food loss and waste, while also promoting food as a human right?
2. What barriers and opportunities exist to achieve a circular food economy in the City of Vancouver that centres a right to food?
3. How can a theory of change framework help identify interventions necessary to achieve the goals of a just circular food economy?

To answer these questions, I conducted semi-structured interviews with (n=20) agri-food experts from across Vancouver's food system and applied a theory of change framework (Mayne, 2015) to map the challenges they face, and the potential interventions that would help achieve their vision for a CFE in Vancouver.

In the following chapter, (Chapter 2: Literature Review), the paper begins by outlining the prevalence and urgency of FLW and food insecurity in Vancouver, identifies gaps in previous research, and sets the case for the integration of a CFE and the right to food. Chapter 3 (Methods) provides the rationale for using a theory of change model and grounds the research in both academic theory and the researcher's own positionality. The collection and analysis of qualitative interview data via NVivo is explained with reference to how the theory of change model was built. Chapter 4 (Findings) shares the results from the interview analysis. The findings are broken up into vision, challenges, and potential interventions. Each of these sections highlights participant quotes to ground the analysis in participant knowledge and experiences.

In Chapter 5 (Discussion) this study presents the theory of change model. This chapter includes recommendations based on the interview results that contribute to participants long-term vision for a resilient and just food system. This paper concludes in Chapter 6 (Conclusion) by summarizing key findings from the research questions and future research directions for the right to food and CFE.

Chapter 2.

Literature Review

Food shapes and is shaped by our values, practices, cultures, expressions, identities, and relationships with each other and the natural world (Booth, 2012; Fonte, 2008). In recognition of the complex and evolving ways that food intersects with our lives, the study of food systems planning highlights the importance of interdisciplinarity (Gordon & Hunt, 2019). Food systems planners contend with a multitude of activities in the food supply chain (FSC) from food production, processing and distribution, to waste management; and, the policies, regulatory bodies, agents and structural power dynamics that influence these activities (Pothukuchi & Kaufman, 2000; Soma & Wakefield, 2011). Food systems planners also harness the power of changing public interests, perspectives, needs and values to plan for more sustainable cities, regions, and nations (Moos, 2019).

In many ways, food systems planning arises from an understanding that social, economic, and environmental challenges to food systems require an integrated, holistic, whole-systems approach (Booth, 2012). A 'food systems perspective' facilitates a non-linear understanding of the many interactions and power dynamics across FSCs (Messner et al., 2021). It looks at the ways that interactions, feedback loops, internal and external dynamics influence the ways that food systems function (Messner et al., 2021).

Food systems planning also recognizes obligations to justice and equity across the food system. Food systems planners work within and against structural and systemic matrices of power, history, and ongoing forms of oppression and domination that impact communities (Gordon & Hunt, 2019). And, they critically analyse how intersecting issues such as colonialism and food insecurity contribute to food justice concerns (Gordon & Hunt, 2019). They build on the work of food justice and just sustainability scholars (Agyeman et al., 2016; Gordon & Hunt, 2019) to identify ways that social movements, communities, and individuals can leverage power to build a more sustainable and just world (Clark et al., 2021).

This research builds on food justice and food systems planning work to advocate for a novel approach to incorporating a right to food in developing a CFE to reduce FLW, and address food insecurity. The literature review first contextualizes FLW and food

insecurity to understand the gaps and challenges of addressing these complex and multi-faceted issues. The review then illustrates the benefits of incorporating a right to food and CFE approach to provide equitable and just solutions. As these two approaches have not yet been integrated in academic literature, the literature review concludes with the theory of change as an approach to explain how the right to food and CFE intersect.

2.1. An Unjust and Wasteful Food System

2.1.1. Food Waste

In Canada, 58% of all food produced is lost or wasted, and 32% of this is avoidable (Nikkel et al., 2019). FLW are commonly used to describe the total volume of losses and waste along the FSC from production to consumption (Vilariño et al., 2017). However, there is no single unifying definition of FLW (FAO, 2019; Vilariño et al., 2017). Some institutions define food 'waste' separately from food 'loss' depending on what stage in the FSC removal of food occurs. Food 'waste' is any food that is fit for human consumption but is discarded or wasted (i.e., not consumed) during the final stages of the FSC (retail, consumption) (Borrello et al., 2017; Kafa & Jaegler, 2021; United Nations, 2015; Vilariño et al., 2017; WASS et al., 2016). Meanwhile, food 'loss' is a reduction in the supply of edible food early in the supply chain (production, post-harvest, transportation, processing) up to, but not including retail and consumer stages (FAO, 2019; Kafa & Jaegler, 2021; Vilariño et al., 2017). The inconsistency with which institutions define FLW poses barriers for measuring, mitigating, and managing FLW.

In 2018 the City of Vancouver conducted a waste audit showing that 63% of food wasted from residential sources was avoidable (*Metro Vancouver Waste Study*, 2018). As of 2017, 75% of organics were being diverted from single family households in Vancouver (City of Vancouver, 2017) and over 42,000 tonnes of food waste was diverted in 2018 from residential, institutional, commercial, and industrial sources (*Metro Vancouver Waste Study*, 2018). The volume of wasted food poses both an incredible environmental challenge, as wasted food contributes more than 56.5 million mega tonnes of CO₂ equivalent emissions annually (Nikkel et al., 2019) and an economic challenge for farmers and producers (among other agents) who forfeit income when wasted food is 'tilled under' into the soil (Soma et al., 2021).

Food systems studies focusing on farmers shows that farmers face dynamic challenges when dealing with FLW (Soma et al., 2021). Many of these factors are beyond farmers control (e.g., market dynamics, weather and pest events, price fluctuations) (Messner et al., 2021; Soma et al., 2021). As a result, farmers often leave food to rot or to be tilled under on the farm, as they cannot afford the cost of harvesting, processing and redistributing the food (MacRae et al., 2016; Messner et al., 2021). Previous research misleadingly overrepresents retail and consumer food waste because it is easier to identify and measure (Kafa & Jaegler, 2021). However, food waste is known to occur along the entire FSC (Göbel et al., 2015; Kafa & Jaegler, 2021; Messner et al., 2020) and recent work suggests that a substantial portion of consumer and retail waste is generated by practices upstream (Messner et al., 2020).

FLW is not a result of isolated practices at one part of the FSC; therefore, solutions to FLW must be based on an understanding of the barriers and opportunities throughout the entire FSC (Göbel et al., 2015; Kafa & Jaegler, 2021, Messner et al., 2020). Moreover, given the dynamic environmental, economic, and social systems within which food systems operate, the need for holistic solutions that centre equity and justice are increasingly pressing (Gordon & Hunt, 2019).

2.1.2. Food Insecurity

In addition to environmental and economic challenges that FLW present, the prevalence of food waste in wealthy nations reflects deep injustices in the ways that food is valued and distributed. In 2018 11.7% of households in Vancouver experienced some level of food insecurity (Tarasuk & Mitchell, 2020). Meaning they were unable to consistently access or afford sufficient quantities of foods that sustain nutritional requirements and food preferences for a healthy life (FAO, 2020; Tarasuk & Mitchell, 2020). Individuals facing food insecurity may alter their diet, ration their grocery purchases, or skip meals to prevent running out of food (Tarasuk & Mitchell, 2020). In addition, food insecure individuals can face anxiety and stress about obtaining food, inability to obtain food through socially acceptable means (Loopstra, 2018), and challenges accessing food provisioning services (Rajasoorian & Soma, 2022). In Vancouver, barriers to access food through non-profit food hubs can include transportation distance, time, cost, reliability, and limited opening hours of food provisioning services (Rajasoorian & Soma, 2022).

Importantly, food insecurity impacts diverse socio-economic groups differently. Food insecurity rates for Indigenous people are up to three times higher than non-Indigenous people in Canada (Desmarais & Wittman, 2014; Fieldhouse & Thompson, 2012). In Vancouver, low-income households, Indigenous, and Black households, and individuals receiving income assistance are the most at risk for food insecurity (Holmes et al., 2019; Tarasuk & Mitchell, 2020). Thus, addressing food insecurity must centre justice in addition to the physical, social, and psychological dimensions identified.

Food insecurity is a systemic issue that will require multi-level interventions to address root causes. Food rescue and redistribution are commonly promoted as a dual solution to widespread FLW and to address food insecurity in affluent countries (Kinach et al., 2020). In theory, recovery and redistribution of food 'waste' constitutes a social, environmental, and economic 'win, win, win' that connects surplus food with hungry people (Mourad, 2016). Food recovery, redistribution, and donation however, are short-term, incremental solutions that cannot address root causes of food insecurity in Canada: income insecurity and inequality (Millar et al., 2020). These services, especially those that focus on incremental charity or food banking to address individual and household hunger (Riches, 2018) are unable to prevent food insecurity or decrease its severity (Bread for the World, 2013; Holmes et al., 2019; Loopstra, 2018) and may exacerbate psychological and social stressors due to stigmas associated with accessing their services (Riches & Silvasti, 2014).

It has been argued that the immediate need for food banks in particular and their legitimacy in the public eye has allowed their proliferation as an appropriate solution to food insecurity (Holmes et al., 2019). Rising reliance on food charity as a primary solution raises concerns however, as dependency on food banks may undermine the dignity of those accessing their services (Bread for the World, 2013). Individuals can experience stress and social stigmatization while accessing food banks, and often have limited avenues to formally complain about quality issues with food or their experiences with volunteers or staff (Bread for the World, 2013). Food banks were established as temporary, emergency services to alleviate immediate hunger in the recession of the 1980's but have since become an established means of food assistance in Canada (Booth, 2012). While their main purpose is to prevent hunger, studies across wealthy countries show they are largely unable to meet this goal (Holmes et al., 2019; Loopstra, 2018). In addition, reliance on food charity points to a much larger problem of downloading

responsibility to deal with hunger and food insecurity to municipalities, non-profits, and private organizations who have limited capacity and resources to deal with this complex issue (Deaton & Deaton, 2020; Holmes et al., 2019; Riches, 2018).

Research shows that both FLW, and food insecurity are systemic structural issues that must be addressed through holistic, comprehensive approaches that centre equity and justice. In addition to environmental and economic challenges created by wasting food, prevention of food waste also reflects a moral obligation to those who are food insecure (Lehtokunnas et al., 2020). In response to these challenges, a right to food and CFE can address the equity, justice, and social aspects of food insecurity (Loopstra, 2018) by prioritizing dignified food access (Riches & Silvasti, 2014; Ziegler et al., 2011), while working within the ecological limits of our planet to regenerate and redistribute resources equitably (Borrello et al., 2017).

2.2. Right to Food

Building on work by food justice and food systems experts, there is a need for systemic solutions to address food insecurity and FLW in Canada in ways that promote dignified food access and just sustainability (Agyeman et al., 2016). Instead of focusing on incremental food charity which does not address root causes of food insecurity (Bread for the World, 2013; Holmes et al., 2019; Loopstra, 2018; Riches, 2018) a right to food approach recognizes the responsibility of governments to prevent hunger as a fundamental human right (UN Committee on Economic, Social and Cultural Rights (CESCR), 1999). The right to food has been defined as:

[T]he right to have regular, permanent and unrestricted access, either directly or by means of financial purchases, to quantitatively and qualitatively adequate and sufficient food corresponding to the cultural traditions of the people to which the consumer belongs, and which ensures a physical and mental, individual and collective, fulfilling and dignified life free of fear. (Ziegler et al., 2011, p. 15)

The right to food recognizes that food is a human right and addressing hunger should be a priority for governments. Working on the underlying set of human rights and entitlement that causes food insecurity is vital for addressing this systemic challenge (Jackson et al., 2021; Sampson et al., 2021). An evolving understanding of right to food implementation includes both a government obligation and a set of principles that non-state actors can

operate with to support government directives directly and indirectly. Organizations working within and outside governments can leverage their 'power to convene' (Clark et al., 2021) to support 'joined up' food policies and actions including setting targets, measuring and monitoring, and identifying interventions to ensure a just and equitable food system (Riches & Silvasti, 2014).

Canada is a signatory to the Universal Declaration of human rights of 1948 and the International Covenant on Economic, Social and Cultural Rights of 1966 which include a right to food (De Schutter, 2011; Jackson et al., 2021; UN Committee on Economic, Social and Cultural Rights (CESCR), 1999). As a signatory to the covenant, Canada has an "obligation to take the necessary action to mitigate and alleviate hunger" (UN Committee on Economic, Social and Cultural Rights (CESCR), 1999). This includes respecting every individual's right to food by not taking actions that could decrease existing access to adequate food; protecting the right to food from non-state organizations that may interfere with any individual's ability to access adequate food; and fulfilling the right to food by implementing and enforcing policies that ensure equitable and dignified access to food for all people (De Schutter, 2011; UN Committee on Economic, Social and Cultural Rights (CESCR), 1999). However, increasing dependency of individuals on food charity and continuing prevalence of food insecurity across Canada is evidence of a capitalist system which regularly treats food as a commodity rather than a right or social good (Jackson et al., 2021; Vivero-Pol, 2017) and sends a message that it is acceptable and normal for individual rights to be accessed based on purchasing power (Bread for the World, 2013; McMichael & Schneider, 2011; Riches & Silvasti, 2014).

Other countries have designed national strategies for realizing the right to food. These strategies are most effective when they are grounded in the right to adequate food, identify and intervene on the root causes of food insecurity, and create accountable systems for monitoring and measuring progress based on the principles of the right to food (De Schutter, 2011). The UK and Italy have both adopted regulatory approaches to realize the right to food through policy that addresses concentration of power in food retail and resulting unfair trading practices for farmers (Piras et al., 2018). These policies focus on aligning trading policies with a right to food by protecting the rights of workers; who experience food insecurity and poverty themselves (Bread for the World, 2013; Weiler et al., 2017). The right to food cannot be separated from the people who produce food, and their challenges and needs must be taken into account in defining a right to food that

recognizes their rights as workers and to adequate food and nutrition (Booth, 2012; Bread for the World, 2013; Weiler et al., 2017).

Critiques of the right to food illustrate a lack of consideration for Indigenous conceptions of rights and relationships with food and food sovereignty. Claeys (2013) argued that conceptions of human rights and the delivery of rights are top-down and dominated by Western, liberal, individual understandings of how rights are awarded, protected, and lost. Western conceptions of rights emphasize individual access to and control of resources (Claeys, 2013) and may further diminish understandings and values of food that reflect Indigenous relationships and ecological knowledge (Coté, 2016). However, rights-based approaches may support food sovereignty goals (Sampson et al., 2021) by incorporating the concepts of relationality, respect, rights, reciprocity, self-determination, and responsibility, central to Indigenous food sovereignty (James et al., 2021). These concepts are critical in efforts to build a food system which rejects an exploitative, neoliberal capitalist system that leaves many Indigenous people in Canada without regular access to nutritious, culturally appropriate foods (Fieldhouse & Thompson, 2012; Power, 2008; Robidoux & Mason, 2017). Supporting Indigenous food sovereignty means recentring the power of communities (Clark et al., 2021). This bottom up approach is vital for all populations to achieve food justice and food security (Gordon & Hunt, 2019).

In Canada, federal efforts to address high rates of Indigenous food insecurity are often ineffective as they lack commitment and initiative to undergo systematic change that transfers power and authority back to Indigenous nations (Robidoux & Mason, 2017). By utilizing a right to food approach however, both state and non-state actors can support key pillars of Indigenous food sovereignty. Achieving Indigenous food sovereignty will require work within and outside of the state to leverage different forms of power, strengthen capacity to mobilize, and build a systems oriented vision of food systems governance (Clark et al., 2021). If a unified right to food approach by government and non-state organizations includes a long-term commitment to structural change (Flowers, 2015), which takes the lead from Indigenous people (Davis, 2011), and facilitates higher degrees of decision making by communities (Robidoux & Mason, 2017), then a right to food approach can support the goals of Indigenous food sovereignty.

A right to food is primarily a federal responsibility; however, it can also inform actions and strategies by provincial and municipal governments, as well as non-

government actors (Sampson et al., 2021). In some cases, non-government actors may be better suited to work with food insecure individuals, who may feel excluded, dismissed, or uncomfortable participating in government services and programs. Davis (2011) found that partnerships between Indigenous communities and environmental groups can be beneficial if respect for Indigenous sovereignty defines the relationship. Other community pilot programs in Northern Ontario demonstrate that non-government partnerships can increase Indigenous food security when communities have ownership over the projects, are able to define their priorities, and work according to their own protocols (Nadasdy, 2003). In this way, actions by corporations and social sector agents can prioritize social supports like job creation, income and housing security, and community based interventions that centre the right to food (Riches & Silvasti, 2014; Ziegler et al., 2011).

Place-based interventions that align with a right to food can decentralize, democratize, and decolonize food systems (Feagan, 2007; James et al., 2021; Sampson et al., 2021) while redistributing resources and power (Movement Generation, 2017; This Is Rubbish, 2021). In addition, place-based interventions can address distance created by an increasingly global and industrial food system that leads to degradation of the environment, disconnect with agricultural production, and loss of community and collective identity and sense of place (Feagan, 2007). The importance of place is emphasized in Indigenous relationships with food systems (Baker, 2021; Desmarais & Wittman, 2014) and there is also a strong connection between sense of place and perceived food security (Richmond et al., 2020). Food security is also connected to knowledge, place-histories, and customs (Feagan, 2007; Fonte, 2008), all of which are inextricably linked to land access (Richmond et al., 2020). Rights based approaches like the right to food must consider the importance that sense of place and community play in promoting environmental integrity, social equity, and justice (Feagan, 2007; Richmond et al., 2020).

Systemic solutions are needed to address food insecurity and food waste in Canada in ways that promote dignified food access. Previous solutions that centre recovery and redistribution of food through food charities and food banks are insufficient to reduce food insecurity, nor do these approaches promote the dignity required to fulfill a right to food (Kinach et al., 2020; Millar et al., 2020; Riches, 2018). Instead, a right to food reconciles rights-based approaches with other food security and food sovereignty movements that centre community agency, dignity, access, and control of food systems (Sampson et al., 2021).

While this approach is key to addressing food insecurity, a right to food does not specify how scholars and policymakers can integrate this approach into a regenerative food system that reduces widespread FLW. Therefore, a right to food must be supported by comprehensive structural transformation of a currently unjust and wasteful linear food system in order to create meaningful, long-term impacts on both food insecurity and FLW.

2.3. Closing the Loop for a Circular Food Economy

2.3.1. A Circular Economy that Integrates a Right to Food

In addition to establishing right to food it is critical to transform the currently linear, wasteful, and unjust food system into an integrated, regenerative food system (i.e., circular food economy). A 'circular food economy' (CFE) is an alternative to the dominant linear model of 'take, make, and dispose' which does not align with sustainability goals or ethical obligations to food insecure individuals (Lehtokunnas et al., 2020). CFEs are a "systemic approach to production and consumption for living within planetary boundaries" (Council of Canadian Academies, 2021, p. xvii). The council's report redefines the framework for management of food waste and loss by focusing on reusing and recycling materials, therefore reducing resource extraction (Council of Canadian Academies, 2021; Messner et al., 2020) and designing material and energy 'waste' as inputs for other products and activities (Ellen MacArthur Foundation, 2019; Jurgilevich et al., 2016; Teigiserova et al., 2020). A CFE asks questions about what kinds of solutions align with diverse cultural values attached to food, at what scale these solutions are appropriate, and who bears the burden of implementation (Soma, 2020). In addition, CFE's can facilitate transformation by stimulating innovation in the food system (Messner et al., 2020), creating new business opportunities (Teigiserova et al., 2020), and increasing agency of consumers (Borrello et al., 2017). It has been estimated that adopting circular practices in Canada could keep materials in use for longer and reduce the need for current material inputs by about half (Council of Canadian Academies, 2021).

Critics of a CFE approach say framing food waste as a resource may encourage overproduction of 'waste' if there is an increased incentive to loop those as inputs into processes at other parts of the supply chain (Messner et al., 2020; Soma, 2020). If not addressed, socio-technical 'lock ins' currently present in the food system (e.g. buyer producer dynamics) can reinforce high levels of food waste and perpetuate an unjust

status quo (Messner et al., 2020). Not addressing these structural problems can worsen FLW by ignoring overproduction and overconsumption in the food system (Soma, 2020). However, an alternative framework is needed that can minimize unnecessary wasting while ensuring that all people have access to a fulfilling diet (MacRae et al., 2016).

It has been suggested that a CFE can decouple economic value from resources (Ellen MacArthur Foundation, 2019) and refocus on the non-market values of food (Jackson et al., 2021); shifting priorities for food in a CFE to centre human need and a right to food. The transformative potential of CFEs is in their ability to convene agents across the food system to tackle complex challenges like FLW and food insecurity by leveraging multiple forms of power (Clark et al., 2021). Harnessing that power to centre equity, dignity, and justice is a promising avenue to convene communities around a right to food. These networks and relationships are critical to design a CFE that integrates social and environmental values into FLW and food security solutions long-term (Booth, 2012; Connelly & Beckie, 2016). The jurisdictional structure of Canadian food systems requires cooperation across levels of government, collaboration with Indigenous governments (Council of Canadian Academies, 2021), and participation of stakeholders at every level of the supply chain and governance (Agriculture and Agri-Food Canada, 2021). Therefore, incorporating a right to food into a CFE means building social infrastructure in addition to physical flows of energy and materials to create a just, equitable, and regenerative food system that reduces food insecurity and FLW.

2.3.2. Key Concepts for a Just and Circular Food Economy

The ways we define FLW in a CFE is critical as tackling waste and loss is a complex and dynamic challenge that will require actions focused on areas of maximum impact (WRAP, 2020). Identifying these critical points requires consistent definitions of the terms food 'loss' and 'waste' (Vilariño et al., 2017) in order to compare across studies and identify where FLW can be efficiently reduced (MacRae et al., 2016). Defining and measuring FLW is an essential first step to monitoring the results of implementing interventions in a CFE (Kafa & Jaegler, 2021).

Current definitions for FLW are based on an understanding of the food system as primarily linear which limits solutions to reducing food 'waste' to downstream activities and reinforces misunderstandings that consumption and retail is responsible for problems and

solutions (Kafa & Jaegler, 2021). A CFE taking a systematic right to food approach must define food 'loss' and 'waste' in ways that reflect a holistic understanding of the challenges and solutions to FLW along the entire FSC (Göbel et al., 2015) and unpack these terms to challenge understandings of what 'food' and 'waste' truly mean in diverse cultural, class, and community contexts (Soma, 2020).

In this study, food surplus is included as a third category in the lifecycle of food. Food surplus has generally been defined as food produced, manufactured, retailed, or served in excess of the expected amount that is fit for human consumption (i.e., edible and desirable) (Garrone et al., 2014; Mourad, 2016; Teigiserova et al., 2020). Including food surplus as a distinct category in the FSC reflects an understanding that a CFE should reduce overproduction that creates conditions for FLW (Messner et al., 2020; Teigiserova et al., 2020). Creating distinct definitions for food surplus, loss, and waste (FSLW) also creates priority pathways for each type of food in a CFE (Teigiserova et al., 2020). Table A.1 in Appendix A (Supplementary Tables) compares definitions of FSLW currently used by the United Nations Environment Programme (UNEP) and the Food and Agriculture Organization (FAO) (FAO, 2019; United Nations Environment Programme, 2021), to definitions developed by Teigiserova et al (2020) specifically for their suitability to a CFE.

This research uses a food waste prevention hierarchy (Figure 1) to illustrate general priority pathways for FSLW. It is important to consider however, when drawing on 'food recovery' and 'food waste prevention' hierarchies that they do not inherently align with non-market values of food, and tend to view food as an exploitable commodity (Soma, 2018). This can reinforce unsustainable redistribution practices based on a two-tiered food system that do not align with right to food principles. Therefore, a food waste prevention hierarchy should be used carefully to identify points in the FSC where FSLW can be reduced while prioritizing dignified food access for those who face food insecurity.

Aligning with a right to food approach, food waste prevention should be the highest priority in a CFE (Agriculture and Agri-Food Canada, 2021, p.; Treutwein & Langen, 2021) where food should be used for people first, followed by use as animal feeds, material upcycling and recycling, and nutrient and energy recovery (Teigiserova et al., 2020). In a CFE 'waste' does not truly exist as materials and energy are used as inputs for other activities in the cycle (Ellen MacArthur Foundation, 2019). Therefore, disposal of FSLW to landfill is not desired or included as a true level in a progressive food waste prevention

hierarchy (see Figure 1). However, during the transition to a CFE disposal may still occur and volume and type of materials landfilled, recycling capacity, and tipping fees should be tracked to measure the cost of materials and energy lost from the CFE (Council of Canadian Academies, 2021). Considering the stage and scale where wasting and loss occurs is also important to prioritize pathways for FSLW in a CFE. In addition, creating appropriate incentives is vital as there are potential competing interests between levels of the food prevention hierarchy based on the underlying goals of various food systems agents (Mourad, 2016). For example, material recycling can compete with recovery and reuse if organizations are incentivized based on diversion from landfill alone (Mourad, 2016). Defining, monitoring, and measuring FSLW along the entire supply chain is vital to implement appropriate and effective solutions that prevent and reduce food waste, and create incentives to loop those inputs back into the CFE.

Implementing a CFE that centres a right to food will require a strategic and sustained effort on the part of multiple municipal and regional governing bodies, food systems agents, and engaged citizens to achieve a just and sustainable food system. Transitioning to a CFE requires collaboration and communication on current challenges, long term vision, and potential interventions to facilitate a concerted effort to address these complex challenges and help ensure benefits and risks are equitably distributed across society (Council of Canadian Academies, 2021). By committing to a CFE, actors across the food system affirm their moral obligations to people facing food insecurity (Lehtokunnas et al., 2020) and the need for solutions that centre equity, justice, and the right to food. The following section explores how a theory of change can unpack complexity and clarify the scope, challenges, and solutions available for food systems agents to prevent and reduce food waste (Messner et al., 2020)

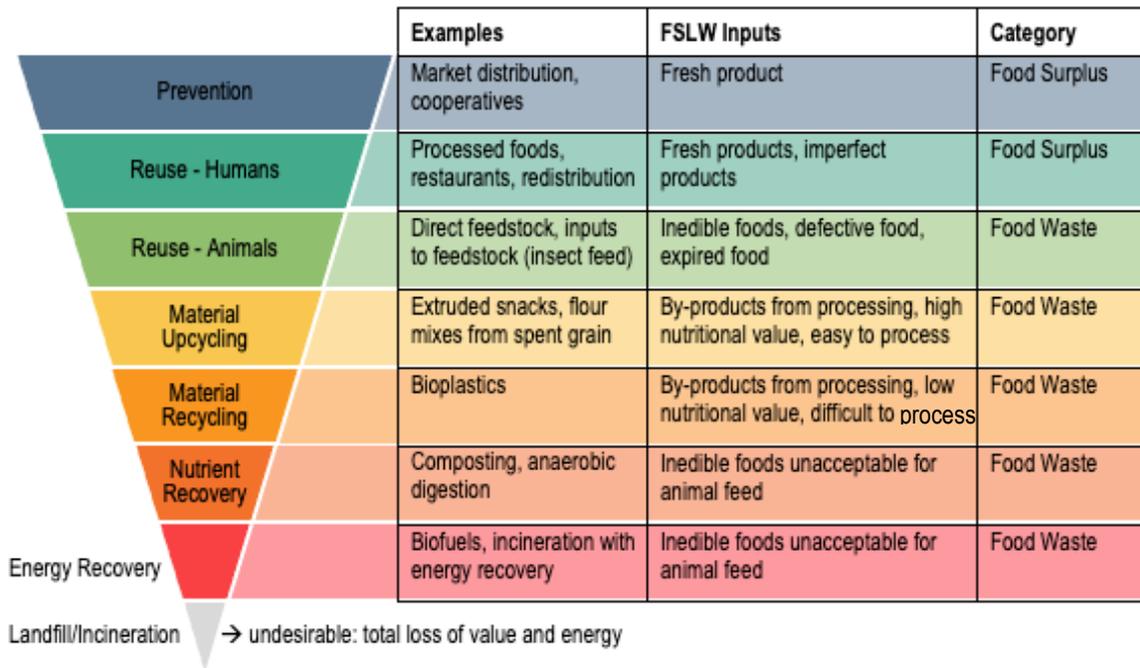


Figure 1. Food Waste Prevention Hierarchy adapted from Teigiserova et al (2020)

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2.4. Theory of Change

A theory of change is a model showing the activities making up an intervention by one or more parties, a desired set of short and long-term outcomes (Mayne, 2015), and the expected pathway for change to occur (Mayne, 2017). An effective theory of change combines logical understanding of the sequence of change with a reflection on the underlying biases, assumptions, and theories informing the model (Vogel, 2012), and includes the enabling conditions and policy environment likely needed to support solutions.

A robust theory of change asks questions about the plausibility of interventions, the measurability of key impacts, and the long-term sustainability of those impacts (Mayne, 2017). It clearly identifies the social, political, economic, and environmental conditions making up the problem context, and the agents and interventions that impact the course of change (Vogel, 2012). At each stage of the theory of change, participating food systems

agents can inform the interventions, assumptions, and enabling conditions that are included in the model.

Developing a theory of change is a reflexive activity that explores how change occurs and what each agents' role is in a particular context or activity (Vogel, 2012). The process emphasizes the importance of input from across the food system to incorporate multiple viewpoints, local knowledge, and the role of power relations in the context of change (Mayne, 2015, 2017; Vogel, 2012). Theories of change in the food system have been used to explore potential interventions to address food insecurity using different rights based approaches (Sampson et al., 2021). The FAO (2018) has used a theory of change to illustrate how food system structures reinforce specific behaviour and to understand how interventions can facilitate positive feedback loops that incentivize sustainability focused actions. This research employs a theory of change to highlight the challenges, opportunities, and vision of a just CFE from the perspectives of agents across the Vancouver city-regional food system.

Chapter 3.

Methods

3.1. Research Context and Enabling Policy Conditions

This research focuses on opportunities for the City of Vancouver to implement a CFE that reduces waste and centres equitable and just food access for all. As a green city, and city of reconciliation, Vancouver is prioritizing actions that will foster increased environmental, economic, and social sustainability through a CFE (Vancouver Economic Commission, 2021). Vancouver also seeks to adopt long term commitments as part of the Truth and Reconciliation Calls to Action published in January of 2016 (City of Vancouver, 2019), including fully adopting the United Nations Declaration on the Rights of Indigenous Peoples (City of Vancouver, 2019; Government of BC, n.d.) which is key for supporting Indigenous food sovereignty. By implementing a CFE, Vancouver can support balanced relationships between people and the environment (Lehtokunnas et al., 2020) and redefine the framework for preventing and managing FSLW (Teigiserova et al., 2020).

In addition to Vancouver's goals for implementing a more circular economy, various regional and municipal policies and plans have been enacted which align with or promote municipal visions for a sustainable and just food system (Millar et al., 2020). This enabling policy environment increases effectiveness of interventions that align with regional and municipal actions, strategies, and plans, to bring about the vision outlined by participants. Documents considered in this research that contribute to an enabling environment include *Climate 2050*, *Zero Waste 2040*, *Vancouver Food Strategy*, and the forthcoming *Vancouver Plan*.

- *Climate 2050* – The regional framework to address the impacts of climate change in Metro Vancouver (Metro Vancouver, 2018). Goals from this plan that align with the research include investment in circular economies and resilient local food systems.
- *Zero Waste 2040* – A guide to reducing solid waste in targeted action areas (City of Vancouver, 2018a). Actions on food waste include organics management, rescue, and redistribution of surplus.

- *Vancouver Food Strategy* - Promotes actions that increase local sustainable procurement, green economy jobs, and access to healthy affordable food for all residents (City of Vancouver, 2013).
- *Vancouver Plan* – The strategic plan for growth and prosperity over the next 30-50 years (City of Vancouver, 2020). Three core themes are: equitable and complete neighbourhoods; diverse, inclusive and shared prosperity; and healthy and connected ecosystems (City of Vancouver, 2021a).

3.2. Researcher's Positionality Statement

Crafting a positionality statement helps uncover the ways that research context and everyday experiences influence data interpretation in qualitative studies (Pitard, 2017). Through positionality, researchers can explore and challenge assumptions that shape interactions with data and seek more meaningful outcomes from their work (Pitard, 2017). An important aspect of this study is the inclusion of a positionality statement to promote reflexivity.

As a young, female presenting settler living on the unceded lands of the the Musqueam, Squamish, and Tsleil- Waututh Nations I recognize my limited understanding of the ways that colonial processes continue to dispossess Indigenous peoples of connections to lands, waters, and food systems in their territories. In this research I hope to convey the importance of Indigenous food sovereignty in developing a resilient and sustainable food system. This includes creating strong reciprocal relationships, and supporting Indigenous self-determination (Coté, 2016; Daigle, 2019; Gordon & Hunt, 2019). Nonetheless, I would like to acknowledge the insufficient number and diversity of Indigenous participants and perspectives as a shortcoming of this research. This study occurred during an especially difficult time, particularly for Indigenous communities in BC and in Canada, with the discovery of unmarked graves on B.C. residential school sites. I hope future research will ensure a stronger role in including Indigenous peoples.

Achieving a vision for a food system that reflects the values and desires of citizens requires critically reflecting on the practices and structures that enable inequality. Diverse voices must be included when formulating and implementing solutions to a wasteful and unjust food system. This research is accountable to the participants and food systems agents whose work may be affected by the emerging insights from this study. As a researcher I commit to:

- Seeking deeper understanding of intersecting challenges facing Indigenous peoples in Vancouver.
- Incorporating diverse views on the challenges and vision for the food system.
- Respecting the value and time of participants and their insights.
- Critically reviewing past research and seeking systemic solutions to issues.
- Promoting change based in accessibility, equity, justice, and the right to food.

In the initial public report published as part of this study, a positionality statement by the internship sponsor Vancouver Economic Commission was also included for the first time to affirm their commitments to the research and as part of a city of reconciliation (Varney, 2021).

3.3. Research Design

3.3.1. Sampling and Recruitment

Ethics approval for this project was granted in April 2021 by Simon Fraser University¹. Throughout the summer of 2021, I contacted and interviewed participants from across the food system in Vancouver and surrounding peri-urban regions. Participants from outside of Vancouver were included as many activities associated with food production, distribution, and waste management take place on a city-region scale (Wiskerke, 2015). Participants included experts in farming and production, processing, retail, non-profit, policy and research, waste management, and an Indigenous food and medicine expert (see Figure 2, and table A.2 in Appendix A). To determine the interviewees, the advisory committee of the Mitacs internship² first developed an initial list of participants. Then we established a priority contact list based on diversity in gender, ethnicity, and experience in the food system across sectors.

I conducted semi-structured interviews with all participants (n= 20) between May – July 2021. Interviews were between 30-120 min long and participants were offered a

¹ This project was approved under the initial title " A "Right to Food" Framework for Tackling Food Waste and Achieving a Just Circular Food Economy in Vancouver, British Columbia."

² The advisory committee met on a monthly basis to discuss the project from May-August 2021.

\$50 honorarium in exchange for their time³. The shortest interview was 43 minutes, and the longest interview was 110 minutes. Interviews were conducted either by phone or via the Zoom video conferencing platform (Zoom Video Communications Inc, 2021). Interviews were recorded using a Sony ICD-PX470 digital voice recorder and transcribed with Otter.ai software (2021).

Participants were asked questions relating to circular economy, food security, and food waste (see Table A.3. in Appendix A). The questions asked what challenges and opportunities participants foresee if the City of Vancouver implements a CFE. The questions also asked participants to envision their ideal CFE and what steps could be taken to shift the current food system to that vision. The semi-structured interview format allowed flexibility to prompt participants for added detail at the researcher's discretion. This contributed to a greater depth of information as participants could clarify root causes of challenges faced and reasoning for proposed interventions.

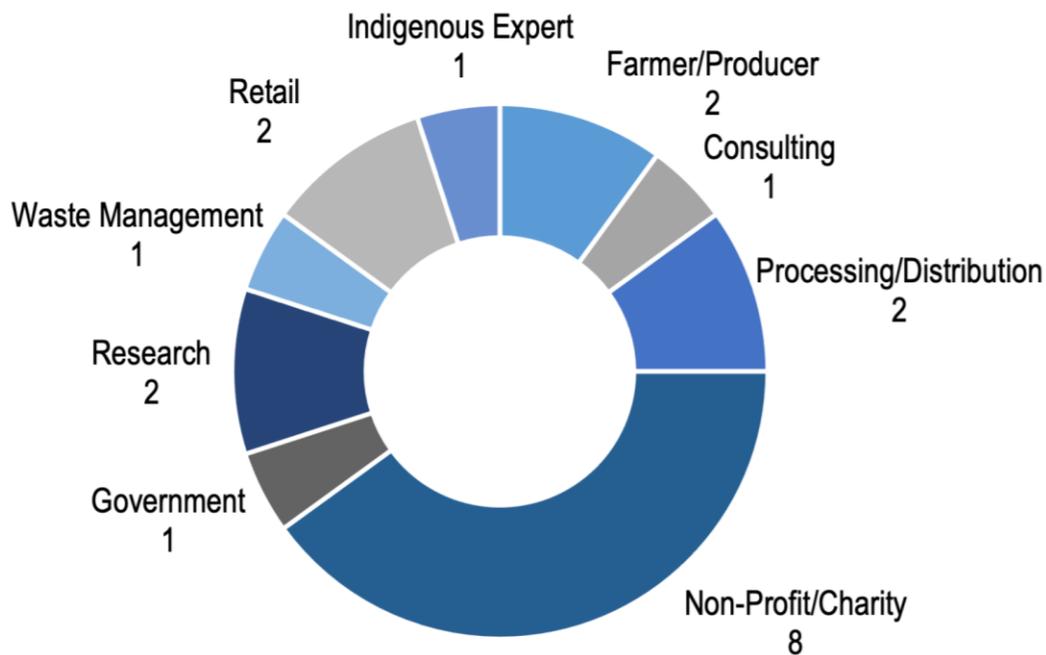


Figure 2. Sector grouping of participants interviewed (n=20).

³ Three participants elected to donate their honorarium.

3.3.2. Data Analysis: Grounding the Theory of Change in Participant Knowledge

Rigour in qualitative studies is requires communicating data with honesty, responsibility (Baxter & Eyles, 1997), and trustworthiness (Maher et al., 2018). To promote rigour, substantial attention is paid to the positionality of the researcher (see Chapter 3.2) and how this affected interpretation of participant responses (Bailey et al., 1999; Baxter & Eyles, 1997; Maher et al., 2018).

This study applies qualitative coding. The coding process is central to creating a grounded theory of change as it immerses the researcher in the data and promotes creative insights from participant responses (Maher et al., 2018). During coding, the analysis was supported by using multiple modes of interaction with the data (Maher et al., 2018). Participant responses were openly coded using NVivo 12 software (QSR International, 2019) by reading through each interview transcript and creating codes inductively using phrases from participants. The goal in this first step was to use participant language to create codes and ground the analysis in their responses. In the second step, codes and related excerpts were printed on paper and laid out on an open workspace for more focused coding. The codes (i.e., paper strips) were rearranged, grouped, compared, and recoded into reoccurring concepts and emergent themes (Bailey et al., 1999)⁴ relating to the core sections of a theory of change: challenges, vision, and interventions.

To further ground the theory of change, key quotes are included in the findings (Chapter 4) that exemplify the attitudes and key insights from participants (Maher et al., 2018). These insights are critical to understanding challenges and opportunities, and pathways to a vision for a just CFE shared by participants.

3.3.3. Limitations

There are two limitations that should be noted for this research: limited Indigenous representation, and lack of participant feedback on interpretation of responses. As mentioned in the positionality statement (Chapter 3.2), I was only able to interview one Indigenous food and medicine expert for this study. Which is a shortcoming of this research. Chapter 2.2 (Right to Food) notes that supporting Indigenous food sovereignty

⁴ Finalized coding trees can be found in Appendix B (Coding Trees) Figures B.1- B.3.

is important when discussing a right to food. Especially in the context of Vancouver, which is situated on the unceded territories of the Musqueam, Squamish, and Tsleil- Waututh Nations. Future research should include more outreach with Indigenous planners, producers, and food and medicine experts to ensure a diversity of Indigenous representation in food systems planning.

In applying rigour to qualitative analysis, some have noted the importance of participation throughout the research process to ensure that data interpretation reflects participants' expertise and attitudes honestly and completely (Bailey et al., 1999; Baxter & Eyles, 1997; Vogel, 2012). Due to timing and ethics constraints of this study, I did not reapproach individual participants to check data interpretation during the analysis phase of the research. However, the themes were regularly reviewed with the advisory committee (Bailey et al., 1999; Baxter & Eyles, 1997). Taking time to discuss and question data interpretation strengthens credibility of analysis and decision-making transparency when designing the theory of change for a CFE that incorporates a right to food framework.

Chapter 4.

Findings: Vision, Challenges, and Interventions

4.1. Vision for a Resilient and Just Circular Food System

Participants shared a vision for a just CFE that aligns with calls to integrate a right to food. Which answers the first research question: How do diverse food systems agents *visualize* an equitable and just circular food economy for Vancouver? This vision is included in the theory of change (see Figure 3) in Chapter 5 (Discussion).

A clear vision is needed to guide a just transition to a circular economy (Movement Generation, 2017). Participants envisioned a CFE that prioritizes the value of food as a human right, minimizes resource extraction, prevents avoidable food waste, facilitates dignified access to sufficient quantities of food that fulfil physical, spiritual, and cultural needs, and supports the rights and labour of workers. Participants identified three main components in this vision: a robust and just local food system, strong relationships across the food system built on reciprocity, as well as healthy ecosystems and regenerated foodscapes.

4.1.1. Place and Prosperity: A Robust and Just Local Food System

A robust and just local food system is one that engages with the diverse values and needs of people across Vancouver's communities, enables access to culturally important foods, and supports diverse markets and revenue streams. Engaging with peoples' values is key to building a robust local food system (Connelly & Beckie, 2016) and can be achieved in part through place-based initiatives. Place-based initiatives were identified by one non-profit manager as initiatives that "respond specifically to the community, in some cases, [are] led by the community (...) And [are] supported by the community" (Participant 9). These initiatives help build capacity and connection to facilitate sense of place and community (Feagan, 2007; Richmond et al., 2020). Participants also highlighted the importance of facilitating opportunities for dignified food access that centre choice and decision-making agency (i.e., individual food sovereignty) and improve the quality of experience when accessing food. This includes improving

access to culturally important foods either through local production or imports (Participant 12). As one charity director stated:

It's not just about ensuring that everyone who needs to access services can do so in a stigma free and dignified experience or dignified way. It's about recognizing the diversity of the needs, and the diversity of the food systems. (Participant 11)

A just local food system will also ensure physical access to Indigenous food and medicine plants in Vancouver (Participant 20). Access to food and medicine plants is essential (Participant 9), and can engage members of Indigenous communities (youths, elders, families) through food harvest and preparation, skill building, and knowledge sharing. As one Indigenous facilitator and medicine expert notes:

We're not only learning for ourselves (...) also, we want to use what we've learned to kind of break down barriers or walls of racism, of not understanding each other. So, any garden that I work out of, it's not just for Indigenous people, but it's for the community as a whole. (Participant 20)

A robust and just CFE will support small and medium processing facilities in Vancouver and encourage innovation that opens new revenue streams for farmers by providing pathways for unavoidable surplus foods in addition to current retail outlets (Teigiserova et al., 2020). Investing in innovative technology can connect food systems actors, reduce operational costs, place focus on higher value jobs, and reduce avoidable food by creating value added products (Participant 4). Processors across Vancouver working out of small and medium facilities and commissary kitchens already integrate circular economy practices into their operations (e.g., Susgrainable, Luv the Grub) and innovation in these businesses will continue to play a role in a robust and just CFE moving forward.

4.1.2. Resilience: Strong Relationships Built on Reciprocity

A resilient food system is one that is "able to continue to function well in the face of [a] stressor" (Participant 13). Participants envisioned a resilient circular economy of food that would strengthen and build relationships based on reciprocity and mutual benefits (Movement Generation, 2017). This was described by one non-profit leader:

I think of [circular economies] quite specifically as local based (...) and recognizing that our relationships are all connected to each other in terms of (...) how we eat, how we produce food, how we support farmers, and how that translates to waste and excess. (Participant 12)

One participant noted that valuing relationships was integral to achieving a circular economy (Participant 7), and workers' rights and creating meaningful jobs are key components in a just and resilient food economy (Participant 10 & 14). Participants highlighted the importance of strengthening and protecting workers rights regardless of their citizenship status, income, or role in the food system (Participant 14).

Finally, relationships and resilience can be strengthened by building value in the food system outside of a capitalistic system. Including social, natural and community capital (i.e., mutual aid initiatives). Activities outside of a formal economy such as sharing and trading networks can be supported in ways that affirm the social and cultural values ascribed to foods and help actors leverage capacity for change by centring a right to food and reciprocity (James et al., 2021). Activities outside of a capitalist economy also align with transformative attitudes that see food as a common good rather than a commodity and seek to challenge a currently unjust capital driven food system (Vivero-Pol, 2017). One non-profit manager stated:

There's so much opportunity [referring to relationship building] because it builds resilience, it builds neighborhood connections, it builds community, and those people are going to support each other in non-food ways as well. (Participant 9)

4.1.3. Circularity: Healthy Ecosystems and Regenerated Foodscapes

Participants' vision for a just circular economy of food included healthy ecosystems, and regenerated foodscapes. This reflects interest in ensuring food production can be sustained in a responsible manner in the region long-term. Regenerative agriculture aims to close the loop on nutrients and reduce the need for external inputs (Sillanpää & Ncibi, 2019), support plant and animal biodiversity, and reduce carbon footprints (Ellen MacArthur Foundation, 2019). Three participants identified these outcomes as desirable (Participant 9, 14 & 19), and one researcher noted:

In an ideal sense, from the ecological side of things, we would have a food system that really (...) prioritizes biodiversity and helps us shift in concrete ways towards decarbonisation. (Participant 14)

This component includes Indigenous food and medicine access. Indigenous plants are well adapted to local environmental conditions, and with proper stewardship can produce yields equal to or higher than agricultural crops without adding chemical inputs (Participant

8). Regenerating foodscapes and producing food in ways that prioritize ecosystem health contributes to a vision for a just and sustainable CFE. Participant 13, who is a regional policy expert, stated:

The thing that probably concerns me the most, is the lack of diversity in the crops that are grown here, and the degree to which the crops that are grown here are really vulnerable to climate change. And, in order to really create a fully resilient food system here, I think we have to really think about: How is food going to be grown in the future? (Participant 13)

4.2. Challenges to Achieving a Just Food System

The second research question asks: What *barriers* exist to achieve a circular food economy in the City of Vancouver that centres a right to food? Participants identified several challenges they currently face and foresee as continued barriers to achieving a just CFE. It should be noted this research took place amidst the global COVID-19 pandemic which placed additional strain on individual and community food security. As noted by one regional policy expert:

I think we know for sure that COVID created new food insecurities that we weren't aware of that would even happen, exacerbated those that were already experiencing food insecurity. (Participant 13)

The rate of household food insecurity increased to 14.6% during May of 2020 (Statistics Canada, 2020); however, it is unclear what long-term effects the COVID-19 pandemic will have on food insecurity in Vancouver. Research that explores the ways in which the food system performed well, and ways that it fails is vital to designing interventions that will increase resilience to future shocks (Deaton & Deaton, 2021). The following sections group the challenges identified by participants into two key themes: a food system that enables waste, and the presence of systemic barriers to addressing food insecurity that limit capacity for individuals to leverage their power for change.

4.2.1. A Food System Which Enables Wasting

Stringent Aesthetic Standards for Produce

Produce grading and stringent aesthetic standards are two forces that result in the loss of edible food from the FSC at retail, processing, and food service levels. Aesthetic expectations shape consumer perceptions of food quality at the retail level with arbitrary

standards that set unrealistic expectations not based on edibility (Göbel et al., 2015). While federal grading standards help to maintain minimum standards for produce sizing, colour, and condition, they are considered less meaningful and impactful in communicating quality and predicting which produce is sold than retail and consumer standards (MacRae et al., 2016). As one farmers' market advocate and organizer stated:

They're [farmers] not bringing grade A, grade B, grade C products to market [farmers' market]. They also bring ungraded products to market. So, it is actually an avenue and a venue for producers to bring products that maybe doesn't meet the standard of the wholesaler. (Participant 7)

Restaurants, retailers, and processors play a powerful role in the FSC and can reject produce based on stringent aesthetic definitions of quality; negotiating lower prices for produce that does not appear to meet these standards (Messner et al., 2021; Soma et al., 2021). This is a challenge for farmers who lose revenue on edible produce, in some cases tilling food under in the field if it is not assumed to meet aesthetic standards and will not be sold (Soma et al., 2021).

Lack of Consistent Date Labelling Creates Avoidable Waste

Another challenge impacting actors at the retail, food service, and consumer levels is confusion around the language and meaning of best before / use by / and expiry dates (Participant 6, 15 & 18). While food safety measures like temperature control can help reduce waste at the farm, distribution, and retail levels and ensure a minimum quality standard for consumers; other food safety practices like date labels can cause confusion that leads to premature food wasting by consumers and retailers (MacRae et al., 2016; Nikkel et al., 2019). One food distribution manager noted how expiry / best before dates could lead to premature consumer or retail wasting:

There's also of course, the confusion and ambiguity around our dates. Best before dates. Still, people are confused (...) you know, best before doesn't mean it's unsafe after. (Participant 18)

This edible food that is wasted prematurely can be downgraded to composting or for use as animal feedstock but is typically not reclaimed for humans.

Lack of Harmonized Sustainable Packaging Standards

Another challenge concerned the packaging used to increase the shelf life of foods and prevent avoidable food waste. Six participants (5, 8, 10, 13 15 & 16) discussed the

tension around (plastic) packaging that reduces food wasting but may contribute to more material waste due to difficulty incorporating it in recycling streams. One retail produce manager noted:

One of our biggest issues right now is responsible food packaging. And the big issue with that, is that the bottom line is that packaging not only helps to sell product, but it helps to extend the shelf life of product. So, there's less food being diverted to landfill or compost. (Participant 15)

There are two key problems that food packaging presents: the sheer volume of packaging being discarded; and a lack of consistency in the materials used for packaging that make it harder to recycle (Hawkins, 2012). However, as participants have identified, an additional tension is created in a CFE where packaging helps extend shelf life of products and reduce the amount of avoidable food waste. In Vancouver these tensions have been highlighted during the COVID-19 pandemic, as food safety concerns led to increased use of disposable packaging. This may appear to have slowed some momentum in Vancouver to find sustainable packaging solutions, promote zero waste through the use of personal reusable containers (e.g., mugs, jars) and reduce single use plastic waste (City of Vancouver, 2018b). These tensions must be resolved to maximize both organic and non-organic material reuse and prevent food waste in a CFE.

4.2.2. Systemic Barriers to Addressing Food Insecurity and Food Waste

Chapter 2 (Literature Review) establishes that root causes of food insecurity and food waste in Canada are structural and dynamic. In this section, participants highlight specific systemic barriers that both exacerbate these issues and limit their capacity to address them. These are: downloading responsibility for food insecurity onto charities and non-profits, the impacts of a low wage economy, high costs of land, living, and infrastructure, lack of support for local food procurement, and ongoing impacts of colonialism on Indigenous food sovereignty.

Downloading Responsibility for Food Insecurity onto Charities and Non-Profits

The depoliticization of food security in Canada highlighted in the literature review (Riches, 2018; Riches & Silvasti, 2014) was also noted by participants as a challenge for private actors, non-profits, and charities who are left to fill gaps in policy with limited

funding, staff, and infrastructure. The fragility of this system was highlighted during the COVID-19 pandemic when social distancing requirements, rapidly changing working conditions, and reduced volunteer staff left many such organizations under resourced while coping with an increasing number of food insecure people in need of food provisioning and related services (Britneff, 2020; Tarasuk & Mitchell, 2020). One food charity manager (Participant 11) noted reduced demand for services as a potential response to the Canada Emergency Response Benefit (CERB) (Canada Revenue Agency, 2020). However, the same participant noted that the end of CERB in December 2020 aligned with a subsequent increase in demand for services (Participant 11). Many of these organizations feel that pressure to address immediate needs of hunger limits their ability to plan long-term and expand their programming to help address root causes of food insecurity like poverty (FAO, 2020; Tarasuk & Mitchell, 2020). One participant, who manages a non-profit commented that charities "fill the gaps of our government" and:

People are so thankful for charities, because of the work we do and the people we serve, but, but we're oftentimes advocating for ourselves just to fund the work that we're doing. (Participant 10)

Low Wage Economy

Participants recognized that the roots of food insecurity lie in poverty and one of the biggest contributors to food insecurity is a reliance on low wage and volunteer labour in the agri-food sector. This is problematic as it does not ensure food security for workers (Weiler et al., 2017). Correcting low wages as a small and medium enterprises (SMEs) or non-profit organization working in the food system can be difficult. As they balance demands of programs that provide access to low-cost foods with providing meaningful job opportunities that pay a living wage (Participant 17). One retailer felt they had to stay "100 times more efficient" to be competitive while providing a living wage to their employees and noted:

Basic living wage is important to us. And I know a lot of what I see jobs advertised at other (...) locations, that's not the rate that they're offering [referring to a living wage]. (Participant 16)

This challenge is compounded by high rental, leasing, and infrastructure costs for businesses and charities, and a high cost of living in one of the most expensive cities in the world.

High Cost of Land, Living and Infrastructure

Participants identified numerous concerns relating to high costs of land and infrastructure in Vancouver. Cost of agricultural and real estate lands in Vancouver and the surrounding peri-urban region are among the highest in Canada (Statistics Canada, 2018b). Consolidation of agricultural lands and increasing prices are viewed as an issue in which zoning favours large, capital rich farmers (Rotz et al., 2019). In addition, competition for land in urban areas can cause price increases (Ellen MacArthur Foundation, 2019) that push small urban farmers, SMEs, and non-profits out of urban areas. Land use and zoning policies can also perpetuate access and affordability issues for low-income neighbourhoods who may lose access to fresh, healthy foods when urban farms, SMEs, and non-profits relocate (FAO, 2019; Pothukuchi & Kaufman, 2000). As noted earlier, these issues are compounded by a high cost of living and low wage economy that influences the presence and severity of food insecurity in Vancouver (Holmes et al., 2019; Tarasuk & Mitchell, 2020).

Non-profits, social enterprises, and community organizations highlighted that the upfront costs for cooling, storage, and food processing infrastructure is a significant barrier to expanding programs. Participants also highlighted that the high cost of real estate and lack of suitable infrastructure in lower cost spaces is a financial challenge for supporting the number of low-income members they serve. One charity manager noted:

The sheer capital investment that we would have had to make to install cold space for storage was just beyond what we could afford. I know that's a pretty like shared sentiment, especially with non-profits and charities is the lack of infrastructure, especially cold space. (Participant 10)

Where federal and provincial grants are available, they can be inadequate to invest in both infrastructure and staff. Grants may also not match the types of service provision needed to support increased community food security. One participant noted that increased interest in local food assets has led to an abundance of funding for community garden spaces. They perceived a focus on community garden as inappropriate to address the food security needs of the community they serve compared to initiatives like grocery coupon programs that receive less funding (Participant 9).

In addition to high cost of real estate and infrastructure in Vancouver, farmers were also concerned about the rising cost of agricultural land compared to other regions

in Canada (Statistics Canada, 2018a). As of 2016 the cost of agricultural land in some areas of the lower mainland in B.C. reached CAD\$75,000 per acre compared to \$1000CAD per acre in regions of Alberta and Saskatchewan (Statistics Canada, 2018a). Farmers interviewed were concerned that high land costs would result in replacement of small and medium farms with large industrial style agriculture, loss of local products in local markets, and decrease the number of producers in B.C. (Participant 8). As this processor noted:

Real estate in the city is crazy, I think something needs to be done about that to make sure that there's space to help to create this zero-waste food economy. (Participant 4)

Lack of Support for Local Food Procurement

Another challenge identified by participants was balancing the availability of low-cost healthy foods with the desire to support local producers. Imported products provide more stable access to low-cost foods and cultural staples for those who need it (Participant 12); however, the discrepancy between the costs of imported (lower cost to consumer) and local foods (higher cost to consumer) points to a deeper issue of favouring cheap imports over local production. As one retailer noted:

As far as getting food to everybody, healthy, fresh food to everybody out there (...) you know, if it's local product, that becomes a financial issue, for sure. And if it's imported product (...) it's certainly less expensive. (Participant 15)

Artificially low prices on imports do not reflect the full environmental, social, and health externalities of industrial style agriculture (Booth, 2012; Jackson et al., 2021). In addition, farmers face several institutional and technical-material lock-ins which manifest as pressures to overproduce, and reduces farmers' power relative to a cheap, import driven market (FAO, 2020; Messner et al., 2020, 2021). Producers who are locked in to contracts with supermarkets due to a lack of alternative retail outlets (Messner et al., 2020) are set up as 'price-takers' instead of 'price makers' (Jensen et al., 2012). Addressing these lock-ins while lowering cost barriers to nutritious local foods is essential to ensuring all people can access physically and culturally fulfilling foods in dignified ways.

Ongoing Impacts of Colonization on Indigenous Food Sovereignty

Finally, participants noted that ongoing effects of colonialism are a barrier to implementation of a just and sustainable food system moving forwards (Participant 8). It has also been recognized in literature that both industrial agriculture and alternative 'sustainable' agriculture have the potential to displace Indigenous food sources, disrupt important relationships that have been maintained since time immemorial (Baker, 2021), and create barriers for accessing traditional foods (Fieldhouse & Thompson, 2012; Power, 2008). In addition, focusing on alternative agricultural movements can be problematic as these movements tends to 'Indigenize' settler farmers under the guise of "people of the land" (Claeys, 2013, p. 8) which dismisses discussions about whose land it is (Kepkiewicz & Dale, 2019), and the question of settler futures on Indigenous land (Tuck & Yang, 2012). Participant 8, who is a cooperative farmer and advocate noted:

We can't even talk about governance, until we address our relationship with land, and in terms of colonization. Because land is the most contentious thing. Because here we are taking land into trust that doesn't even belong to us. That's been stolen in the first place. (Participant 8)

Both control of land and resources, and 'Indigenization' of settler farmers are challenges for understanding how a just food system can support Indigenous food sovereignty within a rights-based framework (i.e., right to food) (Coté, 2016). As noted in Chapter 2.2 (Right to Food), addressing the ongoing challenges of colonialism is key to supporting Indigenous food sovereignty and achieving a food system that is just and equitable for all people moving forwards.

4.3. Opportunities and Interventions to Achieve a Just Circular Food Economy

In addition to identifying barriers, the second research question also asks: What *opportunities* exist to achieve a circular food economy in Vancouver that centres a right to food? Participants identified the following interventions that may help achieve their vision for a robust local food system, resiliency, relationships based on reciprocity, healthy ecosystems, and regenerated foodscapes. Interventions are organized based on how they would address barriers identified in Chapter 4.2 (Challenges). These interventions are action oriented, and may be compared to current municipal, regional, and provincial actions and plans to determine gaps and target areas for forthcoming strategies.

4.3.1. Adopt Clear Regulations and Incentives That Reduce Food Waste and Redistribute Wealth

Participants identified regulation, incentives, and fines as ways to address challenges of a low wage economy, clarify pathways for FSLW that align with a progressive food waste prevention hierarchy, increase compliance with food waste prevention, and promote adoption of social and local procurement targets (see Table 1).

In particular, mandating food waste reporting and using taxes or fines to increase compliance with food waste reporting and reduction at retail and processing levels was mentioned by six participants. One retail manager stated that:

There should be penalties essentially for food waste. So that people are incentivized to figure out how to deal with it. (Participant 16)

Incentives (e.g., reduced business licensing fees) may also promote increased adoption of social and local procurement targets by SMEs to support local producers and processors (Participant 1). In addition, targeting corporate tax havens and tax evasion may be an avenue for stabilizing non-profit funding and redistributing wealth that would otherwise be hidden by companies who avoid contributing to vital public services that reduce food insecurity (This Is Rubbish, 2021). While this is addressed at a federal level, the City of Vancouver can advocate for stronger legislative reform that redistributes wealth more equitably and helps fund social services in ways that politicizes food insecurity as a federal concern (Riches, 2018; Riches & Silvasti, 2014; This Is Rubbish, 2021).

Table 1. Regulations, Fines, and Incentives. Grouped by participant interest.

Regulation / Fine / Incentive	Participants Interested
Ease the way for business licenses for urban farms and cooperatives	Participant 5, 7, 8
Mandate / incentivize food waste reporting at retail and processing levels	Participant 4, 6, 15, 16, 17, 18
Declare portions of parks space for planting and harvesting foods	Participant 2, 20
Alleviate property taxes for social enterprises and non-profits / increase taxes on big box enterprises	Participant 1, 17, 19

4.3.2. Adopt Concrete Targets for Local Food Procurement

Participants identified that there is a lack of support for local food procurement due to issues of balancing support for local producers, while dealing with low budgets to procure food. To combat these challenges participants suggested more ambitious targets for local and social procurement from municipal bodies, and rethinking market spaces and food assets in the city. As discussed by one charity manager:

We are talking just later this week about social procurement as a key issue that the city and the provincial, federal government need to work on. Why does the social enterprise not get a fair kick at the can, when it comes to procuring products? (Participant 17)

Government social procurement contracts are one way for the City of Vancouver to invest in the local food economy through social enterprises that address food insecurity and create meaningful job opportunities. Local and sustainable food procurement happens "in a way that considers not only cost and quality, but equally a full range of social, health and environmental sustainability factors associated with conditions of production, processing, and transportation of food" (City of Vancouver, 2013, p. 84). In 2015 the parks board was able to meet their goal of 40% of food budget spent on local and sustainable food procurement (City of Vancouver, 2017). Ambitious targets should be extended to all municipal departments and the City should advocate for other public institutions (i.e., correctional centres, care facilities, universities) and businesses to set and achieve their own targets.

In addition, rethinking what market spaces, and even 'food assets' (Soma et al., 2021) look like in Vancouver could increase the diversity of sales outlets for producers, create opportunities to obtain fair prices, and lower cost barriers to local foods for purchasers. Creating more options for consumers both reduces waste (Participant 7) and aligns with right to food principles of increasing decision-making agency. Farmers' markets are one venue where producers can set fair prices based on their labour, but these spaces have been identified as inaccessible to low-income residents. As stated by a community engagement and non-profit manager:

I think there's enough people that are pushing for, going to farmers markets that are conscious consumers (...) but it doesn't actually shift things enough when you just have these pockets that are really inaccessible to other people (...) How do we make sure that that policy doesn't end up having

negative repercussion on the people who maybe don't have that access?"
(Participant 3)

Online markets are a promising platform to connect producers directly with consumers and have shown significant growth during the COVID-19 pandemic (Dunn, 2021). However, fulfilling online purchases incurs high transportation costs and greenhouse gas emissions, and shopping in online markets can itself be a barrier to those without stable internet access. Therefore, it is unclear the roles that in person versus online markets will play in a future CFE.

4.3.3. Secure Space for Indigenous Food Practices

Participants noted that ongoing effects of colonization and a lack of Indigenous access to traditional foods and medicines through harvesting and hunting must be addressed in a just circular economy of food (Participant 8 & 14). Participants suggested that, as a City of Reconciliation (City of Vancouver, 2019), Vancouver should centre Indigenous access to traditional food and medicine plants as part of current and future green space design and function. One participant highlighted that access to urban green space is vital to creating community connections and breaking down social barriers (Participant 20). This idea is reflected in the Vancouver Parks Board's Local Food Action Plan⁵ (2013) which has priorities to "increase physical food assets" and create "engaged and capacity rich networks" (p. 26-33, 39-41). In 2021 the plan was updated with support for 'food and culture gardens' including Indigenous run gardens (Vancouver Board of Parks and Recreation, 2021). A comprehensive strategy to increase Indigenous access to urban green space should enable both organized and spontaneous harvest enhanced with workshops and events facilitated by Indigenous knowledge holders. The Indigenous medicine expert mentioned:

I think having planter boxes or not shouldn't matter. Especially if I'm using a space for teaching. It shouldn't be restricted to only free space without planter boxes. (Participant 20)

Converting more green spaces to food spaces may strengthen relationships between Indigenous peoples' and the land through stewardship (Kimmerer, 2017), affirm

⁵ This plan is in the process of being updated.

commitments to reconciliation and decolonization (City of Vancouver, 2019), and support a vision for a values based sharing economy (Participant 20).

4.3.4. Equitable Food Systems Planning and Development

Participants shared that rising housing, real estate, and agricultural land costs were a barrier to implementing a just CFE (Participant 8 & 10). Stabilizing the real estate market and critically considering rezoning applications is vital to ensure that participants vision for inclusive neighbourhoods is achieved by mitigating displacement of SMEs and ensuring commercial and community spaces are available for agents working to address food waste and food insecurity challenges. One non-profit leader noted:

I think that local grocery, like corner store groceries, I think are something that we're really, desperately missing in this city. (Participant 12)

This sentiment aligns with the *Vancouver Plan* provisional goals to "develop an affordable city" and "create complete, connected and culturally vibrant neighbourhoods" (City of Vancouver, 2021b, p. 5).

One tool that the City may use to assess rezoning impacts on the local food system is identifying and mapping community assets. Identifying assets is a key tool for developing an understanding of community strengths, including non-profits and social enterprises who have food related programming, that should be considered when assessing how rezoning may lead to displacement of important community food assets and businesses (Soma et al., 2021). For example, one non-profit leader observed that some small and medium grocers are important provisioners of low-cost food access in the city (Participant 12). One retailer experienced more flexibility when working with other small retailers and processors that facilitated more circular economy practices when providing local products (Participant 16). Moving forward the City of Vancouver should consider incorporating community asset identification and mapping to assess impacts on the local FSC as part of future developments and ensure that space is available and affordable for SMEs and non-profits to support a CFE (Pothukuchi & Kaufman, 2000).

4.3.5. Shorten Supply Chains to Close the Loop on Non-Organic and Organic Materials

Stringent aesthetic standards, confusion around date labelling, and lack of harmonized packaging standards are three challenges that may be addressed by shortening supply chains. Shortening and simplifying supply chains has direct benefits for producers who can engage with consumers on the quality of food not conveyed by retail aesthetic standards. Direct marketing (e.g., gate sales, farmers markets) brings producers and consumers together with high degrees of transparency around product quality. This can offer opportunities to educate consumers about food safety and scale back regulations (i.e., date labelling) that are designed for longer supply chains (Participant 4 & 7). As one market manager noted:

*When there is this extreme degree of transparency between producer and consumer, because we're actually having them meet right together, do you actually need the same kind of traceability that is required in a larger chain?
(Participant 7)*

From an ecological standpoint, supporting local production and sale can reduce energy, water and material uses (Göbel et al., 2015), food spoiling (This Is Rubbish, 2021), and carbon emissions generated by long distance transit (FAO, 2020).

Short supply chains can also help to address material recycling challenges and a lack of harmonized packaging standards suitable to a CFE. As one participant noted, integrating a standardized system for the collection and distribution of glass and metal containers into existing recycling infrastructure is a promising packaging solution as the intrinsic value of these materials is high (Participant 16).

Organic materials can also be looped back into agricultural systems by implementing anaerobic digestion systems (Teigiserova et al., 2020) to create renewable natural gas (i.e., energy production) and recycle nutrients (Participant 19): Or by creating compostable and biodegradable plastics. Directing wasted food to closed loop activities may represent cost savings or additional revenue for grocers/retailers/processors if those composting facilities are in competition for wasted food. In addition, material recycling for compostable and bioplastics may offer additional environmental benefits in decreased reliance on petroleum derived plastics. However, avoiding single use, even for

compostable and biodegradable plastics, is central to a CFE that reduces resource and energy use (Neitzert, 2018), and closes the loop on organic and non-organic materials.

4.3.6. Improve Access to Funding for Non-Profits and Social Enterprises to Implement Place-Based Circular Food Economy Practices

Social enterprises and non-profits addressing the low wage economy and food insecurity would benefit from access to funding that can be used to implement place-based initiatives that adapt to the needs of their communities and contribute to local resilience (Participant 9). Participants identified opportunities for the City to intervene to make funding available that can increase capacity for skill building and educational programs, hiring more staff to implement food security strategies, and support community coordinator positions to oversee progress towards long term goals. There were three suggestions for how funding may be made available for non-profits and social enterprises.

The first was to fund community coordinator positions as part of a City of Vancouver budget for food security initiatives (Participant 5 & 7). As one farmer and community advocate noted, increased funding for coordinator positions could increase capacity for community organizations to network and leverage power for increased impact on key problems:

If we paid people to manage this stuff at the neighborhood level or like, participate politically, at the neighborhood level (...) if going to meetings and thinking about these things. were paid positions, and then people would have time for them. (Participant 5)

The second is to simplify the grant process and provide in-person support for grant applications (Participant 4). Public consultants could be retained by the City to visit non-profits, gather information from managers and staff, and draft grant applications for organizations who otherwise lack the time or expertise to complete application processes. Another consideration is ensuring that grants cover costs of transportation, childcare, training, and staff meal provision, which are indirectly related but integral to establishment of and participation in food security programming (Participant 20). Ensuring that non-profits, and community centres have the capacity to apply for funding covering these peripheral activities is essential to creating financial stability while they adapt their services to the needs of the community (Participant 9) and work on the root causes of food

insecurity as well as meeting the more immediate needs of hunger. One local processor stated:

One of the things that government needs to look at is how they create these application processes. And to make them a little bit more streamlined, and a little bit more fair to those who may not have had the opportunity to be as educated. (Participant 4)

Finally, participants envisioned a funding system that would reduce competition for grants with municipally operated supports and community grant boards (Participant 7). Participant-led community grant boards could operate as a centralized hub for coordination and distribution of funding in ways that encourage collaboration between many organizations to address food security and food waste challenges. In all three cases there is a need for increased transparency of how grant and funding processes increase capacity of non-profits and social enterprises to integrate place-based community programs that advance the vision for a just CFE.

4.3.7. Strengthen and Scale Up Local and Shared Food Infrastructure

Participants shared that high infrastructure costs to facilitate food security programming and circular economy practices was a barrier to implementing a robust and just local food system. However, the COVID-19 pandemic has presented an opportunity to rebuild the food system (James et al., 2021) to scale up technology, shared infrastructure, and support for farmers to deal with unavoidable food surpluses (Teigiserova et al., 2020). Building in processes and structures to properly allocate unavoidable food surpluses can reduce avoidable food wasting if it does not reinforce systems of overproduction (Messner et al., 2020) and includes both supportive policy and infrastructure to implement changes (Participant 18). In addition, scaling up technology, infrastructure, and farmer support should integrate with existing place-based community initiatives where possible to ensure innovation matches community needs and values (Connelly & Beckie, 2016).

One way that processing and distribution can be scaled up efficiently to leverage impact on the volume of avoidable food waste is to invest in innovative technology to connect food systems actors, reduce operational costs and place focus on higher value jobs. For small and medium sized producers and processors, technology offers cost advantages for scaling up operations to "allow | a small business to behave like a big

business for pennies on the dollar" (Participant 1). Use of technology across the food system may also increase the need for higher value jobs that provide higher income and job satisfaction (Participant 4). The City can consider various pathways to supporting technology adaptation by SMEs, including funding and leasing options, and encouraging co-location and infrastructure sharing.

Participants suggested that developing and subsidizing shared cold storage and kitchen space for smaller organizations could lower individual leasing costs and facilitate more circular practices (Participant 3). Establishing post-handling infrastructure such as community coolers can also increase shelf-life of foods making it easier for retailers to stock local products (Participant 15), extend the viability of unavoidable surplus to be incorporated into processing streams, and integrate with redistribution efforts (Participant 7). Using unavoidable surplus foods as inputs for value added processing aligns with a right to food because it gives processors additional ways to manage unplanned surpluses, prioritizes the value of food for human use, and reduces burden on non-profits, charities, and social enterprises who can become dumping grounds for surplus foods (Bread for the World, 2013). One non-profit manager noted:

I think the tension with [redistribution], that I've seen come up is always around kind of that like that excess, and that stigma of always matching, like, recovered foods with people who are in need and, and how that's not necessarily a good, like best principles for excess. (Participant 3)

The City can communicate with farmers, processors, vendors, and non-profits to identify public and/or private spaces that could be used for community coolers. The City could also explore the use of requests for expressions of interest to identify properties and activities that support post-harvest handling and infrastructure. A further step will be to identify the requirements (i.e., facility certifications) necessary for non-profits and social enterprises who wish to distribute and sell products processed from shared kitchens and community coolers and build those elements in to the accessible infrastructure.

4.3.8. Expand Community Supported Agriculture and Land Co-Ops

Participants envisioned a just circular economy of food that challenged the commodification of food and stringent aesthetic values that do not convey quality. Cooperative farms, where farmers share costs and knowledge, represent a distancing from the financialization of land and food and offer ways to connect urban communities

directly with agriculture (Wittman et al., 2017). Many land cooperatives also use regenerative agriculture principles (Participant 8), which aligns with the vision for healthy ecosystems and regenerated foodscapes. Supporting the creation of land cooperatives could include collaborating with farmers' institutes to identify and secure land to be held in trusts owned by communities, or allocating a portion of food security funding to alleviate the high cost of agricultural lands needed to facilitate these alternative land arrangements (Statistics Canada, 2018a; Wittman et al., 2017). Land cooperatives may also support Indigenous food sovereignty by creating shared spaces for farming; however, this approach must be careful as cooperatives may reinforce power asymmetries between settler and Indigenous farmers that lead to unequal access to land (Daigle, 2019).

Community supported agriculture is another way that communities can support food security by investing directly into a farm prior to the growing season. In Vancouver, several urban and peri-urban farms sell CSA shares as one way to guarantee income for farmers and plan appropriately for demand. In addition, CSAs can strengthen producer-consumer relationships that increase sale of local products (Participant 7) and provide access to culturally important produce at low costs (Participant 12). The City could support the creation of more urban CSAs by helping establish community pick-up points and cold storage for farmers to distribute produce (Participant 5 & 7). As one market manager noted:

Distributed cold storage (...) it could be actually really interesting to pilot something like that at some farmers market locations. (Participant 7)

CSAs can also be integrated into local procurement contracts to establish a consistent stream of local produce for social enterprises and non-profits. Connecting consumers to producers through land cooperatives and CSAs can foster supportive and diverse community relationships that contribute to a resilient and just circular economy of food.

4.3.9. Support Advocacy and Education Initiatives to Build Capacity and Awareness for a Just, Circular Food Economy

Regulation, infrastructure, education and advocacy are all needed to support agents working to leverage their power for change and implement circular economy practices. The City of Vancouver can play a vital role in a CFE by establishing and sponsoring programs, events, and campaigns that that explore the social and cultural

values of food, empower citizens - not just as consumers (Jackson et al., 2021), and build social infrastructure (Connelly & Beckie, 2016). Sharing successes and solutions may help create public awareness of work being done and inspire further action (Participant 9, 10, 17 & 18). As one retailer noted:

I think if you start talking with the solutions and celebrating the work that's being done, you inspire action. (Participant 18)

The City can also create and distribute educational tools for food systems agents, and connect those agents with academic and government institutions to better understand the challenges faced by specific groups (e.g., farmers) (Ikerd, 2019), so they may better design grants, educational tools, infrastructure and technology to address those challenges. As one cooperative farmer noted municipalities can share their successes and challenges to leverage impact on a broader scale:

A workshop where we bring the municipalities together and say, 'okay, here's the best practices. Here's a municipality that is doing things [that are] working.' And just really get down to it. (Participant 8)

While education and advocacy alone will not support the transition to a resilient and just CFE, providing up to date information on actions taken by various agents will increase transparency on progress towards goals, inspire more organizations and individuals to get involved, and increase the impact of actions by making it easier for agents along the FSC to leverage power for change.

Chapter 5.

Discussion

5.1. Theory of Change for a Circular Food Economy in Vancouver

The final research question asked: How can a theory of change framework help identify interventions necessary to achieve the goals of a just circular food economy? The theory of change model is presented below (see Figure 3). This model was developed by analysing participant interviews (see Chapter 3.3) to identify interventions that can help achieve the goals of a just CFE. The challenges, vision, and interventions are each presented in the theory of change alongside assumptions, policy, and accountability measures that increase the probability that interventions will lead to desired short- and long-term outcomes. This theory of change informs the recommendations for actions in critical areas identified through the literature review and participant interviews to reduce food waste and food insecurity in Vancouver.

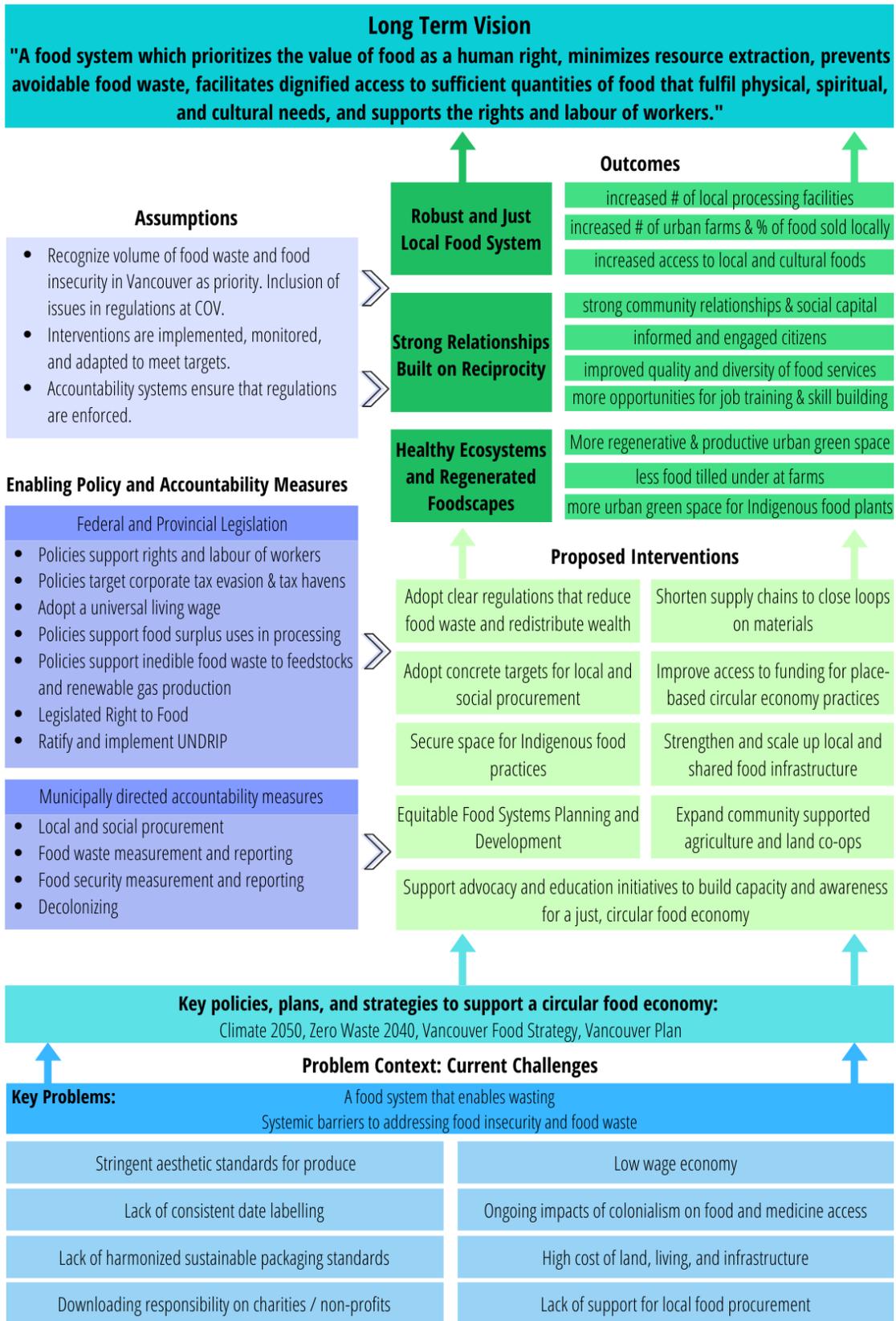


Figure 3. Theory of Change adapted from Varney (2021)

5.2. Assumptions, Policy and Accountability Measures

5.2.1. Assumptions

The theory of change includes assumptions about how proposed interventions will lead to desired short- and long-term outcomes. These include assuming that food waste and food insecurity are priorities in policy and planning; interventions are implemented, monitored, and adapted to meet targets that align with a progressive food waste prevention hierarchy; and, that accountability systems are in place to ensure that regulations around the reuse, redistribution, and disposal of FSLW are enforced.

Importantly, the interventions identified by participants and the resulting recommendations are bound by a capitalist economy which frames food as a commodity rather than a common good (Jackson et al., 2021; Vivero-Pol, 2017). Capitalism is an inherently unjust system which exploits food workers, reinforces colonial institutions, and a status quo of oppression and domination of historically marginalized groups (Bread for the World, 2013; Jackson et al., 2021; Vivero-Pol, 2017; Weiler et al., 2017; Wittman et al., 2017). The current neoliberal capitalist regime fails to uphold its obligation to ensure all people are able to access the foods needed to support a healthy and fulfilling life (Tung et al., 2021). While the initiatives and recommendations identified may shift the needle towards equity and justice, they will continue to face barriers when food is valued as a commodity instead of a human right.

5.2.2. Policy and Accountability Measures

In addition to the strategies and actions planned or in place for Metro Vancouver (i.e., *Climate 2050*, *Zero Waste 2040*, *Vancouver Food Strategy*, and *Vancouver Plan*) there are policies and accountability measures that the Federal, Provincial, and Municipal governments can use to and reduce barriers and build momentum towards a just CFE. These tools are presented as "Enabling Policy and Accountability Measures." Which increase the likelihood of a successful outcome where interventions are implemented. Tools are divided into Federal and Provincial policies and legislation, and Municipal accountability systems. By including both, the theory of change reinforces that action at all levels of government are needed to impact the root causes of food waste and food insecurity.

5.3. Recommendations

Dynamic and adaptive governance is needed to convene multiple forms and sources of power (i.e., government, NGO, private sector) to leverage impact on the systemic issues of food waste and food insecurity (Clark et al., 2021). Beyond interventions at the municipal level, these issues require substantial policy action at the provincial and federal level and collaboration with private actors and NGOs throughout the entire FSC (Collins et al., 2014; Göbel et al., 2015; Loopstra, 2018; Treutwein & Langen, 2021).

In Vancouver participants defined a dynamic and adaptive governance system as one that supports both incremental and transformative actions designed to accelerate the transition to a CFE while providing support for immediate food security needs. This governance system requires transparency in all levels of government to report on any progress towards the goals and targets of plans relating to the food system and communication between government and other actors to identify further challenges and opportunities to achieving participants vision of a CFE.

The following recommendations propose critical areas for intervention based on the findings (Chapter 4) and literature review (Chapter 2). While interventions outlined by participants (Chapter 4.3) are specific to the City of Vancouver, the recommendations may be more broadly interpreted as starting points for Canadian municipalities to implement CFEs that align with a right to food. These recommendations should be adapted to each municipal context to ensure that interventions chosen are appropriate and effective.

5.3.1. Clarifying Definitions and Targeting Root Causes of Food Waste to Align with the Right to Food

The findings from this research highlight that the language used to describe FSLW should align with distinct uses in a CFE and values of food as a human right. Definitions for FSLW should emphasize the root causes of food waste (Tung et al., 2021), its persistence across the entire FSC (Göbel et al., 2015) and the social and cultural contexts that shape understandings of FSLW in different communities (Soma, 2020). Language around food 'surplus', 'loss', and 'waste' should also carefully consider how definitions imply priority pathways for each type of food in a CFE (Teigiserova et al., 2020) and ensure

that dignified access to healthy, culturally appropriate foods is the highest priority. By clarifying the language used to define and regulate the uses of FSLW in a CFE governments and other actors take a first step in aligning their actions with a right to food.

Strengthening food chain infrastructure and cooperation along the entire FSC is also needed to reduce food waste and food insecurity long-term. This includes scaling up local food processing and redistribution infrastructure to manage unavoidable food surpluses (Messner et al., 2020). Critically, redistribution should not reinforce reliance on food banks and food charities (Millar et al., 2020; Riches, 2018) but instead focus on the potential for creating value added products through local processing and manufacturing (Grasso, 2020). In addition, social capital must be built through community education and engagement, and empowering citizens through community partnerships and place-based programs in order to maintain the values and integrity of local food security initiatives (Connelly & Beckie, 2016; Jackson et al., 2021). These relationships are essential for building a sustainable CFE that can reduce food waste and food insecurity.

5.3.2. Supporting Community Food Organizations and Assets Without Shifting Burden

Downloading responsibility to deal with food insecurity onto NGOs and private enterprises is a systemic issue that must be addressed in a CFE that centres a right to food (Riches & Silvasti, 2014). However, the role of community organizations, food banks, and other NGOs will continue to be important as they interact closely with people facing food insecurity (Holmes et al., 2019). In addition, community organizations play an important role in holding the state responsible to their obligation to citizens' food security (Tung et al., 2021). Therefore, better funding and supports should be prioritized through community grant boards, providing in person support, and supporting the creation of community coordinator positions as part of a CFE. Assessing the impacts of policies and development on valuable community food assets and ensuring that spaces are provided at affordable, or subsidized costs is also critical to ensuring that non-profits, social enterprises, and SMEs can continue to provide their services in Vancouver. Providing stable funding and assessing impacts can help organizations not only to address immediate needs of hunger but also implement circular practices that can help people achieve food security long term (Booth, 2012; Connelly & Beckie, 2016; Ellen MacArthur Foundation, 2019).

Despite numerous food assets in cities (e.g., non-profit food hubs) low-income individuals still face many barriers to accessing food (Rajasooriar & Soma, 2022). Therefore, governments cannot rely solely on community organizations, NGOs, and private enterprises to respond to the root causes of food waste and food insecurity (Riches, 2018; Riches & Silvasti, 2014). Municipal governments must continue to call on provincial and federal governments to implement policies and legislation that target poverty reduction, workers' rights, decolonization, and the right to food (Collins et al., 2014; Tung et al., 2021). In addition, policies and legislation must support pathways for FSLW that prioritize prevention of food waste (Agriculture and Agri-Food Canada, 2021; Treutwein & Langen, 2021) and dignified food access for food insecure individuals.

5.3.3. Decolonizing Food Systems Planning and Centering Indigenous Knowledge

A critical step in achieving a just CFE is challenging policies and practices that reinforce a status quo of social inequality, environmental exploitation, and colonization (Gordon & Hunt, 2019; James et al., 2021). In James et al (2021) the authors highlight five interconnected principles that can help shift the food system to one "based on social justice and ecological foundations" (pg. 3). These are: relationality, respect, reciprocity, responsibility, and rights (James et al., 2021). Prioritizing reciprocal relationships with Indigenous nations, community organizations, and individuals will be key to establishing a CFE that centres equity, justice, and supports Indigenous food sovereignty and food security.

Interventions that target these critical points and centre the principles of the right to food are expected to have outcomes that build towards the long-term vision for a just CFE in Vancouver. These outcomes include increased access to local and cultural foods through multiple market and non-market streams, stronger networks of food systems agents, governments, and consumers working to support the CFE, and more opportunities for Indigenous food access through planting, growing, and harvesting in urban green spaces. Achieving these outcomes requires action on the part of all levels of government, NGOs, and private enterprises to transform the food system to one centred on equity, justice, and the right to food.

Chapter 6.

Conclusion

Canada is at a turning point for addressing food waste and food insecurity by implementing circular economies (Council of Canadian Academies, 2021). Over 58% of all food produced is lost and wasted annually (Nikkel et al., 2019). While 12.7% of Canadian households face food insecurity each year (Tarasuk & Mitchell, 2020). The federal, provincial, and municipal governments must take action to affirm a moral obligation to preventing food waste and ensuring all citizens have the means to be food secure. The City of Vancouver is in a powerful position to implement a circular economy of food (Ellen MacArthur Foundation, 2019) that supports a right to food for all people. This study asked:

1. How do diverse food systems agents visualize an equitable and just circular food economy for Vancouver that prevents/reduces food loss and waste, while also promoting food as a human right?
2. What barriers and opportunities exist to achieve a circular food economy in the City of Vancouver that centres a right to food?
3. How can a theory of change framework help identify interventions necessary to achieve the goals of a just circular food economy?

Regarding the first question participants envisioned a food system that prioritizes the value of food as a human right, minimizes resource extraction, prevents avoidable food waste, facilitates dignified access to sufficient quantities of food that fulfil physical, spiritual, and cultural needs, and supports the rights and labour of workers. Long-term participants envision a local food system that is robust and just, builds strong relationships between governments, food systems agents, and citizens based in reciprocity, and regenerates foodscapes and ecosystems to ensure environmental sustainability.

In response to the second question, participants highlighted current systemic challenges of wasting and addressing food insecurity such as downloading responsibility onto charities and non-profits, and lack of support for local food procurement. Participants also identified opportunities for regulation, funding, and infrastructure to close loops on waste and build capacity for a just CFE.

Finally, in applying the theory of change (see Figure 3), this study identifies how participant insights are integrated to inform interventions necessary to achieve the goals of a just CFE. The theory of change illustrates pathways to change through a dynamic and adaptive governance system which convenes the power of multiple food systems agents to leverage impact on critical points identified in the recommendations (Chapter 5.3). These include defining and targeting food waste in ways that align with a right to food, supporting community organizations and food assets without shifting the burden of responsibility, and decolonizing food systems planning and centering Indigenous knowledge. Continuing to seek systemic solutions that address the root causes of food insecurity and food waste is vital to building an integrated and circular food system which recognizes the right to food, and centres justice, equity and promotes prosperity for current and future generations.

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Appendix A.

Supplementary Tables

Table A.1. Food Surplus, Loss and Waste Definitions Table

Term	Definitions adapted from <u>Teigiserova et al 2020</u>	UNEP and FAO Definitions
Food Waste	<p>Food that is inedible or becomes inedible during management of food throughout the whole supply chain. This includes <u>unavoidable</u> waste of inedible foods which are unfit for human consumption raw or as a by-product of processing; and waste that is <u>avoidable</u> when edible foods become inedible due to natural causes (e.g., pest), lack of appropriate infrastructure, or poor management along the supply chain.</p> <p><u>Waste occurs at all points of supply chain.</u></p>	<p>Food and associated inedible parts removed from the human food supply chain (i.e., ending in landfill, controlled combustion, sewer, litter/discards/refuse, co/anaerobic digestion, compost / aerobic digestion or land application) at food/grocery retail, food service, and household levels.</p> <p><u>Waste occurs at consumer and retail points of supply chain.</u></p>
Food loss	<p>Foods that are unaccounted for, such as mismatches in expected versus delivered goods.</p> <p><u>Loss occurs at points of supply chain prior to consumer purchase.</u></p>	<p>All the crop, livestock and fish human-edible commodity quantities that, directly or indirectly, completely exit the post-harvest/ slaughter/catch supply chain by being discarded, incinerated or otherwise disposed of, and do not re-enter in any other utilization (such as animal feed, industrial use, etc.), up to, and excluding, the retail level.</p> <p><u>Loss occurs in 'early' points of supply chain: production, processing, harvest.</u></p>
Food surplus	<p>Food produced in excess of the expected amount that is fit for human consumption (Teigiserova et al., 2020).</p> <p><u>Surplus occurs during production, processing, and manufacturing.</u></p>	<p>Food that is redistributed for consumption by people, used for animal feed or used for bio-based materials / biochemical processing.</p> <p><u>Surplus occurs at/after food/grocery retail or food service.</u></p>

Table A.2. Participant Roles and Expertise

Participant Code	Current Role/Sector	Background Experience and Related Expertise
Participant 1	Consulting	Circular Economy / Processing /Distribution
Participant 2	Non-Profit	Education / Agriculture / Processing / Distribution
Participant 3	Non-Profit	Education / Agriculture
Participant 4	Processing	Retail / Circular Economy / Consulting
Participant 5	Farmer	Agriculture / Research
Participant 6	Farmer / Research	Agriculture / Education / Consulting
Participant 7	Non-Profit	Agriculture / Retail
Participant 8	Farmer	Land Cooperatives / Non-Profit
Participant 9	Non-Profit / Registered Charity	Food Security
Participant 10	Registered Charity	Food Security / Circular Economy / Distribution
Participant 11	Registered Charity	Food Security / Distribution
Participant 12	Non-Profit	Food Security / Research/ Consulting / Distribution
Participant 13	Policy	Agriculture / Food Security
Participant 14	Research	Agriculture / Labour / Education
Participant 15	Retail	Processing / Distribution / Circular Economy
Participant 16	Retail	Circular Economy / Processing / Distribution / Marketing
Participant 17	Social Enterprise / Registered Charity	Food Security / Processing / Distribution / Consulting
Participant 18	Distribution	Technology / Circular Economy
Participant 19	Waste Management / Research	Technology /Circular Economy / Agriculture
Participant 20	Facilitator / Indigenous Medicine	Consulting / Food And Medicine

Table A.3. Interview Questions

Question
Can you tell me a little bit about your role in Vancouver's food system?
In general, do you think the current food system in Vancouver is 'working'? What do you think we do well in the current food system and what do we not do well?
How would you define a circular food economy?
Would you describe the current food system in Vancouver as inefficient/ wasteful? or as efficient/circular? Can you elaborate?
In your own work, or in your sector, have you tried to reduce food from being wasted? If so, can you explain how? If there is no waste, can you explain how you achieved this?
What are examples of food waste reduction/ prevention solutions that in your view works well or is innovative?
In your opinion, can solutions to address food waste and food loss help also help address food insecurity? Can you elaborate?
If you had a blank slate or you were asked to create a vision, what would a circular food economy look like in Vancouver? Do you think a circular food economy has the potential to address any of the key issues you described in the current food system?
Where are we now in Vancouver in comparison to this vision? What do you think are the steps that needs to be taken to get from where we are now to the vision?
What do you think are the main challenges to achieving a circular food economy/food system in Vancouver?
What are the main opportunities for to achieving a circular food economy/food system in Vancouver? And are there benefits that might extend beyond the food system if Vancouver becomes a circular food economy?
What is the role of infrastructure in achieving the circular food economy in Vancouver?
How might various food system stakeholders and levels of government support the vision of a circular food economy in Vancouver?
Do you have any additional comments on the circular food economy in Vancouver?

Appendix B.

Coding Trees

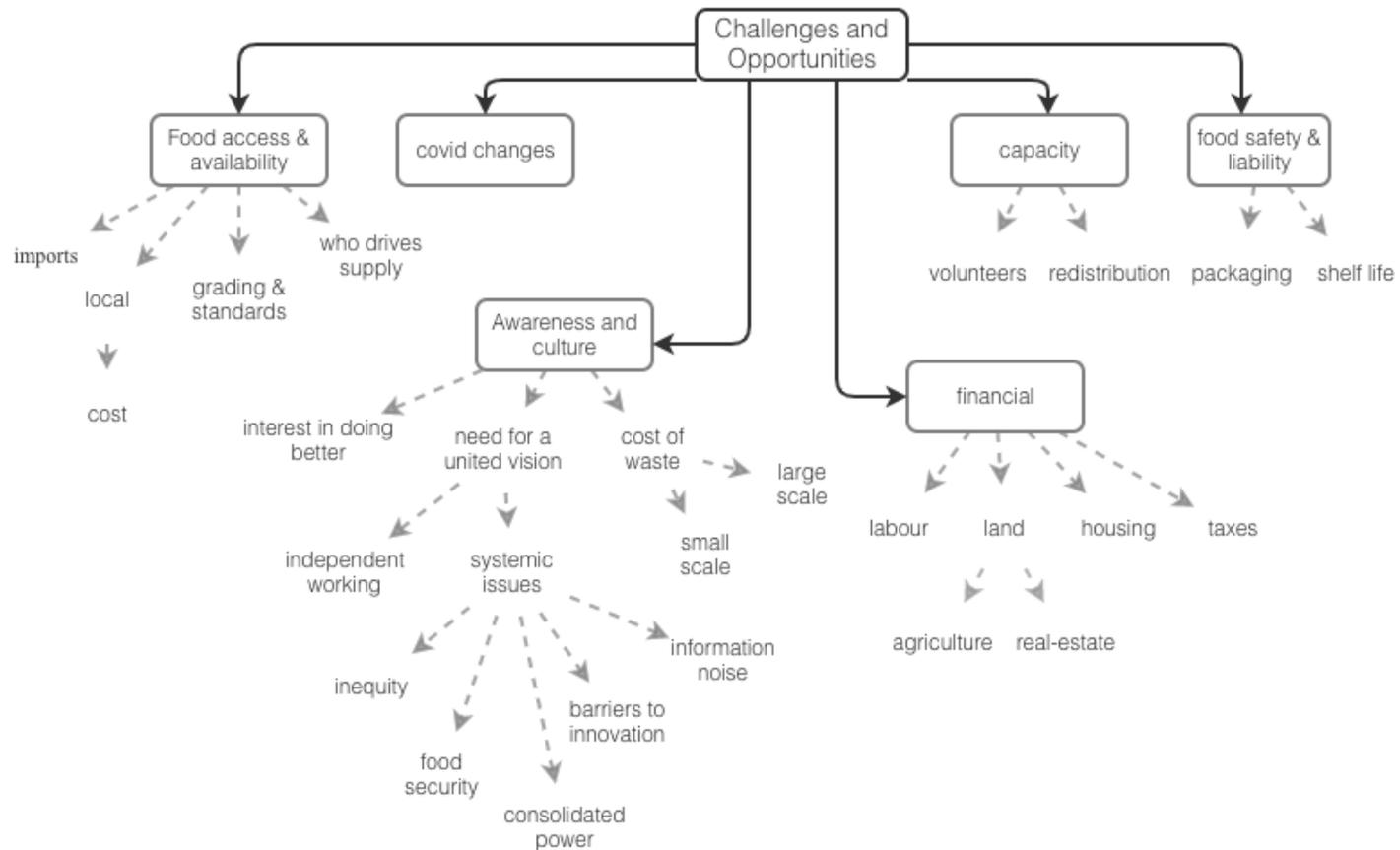


Figure B.1. Coding Tree : Challenges and Opportunities.

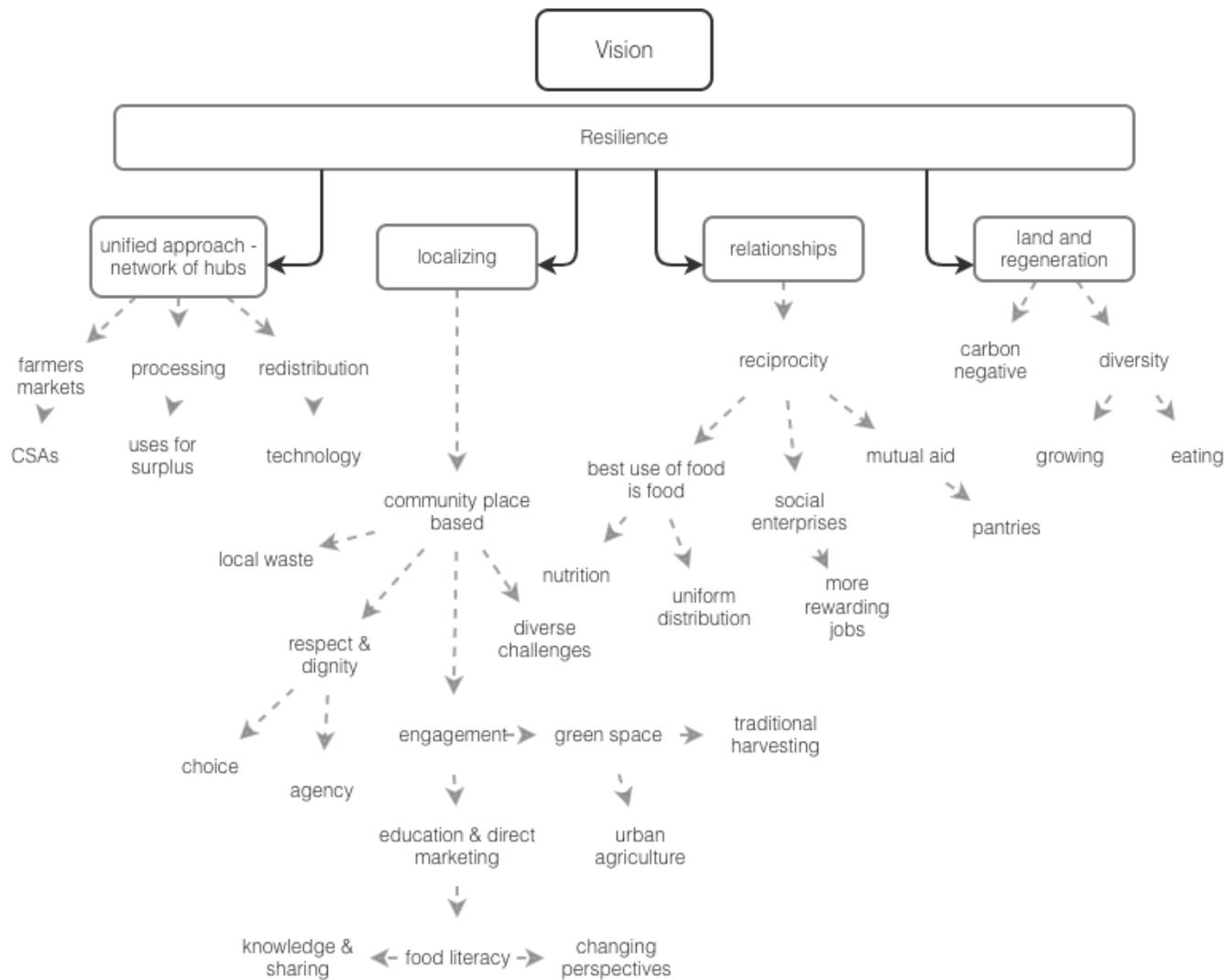


Figure B.2. Coding Tree : Vision.

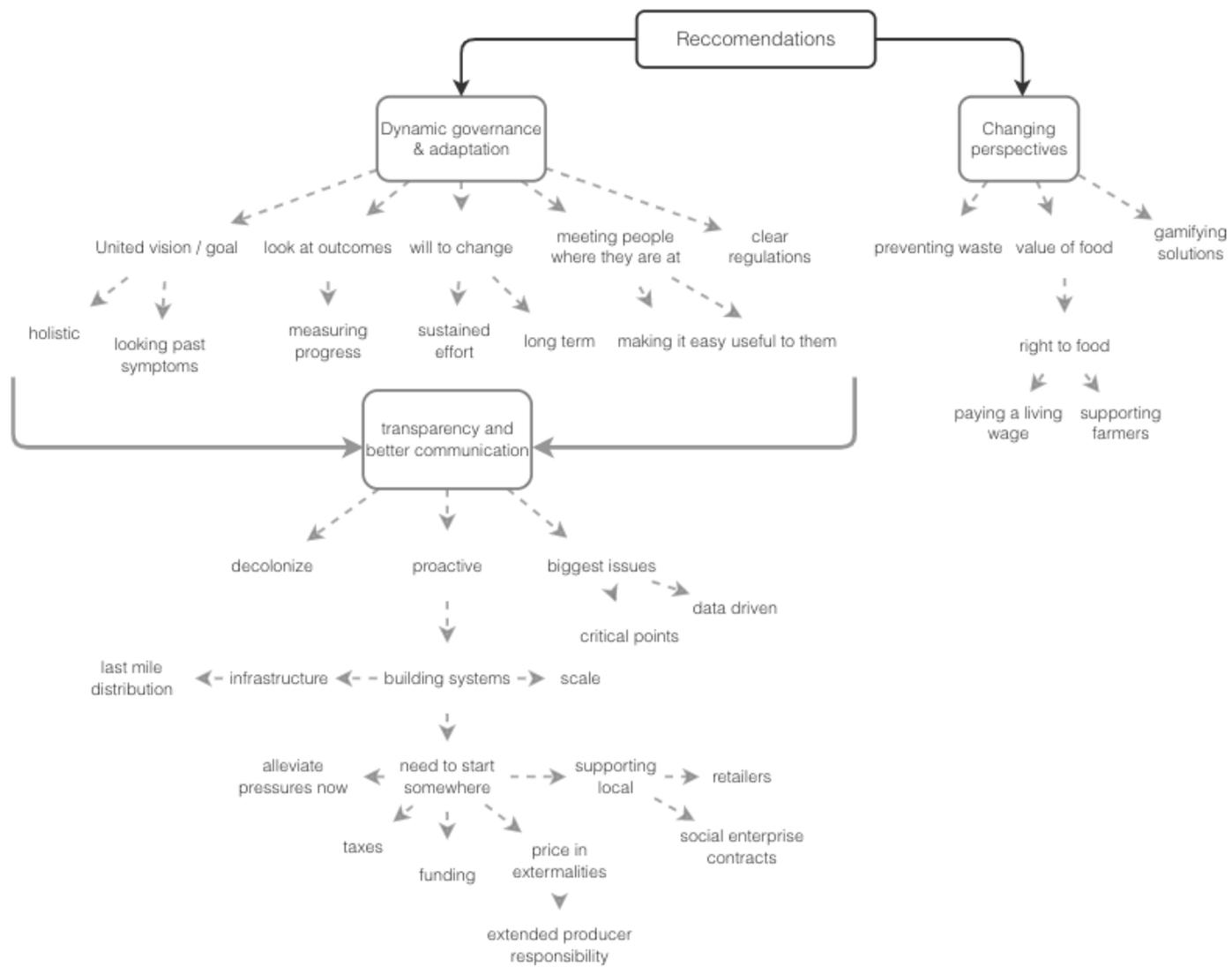


Figure B.3. Coding Tree : Recommendations.